

Colorado
State
University

2012-2013
General Catalog

COLORADO STATE UNIVERSITY

A MESSAGE FROM PRESIDENT ANTHONY A. FRANK



One of the hallmarks of an educated person is the recognition of how much we *don't* know—and how often we can be surprised by the important questions we hadn't thought to ask.

Colorado State University students can minimize the possibility of surprises related to University policies, expectations, and resources by taking the time to become familiar with this General Catalog. As the encapsulation of our academic mission and program, the General Catalog should be considered an essential roadmap for navigating through the many timelines, decisions, and choices involved with earning your degree, and it often will be the best place to find the answer to questions about University operations and protocols.

As a community of scholars, we are all here—as students, faculty, and staff—because we value learning and understand that earning an academic degree requires considerable work, sacrifice, and

determination. Throughout this challenging, life-changing process, I encourage you to seek out and take full advantage of all the resources available to support your success. Meet with your professors, don't be afraid to ask for help or assistance, and regularly consult with both your adviser and this catalog to ensure you're on track.

Armed with spirit, commitment, and information, your academic goals are well within your reach. Best wishes for a successful CSU experience!

Dr. Anthony A. Frank
President

About Colorado State University

The Colorado State University campuses are located in or near the city of Fort Collins. The county seat of Larimer County, this community of approximately 130,446 is located 65 miles north of Denver on Interstate 25, and 45 miles south of Cheyenne, Wyoming. The city is served by railroad-freight and bus lines. Transportation from Fort Collins to Denver International Airport is provided by shuttle service.

At the foot of the Rocky Mountains, Fort Collins is within an hour's drive of such major recreational areas as Estes Park, Red Feather Lakes, Horsetooth Reservoir, and several mountain parks, including the 790,000-acre Roosevelt National Forest and Rocky Mountain National Park.

A wide variety of recreational activities is fostered not only by the presence of such areas but also by the climate in the Fort Collins region. Located at an elevation of 5,000 feet, Fort Collins has a clear, dry atmosphere, over 300 days of sunshine and generally pleasant temperatures throughout the year. The summer temperature ranges from an average high of 85° to an average low of 52°; the winter temperature ranges from an average high of 42° to an average low of 13°.

Indicative of the cultural life of Fort Collins are the museum, the public library, the civic symphony, and the University's own University Center for the Arts. An active University calendar – guest speakers, art exhibits, theater, cinema, concerts – adds to community life. This broad spectrum of cultural and outdoor recreational facilities, the excellent climate, and the mountain surroundings contribute toward making Fort Collins an ideal university setting.

GENERAL CATALOG 2012-2013

ALL STATEMENTS MADE IN THIS AND SIMILAR PUBLICATIONS DISTRIBUTED GENERALLY TO PROSPECTIVE OR ADMITTED STUDENTS SHALL BE FOR INFORMATIONAL PURPOSES ONLY AND SHOULD NOT BE INTERPRETED AS BEING CONTRACTUAL FOR ANY PURPOSE.

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The Colorado State University *General Catalog* is produced by the Curriculum and Catalog Administration section of the Provost/Executive Vice President's Office.

The cover was designed by Sarah Rudy.

University Calendar

Fall Semester – 2012

Aug. 16-17	Thursday, Friday. Orientation, advising, and registration for new students.
August 20	Monday. Classes begin.
August 24	Friday. End Restricted Drop.
August 26	Sunday. End Regular Add.
Sept. 3	Monday. Holiday – University offices closed; no classes.
Sept. 5	Wednesday. Registration closes. End of period for adding courses. Last day for dropping courses without record entry, changes in grade option, and tuition and fee adjustments.
Oct. 15	Monday. End of course withdrawal (“W”) period.
Nov. 17	Saturday. Fall Break begins. No classes next week.
Nov. 22-23	Thursday-Friday. Holiday – University offices closed.
Nov. 26	Monday. Classes resume.
Dec. 7	Friday. Last day of classes; University withdrawal deadline.
Dec. 10-14	Monday-Friday. Final Examinations.
Dec. 14-15	Friday-Saturday. Commencement ceremonies.
Dec. 18	Tuesday. Fall grades due.
Dec. 24-26	Monday-Wednesday. Holiday – University offices closed.

Spring Semester – 2013

Jan. 1	Tuesday. Holiday– University offices closed.
Jan. 17-18	Thursday, Friday. Orientation, advising, and registration for new students.
Jan. 21	Monday. Holiday – University offices closed.
Jan. 22	Tuesday. Classes begin.
Jan. 25	Friday. End Restricted Drop.
Jan. 27	Sunday. End Regular Add.
Feb. 6	Wednesday. Registration closes. End of period for adding courses. Last day for dropping courses without record entry, changes in grading options, and tuition and fee adjustments.
March 16	Saturday. Spring Break begins. No classes next week.
March 25	Monday. Classes resume. End of course withdrawal (“W”) period.
May 10	Friday. Last day of classes; University withdrawal deadline.
May 13-17	Monday through Friday. Final examinations.
May 17-18	Friday, Saturday. Commencement ceremonies.
May 21	Tuesday. Spring grades due.
Feb. 6	Wednesday. Registration closes. End of period for adding courses. Last day for dropping courses without record entry, changes in grading options, and tuition and fee adjustments.
March 16	Saturday. Spring Break begins. No classes next week.
March 25	Monday. Classes resume. End of course withdrawal (“W”) period.
May 10	Friday. Last day of classes; University withdrawal deadline.

May 13-17	Monday through Friday. Final examinations.
May 17-18	Friday, Saturday. Commencement ceremonies.
May 21	Tuesday. Spring grades due.

Summer Session – 2013

May 20	Monday. First 4-week term and 12-week term begin.
May 27	Monday. Holiday – University offices closed; no classes.
June 14	Friday. First 4-week term ends.
June 17	Monday. Second 4-week term and 8-week term begin.
July 4	Thursday. Holiday – University offices closed; no classes.
July 12	Friday. Second 4-week term ends.
July 15	Monday. Third 4-week term ends.
August 9	Friday. 8-week, 12-week and third 4-week terms end.
August 13	Summer grades due.

Fall Semester – 2013

Aug. 22-23	Thursday, Friday. Orientation, advising, and registration for new students.
August 26	Monday. Classes begin.
August 30	Friday. End Restricted Drop.
Sept. 1	Sunday. End Regular Add.
Sept. 2	Monday. Holiday – University offices closed; no classes.
Sept. 11	Wednesday. Registration closes. End of period for adding courses. Last day for dropping courses without record entry, changes in grade option, and tuition and fee adjustments.
Oct. 21	Monday. End of course withdrawal (“W”) period.
Nov. 23	Saturday. Fall Break begins. No classes next week.
Nov. 28-29	Thursday-Friday. Holiday – University offices closed.
Dec. 2	Monday. Classes resume.
Dec. 13	Friday. Last day of classes; University withdrawal deadline.
Dec. 16-20	Monday-Friday. Final Examinations.
Dec. 20-21	Friday-Saturday. Commencement ceremonies.
Dec. 23	Monday. Fall grades due.
Dec. 25-27	Wednesday- Friday. Holiday – University offices closed

Spring Semester – 2014

Jan. 1	Wednesday. Holiday– University offices closed.
Jan. 16-17	Thursday, Friday. Orientation, advising, and registration for new students.
Jan. 20	Monday. Holiday – University offices closed.
Jan. 21	Tuesday. Classes begin.
Jan. 24	Friday. End Restricted Drop.
Jan. 26	Sunday. End Regular Add.

Feb. 5 Wednesday. Registration closes. End of period for adding courses. Last day for dropping courses without record entry, changes in grading options, and tuition and fee adjustments.

March 15 Saturday. Spring Break begins. No classes next week.

March 24 Monday. Classes resume. End of course withdrawal (“W”) period.

May 9 Friday. Last day of classes; University withdrawal deadline.

May 12-16 Monday through Friday. Final examinations.

May 16-17 Friday, Saturday. Commencement ceremonies.

May 20 Tuesday. Spring grades due.

Summer Session – 2014

May 19 Monday. First 4-week term and 12-week term begin.

May 26 Monday. Holiday – University offices closed; no classes.

June 13 Friday. First 4-week term ends.

June 16 Monday. Second 4-week term and 8-week term begin.

July 4 Friday. Holiday – University offices closed; no classes.

July 11 Friday. Second 4-week term ends.

July 14 Monday. Third 4-week term ends.

August 8 Friday. 8-week, 12-week and third 4-week terms end.

August 12 Summer grades due.

Directory

The Web address for Colorado State University is: www.colostate.edu

Note: All numbers (unless indicated otherwise) are in area code 970. The general telephone number for Colorado State is 491-1101.

A

Academic Advancement Center www.aac.colostate.edu	491-6129
Academic Computing and Networking Services www.colostate.edu/services/acns	491-5133
Academic Affairs (Provost/Senior Vice President) www.provost.colostate.edu	491- 6614
Accounting, Department of www.biz.colostate.edu/accounting/Pages/default.aspx	491-5102
Accounts Receivable Operations www.aroweb.colostate.edu	491-6466
Administrative Services www.admin.colostate.edu	491-5257
Admissions www.admissions.colostate.edu	491-6909
Adult Learners, Resources for www.ocssral.colostate.edu	491-2248
Aerospace Studies, Department of (Air Force ROTC) www.colostate.edu/Depts/AFROTC	491-6476
Agricultural & Resource Economics, Department of dare.colostate.edu/	491-6325
Agricultural Experiment Station www.colostate.edu/Depts/AES	491-5371
Agricultural Sciences, College of www.agsci.colostate.edu	491-6274
Alumni Association www.ar.colostate.edu	491-6533
Animal Sciences, Department of ansci.colostate.edu	491-1442
Anthropology, Department of www.colostate.edu/Depts/Anthropology	491-5447
Applied Human Sciences, College of www.cahs.colostate.edu	491-6331
Army ROTC armyrotc.colostate.edu/	491-6506
Art, Department of www.colostate.edu/Depts/Art	491-6774
ASCSU (Associated Students of Colorado State University) www.ascsu.colostate.edu	491-5931
Asian/Pacific American Student Services www.apass.colostate.edu	491-6154
Asian Interdisciplinary Minor	491-3065

(Office of International Programs) wsprod.colostate.edu/cwis30/2007/international_ed/index.asp?url=acad_pro_ie	
Association for Student Activity Programming (ASAP) www.asap.colostate.edu	491-2727
Athletics www.csurams.com	491-5300
Atmospheric Science, Department of www.atmos.colostate.edu	491-8682

B

Bioagricultural Sciences & Pest Management, Department of www.colostate.edu/Depts/bspm	491-5261
Biochemistry & Molecular Biology, Department of www.bmb.colostate.edu	491-5602
Biology, Department of www.colostate.edu/Depts/Biology	491-7011
Biomedical Engineering Interdisciplinary Minor www.engr.colostate.edu/bep/	491-7157
Biomedical Sciences, Department of www.cvmb.colostate.edu/bms/	491-6187
Black/African American Cultural Center www.bss.colostate.edu/home.aspx	491-5781
Board of Governors csusystem.edu	534-6290
Bookstore www.bookstore.colostate.edu	491-0546
Business, College of www.biz.colostate.edu	491-6471

C

Campus Media (see Student Media) www.studentmediacorp.com/	491-1683
Career Center career.colostate.edu	491-5707
Cashier's Office bursar.colostate.edu/cash.aspx	491-2767
Cell and Molecular Biology Graduate Degree Program www.colostate.edu/Depts/CMB/	491-0241
Center for Advising and Student	491-7095

Achievement (CASA) www.casa.colostate.edu		www.registrar.colostate.edu	
Chemical & Biological Engineering, Department of www.engr.colostate.edu/cheme	491-5252	Design and Merchandising, Department of www.caahs.colostate.edu/dm-search/	491-1629
Chemistry, Department of www.chm.colostate.edu	491-6381	Disabled Students, Resources for www.colostate.edu/Depts/RDS	491-6385
Civil & Environmental Engineering, Department of www.engr.colostate.edu/ce/	491-5048	Diversity, Office of diversity.colostate.edu/	491-7197
Clinical Sciences, Department of www.cvmb.colostate.edu/clinsci	491-1274	Diversity in Law Interdisciplinary Minor advising.libarts.colostate.edu/	491-7095
Colorado Cooperative Fish and Wildlife Research Unit warnercnr.colostate.edu/coopunit	491-5396	E	
Colorado Institute for Irrigation Management www.engr.colostate.edu/ce/centers/ciim.cfm?Source=Industry	491-5247	Ecology Graduate Degree Program www.ecology.colostate.edu/	491-4373
Colorado State Forest Service csfs.colostate.edu/	491-6303	Economics, Department of www.colostate.edu/Depts/Econ	491-6324
Colorado State University Foundation www.giving.colostate.edu/index.asp?url=foundation	491-7135	Education, School of soe.caahs.colostate.edu	491-6317
Colorado State University System csusystem.edu	534-6290	Educational Access and Outreach, Center for www.ceao.colostate.edu	491-6473
Colorado Water Resources Research Institute cwrr.colostate.edu	491-6308	El Centro Students Services www.elcentro.colostate.edu/	491-5722
Communication Studies, Department of communicationstudies.colostate.edu/	491-6140	Electrical & Computer Engineering, Department of www.engr.colostate.edu/ece/	491-6600
Computer Information Systems, Department of http://www.biz.colostate.edu/cis/	491-7929	Employment Services, Student www.ses.colostate.edu	491-5714
Computer Science, Department of www.cs.colostate.edu	491-5792	Engineering, College of www.engr.colostate.edu	491-6220
Conference Services www.housing.colostate.edu/conference/index.htm	491-6222	English, Department of www.colostate.edu/Depts/English	491-6428
Conflict Resolution and Student Conduct Services www.conflictresolution.colostate.edu	491-7165	Enrollment Services www.es.colostate.edu	491-2682
Conservation Biology Interdisciplinary Minor warnercnr.colostate.edu/hdnr-undergraduate-degrees/hdnr-ispcb.html	491-5020	Environmental Affairs Interdisciplinary Minor www.colostate.edu/Programs/EAP/	491-5281
Construction Management, Department of www.cm.caahs.colostate.edu/	491-7353	Environmental & Radiological Health Sciences, Department of www.cvmb.colostate.edu/erhs	491-7038
Consumer and Family Studies (see Family and Consumer Sciences)	491-6331	Ethnic Studies, Department of ethnicstudies.colostate.edu/	491-2418
Continuing Education, Division of www.online.colostate.edu/	491-5288	Equal Opportunity, Office of oeo.colostate.edu/	491-5836
Cooperative Extension www.ext.colostate.edu	491-6281	Events and Calendars http://events.colostate.edu/day_default.asp?ID=7	491-6432
Cooperative Institute for Research in the Atmosphere www.cira.colostate.edu/index.html	491-8448	Extreme Ultraviolet and Optical Science and Technology Graduate Interdisciplinary Studies Program http://euverc.colostate.edu/	491-8938
Counseling Center, University health.colostate.edu/Home.cfm	491-6053	F	
D		Facilities Management www.colostate.edu/Depts/Facilities	491-0077
Degree Requirements/Certification	491-7159	Family and Consumer Sciences www.fcs.caahs.colostate.edu/	491-5319
		Finance & Real Estate, Department of http://www.biz.colostate.edu/financeRealEstate	491-5062
		Financial Aid (see Student Financial Services) www.sfs.colostate.edu	491-6321

Fish, Wildlife, & Conservation Biology, Department of hwarnrcnr.colostate.edu/fwcb-home/	491-5020	Immunization Information health.colostate.edu/	491-6548
Food Science & Human Nutrition, Department of www.cahs.colostate.edu/fshn	491-3663	Information/Campus Information Services www.whatsup.colostate.edu	491-6444
Food Science/Safety Interdisciplinary Studies Programs www.fshn.cahs.colostate.edu/academic_programs/isp_food_science_safety	491-3663	Information Science & Technology Interdisciplinary Minor istec.colostate.edu/education	491-6600
Foreign Languages & Literatures, Department of www.colostate.edu/Depts/FLL	491-6141	Information Systems www.colostate.edu/Depts/IS	491-5491
Forest, and Rangeland Stewardship, Department of warnrcnr.colostate.edu/frws-home/	491-6911	Insurance, Student Health health.colostate.edu	491-5118
G		Integrated Resource Management Interdisciplinary Minor (WCIRM) www.wcirm.colostate.edu/	491-1610
Geosciences, Department of warnrcnr.colostate.edu/Geosciences-Home	491-5661	International Development Interdisciplinary Studies Programs wsprod.colostate.edu/cwis30/2007/international_ed/index.asp?url=ids_main	491-5917
Gerontology Interdisciplinary Minor www.coa.cahs.colostate.edu/education/#1	491-6358	International Programs www.international.colostate.edu	491-5917
Global Environmental Sustainability Interdisciplinary Minor soges.colostate.edu/education/minor-in-sustainability.html	492-4070	Italian Studies Interdisciplinary Minor http://www.colostate.edu/Depts/FLL/language/italian.html	491-6141
Graduate School graduateschool.colostate.edu	491-6817	J	
Graduation Requirements (Degree Requirements) www.registrar.colostate.edu	491-7159	Journalism & Technical Communication, Department of journalism.colostate.edu/	491-6310
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Health & Exercise Science, Department of hes.cahs.colostate.edu/	491-5081	Latin American/Caribbean Studies Interdisciplinary Minor secure.casa.colostate.edu/applications/achoriz/majorDescription.cfm?major=IP20	491-7095
Health Service, Hartshorn health.colostate.edu/Home.cfm	491-7121	Legal Services, Student www.sls.colostate.edu	491-1482
History, Department of www.colostate.edu/Depts/Hist	491-6335	Liberal Arts, College of www.libarts.colostate.edu/	491-5421
Honors Program www.honors.colostate.edu	491-5679	Libraries, University http://lib.colostate.edu	491-1841
Horticulture & Landscape Architecture, Department of hla.colostate.edu	491-7019	Lory Student Center www.sc.colostate.edu	491-6444
Housing and Dining Services www.housing.colostate.edu	491-6511	M	
Human Development & Family Studies, Department of www.hdfs.cahs.colostate.edu	491-5558	Management, Department of biz.colostate.edu/management/	491-5323
Human Dimensions of Natural Resources, Department of welcome.warnrcnr.colostate.edu/welcome-to-hdnr/index.php	491-6591	Marketing, Department of biz.colostate.edu/marketing/	491-5063
I		Mathematics, Department of www.math.colostate.edu	491-1303
		Mathematics Graduate Interdisciplinary Studies Program www.math.colostate.edu/programs/graduate/requirements.shtml#_Inter	491-7925
		Mechanical Engineering, Department of www.engr.colostate.edu/me	491-6559
		Microbiology, Immunology, & Pathology, Department of	491-6144

www.cvmb.colostate.edu/mip	
Military Science, Department of (Army ROTC)	491-1640
armyrotc.colostate.edu	
Molecular Biology Interdisciplinary Minor	491-0241
www.colostate.edu/Depts/CMB	
Molecular, Cellular and Integrative Graduate Interdisciplinary Studies Program	491-0425
www.cvmb.colostate.edu/mcin	
Music, Theatre, & Dance, Department of	491-5529
sota.colostate.edu/	
N	
Native American Student Services	491-1332
www.nass.colostate.edu	
Natural Resources, Warner College of	491-6675
welcome.warnercnr.colostate.edu	
Natural Sciences, College of	491-1300
www.natsci.colostate.edu/	
O	
Occupational Therapy, Department of	491-6253
www.ot.cahs.colostate.edu	
Organic Agriculture Interdisciplinary Minor	491-6501
organic.colostate.edu	
Orientation Services/PREVIEW	491-6011
www.otp.colostate.edu/otp-home.aspx	
P	
Parking Services Division	491-7041
www.parking.colostate.edu	
Peace and Reconciliation Interdisciplinary Studies Programs	491-5917
wsprod.colostate.edu/cwis30/2007/ international_ed/index.asp?url=acad_pro_ie	
Pathology (see Microbiology, Immunology, & Pathology)	491-6144
http://www.cvmb.colostate.edu/ns/departments/ mip/index.aspx	
Philosophy, Department of	491-6315
www.colostate.edu/Depts/Philosophy	
Physics, Department of	491-6206
www.physics.colostate.edu	
Physiology (see Biomedical Sciences)	491-6187
www.cvmb.colostate.edu/bms	
Pingree Park	491-4747
www.housing.colostate.edu/conference/index.htm	
Police Department	491-6425/911
police.colostate.edu	
Political Science, Department of	491-5156
www.colostate.edu/Depts/PoliSci	
Political Economy Graduate Interdisciplinary Studies Program	491-5157
www.colostate.edu/Depts/PoliSci/pec/	
President's Office	491-6211
president.colostate.edu/	
Provost/Senior Vice President's Office	491-6614
www.provost.colostate.edu	

Psychology, Department of	491-6363
www.colostate.edu/Depts/Psychology	
Public Health Graduate Degree Program	491-6156
www.publichealth.colostate.edu	

R

Radiological Health Sciences (see Environmental & Radiological Health Sciences)	491-7038
www.cvmb.colostate.edu/erhs	
Rangeland Ecology (see Forest and Rangeland, Stewardship)	491-6911
warnercnr.colostate.edu/frws-undergraduate- degrees/frws-ug-rangeland-ecology-degrees.html	
Records, Student	491-7148
www.registrar.colostate.edu	
Recreation Center	491-6359
www.campusrec.colostate.edu	
Registration	491-7148
www.registrar.colostate.edu	
Religious Studies Interdisciplinary Minor	491-5421
secure.casa.colostate.edu/applications/ achoriz/majorDescription.cfm?major=IP24	
Research, Vice President for	491-7194
vpri.colostate.edu	

S

Scholastic Standards	491-7095
advising.colostate.edu/students/policies/ scholasticStandards.cfm	
Social Work, School of	491-6612
www.ssw.cahs.colostate.edu/	
Sociology, Department of	491-6044
sociology.colostate.edu/	
Soil and Crop Sciences, Department of	491-6517
soilcrop.colostate.edu/	
Sports, Recreational	491-6359
www.campusrec.colostate.edu	
State Board of Agriculture (see Board of Governors)	534-6290
csusystem.edu	
Statistics, Department of	491-5269
www.stat.colostate.edu	
Student Accounts/Loans Receivable	491-6321
www.sfs.colostate.edu	
Student Activities and Involvement	491-6444
www.whatsup.colostate.edu	
Student Affairs, Division of	491-5312
www.studentaffairs.colostate.edu/	
Student Center, Charles A. Lory	491-6444
www.sc.colostate.edu	
Student Financial Services	491-6321
www.sfs.colostate.edu	
Student Media	491-1683
www.studentmediacorp.com/	
Summer Session	491-1590
www.summer.colostate.edu	
Systems Engineering Graduate Interdisciplinary Studies Program	491-6706

www.online.colostate.edu/certificates/systems-engineering.dot

T

Teacher/Educator Licensure 491-5292

www.stepp.cahs.colostate.edu/

Testing Service, University 491-6498

health.colostate.edu/Home.cfm

Transcripts 491-7148

www.registrar.colostate.edu

Transfer Evaluation 491-7147

www.registrar.colostate.edu

U

University Development & Advancement, 491-7530

www.advancement.colostate.edu

V

Veterans Certification 491-7148

www.registrar.colostate.edu

Veterinary Medicine & Biomedical Sciences, 491-7051
College of

www.cvmb.colostate.edu

W

Warner College of Natural Resources 491-6675

welcome.warnercnr.colostate.edu

Water Resources Interdisciplinary 491-6308

Minor

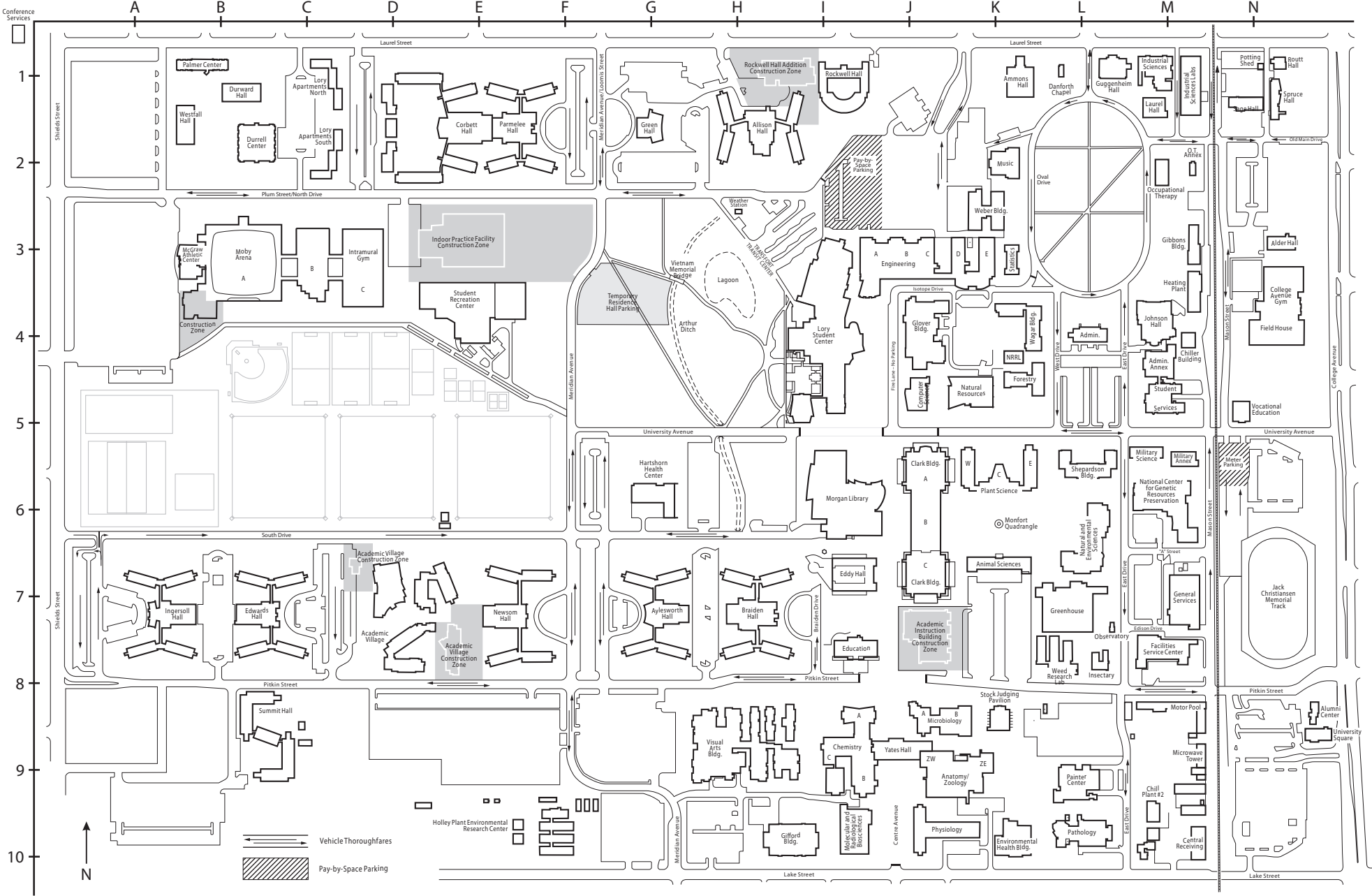
www.cwi.colostate.edu/default.asp

Women's Programs and Interdisciplinary 491-2882

Studies Programs

womensstudies.colostate.edu/

Conference Services



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Colorado State University

In 1870, the Territorial Council and House of Representatives of the Territory of Colorado created the Colorado Agricultural College. When the Territory became a State in 1876, the College was placed under the governance of the State Board of Agriculture. The College admitted its first students in 1879 and received designation that same year as Colorado's land-grant college under the Morrill Act of 1862. The Morrill Act provided federal endowment support for state institutions, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the Legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.

Subsequent federal legislation led to the establishment of an Agricultural Experiment Station (1887) and Cooperative Extension Service (1914). State legislation added responsibility for the Colorado State Forest Service (1955).

Graduate study began about 1891, with the first master's degree awarded in 1893. At that time, and in the years that followed, a Committee on Advanced Degrees supervised graduate programs – until the Graduate School was organized in 1941. The veterinary medical program began granting degrees in 1904. Growth after World War II was rapid; the first doctorate was awarded in 1955.

In 1935, the College became Colorado State College of Agriculture and Mechanical Arts and in 1944 the name was changed to Colorado Agricultural and Mechanical College. In 1957, the name was changed to Colorado State University by action of the Colorado General Assembly. C.S.U. earned recognition by the North Central Association (NCA) of Colleges and Schools as a mature university in 1974.

Today, Colorado State is one of the leading public research universities in the United States, having approximately \$330.8M research expenditures in FY11, in addition to substantial non-funded scholarship and artistry. CSU's instructional programs cover the broad spectrum befitting a major, comprehensive state university. Excellent undergraduate and graduate programs are available in the various arts, sciences, humanities and professions. Total enrollment has grown

to over 26,700 regular, on-campus students. In 2010-2011, CSU granted 4,436 bachelor's degrees, 1,399 master's degrees in 67 fields and 204 Ph.D. degrees in 36 fields. The Professional Veterinary Medicine (PVM) program awarded 137 DVM degrees.

UNIVERSITY MISSION

By statute, Colorado State University is a comprehensive graduate research university with selective admission standards. Charged with offering a comprehensive array of baccalaureate, master's and doctoral programs, it holds exclusive statewide authority for programs in agriculture, forestry, natural resources, and veterinary medicine.

Colorado State University has a unique mission in the state of Colorado. The land-grant concept of a balanced program of teaching, research, extension, public service, and engagement provides the foundation for the University's teaching and research programs, Agricultural Experiment Station, Cooperative Extension, and Colorado State Forest Service. The University has long been a leader in recognizing the rapidly changing global environment, and has a commitment to excellence in international education in all its instructional, research, and outreach programs. The University continues to make education and training accessible to deserving applicants from all classes and groups, and maintains a wide range of research, extension, and public service programs in response to the needs of the people of Colorado, the nation, and the world.

UNIVERSITY AIMS

In April 2005, the Board of Governors adopted the following mission and values statements for Colorado State University.

Mission

Inspired by its land-grant heritage, Colorado State University is committed to excellence, setting the standard for public research universities in teaching, research, service and extension for the benefit of the citizens of Colorado, the United States and the world.

Values

- Be accountable
- Promote civic responsibility
- Employ a customer focus
- Promote freedom of expression
- Demonstrate inclusiveness and diversity
- Encourage and reward innovation
- Act with integrity and mutual respect
- Provide opportunity and access
- Support excellence in teaching and research

A comprehensive 10-year strategic plan¹ for achieving this mission in a way that supports these values was adopted in 2006 and revised in January 2010. This revised strategic plan has the following key objectives.

Teaching and Learning

- Assure excellence in academic programs
- Create distinctive undergraduate experiences
- Enhance the quality and role of graduate education
- Expose students to diverse cultures
- Integrate academic and co-curricular experiences

Research and Discovery

- Foster excellence in research, scholarship and creative artistry
- Improve discovery capabilities
- Focus research in key areas of institutional strength and societal and global needs

Outreach and Engagement

- Engage citizens through community involvement
- Prepare and empower learners outside the campus environment
- Foster excellence in intercollegiate athletics

Resources and Support

- Expand fundraising and marketing
- Build necessary infrastructures
- Nurture human capital
- Guarantee financial stability

Diversity

- Embed commitment to diversity in all key objectives
- Promote environment that encourages excellence, access, and inclusion

¹ For a copy of the full plan see: www.president.colostate.edu/pdf/csu-strategic-plan-update-2006-2015.pdf

ASSESSMENT AND IMPROVEMENT OF PROGRAM QUALITY

The University uses a process for continuous and systematic improvement of programs in academic and student affairs areas. Program performance evaluation and subsequent improvements are reported annually for undergraduate and graduate student learning, faculty research, scholarship, and artistry, and faculty outreach efforts. Academic programs regularly research the quality of their learning delivery systems, while support programs routinely survey students for their satisfaction ratings of University services. The yearly process of collecting data, monitoring program participation in the improvement process, and distributing program improvement information and “best practices” to the University community is part of the University’s Plan for Researching Improvement and Supporting Mission (PRISM). Learning from each other forms a central theme in achieving Colorado State University’s quality programming.

ACCREDITATION

Colorado State University is accredited by The Higher Learning Commission and is also a member of the North Central Association

www.higherlearningcommission.org

30 N. LaSalle Street, Suite 2400

Chicago, IL 60602-2504;

(800) 621-7440; (312) 263-0456

The specialized accrediting bodies listed below apply to accredited academic programs at Colorado State University.

Accreditation Board for Engineering and Technology
 Accreditation Board for Engineering and Technology:
 Applied Science Accreditation Commission
 Accreditation Council for Occupational Therapy Education (COTE)
 Accreditation Council for Nutrition and Dietetics
 Accrediting Council on Education in Journalism and Mass Communications
 American Association of Marriage and Family Therapy
 American Chemistry Society
 American Council for Construction Education
 American Occupational Therapy Association
 American Psychological Association
 American Veterinary Medical Association
 Association to Advance Collegiate Schools of Business
 Council for Interior Design Accreditation
 Council for the Accreditation of Counseling and Related Educational Programs
 Council on Social Work Education
 Landscape Architectural Accreditation Board
 National Association of Schools of Music
 National Environmental Health Science and Protection Accreditation Council
 Society for Range Management

Society of American Foresters
Teacher Education Accreditation Council
Colorado State is approved by the Colorado State
Department of Education for training teachers.

PRESIDENT'S CABINET

Leadership for the University is provided by:

Anthony A. Frank, President
Rick Miranda, Provost and Executive Vice President
Brett Anderson, Vice President for Advancement
Robin Brown, Vice President for Enrollment and Access
*Patrick J. Burns, Vice President for Information
Technology, Dean of Libraries, Professor of
Mechanical Engineering*
Dan Bush, Vice Provost for Faculty Affairs.
Jim Cooney, Vice Provost for International Affairs
Bill Farland, Vice President for Research
Tim Gallagher, Faculty Council, Chair
Jack Graham, Director of Athletics
Blanche M. Hughes, Vice President for Student Affairs
*Jason Johnson, Deputy General Counsel, Office of the
General Counsel*
*Lynn Johnson, Associate Vice President for Finance and
Budget*
Alan Lamborn, Vice Provost for Undergraduate Affairs
*Ajay Menom, Executive Dean and Dean of the College of
Business*
Tom Milligan, Vice President for External Relations
Mary Ontiveros, Vice President for Diversity
Amy Parsons, Vice President for University Operations
Ron Sega, Vice President for Energy and Environment
Lou Swanson, Vice Provost for Engagement

CABINET STAFF

Mark Gill, Chief of Staff to the President
Kathleen Henry, President and CEO of CSUF/CSURF
Katie Kalkstein, Executive Assistant to the President
*Cara Neth, Director of Presidential and Administrative
Communications*

COLORADO STATE UNIVERSITY SYSTEM

410 Seventeenth Street, Suite 1415
Denver, CO 80202
(303) 534-6290
csusystem.edu/

Administered by the Chancellor, the Colorado State University System promotes collaborative academic programs and related activities between Colorado State University and Colorado State University-Pueblo.

Board of Governors of the Colorado State University System

The Board of Governors consists of 13 members, nine of which are voting members. The remaining members represent the component universities of the Colorado State University System with one faculty member and one student leader from each campus.

It is the intent of the Board of Governors of the CSU System to foster development of Colorado State University and Colorado State University-Pueblo as identified in Colorado Revised Statute ' 23-31-107 et. seq. and 23-31.5-101 et. Seq.

It is the intent of the Board to support the institutions in their development as separate and distinct institutions through planning and resource development.

It is the intent of the Board to maintain each institution's flexibility to address challenges and opportunities that arise as the institutions seek to fulfill their statutory missions.

It is the intent of the Board to support opportunities for cooperation in program and resource sharing between the institutions.

It is the intent of the Board to facilitate system-wide financial accountability through annual financial audits as well as the program of the internal auditing unit within the CSU System structure.

It is the intent of the Board to promote administrative efficiency through a small central system staff, relying upon the expertise of institutional personnel where necessary and appropriate. It is the further intent of the Board to measure and promote administrative efficiency consistent with the policies of the Colorado Commission on Higher Education.

Members of the Board of Governors as of July 2012 included:

Joseph C. Zimlich,, Board Chair
Dorothy Horrell, Vice Chair
Ed Haselden, Secretary
Dennis E. Flores, Voting Member
Russell N. Johnson, Voting Member
Scott C. Johnson, Voting Member
Mary Lou Makepeace, Voting Member

Non-Voting Members

Kandi Brown, Student Representative, CSU-Global
Logan Gogarty, Student Representative CSU-Pueblo

*Carole Makela, Faculty Representative CSU
Regina Martel, Student Representative CSU*

*Richard Weinberger, CSU-Global
Frank Zizza,, Faculty Representative CSU-Pueblo*

Colorado State University reserves the right at any time, without notice, to change, modify, or cancel any course, program, procedure, policy, financial requirement, or disciplinary arrangement set forth in this catalog whenever, in its sole discretion, it determines such action to be appropriate. Furthermore, Colorado State will not be responsible for any failure to present or complete any course or program or to perform any other activity, function, or obligation mentioned in this catalog. Since changes may occur at any time, students must check the relevant website (as noted throughout various chapters in this catalog).

Broadening Your Horizons

Colorado State promotes the integration of classroom education with hands-on learning experiences. We believe in giving students the opportunity to practice what is learned in the classroom in ways that will deepen understanding and broaden perspectives.

UNIVERSITY HONORS PROGRAM

Office in Academic Village
Robert R. Keller, Director
(970) 491-5679
www.honors.colostate.edu

Program Philosophy

The University Honors Program, established in 1957, is a special learning community that offers extraordinary students a wide range of enriching educational experiences. Hallmarks of the program include small classes and interdisciplinary seminars taught by some of the University's finest teachers, individualized academic advising, faculty-mentored research and other creative activities, an optional residential learning community in the Academic Village, early registration for classes, co-curricular activities, a scholarship for students who enter the program in the freshman year, and assistance with applications for prestigious post-graduate awards. Approximately 1,350 students participate in the program where they receive a world class education, enjoy the personalized attention typically found at a small college, and benefit from the resources and diversity of a nationally acclaimed research university.

Main Features

University Honors Core Curriculum. Two curricular options provide enriched educational experiences for high ability students in all majors. The *University Honors Scholar* program of studies (Track 1) is composed of four Honors seminars, two Honors courses in the major, and a faculty-mentored senior year creative activity (thesis). Completing Track 1 fulfills nearly half of Colorado State University's All University Core Curriculum. Participating in the Honors program provides for a more enriched and rewarding education without extending the time to graduation.

The *Discipline Honors Scholar* program of studies (Track 2) is designed for students who have already satisfied many categories in the AUCC through AP, IB, or college transfer courses. Track 2 focuses on upper division Honors experiences in the student's major through small classes, enriched experiences, and opportunities for one-on-one interactions with professors. Students become a *Discipline* (e.g., *Biochemistry* or *Business*) *Honors Scholar* by completing three to four Honors courses (12 credits) in the major, and a faculty-mentored senior year creative activity (thesis).

The two Honors Core Curricula are found in the University-Wide Instructional Programs section of this catalog.

Graduating as a University and/or Discipline Honors Scholar. Students who complete the Honors requirements and achieve at least a 3.5 cumulative grade point average earn the prestigious designation of Honors Scholar for Track 1 and/or Track 2. Scholars are recognized at graduation, and the Honors Scholar designation appears on their diplomas and transcripts. For more information on graduation as an Honors Scholar, see the section on Graduation Requirements and Procedures in this catalog.

Admission to the Program. The application and selection process, which targets high school seniors and transfer students, is designed to attract an Honors class that represents high academic achievement, diversity of life experiences, and great promise for contributing to the Honors and University communities. Typically, 350 first-year students enroll in the Honors Program each year. Currently enrolled CSU students may also apply to the University Honors Program after their first year of college, and high-achieving transfer students are invited to apply..

The Honors Residential Learning Community. The optional Honors Residential Learning Community (HRLC) is located in the Academic Village and in Edwards Residence Hall. It links in-class and out-of-class student learning through residence life experiences and special programs. Students, especially first-year students, are encouraged to take advantage of this special opportunity. The HRLC is home to the Honors Office and classrooms that are used for seminars, special lectures, study sessions, and a wide variety of co-curricular activities. The 24/7 Fireside Lounge is located near the Program Office in the Academic Village.

The Honors Merit Scholarship. All new freshmen who have been admitted to, confirm to the program, and participate in the University Honors program receive a renewable scholarship. Students who remain in good standing with the University Honors Program and meet the minimum GPA requirement for continuation of the honors merit scholarship will receive the scholarship for four years.

HONORARY SOCIETIES

By promoting, advancing, and recognizing the top scholars of our campus community, honorary societies assist students in their pursuit of academic excellence. Criteria for membership and the scope of activities vary widely – some societies focus primarily on scholastic achievement; others consider grades along with other factors such as community service and leadership. For a listing of various honorary societies at Colorado State University, visit the web site www.provost.colostate.edu/files/students/honorcsu.asp. A list is also available in the Graduation Requirements and Procedures chapter of this catalog.

ENHANCEMENTS TO YOUR MAJOR

Students may broaden their academic horizons at Colorado State by adding a second major, a minor, an interdisciplinary studies program, or a second or third language to their courses of study. Students may take advantage of pre-medical, pre-veterinary, and pre-law advising and clubs. More detail can be found in the Degree Programs chapter of this catalog. Another way to broaden academic horizons is to do an independent study. Information about Independent Study is found in the chapter on Advising and Registration.

RESIDENTIAL LEARNING COMMUNITIES AND THEMED PROGRAMS

Housing & Dining Services offers Residential Learning Communities and Themed Programs (academic, curricular and themed floors) in many of the residence halls. These programs offer a unique residential experience consisting of special interest areas that help build positive communities with students who share similar academic or personal interests and/or lifestyles. There are thirteen Residential Learning Community and Themed Program options designed to be academic or co-curricular in their focus.

These communities connect students with faculty and staff advisers who engage students in their learning and provide information about opportunities available at Colorado State University.

Engineering Residential Learning Community: Located in the Academic Village on the south side of campus, the Engineering Residential Learning Community provides the perfect atmosphere for College of Engineering students to succeed. Residents have an instantaneous support network with other students who have a similarly academically rigorous program. Study groups, tutoring, and review sessions for examinations are all held within the Academic Village. In addition to the Academic Village, Edwards Hall also provides an Engineering Residential Learning Community for first-year and returning students. College of Engineering faculty participate in events in the community to get to know their students better.

Equine Community: Students who have an interest in science and industry, animals, agronomy, farm and ranch management, food science, horticulture, landscape design, or agricultural business and economics, will find a welcome environment in the Equine Community. Residents in this community in Edwards not only study together, but they also support each other's efforts with the Equestrian Team, Polo Team, Collegiate Horseman's Association, Rodeo Club, and many others. Being active and involved members of the community are important to students living in the Equine Community.

Global Village: Global Village, located in Braiden Hall, consists of both domestic and international students from a variety of international backgrounds (including global nomads) who share an interest in world relations and building bridges of understanding between cultures. Students with a high school International Baccalaureate diploma may find Global Village to be the next step in their journey. Global Village is the perfect connection for students who have lived abroad, or are interested in majors in anthropology, foreign languages, international business, international studies, political science, natural resources recreation and tourism, social work, sociology, and speech communication.

Health and Exercise Science Community: The Health and Exercise Science Community (HES Community), located in Corbett Hall, is the ideal niche for students interested in majoring in health and exercise science with concentrations in health promotion and sports medicine. Residents of this floor live with other students who are taking many of the same classes, have similar career goals, and are equally interested in living an active and healthy lifestyle. The HES Community will offer consistent opportunities for

experiential learning via the Campus Recreation and the CSU Health Network. First aid and CPR (among other courses sponsored by CSU Health Network) will be offered in Corbett Hall. Conveniently located by the Recreation Center and Moby Athletic Arena, Corbett Hall is ideal for HES students.

Honors Learning Community: See the description earlier in this chapter under University Honors Program.

Ingersoll Residential College (Natural Sciences): Residents of the Ingersoll Residential College (IRC) in Ingersoll Hall have a major in the College of Natural Sciences. Students share an interest in science and want to live with others who share similar interests. Many IRC residents take the same classes, so it is easy to form study groups and ask other residents for assistance with homework. The College of Natural Sciences Tutorial hall meets five nights a week in the Great Hall, TILT Building (2nd floor of the old Music Building) and offers free tutoring for most first- and second-year science and math classes. The IRC hosts its own computer and video labs. Majors include biochemistry, biological science, chemistry, computer science, mathematics, natural sciences, physics, psychology, and zoology. Natural Science Open Option and Life Science Open Option students are also invited to become part of the Ingersoll Residential College. In addition to a significant focus on providing academic support, the Ingersoll Residential College also provides a wide variety of social opportunities.

Key Academic Community: The Key Academic Community in Braiden Hall is an academically-focused residential community for first-time freshmen. Residents on the Key Academic Community floors share values that are the foundation for the community: desire for academic achievement, active involvement in classes and campus activities, and appreciation of diversity. Residents have a range of tools to help them succeed, including enrolling in and attending three classes with other students in the community, group study opportunities, feedback on how they're doing, leadership development, and connection with faculty. A separate application form is required. For more information contact the Center for Advising and Student Achievement (CASA) at www.keycommunities.lc.colostate.edu.

Key Explore Community: The Key Explore Community is focused on providing students who have not yet declared a major the opportunity to explore their options at Colorado State University. Students will live together on a floor in Parmelee Hall and enroll in three classes together. This group of undeclared students will have a chance to "create your own story" in order to understand how their interests, skills, identity, and experiences have shaped who they are.

Additionally, students will have social, educational and community-oriented activities that help support where they are going with their major, career, and leadership paths. The Key Communities strive to create an environment committed to academic excellence, campus involvement, and a diverse and supportive environment.

Key Plus Community: The Key Plus Community, located in Braiden Hall, is an optional sophomore year program for students who participated in the Key Academic Community or the Key Service Community during their first year at Colorado State University. Key Plus is still an academically-focused residential learning community at CSU but works more closely with students to develop strong leadership and career decision making skills. Key Plus is an honorary program opportunity with limited spaces, so students must apply and be selected to participate in this program.

Key Service Community: The Key Service Community is a first-year residential learning community developed around the theme of "student leadership and civic engagement." The Key Service Community comprises 150 students who live together in Braiden Hall and co-enroll in linked courses in groups of 19. In this community, students take advantage of year-long service opportunities while building connections with faculty and community organizations. Through discussion, service, and reflection, students develop a personal philosophy about their role in our world. Students also assess how they can contribute to a more civil society while becoming more active and positive role models within university life and beyond. A separate application form is required.

Leadership Development Community: This community in Durward Hall provides students with the opportunity to continue the development of their leadership skills through a variety of involvement opportunities. Students often become involved in service projects and learn about on-campus and community leadership opportunities.

Live Green Community: This community in Summit Hall is for students who are passionate about the environment and would enjoy living with other students who want to live green at CSU. The Live Green floor is open to students in any major. Students on this themed floor will have the opportunity to participate in sustainability initiatives like recycling, composting, water conservation, energy reduction, and wind power projects.

Living Substance Free: If you are committed to enjoying college without using alcohol or drugs, this option in Parmelee Hall offers an environment to support that decision. Students who choose to abstain from alcohol and/or drugs for personal, religious, or health reasons as well as those from alcoholic backgrounds or recovering

from addictions, are invited to participate in this floor. A variety of social opportunities are offered to make this a fun and involved community.

LEADERSHIP DEVELOPMENT

A member of Campus Compact, CSU promotes programs that develop citizenship skills and values, including service learning and partnerships between the campus and community. CSU has been named a “Top Character-Building Institution” by the Templeton Foundation.

President’s Leadership Program (PLP)

The President’s Leadership Program is a fourteen credit leadership development experience consisting of three year-long (two semester) academic and experiential courses designed to explore the personal, organizational, and social dimensions of leadership. Students must apply to each year of the program and 80-100 students participate annually. For more information, visit www.slice.colostate.edu/plp.aspx.

Associated Students of Colorado State University (ASCSU)

Office in Lory Student Center, ASCSU Complex
(970) 491-5931
www.ascsu.colostate.edu/

All full-time Colorado State students are members of Associated Students (ASCSU), the student governing body that promotes the interests and welfare of the students. ASCSU is comprised of three main branches: Senate, Cabinet, and Supreme Court. Student senators and the ASCSU cabinet represent all CSU students. Programs and services provided by ASCSU include Ram Road Trips, RamRide, Ram Leadership Team, ASCSU Handbook Planner, and the ForEver Green shirt program.

Closely affiliated with student government are student-faculty committees including the Student Funding Board, Athletic Advisory Committee, Lory Student Center Governing Board, Student Health Advisory Committee, and Student Fee Review Board.

In addition, ASCSU students are elected annually by Faculty Council as voting members to the following Faculty Council Standing Committees: The Committee on Intercollegiate Athletics, The Committee on Libraries, The Committee on Scholarship, Research, and Graduate Education, The Committee on Strategic and Financial Planning, The

Committee on Teaching and Learning, The Committee on University Programs, and The University Curriculum Committee.

College Councils

Students who have declared a major can contact their Dean’s Office in order to find out more about the College’s Student Council and the leadership opportunities it may afford. Students who have not declared a major should contact the Center for Advising and Student Achievement to get information about the Undeclared Leadership Council (see <http://www.ulc.casa.colostate.edu/>)

RESEARCH AND CREATIVE OPPORTUNITIES

Qualified undergraduate students have many opportunities to engage in research and creative activity while enrolled at Colorado State University. These opportunities allow students to enhance their education by working closely with a faculty mentor. Settings for these activities include laboratory, office, concert halls, and studio environments on campus. Some opportunities exist off campus, as well, at state and national laboratories located in and near Fort Collins. Students can identify faculty research and creative activity by contacting the Office of Undergraduate Research and Artistry at The Institute for Teaching and Learning (tilt.colostate.edu/oura), searching departmental websites, or by contacting advisers or college and departmental offices. Students can then contact faculty who are willing to enlist undergraduates in their research and creative work. The amount of time spent in such activities varies but generally ranges from six to ten hours per week on average. Placement, time commitments, and qualifications are dependent upon an agreement between the student and faculty mentor.

More than 300 performances, exhibits, and arts events are staged each year, from an internationally-recognized poster show to student-produced theater and opera. Facilities include the Hatton and Curfman Galleries, the Music Recital Hall, and the Lory Student Center Theatre. Construction is complete on the University Center for the Arts, housing the Edna Rizley Griffin Concert Hall – recently listed as by the *Denver Post* as one of the top five places for live chamber music, the University Theatre, the Studio Theatre, the Runyan Music Hall, production support facilities, recital and rehearsal halls, dance performance space and studios, classrooms, and faculty offices. The campus culture at Colorado State is steeped in the performing arts.

Celebrate Undergraduate Research & Creativity (CURC)

The achievements of students in the areas of research and creativity are recognized each spring semester. Students are invited to participate in a variety of events focused on original research, creative arts, and design, culminating in a showcase that features outstanding performers and award winners from all disciplines. Award winning projects from recent years ranged from genetic and neural studies to improvements in the apparel design process to poetry. For more information, please see the website at www.curc.colostate.edu.

NATIONALLY COMPETITIVE SCHOLARSHIP OPPORTUNITIES

Assistance is available to qualified undergraduate students who wish to apply for nationally competitive scholarships and fellowships sponsored by federal and private organizations. These include but are not limited to the Truman, Marshall, Udall, Rhodes, Gates-Cambridge, Goldwater, and Fulbright scholarships. These scholarships and fellowships are highly competitive and require high grade point averages (GPAs), a commitment to service both on and off campus, and specific career and professional goals. In many instances, these organizations support undergraduate and/or graduate work within the United States as well as abroad. Students can identify and determine eligibility for these nationally competitive scholarships and fellowships by viewing the website of the Office of Nationally Competitive Scholarship Programs, tilt.colostate.edu/scholarships. Students may also contact Amanda Purnell (amanda.purnell@colostate.edu) for information, campus deadlines, and assistance in applying.

OFFICE OF INTERNATIONAL PROGRAMS

*Offices in Laurel Hall
(970) 491-5917*

www.international.colostate.edu

James A. Cooney, Vice Provost for International Affairs

The mission of the Office of International Programs (OIP) is to help create and foster international activities supporting teaching, learning, research and engagement throughout Colorado State University. This mission is accomplished through a broad array of programs and services designed to

provide international experiences for all CSU students, scholars, faculty and staff. To accomplish this:

- OIP encourages students to experience and understand diverse cultures through study abroad programs and international field experiences which help them prepare for success in today's global economy.
- OIP provides quality services to international students and scholars, recognizing their critical role in the internationalization of our campus.
- OIP organizes classroom-based, programmatic and experiential activities, both on-campus and abroad, to provide the CSU and broader communities with relevant international and intercultural educational experiences.
- OIP supports the international activities of CSU colleges, departments, and faculty in their efforts to create joint research initiatives, international exchanges and other collaborative activities worldwide.
- OIP establishes and manages CSU's key strategic partnerships, creating pathways for CSU students and faculty to become more engaged around the world.

In fulfilling its mission, the Office of International Programs brings Colorado State University recognition as a model of effective, innovative, and student-centered institutional internationalization. It does so through a collaborative process, especially with the faculty and CSU's eight colleges, that makes international activity integral to the University's instruction, student service, research and outreach programs, and to the experience of the University's students.

The Office of International Programs is involved directly in implementing the University's Strategic Plan that outlines CSU's commitment to international research and strategic partnerships. This includes global scholarship, the funding of research through cooperative agreements with partners abroad, and the integration of global concerns into our signature areas of funded research. The Office of International Programs developed the University's "internationalization plan" and monitors its progress.

The office is organized into three functional units:

- 1) International Student and Scholar Services
- 2) Study Abroad
- 3) International Education

SUMMER SESSION

101 Johnson Hall

(970) 491-1590

www.summer.colostate.edu

Barbara Gotshall, Director

There are many opportunities for students at Colorado State University in the summer session. Students who wish to take courses during the summer session do not have to be formally admitted to the University.

There is a great selection with over 500 courses from which to choose. Summer school is convenient: courses are accelerated (offered in 4- and 8-week terms with several mini-courses available) giving students the flexibility to work and make other summer plans. It's a suitable time to complete a prerequisite, take a required course, improve one's GPA, or lighten one's course load for another term.

Summer is an appealing time. The campus atmosphere is relaxed and hassle-free. The classes are generally smaller. It's a time when students can focus on one or two classes. New freshmen and transfer students enjoy summer classes as a way to transition to the University. Students currently enrolled in degree programs at Colorado State University use summer session to stay on track for graduation. Returning teachers pursue advanced study and graduate students conduct research during the summer session. Academic departments sponsor a variety of institutes, conferences, and workshops. Pre-college programs for high school students and youth programs are available on campus during the summer months. A visit to the summer session homepage provides information about the University's summer activities.

Requests for a printed copy of the *Summer Class Schedule* can be made from the summer homepage or by calling (970) 491-1590. Detailed information about summer session is available at www.summer.colostate.edu.

OUTSIDE THE CLASSROOM

There are literally hundreds of opportunities for students to broaden their horizons outside of the classrooms. We have only noted a few here. More information can be found in the Student Services chapter.

- Thriving sport club programs offer over 30 teams that compete on the regional and national scene. Club teams have won six national championships in the last five

years, and lacrosse, ice hockey, cycling, soccer, polo, and volleyball are nationally ranked or recognized this year.

- Students hold membership to a 100,000 sq. ft. indoor and 32-acre outdoor Recreation Center. Facilities include disc golf, roller hockey, cardio theatre, weight rooms, pool with sun deck, and more.
- The Lory Student Center is home to an active student government and 300 clubs and organizations.
- CSU offers a wide range of civic engagement opportunities ranging from one-day special events, classroom experiences, year-long service clubs, community-based research, and volunteer opportunities during spring break.

Internships are offered in many academic areas and include some international opportunities. Academic programs offer several ways to receive academic credit for internships, with most being administered at the departmental level.

Athletics-Intercollegiate

McGraw Athletic Center

(970) 491-5300

www.CSURAMS.com

Jack Graham, Director of Athletics

The University is a member of Division I-A of the NCAA and competes in the Mountain West Conference. Other conference members include, Boise State University, San Diego State University, Texas Christian University, the United States Air Force Academy, the University of Nevada at Las Vegas, the University of New Mexico, the and the University of Wyoming, for the 2010-11 academic year. Beginning with the 2011-12 academic year, Fresno State University and the University of Nevada will also join the conference.

The University sponsors men's intercollegiate competition in basketball, cross country, football, golf, and track (indoor and outdoor). It sponsors women's intercollegiate competition in basketball, cross country, golf, softball, swimming/diving, tennis, track (indoor and outdoor), volleyball, and water polo.

Colorado State University recognizes intercollegiate athletics as an integral part of its mission; therefore the University is committed to the pursuit of excellence with integrity in athletics.

A strong intercollegiate athletic program gives talented student-athletes the opportunity to develop their physical,

intellectual, and leadership skills as they participate in all aspects of college life, represent their school in athletic competition and in the community, and pursue college-level studies to prepare themselves for meaningful careers. Therefore, the Department of Athletics' administrators and coaches are expected to recruit qualified student-athletes who can succeed academically and athletically and who will represent the University responsibly and with integrity. Administrators, coaches, faculty, and staff are obligated to encourage and help student-athletes balance the demands of athletic participation with those of the classroom and to assist them in achieving success in both their sport and their chosen field of study. They are also obligated to guard the physical and mental well-being of student-athletes and refrain from doing or encouraging anything that would jeopardize the health or welfare of the participants.

Intercollegiate athletics can foster a sense of loyalty, community, and support among students, faculty, staff, alumni, and friends. The University subscribes fully to the principles of fair play. It will at all times insist that its athletic program and everyone connected with it embody the spirit of athletic amateurism and abide by and uphold the laws, rules, and regulations governing intercollegiate athletics.

The Department of Intercollegiate Athletics is supervised by the Director of Athletics. The Faculty Council Committee on Intercollegiate Athletics serves in an advisory capacity to both the President and the Director of Athletics. Regulations for the conduct of intercollegiate athletics conform to those established by the Mountain West Conference and the NCAA.

Student-athletes participating in intercollegiate athletics must comply with all eligibility and academic requirements of the University, the Mountain West Conference, and the NCAA, and are expected to make consistent and satisfactory progress towards completion of their degree programs. Student-athletes are also required to conduct themselves in conformance with the department's specific expectations in the areas of academics, athletics, and social and outreach activities.

Athletics-Sport Clubs

Sport clubs are student-run competitive sport organizations that compete with other colleges and provide the opportunity to play for national championship sport club titles. For additional information, contact the Campus Recreation department, Student Recreation Center, (970) 491-6359 or visit www.campusrec.colostate.edu.

Colorado State University reserves the right at any time, without notice, to change, modify, or cancel any course, program, procedure, policy, financial requirement, or disciplinary arrangement set forth in this catalog whenever, in its sole discretion, it determines such action to be appropriate. Furthermore, Colorado State will not be responsible for any failure to present or complete any course or program or to perform any other activity, function, or obligation mentioned in this catalog. Since changes may occur at any time, students must check the relevant website (as noted throughout various chapters in this catalog).

Undergraduate Admissions Policies and Procedures

Office of Admissions
University Welcome Center, Ammons Hall
(970) 491-6909
www.admissions.colostate.edu

All correspondence about undergraduate admissions should be addressed to the Office of Admissions, Colorado State University, 1062 Campus Delivery, Fort Collins, CO 80523-1062 and should include the student's full legal name and date of birth. Students interested in graduate admission should consult the [Graduate and Professional Bulletin](#).

The final admission decision is based on a student's potential for attaining a degree at Colorado State University, and takes into account a variety of factors, including the student's past academic course work and achievement, test scores, essay, leadership qualities, school and community service, and/or school-based counselor recommendations, geographic residence, first generation status, and ability to contribute to a diverse campus community. Because the University receives more applications than it can honor, and because of the commitment to diversity as an important educational objective, the admission evaluation process and the admission decisions reflect and rest upon this range of factors.

REQUIREMENTS AND PROCEDURES

Students who knowingly falsify application information, transcripts, or test scores, or who fail to indicate all previously attended institutions are subject to rejection or dismissal. Sponsoring agencies will be informed of this decision.

Admission requirements set forth in the following sections are minimum requirements that may be subject to change after a General Catalog has been published. The Board of Governors of the Colorado State University System, Colorado State's governing board, reserves the right to deviate from published admission requirements. In such cases, changes in admission policy will be publicized.

APPLICATION INFORMATION FOR ALL APPLICANTS

Obtaining an Application

Students are encouraged to apply for admission online at www.admission.colostate.edu, or through the Common Application at www.commonapp.org. Paper applications can be requested by e-mailing, calling (970) 491-6909, or writing the Office of Admissions, Colorado State University, 1062 Campus Delivery, Fort Collins, CO 80523-1062.

Completing an Application

Unless otherwise indicated, all applicants are required to submit the following documents in order to complete an application for admission. In some cases, additional information may be required before an admission decision can be rendered.

Freshman Applicants:

- Application for admission (online preferred)
- \$50 non-refundable processing fee
- Official high school transcript reflecting GPA and class rank (if applicable). International applicants please note: If secondary school transcripts are not in English, a certified English translation must accompany each document.
- ACT or SAT results (written portions are not used for decision or scholarship purposes: ACT/SAT is not required of applicants who are 23 years of age or older or who have been out of high school five or more years) Please note: International applicants are not required to submit SAT or ACT scores, but must submit official TOEFL or IELTS results.
- Personal statement—essay
- A recommendation from a teacher, school counselor, or other person who can attest to the applicant's personal character and potential to succeed **academically** at CSU

Transfer Applicants:

- Application for admission (online preferred)
- \$50 non-refundable processing fee
- Official transcripts of all collegiate work attempted. Transcripts must show **all** work attempted from each university or college attended. No part of the previous collegiate record may be disregarded. *Failure to list all institutions previously attended is a serious offense that may result in the rescinding of admission, loss of credit, or disenrollment.* Although course work taken at vocational-technical institutes or non-accredited colleges is not counted toward the minimum number of credits required for admission of transfer students, transcripts are still required. International applicants please note: If secondary school transcripts are not in English, a certified English translation must accompany each document.
- Official high school transcript may be used to determine whether you satisfy course work requirements and to verify high school graduation and assist with placement. High school credentials will be evaluated as part of the admission decision for applicants who have completed **fewer than 30 credits** at the point of application.
- Personal statement (essay)
- A recommendation from a teacher, advisor, or other person who can attest to the applicant's personal character and potential to succeed **academically** at CSU
- ACT or SAT results are recommended and used for placement purposes, but not required of transfer applicants.

Application Processing Fee

A \$50 nonrefundable processing fee (or approved fee waiver) is required of all applicants and must be submitted with the application. This fee is not refunded if admission is denied nor is it applicable to tuition and fees if the student enrolls.

Application Deadlines

Applications are processed up to 14 months before the requested date of entrance.

Fall Semester Consideration:

Admissions decisions for the fall semester are rendered on a rolling basis beginning in September one year prior to the start of the term for which the student has applied.

Applications must be **submitted** before **5pm Mountain Time** (7pm Eastern; 4pm Pacific) to meet the following deadlines.

Domestic Applicants:

- Freshmen -- February 1
- Transfers -- June 1
- After these dates, but no later than July 1, applications are considered on a space available basis.

International Applicants:

Completed applications and all supporting documents must be received by **May 1** for the fall semester, which begins in August.

Spring Semester Consideration:

Domestic Applicants:

The **completed application deadline** is **November 1**. Applications completed or received after the deadline may be updated to the next consecutive semester or withdrawn.

International Applicants:

Completed applications and all supporting documents must be received by **October 1** for the spring semester, which begins in January.

Enrollment Deposit and Admission Confirmation

In order to hold a place in the class and to be "registration ready" (eligible to register for classes), all newly admitted freshman and transfer students (including international students) must submit a nonrefundable \$300 enrollment deposit. The non-refundable deposit is applied to new student orientation fees and first semester tuition. The deadline for submitting the enrollment deposit is May 1 for the fall semester, December 1 for the spring semester, or within two weeks of receiving the offer of admission (whichever is later). If payment of the \$300 deposit presents a financial hardship, students are encouraged to contact the Office of Admissions.

Good Standing Requirement

Applicants for admission to Colorado State University whose records indicate they are under disciplinary censure generally may not be admitted until they have cleared their disciplinary records.

Personal Identifier

The personal identifier for all CSU students is the CSUID. The CSUID is a nine-digit unique numeric identifier that begins with the digit 8 and is assigned by the ARIES student information system. The social security number (SSN) is not used at CSU as a personal identifier.

All students are requested to submit a social security number (SSN) at the time of admission or before initial enrollment at the University. The social security number is maintained as a secure data element in the student information system and is not accessible as directory information or to unauthorized persons. International students are encouraged to file for a social security number although they are not eligible for social security benefits. *Students' disclosure of the social security number is required for financial aid purposes, employment, and state and federal reports required by law.*

The social security number is released to agencies or individuals outside the University only at the request of the student or in accordance with federal and state requirements in regard to financial aid awards; Internal Revenue Service for student employee salary reporting and 1098T/1098E reporting; and State Controller's debt collection procedure. The University has strict policies protecting and prohibiting the use of SSN and uses every reasonable effort to protect and not disclose the SSN.

Immunization Policy

Colorado State University, in compliance with Colorado State laws and Health Department regulations, requires persons born January 1, 1957 or later to show proof of two vaccinations for measles, mumps, and rubella (MMR) or laboratory evidence for proof of immunity by submitting an immunization certificate to the Hartshorn Health Service *prior* to arrival at school. Additional information concerning immunization should be directed to Immunizations, Hartshorn Health Service, 8031 Campus Delivery, Colorado State University, Fort Collins, CO 80523-8031.

Immunization Office

Hartshorn Health Service, Room C114

(970) 491-6548

immunize@lamar.colostate.edu

Selective Service Registration

In compliance with C.R.S. 23-5-118, Selective Service registration is required of male United States citizens between the ages of *17 years and 9 months* and *26 years* who wish to enroll at Colorado institutions of higher education. Individuals providing false information are subject to penalty of law and disenrollment.

FOR HIGH SCHOOL GRADUATES

The admission decision is based on a careful and individual review of the completed application materials, with particular emphasis placed on an applicant's

demonstrated academic achievement and ability to contribute to and benefit from the Colorado State University community.

Higher Education Admission Requirements (HEAR)

The Colorado Department of Higher Education (previously Colorado Commission on Higher Education) stipulates completion of at least 15 academic high school units to be admissible to a 4-year public college or university in Colorado for high school graduates beginning in spring 2008 and an additional two academic units for graduates beginning in spring 2010.

Colorado State University gives priority consideration to applicants with a minimum 3.25 GPA who satisfactorily complete a minimum 18 high school units defined as the CSU Priority Standards.

The minimum passing grade is D; however, grades of D may not be competitive in a selective admission environment and grades of C- or better are preferred.

Colorado State University recognizes that academic preparation may take several forms and that students contribute to campus in a variety of ways. In this spirit, all students receive a holistic application review. Applicants who do not meet the 18 academic units and/or who have a cumulative GPA below 3.25 are still encouraged to apply for admission. In such cases, we look for other evidence of a student's potential for success at Colorado State, including other measures of academic rigor, trends in grades, high school type, personal circumstances, leadership and community service, motivation and maturity, and ability to contribute to a diverse campus community.

Please note: Because of demand, admission to some programs of study is more competitive than others; admission to these programs is limited to students presenting the strongest academic credentials. Additional information about competitive majors can be found at: admissions.colostate.edu/futurefreshmencompetitivemajors.

Admission is subject to high school graduation, satisfactory completion of current courses, and submission of a final, complete, official high school transcript.

Applicants must graduate from high school prior to enrolling at Colorado State, as demonstrated by a final, official high school transcript, reflecting the date of graduation, submitted prior to the start of the term. Admitted students cannot register for their second semester of enrollment until a final, official high school

transcript, reflecting the date of graduation, has been received.

For Home-Schooled Applicants

Colorado State University encourages applications from home-schoolers who have completed a solid college-preparatory curriculum. It is recognized that home-schooling may offer diverse teaching methods and learning environments personalized to fit each individual. Applications are reviewed within the context of an individual's experience; however, standard documentation of that educational background is required. Such documentation should include a description of the learning environment, a detailed list of courses and course content if not articulated in a transcript, an explanation of any applicable grading scales and documentation of any standardized or external curricula used (e.g., college courses, online courses, published home-school curricula, etc.)

Admission decision factors for home-schooled applicants are the same as those for traditional high school graduates. Please refer to the priority coursework considerations and description of holistic application review noted in the high school graduate section. Additional information may be found at admissions.colostate.edu/homeschoolfaq.

For Early Graduates from High School

Admission preference is given to students who complete four years of high school and use the time effectively to take accelerated and/or academically rigorous course work (i.e., Advanced Placement, International Baccalaureate, and dual enrollment college courses). Colorado State will admit exceptional students graduating early, provided they have satisfied all pre-requisite high school course work and their credentials are competitive with strong candidates graduating with four years of course work (including accelerated and/or academically rigorous courses, as identified above).

Additional information may be found at admissions.colostate.edu/earlygraduates

College-Level Courses Completed by High School Students

Colorado State credit may be allowed for college-level courses completed at a college or university while a student is still in high school if the following conditions are met:

1. The college or university must be fully accredited by one of the six regional associations of schools and colleges.
2. Credit will be granted only for academic courses with grades of C- or better.
3. An official transcript must be provided by the college or university listing the courses completed.
4. The course is not remedial or vocational/technical in content.

The College Board Advanced Placement Program

The Advanced Placement Tests administered by The College Board are used by the University to award credit and advanced placement in any of several fields in which a student may have participated in high school. Credit awarded is treated as transfer credit without a grade but is counted toward graduation and may be used in fulfilling specific curriculum requirements.

The academic department responsible for the course in which test credit is granted determines what equivalency will be awarded. Re-evaluation or appeal of this decision is not applicable as it is the final determination of the department how an equivalency for an exam will apply. Credit is granted for scores of four or five on the Advanced Placement Tests in government and politics, biology, computer science, English, environmental science, and human geography. Credit is granted in art, chemistry, Chinese, economics, French, German, history, Italian, Japanese, Latin, mathematics, music, physics, psychology, Spanish, and statistics for scores of three or higher. Scores of one and two are not granted credit.

Go to the Registrar's website at registrar.colostate.edu/students/transfer/index.aspx and select "Advanced Placement (AP) Exam Equivalencies" for a complete table indicating those courses for which credit is awarded.

College-Level Examination Program (CLEP)

The College-Level Examination Program (CLEP) was designed by The College Board to enable both traditional and nontraditional students to receive college-level credit by examination. There are two types of examinations offered – the General Examinations and the Subject Examinations.

For general examinations, a minimum of three credits will be awarded for a score of 50 or higher. For subject examinations, credit will be awarded in the amount equivalent to the CSU course(s), for scores of 50 or higher. See the website www.registrar.colostate.edu, select "Students," select "Transfer Evaluation" from the

drop-down list and choose the “CLEP Exam Equivalencies” for a complete table indicating those courses for which credit is awarded.

Information may be obtained and arrangements for taking the tests by contacting the University Testing Service, 100 NE Aylesworth, at (970) 491-6498, or by writing to The College Board, Box 1822, Princeton, NJ 08541-6601, for a list of test centers. Credit awarded for these examinations cannot be used in meeting the Colorado State residency requirement for the baccalaureate degree.

The academic department responsible for the course in which test credit is granted determines what equivalency will be awarded. Re-evaluation or appeal of this decision is not applicable as it is the final determination of the department how an equivalency for an exam will apply.

International Baccalaureate

Students who graduate from high school with an International Baccalaureate diploma or have completed International Baccalaureate examinations may receive University credit for scores of four or higher.

The number of credits awarded for successful completion of an International Baccalaureate diploma program will be a minimum of 24 semester credits. If a score of less than four is received on an exam, the number of credits granted will be reduced accordingly if the student meets the necessary requirements.

The academic department responsible for the course in which test credit is granted determines what equivalency will be awarded. Re-evaluation or appeal of this decision is not applicable as it is the final determination of the department how an equivalency for an exam will apply.

See the website at www.registrar.colostate.edu and choose the drop-down list under “Students,” select “Transfer Evaluation,” then select “IB Equivalencies” for a list of courses for which credit will be granted.

FOR NON-HIGH SCHOOL GRADUATES

Applicants for admission who have earned a GED must submit:

- Official scores from the General Educational Development (GED) Test.
- Transcripts showing any and all completed high school and collegiate courses.
- Scores from either the ACT or the SAT (not required of applicants who are 23 years of age or older or who have been out of high school five or more years).

- A personal statement (essay)
- A recommendation from a teacher, employer, or other person who can attest to the applicant’s personal character and potential to succeed **academically** at CSU.

The admission decision is based on the student’s academic potential for attaining a degree at Colorado State. In special cases, students otherwise well-qualified, but not meeting all requirements, are considered for admission on a case-by-case basis.

Strong candidates for admission present a minimum of 550 GED average and satisfy as many of the Freshman Admission Standards as possible.

Additional information may be found at: admissions.colostate.edu/futurefreshmendedapplicants.

FOR TRANSFER STUDENTS

Undergraduate applicants who have **completed more than twelve** credits at other regionally-accredited institutions *after* graduation from high school or *after* earning a GED must apply as transfer students. Those who were enrolled in college courses during high school (regardless of the number of credits attempted) or those who have completed twelve or fewer credits *after* high school graduation (or earning a GED) must apply for admission as freshmen (see “For High School Graduates” above). For these students, a “transfer profile” consisting of the total number of attempted credits and cumulative college GPA will be noted in the admission decision even though the applicant is applying as a freshman.

Transfer Admission Requirements

Each application is reviewed individually, carefully and thoroughly. Our goal is to identify students who will be successful at Colorado State University, and a number of factors are considered in the decision, including academic performance, pre-requisite transfer work, preparation for preferred major and personal qualities such as leadership and community service, the ability to contribute to a diverse campus community and unique or compelling circumstances.

Priority consideration is given to transfer applicants who have earned a minimum 2.5 cumulative GPA in 30 or more college-level academic semester credits. Applicants with a cumulative GPA below 2.5 and/or fewer than 24 completed credits are encouraged to apply since many factors are considered in the admission decision.

Students who have completed fewer than 30 credits at the point of application are classified as transfer applicants;

however, the admission decision will include an assessment of both high school AND college-level performance.

Applicants must have a minimum 2.000 GPA in order to be considered for admission.

Students who have completed an Associate of Arts or an Associate of Science degree from an accredited Colorado institution will be guaranteed admission to the University providing that it is the last institution attended and that a cumulative 2.00 GPA (on a 4.000 scale) has been achieved from ALL institutions attended. Entry into a specific major may depend on completion of appropriate prerequisite courses and enrollment limitations of the major.

All applicants are evaluated according to the same University admission standards. We recognize, however, that not every student's personal or educational background is the same. Transfer applicants who have not yet completed an Associate's degree or who do not meet the priority consideration standards are still encouraged to apply.

Additional information may be found at:
admissions.colostate.edu/transfer

Special Notes for Transfer Applicants:

- If currently registered at another institution, include in your application a list of courses in progress and courses scheduled to be completed prior to entering Colorado State.
- Transfer applicants must meet the admission requirement in mathematics. This requirement may be met by completing a transferable mathematics course, through high school course work or by achieving a satisfactory score on the Colorado State University Mathematics Placement Exam.
- Plan to complete college composition and mathematics requirement before enrolling at Colorado State University. These two graduation requirements must be satisfactorily completed within the student's having completed 60 credits total (including both transfer credits and Colorado State University credits – only one semester extension will be allowed once a student enters Colorado State).

Because of demand, admission to some programs of study is more competitive than others; admission to these programs is limited to students presenting the strongest academic credentials

Applicants are granted admission on the basis of their previous academic and conduct records, the appropriateness of their previous courses to their proposed program of study, and the availability of space in the program. Admission is subject to satisfactory

completion of current courses and submission of a final, complete, official transcript.

Priority will be given to students who demonstrate the greatest academic potential for attaining a degree at Colorado State. In special cases, students otherwise well-qualified, but not meeting all of these requirements, are considered for admission on a case-by-case basis.

Evaluation of Credits

The Registrar's Office is responsible for determining course equivalencies for all courses that are presented for transfer to Colorado State University. Students should be aware that credits may transfer to the University, but not count toward department graduation requirements. Evaluation of credits is made only from official transcripts after a student has been granted admission.

If a student attends one or more regionally accredited 2-year institutions a total of 64 transfer credits may be accepted. There is no limit for the amount of credit that can be transferred from regionally accredited 4-year institutions.

Regular academic courses from institutions accredited by one of the six regional associations of schools and colleges completed with a grade of C- or better are generally accepted in transfer. Course work from institutions that are not regionally accredited will not be transferred. Coursework that is remedial or vocational/technical in nature will not be transferred. Transfer grades and credits are not computed within the cumulative GPA earned at Colorado State.

If coursework presented for transfer is over 10 years old, the academic department will need to review it for applicability towards degree requirements.

International institutions must be recognized by the country's governmental agency for possible transfer of credits (i.e., Ministry of Education).

International Credit toward a Baccalaureate Degree

Transfer credit is generally only considered from international tertiary institutions that are recognized by the ministry of education, or a similar accrediting body, in the home country. In order to qualify for transfer credit, courses completed at recognized international tertiary institutions must be applicable to the student's degree and comparable to the nature and quality of CSU courses.

International courses with the same or similar course titles as CSU courses may satisfy course requirements. An official or certified copy of the transcript must be

presented to the Registrar's Office for work to be officially evaluated for transfer credit. A certified translation must accompany transcripts not issued in English. The translation should be literal and not interpretive. If course content is not evident from course titles on the transcript, students should be prepared to provide official catalog course descriptions or syllabi (in English) from their schools or faculties.

Rarely is international secondary level work considered for transfer credit. The completion of rigorous secondary school subjects is expected of all admission candidates-international and domestic alike. Transfer credit is not awarded for secondary school subjects. Possible exceptions may include an additional 13th year of secondary school was completed and/or a standardized examination was administered. Examples might include the British Advanced Level (A-Level) examinations, German Abitur examinations, or Italian Maturita examinations.

In many cases, international credits will have to be converted into the U.S. semester system unless there is an official CSU Memorandum of Understanding (MOU) that allows for an alternate credit evaluation option. In those cases where there is not an official MOU indicating an alternate, a conversion factor will be used to determine the U.S. Credit equivalency for each course. No more than 18 credit hours per term or 36 credit hours in any academic year may transfer. All courses considered for transfer must be completed with a "C-" or better grade. The Registrar's Office will determine the international grade equivalencies.

u.select

U.select enables students, advisors, faculty, and administrators from colleges and universities to obtain consistent and accurate information about how courses will transfer from one institution to another, and how those courses will apply to meet academic program requirements at the other institutions. A potential transfer student can have direct access to course acceptability, equivalency, and applicability among all participating institutions by using each institution's existing course equivalency tables. Course descriptions, details about academic programs, and course equivalencies can all be obtained from this one website.

For Colorado State University, u.select is a database of selected accredited institutions in the U.S. and some recognized international institutions, their courses and how those courses will transfer to Colorado State University. All public institutions in Colorado and Wyoming are part of this database and, in addition, many frequently transferred courses from selected institutions in other states are also listed. Access this database by going

to the website www.registrar.colostate.edu and clicking on "Students," then "Transfer Evaluation," and then "Find Transfer Course Equivalencies (u.select)". If a particular institution is not listed, contact the Degree and Transfer Evaluation unit of the Registrar's Office for evaluation of specific courses.

Statewide Guaranteed Transfer Program (gtPathways)

The state of Colorado has developed a statewide guaranteed transfer program, which applies to all Colorado public institutions of higher education, including Colorado State University. Statewide there are approximately 1,000 lower-division general education courses in 20 subject areas approved for guaranteed transfer from one public institution of higher education in Colorado to another.

After starting on a higher education pathway at any public college or university in Colorado, and upon acceptance to another, a student may transfer up to 31 credits of successfully (C- or better) completed guaranteed transfer general education coursework in a set of defined categories. These courses will apply toward the general education (All University Core Curriculum) graduation requirements at Colorado State University. Extended detail may be found on the Colorado Department of Higher Education (CDHE) web site at: higher.ed.colorado.gov/Academics/Transfers/gtPathways/. Colorado State University's site may also be referenced at www.registrar.colostate.edu/transfer-evaluation. Click on "State Guaranteed Transfer Information."

Transfer Appeals Process

Students may appeal a decision regarding the transferability of a specific course(s) and/or the decision regarding how it is used to fulfill degree requirements. Any request for re-evaluation of credit should first be directed to the Degree and Transfer Evaluation unit of the Registrar's Office.

The student is responsible for supplying any supporting documentation from the student's transferring college, such as a syllabus or more detailed course description. The Degree and Transfer Evaluation unit will either satisfy the student's request or refer the student to an academic department for additional consideration. If the academic department cannot fulfill the request for any item related to an AUCC requirement or an overall university graduation requirement, a formal written appeal may be presented to the Degree and Transfer Evaluation unit for presentation to the Vice Provost for Undergraduate Affairs for a final decision.

60-Credit Rule for Mathematics and Composition

Colorado State has a requirement that all students must complete their math and composition credits required by the All-University Core Curriculum (AUCC) within 60 credits. More complete information on this policy may be found in the chapter on the All-University Core Curriculum of this catalog. Transfer credits do count toward this 60-credit rule. Students transferring 40 or more credits into CSU are advised that the math and composition requirements should either be met from transfer credits or are to be completed in the first semester at CSU.

Credit from Two-Year Colleges

- If a student attends one or more regionally accredited two-year institutions, a total of 64 transfer credits may be accepted.
- Credit earned at a two-year college may not be used to meet the upper-division (300-400 level) graduation requirement. Academic departments may allow substitution of course work from two-year colleges towards specific major upper-division requirements.
- Transfer guides for specific majors are available for students who want to complete a four-year degree at Colorado State University by first completing an AA or AS degree at a Colorado community college, and then completing the 60 designated C.S.U. credits listed on the guide. See www.registrar.colostate.edu, use the drop-down list under “Students,” select “Transfer Evaluation,” and then select “Transfer Guides for Colorado Students.”

Service Schools and Courses of the Armed Services

Credit may be allowed for transfer from those service schools carrying a baccalaureate credit recommendation in the latest *Guide to the Evaluation of Educational Experiences in the Armed Services* (www.militaryguides.acenet.edu) prepared by the American Council on Education (ACE). Students must submit their DD-214 Form, SMART Form, or ACE Transcript to the Registrar’s Office to have the information evaluated for eligibility and to receive credit. Individual academic departments determine whether those courses clear specific major curriculum requirements or may be used as elective credit within the program of study. Contact the Degree and Transfer Evaluation unit of the Registrar’s Office for further information.

Transfer Credit from Non-Collegiate Institutions

Colorado State will award transfer credit for academic work done under the sponsorship of non-collegiate

institutions, if 1) the courses proposed for transfer have been approved by the American Council on Education, 2) are listed in *The National Guide to Educational Credit for Training Programs*, and 3) are approved by the academic department and college in which the subject matter is taught at Colorado State. Those wishing to request such credit should contact the Degree and Transfer Evaluation unit of the Registrar’s Office.

FOR FORMER COLORADO STATE STUDENTS

Former Colorado State students who wish to return to CSU after an absence of one or more semesters to complete an undergraduate degree already in progress must submit an “Intent to Return Form,” available at admissions.colostate.edu/returning/, including students who have not attended another institution since leaving Colorado State University. Students who have withdrawn prior to the end of a semester must also file an “Intent to Return Form.” Students are readmitted if they are eligible to return to the University and if space is available.

No application processing fee is required of former students returning to complete a degree in progress. Colorado State University graduates who wish to return to earn a *second* bachelor’s degree should follow the policies and requirements for Second Bachelor’s applicants. For more information refer to Second Bachelor’s section below or refer to admissions.colostate.edu/Transfer/ for more information.

Students who have attended other collegiate institutions after attending Colorado State must submit transcript(s) of all courses attempted at the other institution(s) attended, and include a list of future coursework or courses in progress that will be completed prior to returning to Colorado State University. The admission decision is based on previous Colorado State work, the student’s academic performance at transfer institutions, and whether space is available.

Students who left the University in a probationary or dismissed status should refer to the Scholastic Standards Policy for additional information about qualifying to return to Colorado State University.

FOR SECOND BACHELOR’S DEGREE CANDIDATES

In order to be admissible as a second bachelor’s degree candidate, applicants must:

- Successfully complete a first bachelor’s degree

- Select a degree-seeking major (i.e., applicants cannot enter as “undeclared”) that does not duplicate the first degree.
- Follow the instructions for transfer students regarding required documents, coursework requirements and application processing fee.

Some majors have more competitive admission requirements that require additional course work and/or a specific grade point average for direct admission.

(For second bachelor’s degree requirements, see the Degree Programs chapter of this catalog.)

FOR U.S. CITIZENS/PERMANENT RESIDENTS EDUCATED OVERSEAS

Note: Also refer to section “Application Information for All Applicants” above.

Colorado State recognizes that the pool of U.S. citizens/ Permanent Residents educated abroad covers a wide spectrum, including students with dual citizenship who have never been to the U.S., U.S.-born students who have lived in multiple countries or who have only recently moved overseas as the result of family military or employment assignments, and U.S. Permanent Residents with varied amounts of U.S.-based education.

Applicants who are U.S. citizens or U.S. Permanent Residents who have been educated in part or wholly overseas should submit the domestic application for admission and follow the application instructions according to the appropriate academic status listed above for domestic students (high school graduate, non-high school graduate, transfer student).

The admission decision will include a review of the applicant’s personal background and educational circumstances to determine whether additional support information is required to assess the applicant’s potential for academic success at the University. For example, an applicant whose native language is not English and who has had all education in a language other than English may be asked to provide English proficiency documentation and a translation of academic records.

U.S. citizens or U.S. Permanent Residents who have been educated abroad may be eligible for financial aid and scholarships. Refer to Financial Assistance in the Financial Services for Students chapter for more information.

FOR INTERNATIONAL STUDENTS

Note: Also refer to section “Application Information for All Applicants” above and see the section for “International Student and Scholar Services” in the “International Programs and Services” chapter.

The initial inquiry about admission should indicate the applicant’s academic background, proposed program of study, and the source and amount of financial support for study at Colorado State University. International applicants are required to submit the “Certificate for Issuance of Immigration Document” and financial support statements for immigration processing.

Colorado State University requires all applicants whose first language is not English, regardless of citizenship, to demonstrate a high level of English proficiency. Applicants from Australia, Canada, Ireland, New Zealand, and the United Kingdom whose first language is English are exempt from this requirement. While alternative English language proficiency measurements may be considered for conditional admission, the TOEFL (Test of English as a Foreign Language) and the IELTS (International English Language Testing Service) exams are preferred. To be considered for clear (unconditional) admission, undergraduate applicants must present strong academic preparation and a minimum TOEFL score of 71 on the internet-based exam, 525 on the paper-based exam, or a minimum IELTS score of 6. To be considered for conditional admission, applicants must present strong academic preparation and a minimum TOEFL score of 44 on the internet-based exam, 450 on the paper-based exam or a minimum IELTS score of 5.

Freshmen applicants must:

- Submit official secondary school transcripts and/or school leaving certificate(s). If transcripts are not in English, a certified English translation must also accompany each document.
- Demonstrate a high level of English proficiency.
- Submit all other documentation required of freshman applicants (refer to Freshman Applicant section above).

Transfer applicants must:

- Submit official transcripts of all university or college courses taken in the United States or abroad. Transcripts must show **all** work attempted from each university or college attended. No part of the previous collegiate record may be disregarded. *Failure to list all institutions previously attended is a serious offense that may result in the rescinding of admission, loss of credit, or disenrollment.* Although

course work taken at vocational-technical institutes or non-accredited colleges is not counted toward the minimum number of credits required for admission of transfer students, transcripts are still required. If transcripts are not in English a certified English translation must also accompany each document

- Submit secondary school transcripts and/or school leaving certificate(s). If transcripts are not in English,

a certified English translation must also accompany each document.

- Demonstrate a high level of English proficiency.
- Submit all other documentation required of transfer applicants (refer to Transfer Applicant section above).

Colorado State University reserves the right at any time, without notice, to change, modify, or cancel any course, program, procedure, policy, financial requirement, or disciplinary arrangement set forth in this catalog whenever, in its sole discretion, it determines such action to be appropriate. Furthermore, Colorado State will not be responsible for any failure to present or complete any course or program or to perform any other activity, function, or obligation mentioned in this catalog. Since changes may occur at any time, students must check the relevant website (as noted throughout various chapters in this catalog).

Financial Services for Students

*Student Financial Services
Office in Centennial Hall
(970) 491-6321
www.sfs.colostate.edu*

TUITION, FEES, AND EXPENSES

Authority to set tuition rates is vested in the governing boards of Colorado's state institutions of higher education. The tuition rates which apply to any succeeding fiscal year will not be known until June of each year. *The Board of Governors of the Colorado State University System, therefore, reserves the right to change tuition and fee schedules and related policies, including the time, date, and method for payment, at any time.*

Schedule of Tuition and Fees

The most current listing of tuition and fees will be found at: www.registrar.colostate.edu/tuition-fees .

In addition to the charges listed under each category, students may pay supplemental tuition, appropriate charges for technology, university technology fee, university facility fee, and/or special course fees. Tuition and fees for a student registering for a combination of regular on-campus courses or continuing education courses will be assessed individually according to the schedule established for each.

Students who are off campus for full-time internships, practica, and professional affiliations, and are not concurrently enrolled in other on-campus experiences or courses, will be assessed a reduced student fee.

Undergraduate Colorado resident students are eligible to receive a College Opportunity Fund (COF) stipend from the State of Colorado to apply toward tuition costs. To receive the COF stipend, students must apply for the stipend at cof.college-assist.org AND authorize CSU to receive the funds EACH semester via RAMweb. Go to sfs.colostate.edu/cof/ for more information.

Tuition and Fee Adjustments

Registration Cancellation

Before classes begin for a particular term, all courses can be canceled via the Web registration system (RAMweb) with no charge and no charges will be assessed. Students not planning on attending must cancel their registration before the fall or spring semester begins or they will be assessed a portion of tuition and fees.

Registration Changes

Tuition and fees will be adjusted (not cancelled) for undergraduate students if credits are added or dropped during the schedule change period at the beginning of the semester. Specific dates are listed in the on-line class schedule. After this deadline, there is no adjustment in tuition and fees if a student drops part of his or her schedule.

University Withdrawal

Once the semester begins in fall or spring, students dropping all courses and leaving the University must contact the Center for Advising and Student Achievement (CASA), Room 121, The Institute for Learning and Teaching (TILT), 801 Oval Drive.

The schedule for tuition and fee adjustments for students withdrawing from the University may be found on the Registrar's website at: www.registrar.colostate.edu/university-withdrawal

Exceptions to the pro-rated tuition and fees adjustments may be made in the following situations:

1. Withdrawing students who received financial aid are subject to specific federal, state, and University withdrawal policies regarding tuition and fees, housing charges, return of funds to financial aid programs, and repayments resulting from their withdrawal.

A withdrawal may require an immediate return of financial aid funds. Returns are calculated according to Federal Student Assistance General Provisions regulations. The date of a student's withdrawal, financial aid disbursements to the student's account,

and University charges, are used to calculate the return amount.

The student may have to repay those funds which are in excess of an amount based on their length of enrollment.

All calculated refunds and repayments of University charges will be allocated to financial aid programs first, and any remaining amount to the student.

2. University room and board charges will be assessed through the vacate date from University housing.
3. In the case of a student death, a refund of tuition and fees may be made any time during the semester.
4. Withdrawal as a result of serious illness, disabling accident, military draft, or activation of reserves or National Guard units, initiated at the Center for Advising and Student Achievement (CASA), Room 121, The Institute for Learning and Teaching (TILT), will be subject to review by the Office of the Vice President for Student Affairs which may recommend a variation from the normal adjustment policy.

Please note: No financial adjustment will be made for a student who is suspended, dismissed, or expelled for breach of discipline.

Student General Fee Appeal Process

Student General Fee appeals must be submitted in writing within the first two weeks of the current term. The request should outline the particular circumstances for an appeal from the mandatory full-time Student General Fee. Send the appeal to Student General Fee Appeal Committee, Office of the Vice President for Student Affairs, Colorado State University, 8004 Campus Delivery, Fort Collins, CO 80523-8004. The following information should be included in the request: full name, CSUID, current address, telephone number, and e-mail address.

Special Fees

Nonrefundable Fees*

Admission application fee	
New and transfer students	\$ 50.00
GUEST students	\$ 60.00
Application fee for admission to professional program in Veterinary Medicine	\$ 60.00
Enrollment Deposit and Admission Confirmation (new and transfer students)	\$ 300.00
Composition Placement Examination	\$ 22.00

Mathematics Placement Examination	\$ 15.00
Credit Established by Challenge Examination per credit attempted	\$ 20.00
Dissertation microfilming fee	\$ 65.00
Language Placement Examination (one-time charge; no charge for retakes)	\$ 10.00
Charge for technology, per term (college-wide): ¹	
Agricultural Sciences	\$ 86.15
Applied Human Sciences ²	\$ 68.00
Business	\$ 94.50
Engineering	\$ 170.00
Intra-University	\$ 35.50
Liberal Arts	\$ 54.58
Natural Resources	\$ 94.50
Natural Sciences	\$ 94.50
Veterinary Medicine and Biomedical Sciences	\$ 90.00
Transcript fee per copy	
Secure Electronic Transcripts	\$ 11.00
Paper Transcript, first class mail	\$ 13.00
Paper Transcript, student pick-up next day	\$ 15.00
Paper Transcript, student pick-up same day	\$ 20.00
University Technology Fee	\$ 20.00

*Fees are subject to change.

¹For full-time resident and nonresident undergraduates and graduates. Graduate students in the Colleges of Natural Sciences and Veterinary Medicine and Biomedical Sciences are not assessed a charge. Students enrolled for ten or more credits are considered full time and required to pay the full amount according to their college affiliation. Part-time undergraduate and graduate students pay a prorated amount.

²The College of Applied Human Sciences is the only college that applies their charge during the summer session.

Special Course Fees

Certain courses require enrolled students to pay fees for special services and/or materials. Courses with fees are indicated by (\$) in the Courses of Instruction section of this catalog. Special course fees are updated in June for the upcoming academic year. For the most current listing of special course fees, visit the Provost and Executive Vice President's web page at: www.provost.colostate.edu/files/course_fee/SCFComprehensiveListFY13.pdf

There are four types of special course fees:

1. For some courses, enrolled students are assessed a uniform fee during registration to cover costs such as the rental of external facilities, the expenses of field placements, the provision of special equipment and materials that the University would not otherwise maintain, and/or the costs of off-campus travel of students with supervising faculty members.

2. For some courses, enrolled students are assessed a fixed or variable fee by the department based upon actual use of expended materials supplied by the department and used by the student in the creation, construction, and/or fabrication of an object of value, such as a class project that becomes the student's property. These fees are designed for situations in which it is more efficient for the departments to supply the expendable materials because of the inability to make individual purchases economically.
3. For some courses, enrolled students are assessed variable fees by the department based upon actual damage or non-return of equipment used in the courses.
4. For some courses, enrolled students are assessed a fixed fee to provide funds for replacement or upgrade of equipment that was purchased originally through department funds and cannot be maintained appropriately without this type of student fee support.

All special course fees will be assessed and collected through normal student accounts receivable procedures. *No fees should be paid directly to academic departments or individuals.*

Tuition for Continuing Education Courses

Tuition and course fees assessed for courses offered by the Division of Continuing Education vary by program, level of instruction, and delivery method. For specific tuition rate information on any of the Continuing Education programs, visit the web site at www.online.colostate.edu or call (970) 491-5288 or toll free (877) 491-4336.

Additional Expenses

Personal and Living Expenses

The amount of money spent by a student in an academic year (two semesters—August to May) for personal and living expenses varies with current prices and the habits and needs of the student; therefore, it is important that each student estimate the amount of money needed for such items as laundry, clothing, transportation, health care, etc. Expenses not directly related to educational costs are not included in the estimates.

Example of Estimated Direct Expenses for 2011-2012

(based on 15 credits per semester for 2010-2011)

	Resident	Non-Resident
Total base tuition and fees	\$8,846	\$23,096 ¹
College Opportunity Fund stipend credit (Colorado residents) ²	- \$1,860	\$0
Student share of base tuition and fees ³	\$6,986	\$23,096
Charge for technology (average)	\$185	\$185
Living allowance ⁴	\$8,424	\$8,424
Books and supplies	\$1126	\$1126
Total direct costs for the year⁵	\$16,721	\$32,831

¹A significant percentage of non-residents with competitive academic records are offered scholarships to help offset the cost of tuition.

² If you are a Colorado resident, be sure to apply for the College Opportunity Fund (COF) at the following website: <https://cof.college-assist.org>.

³ There may be additional costs for undergraduate students enrolled in high-cost/high-demand programs and/or upper-division courses. For more information about tuition and fee charges, visit the Registrar's website at www.colostate.edu/Depts/Registrar.

⁴ Based on a standard residence hall room with meal plan B. Other residence hall plans are available at varying costs. For details, visit www.housing.colostate.edu.

⁵ This figure does not include personal expenses for such items as laundry, clothing, transportation, health care, etc., which vary from student to student.

For more information about annual costs, including estimates of personal expenses, visit sfs.colostate.edu/.

Health Insurance

To protect your good health and financial stability, all students are encouraged to carry adequate health insurance coverage. Students who find themselves without adequate coverage are urged to enroll in the university-sponsored CSU student insurance plan. The plan is in addition to the medical care already provided by the CSU Health Network. Insurance is not a prerequisite to the use of the CSU Health Network, but is designed to supplement it and to help protect against the high costs of an accident or sickness requiring hospitalization. For more information on the insurance plan or the CSU Health Network, please visit www.health.colostate.edu.

Beginning in Fall Semester 2008, all new, full-fee paying resident instruction graduate students will be required to enroll in the CSU Student Insurance Plan or demonstrate comparable health insurance coverage. More information is available at graduateschool.colostate.edu/prospective-students/apply/health-insurance/index.aspx.

This policy does not impact the current University policy that requires all international students to carry health insurance. International students, please visit the CSU Health Network website listed above.

All international and graduate students are encouraged to visit the website at: graduateschool.colostate.edu/prospective-students/apply/health-insurance/index.aspx for specific health insurance requirements.

Half-time	3-5 credits
Graduate Students	
Full-time	5 or more credits
Half-time	3-4 credits

Housing Deposit

Residence Halls

The housing deposit for residence hall students serves as both a reservation fee and a contractual guarantee. A partial refund of this deposit is available if the applicant cancels his/her request prior to the date the residence halls open for the semester. For specific information about the refund policy, refer to the “Housing Deposit & Refund Information” outlined in the Housing Guide or on the housing web site at www.housing.colostate.edu under Application Information and Refund Policy on the Room & Board Rates page.

University Apartments

An application deposit is required for students applying for university apartments. This deposit will convert to a damage/cleaning deposit at the time of assignment. The deposit will be refunded any time prior to confirming an apartment assignment, upon request. The refund procedure for current apartment residents is outlined in the Apartment Life Housing Agreement. For further information, refer to the Housing Guide or the housing web site at www.housing.colostate.edu/apartments.

Full-Time/Half-Time Enrollment Status

Enrollment status (full-time, half-time) is determined by the number of credits which the student has completed or is pursuing for the term in which the verification is requested. Courses from which the student has withdrawn or is auditing are not included. (The following schedule for enrollment status differs from the full-time/part-time schedule for tuition and fees.) See the Registrar’s Office web site, www.registrar.colostate.edu.) Credit requirements are as follows:

Fall/Spring Semesters:

Undergraduates	
Full-time	12 or more credits
Half-time	6-11 credits
Graduate Students	
Full-time	9 or more credits
Half-time	5-8 credits

Summer Session:

Undergraduates	
Full-time	6 or more credits

For verification of enrollment status go to www.ramweb.colostate.edu and click on “Enrollment Verification Certificate.”

Graduate Assistants

Full-time graduate assistants receive a minimum monthly stipend during the academic year, as set by the University. Such assistants must register for and complete at least one on-campus credit during each fall and spring semester during which the assistantship is in effect; and such credits as the appointing department may require each summer term during which the appointment is in effect. Assistants may have tuition payments made in their behalf.

IN-STATE RESIDENCY FOR TUITION CLASSIFICATION PURPOSES

*Student Financial Services, Centennial Hall
(970) 491-6321
FAX: (970) 491-5010
sfs.colostate.edu/residency*

Refer to the residency section of our website for more information.

Classification of students for tuition purposes is governed by state statute (“tuition law”) which sets forth conditions for a student being considered as “in- state” for purposes of tuition classification. The tuition law is contained in sections 23-7-101 to 111 of the Colorado Revised Statutes. Although individuals may be considered state residents for voting or other legal purposes after being in the state for a short period of time, the tuition law specifies additional requirements for classification as “in-state” for tuition purposes. The tuition law, which applies to all public institutions of higher education in Colorado, is subject to judicial interpretation and change at any time by the Colorado Legislature. Colorado State University must apply the rules set forth in the Colorado Revised Statutes, and is *not* free to make exceptions except as specifically permitted under the Statute.

Note: This information is considered to be general guidance and is not legal advice. Refer to State Statute to review the actual law.

Definition of “In-State Residency”

Under the Colorado tuition law, the term “in-state” student means: “A student who has been domiciled in Colorado for one year or more immediately preceding the first day of classes for the term for which such status is claimed.” Further the tuition law states: “Attendance at an institution of higher education, public or private, within the state of Colorado shall not alone be sufficient to qualify for domicile in Colorado.”

In-state classification requires domicile in Colorado for 12 months on or prior to the first day of classes of each semester. “Domicile” is the term used to describe the place where a person has chosen to make a permanent and fixed home. Domicile is made up of two components: physical presence and evidence of intent. Both physical presence and evidence of intent must be established to begin the domicile year. A student can only establish domicile in Colorado for tuition purposes if s/he intends to reside permanently in the state, and meets the definition of a “Qualified Person.” Exceptions to One Year Domicile are in this section and also on our website at sfs.colostate.edu/residency.

Initial residency determination for tuition purposes of any student enrolling at Colorado State University is determined by the Office of Admissions. To be initially considered for in-state classification you must answer all residency questions completely and accurately on the application; failure to do so will result in classification as out-of-state for tuition purposes.

Petition for Reclassification

A petition may be filed if a student wishes to contest out-of-state classification or if s/he has subsequently become eligible for in-state status. Petition materials may be obtained from Student Financial Services. Petitions will be processed only for students who have been admitted to the University and are currently enrolled for the semester for which they are requesting a change in classification.

A student’s current tuition classification will remain until they have received notification from the Student Financial Services Tuition Classification Officer indicating a residency change has been approved. Students who are petitioning for in-state classification remain responsible for paying their tuition based upon current tuition classification. Students are strongly urged to petition by the “Priority Deadline to Submit Petition” provided on our website in order to receive a response of their tuition classification prior to the beginning of the semester and tuition and fee deadlines.

Petition Process/Deadline

Student Financial Services must receive completed petitions no later than the published deadline date for the semester for which the student is petitioning. Deadlines are provided on our website at sfs.colostate.edu/residency. Petitions will not be accepted after the published deadline date and incomplete petitions will not be accepted and/or reviewed for that semester, and the tuition classification and tuition assessment will remain nonresident for that term.

Petitioners will be notified of the results of their petition by mail. Please allow up to six weeks for notification. If additional information is required, the additional information must be submitted within 15 days from the original petition unless special arrangements are made with the Tuition Classification Officer.

Decisions made by the Tuition Classification Officer may be appealed to the University’s Residency Appeals Committee. A student wanting to appeal the decision to the Residency Appeals Committee must contact Student Financial Services no later than two weeks (10 business days) after the date of the letter in which the decision was conveyed to the petitioner. The decision of the Residency Appeals Committee is the final University determination for that specific semester. In addition, there are no provisions in the Tuition Classification Statutes for retroactive petitioning.

The fact that a student does not qualify for in-state status in any other state does not guarantee in-state status in Colorado; in-state classification is governed solely by Colorado statute. The tuition classification statute places the burden of proof on the petitioner to provide clear and convincing evidence of eligibility.

Any student who provides false information to avoid paying out-of-state tuition may be subject to legal and/or disciplinary actions.

Military Personnel and/or Their Dependents

Active-duty Military Personnel Stationed in Colorado

1. Active-duty personnel of the armed forces of the United States and Canada and their dependents (as defined by military regulations) are eligible for in-state status, regardless of domicile or length of residence in Colorado. The military member must have active duty status and report to a duty station in Colorado, as certified by their military command, by the first day of the semester. Members of the Colorado National Guard, regardless of length of residence in Colorado, if showing “sole residency,” are eligible for in-state status.

To request the Military Tuition Adjustment Request Form, contact Student Financial Services.

2. Military dependents granted in-state classification who maintain continuous enrollment in a Colorado college can continue to be classified as in-state for tuition purposes even though the military member has been transferred out of Colorado .
3. If a parent of an unemancipated student was active-duty in Colorado at any time during the student's senior year of high school in Colorado, and has been transferred out of Colorado, the student may be eligible for in-state classification based on a military waiver, if the student enrolls in a public institution of higher education in Colorado within 12 months of high school graduation, and the student did not attend college outside Colorado during that 12 months.
4. All members of the armed forces of the United State on active duty in Colorado or the member's spouse or dependent shall not lose his or her eligibility for in-state tuition status if the member retires or separates from the military and remains in Colorado.

Active-Duty Military Personnel Domiciled in Colorado Prior to Enlistment, But Currently in Another State

1. To retain domicile in Colorado during an absence from Colorado due to military orders, military personnel must maintain Colorado as their state of legal residence for tax purposes and voters must maintain Colorado voter registration.
2. A person domiciled (see definition of domicile for tuition purposes) in Colorado for one year prior to enlisting in active duty who returns permanently to Colorado within 6 months of discharge is eligible for in-state tuition classification regardless of changes of domicile while active duty.

Note: Military personnel may not establish domicile in Colorado for tuition purposes while residing elsewhere or while being physically present in the state only on a temporary basis. If a student/parent meets the requirement for domicile (see definition of domicile for tuition purposes) in Colorado for one year, the student must submit a petition to Student Financial Services to be considered for in-state classification for tuition purposes.

Colorado National Guard

Members of the Colorado National Guard and their dependents qualify for in-state tuition classification if the

member maintains his or her sole residence in Colorado. This includes having Colorado state taxes withheld from wages, leasing or owning property in Colorado, and maintaining Colorado vehicle registration, Colorado driver's license, and Colorado voter's registration.

International Students

Persons who are lawful permanent residents or who are admitted as refugees are eligible to establish domicile for tuition purposes.

Non-immigrant aliens who are residing in Colorado for purposes other than education may qualify for in-state status after one year of Colorado residence.

Non-immigrants in the following student categories cannot qualify for in-state tuition classification: F-1, F-2, H-3, H-4 (if the visa holder is the spouse or child of an H-3), J-1 and J-2 (if the J-1 visa holder is a student or trainee), M-1, and M-2.

Exceptions to One-Year Domicile Requirements

Four-Year Rule

If a student is not a qualified individual and their parents had Colorado domicile for four or more years and then moved to another state after the junior year of high school and they enroll at a Colorado public college or university within three years and six months after their parents left Colorado the student may be eligible for Colorado residency.

Economic Incentive Program

Employees whose employer moved their company operations to Colorado as a result of receiving an incentive from the Colorado Office of Economic Development are eligible for Colorado residency for tuition purposes. The employee must have been employed by the employer prior to the relocation.

New Faculty at a State-Supported College

The child of a new faculty member (but NOT the faculty member or the spouse) at a state-supported institution of higher education is eligible for Colorado residency for tuition purposes. A faculty member is defined as academic faculty with regular and special appointments of 50% time or greater.

Attended Colorado High School for Three Years

Students who are U.S. citizens, Colorado high school graduates, attended high school in Colorado for 3 years immediately preceding enrollment in a Colorado institution of higher education or GED and reside in Colorado can be considered for in-state classification for tuition purposes.

GI Promise

All honorably discharged veterans and their dependents that show established domicile in Colorado regardless of length of time shall be granted in-state tuition status. A dependent is an unmarried undergraduate student and under the age of 23 on or before the first day of class.

Colorado Employment and Relocation by Parents of Dependent Student

This provision grants in-state student status to a child who moves to Colorado during the child's senior year of high school as the result of the child's parent or legal guardian taking a job that requires relocating to Colorado.

1. Child's parent or legal guardian moved their family to Colorado for the purpose of accepting a job in the state during the child's senior yr of high school.
2. Child moved with their parent or legal guardian to Colorado during the child's senior yr of high school and they graduated from a Colorado **public** high school.
3. Must be a legal resident of the US.

PAYING YOUR BILL

Cashiers Office
First Floor Lory Student Center
(970) 491-2767
www.bursar.colostate.edu

You can make a payment on your student account by using CSU's preferred payment option—Web Cashier. Web Cashier is the fastest, most secure way to make a payment. Web Cashier is a free service to students and their parents and is easy to use.

Web Cashier can be accessed through RAMweb at www.ramweb.colostate.edu. You simply need your routing number and account number from the bottom of a personal check.

For details on other payment options, please visit the Bursar's web site at www.bursar.colostate.edu.

Student Billing

Student Financial Services
Office in Centennial Hall, First Floor
(970) 491-6321
www.sfs.colostate.edu

In support of the University's Green Initiatives, the University is implementing e-billing effective in Fall 2010. Billing notifications will be e-mailed to Rams e-mail addresses. Students can then log into RAMweb to view their University Billing Statement. Additional billing notifications may be sent to e-mail addresses maintained by the student on RAMweb.

Due Dates:

Fall	September 10
Spring	February 10
Summer	Due when billed

University charges are due by the date specified on the bill. Due dates are the 10th of each month unless the 10th falls on a weekend or holiday, then the due date is the following business day. The University does not offer an installment plan on payments. All payments should be in U.S. currency. Mailed payments must reach the University Cashier's Office, 6015 Campus Delivery, by 4:00 p.m. (MT) on the due date. Payments by check are processed when received – postmarks do not apply and future dates are not honored. Online payments must be made by 4:00 p.m. (MT) on the due date for the payment to be considered timely. Penalties for late payment include holds on University services and a 1.5% late payment charge of the past due balance. Penalties are initiated for the purpose of encouraging prompt payment.

Student Account Notes

Students are responsible for all charges on their account and arrangement of payments due. Payments should only be made when a balance due exists on an account. All overpayments will be refunded to the student.

Failure to pay amounts due may result in referral of outstanding balances to a collection agency. These agencies may take legal action to collect past due balances. Further, the University reserves the right to impose a penalty fee and financial hold for returned checks (refer to Returned Checks policy).

Students who are sponsored by a third party may request direct billing to the sponsor for tuition, fees, and other related educational expenses. Detailed information on sponsor billing is available upon request from the Student Financial Services Office or sfs.colostate.edu/paying

[yourbill/thirdpartysponsors.aspx](#). Arrangements for sponsor billing must be made prior to the student account due dates to prevent late payment penalties.

“Billing Information” at www.ramweb.colostate.edu provides more information on setting up a billing address, billing statement information, accepted payment methods, credit balance refunds, and education tax credit information. University Student Account Statements are mailed to the current billing address. If a billing address has not yet been created, statements will be mailed to the current mailing address on file with the University.

Unpaid past due balances may cause a hold on registration, transcripts, and diploma. The University will not register a student, confer a degree on a student, nor provide official transcripts to any student or former student who has past due financial obligations to the University until the hold is removed. The release of the hold may be expedited by paying the past due balance in full.

Returned Checks

All checks returned for insufficient funds, either paper or electronic, will incur a penalty as provided by state law.

The University will attempt to contact the originator of the check by mail and by telephone. In the case of students, a notice will be mailed to the student’s Fort Collins area address. If no response is received, a follow-up mailing will be sent to the student’s permanent mailing address of record. (All students are required to maintain an accurate address and telephone number with the University at all times.) These reparative payments are due by the method and deadline specified in the letter. The payment must be equal to the full amount of the invalid check plus penalty and fee if applicable. Failure to follow through will result in further collection actions. Please note: If the presentation of the original check permits a student to register for an academic term and if full payment of the returned check plus penalty and fee is not made by the specified deadline, the student’s class schedule will be canceled.

Address Updates

It is the student’s responsibility to maintain correct addresses (mailing and email) with the University. To create or update an existing address, go to www.ramweb.colostate.edu. In order to communicate quickly and effectively with students, the University now requires that each enrolled student provide an e-mail address. Colorado State University has designated email as an official form of communication to students.

Being able to communicate electronically with the student population provides several benefits:

- Students can be quickly notified by professors and University offices of events that affect them personally or may be of interest to them generally (e.g., classroom changes, class meeting time changes, department activities, etc.)
- It's faster and less costly than printing and mailing letters.
- It advances the University's commitment to environmental consciousness by reducing paper use and eliminating physical refuse.

It is also essential that students maintain a current mailing address with the University by updating it at www.ramweb.colostate.edu.

Deadlines for registrations and payments of tuition, fees, and other charges must be met to allow registration to occur. Therefore, students must respond to correspondence from the University in a timely manner.

FINANCIAL ASSISTANCE

Student Financial Services

Office in Centennial Hall
(970) 491-6321
www.sfs.colostate.edu

Student Financial Services administers a variety of institutional, state, federal, and private financial assistance programs for qualified students. Financial assistance programs include scholarships, grants, loans, and employment. Employment opportunities available include the Work Study Program, on-campus departmental positions, and community part-time employment.

Financial Aid Programs

Colorado State University offers a variety of financial assistance programs for students based on merit and income. Awards recognize scholastic achievement, assist low income students, and provide funding so students can reach their goal of graduation.

Detailed information on all financial aid programs is available on request from Student Financial Services and on the website at www.sfs.colostate.edu. Financial aid policies and procedures may change without notice.

Scholarships

Colorado State University administers state, federal institutional, private agency, foundation, service club, and

individual scholarships. The Colorado State University Scholarship Application (CSUSA) is available on RAMweb December 1 to March 1 of each year. Students use the CSUSA to apply for most University scholarships. Scholarship information, including specific criteria, application requirements, and deadline dates is available on the website.

Grants

Colorado State University administers a number of grant programs available to undergraduate students. Several are restricted to Colorado residents.

- Colorado Leveraging Educational Assistance Partnership Program
- Colorado Student Grant (Colorado's College Responsibility Program)
- CSU Commitment to Colorado
- CSU Ram Grant
- Federal Pell Grant
- Federal Supplemental Educational Opportunity Grant
- Supplemental Leveraging Educational Assistance Partnership Program

The University administers the Federal Pell Grant program for qualified undergraduates. The federal government establishes the dollar limit for the Federal Pell Grant program each year. All grants may be re-awarded in subsequent years, providing the student reapplies for financial aid, continues to document financial need, and maintains satisfactory academic progress.

Loans

Colorado State University participates in the following loan programs:

- Federal Perkins Loan Program
- Federal Direct Loan Programs, both subsidized and unsubsidized
- Federal Direct Parent PLUS Loan Program
- Federal Direct Graduate PLUS Loan Program
- Health Professions Loan Program – veterinary medical degree program only

Loan amounts vary depending on degree program, need, eligibility, availability of funds, and maximum limits established by federal regulations.

Work-Study

The Federal and State Need-Based Work-Study Programs are administered by Student Employment Services and provide part-time employment opportunities to qualified

students. Both undergraduate and graduate students are eligible to apply. Awards are based on the evaluation of students' financial need and availability of funds.

The Merit Work-Study Program is available to University students and they do not have to document financial need. Students must find a job, generally on campus, which relates to their academic major. All regularly enrolled students, other than Colorado resident graduate students, are eligible to apply. Applications are available on each student's RAMweb beginning in early February for the next academic year.

Applying for and Retaining Financial Aid

Application Procedures for Need-Based Financial Aid

Students use the Free Application for Federal Student Aid (FAFSA), available online at www.fafsa.gov, to apply for financial aid. Application and procedures for any of the above programs may be obtained from Student Financial Services and is available on the website.

Satisfactory Academic Progress Standards

Students applying for and/or receiving financial aid are expected to maintain satisfactory academic progress. Failure to perform at established levels may result in students becoming ineligible for financial aid. Copies of the complete policy are available at Student Financial Services, in "Your Financial Aid Guide," or on the website.

Ceased Attendance

The last date of class participation must be verified for students who receive all F, U, and/or W grades. A student may be required to return up to 100% of the financial aid received if participation cannot be verified.

Fraudulent Receipt of Funds

Students who receive student aid funds through a misrepresentation, falsification, or omission of information may have their names referred to appropriate law enforcement authorities for possible prosecution under the law. Any person who purposely gives false or misleading information may be fined \$20,000, sent to prison, or both.

Reporting Changes

All students must immediately notify Student Financial Services of any additional resources, such as scholarships,

veteran's non-educational benefits, etc., any changes in their financial situation, residency, class standing, or any other factors which can reasonably be construed to impact their eligibility for financial aid.

Student Employment Services

Office in Student Services Building, Room 133
(970) 491-5714
www.ses.colostate.edu

Student Employment Services is responsible for the University's Student Employment Program. This office lists work-study positions, some of the University's on-campus student hourly positions, and is a central listing source for employers to post community jobs. Students may view job notices on RAMweb.

All individuals who are currently enrolled with at least one or more resident instruction (RI) credits and degree-seeking may use this service.

Student employees, both work-study and student hourly, are compensated on an hourly basis and are paid every other week through direct deposit to their personal checking or savings account. All student employees enrolled at least half-time in resident instruction credits as degree-seeking students are exempt from retirement withholdings. Enrollment is verified every pay period.

Several thousand students work on campus each year through the work-study and student hourly programs, and a large number of students have found employment through the off-campus employment program.

Colorado State is an Equal Opportunity Employer, and adheres to the state's fiscal rules and the regulations set forth by the Department of Education and the Colorado Department of Higher Education which govern the work-study and student employment programs.

Student Employment Services staff encourages any student seeking a job to contact them.

Veterans' Benefits

The Registrar's Office assists the Department of Veterans' Affairs (VA) in providing certification for the following education benefits:

- Under Title 38, U.S. Code
- Chapter 30 (Montgomery G.I. Bill)
- Chapter 31 (Vocational Rehabilitation)
- Chapter 32 (Post-Viet Nam Era)
- Chapter 33 (Post-9/11 G.I. Bill)
- Chapter 35 (Dependents Educational Assistance)
- Under Title 10, U.S. Code
- Chapter 1606 (Selected Reserve/National Guard Members)
- Chapter 1607 REAP (Reserve Education Assistance Program)

Students eligible for any of these benefits must contact the Registrar's Office as soon as possible prior to the expected date of enrollment. Applicants should apply to Colorado State University in a degree-seeking major or for teacher licensure before applying for veterans' education benefits. A description of the regulations governing receipt of veterans' education benefits, Standards of Progress, and other policies is available at: registrar.colostate.edu/students/veterans/index.aspx

Financial Support for Graduate Students

Graduate students seeking financial support should consult Section F of the *Graduate and Professional Bulletin*, www.graduateschool.colostate.edu/current-students/bulletin.aspx. Merit-based awards, such as fellowships and assistantships, are available on a competitive basis through the academic departments. Need-based support, such as loans or work-study positions, may be provided to students who apply for financial aid and qualify based on financial aid guidelines.

Colorado State University reserves the right at any time, without notice, to change, modify, or cancel any course, program, procedure, policy, financial requirement, or disciplinary arrangement set forth in this catalog whenever, in its sole discretion, it determines such action to be appropriate. Furthermore, Colorado State will not be responsible for any failure to present or complete any course or program or to perform any other activity, function, or obligation mentioned in this catalog. Since changes may occur at any time, students must check the relevant website (as noted throughout various chapters in this catalog).

International Programs and Services

OFFICE OF INTERNATIONAL PROGRAMS

*Offices in Laurel Hall
(970) 491-5917*

www.international.colostate.edu

James A. Cooney, Vice Provost for International Affairs

The Office of International Programs acts as a catalyst for ideas that bring about internationalization and institutional change, and it identifies resources to support international programs and initiatives on campus. Its programs and services have an impact on teaching, learning, research, outreach, and the campus environment. The University received an award for one of the eight outstanding internationalization plans in the country.

The Office of International Programs is involved directly in implementing the University's Strategic Plan that outlines CSU's commitment to international research and strategic partnerships. This includes global scholarship, the funding of research through cooperative agreements with partners abroad, and the integration of global concerns into our signature areas of funded research. The Office of International Programs developed the University's "internationalization plan" and monitors its progress. The goals of the Office of International Programs' activities are to encourage domestic and international students to graduate from CSU with a broader outlook on the world by participating in courses with international content, study abroad experiences, and other activities on campus.

In fulfilling its mission, the Office of International Programs brings Colorado State University recognition as a model of effective, innovative, and student-centered institutional internationalization. It does so through a collaborative process, especially with the faculty and CSU's eight colleges, that makes international activity integral to the University's instruction, student service, research and outreach programs, and to the experience of the University's students.

The office is organized into three functional units:

- 1) International Education
- 2) Study Abroad
- 3) International Student and Scholar Services

International Education

*Office in Laurel Hall
(970) 491-5917*

international_initiatives.colostate.edu/index.asp?url=acad_pro_ie

Colorado State University encourages students and faculty to gain knowledge for living and working in an increasingly globalized and interdependent world. The Office of International Programs, through its International Education unit, offers relevant international experiences for students and faculty on campus and abroad. Experiences coordinated through International Education include on-campus courses for learning about other cultures and issues of world importance (IE prefix courses), international interdisciplinary programs, international field experiences and work, internship, and volunteer programs, and ongoing campus programs such as the Global Village Residential Learning Community that offer opportunities to learn about the world. The Peace Corps Masters International Program in Agriculture, Natural Resources, English, and Food Science and Human Nutrition are administered through International Education. The campus Peace Corps representative is also located within International Education.

Interdisciplinary Programs and Area Studies

Undergraduates may enrich their understanding of regional cultures and international issues through international interdisciplinary minor programs. Minors are offered in Asian Studies, Latin American and Caribbean Studies, International Development Studies and Peace and Reconciliation Studies. For specific program descriptions, refer to the University Interdisciplinary Studies Programs section in the University-Wide Instruction Programs chapter.

International Education (IE) Courses

International Education (IE prefix) courses such as World Interdependence: World Food and Population; Plants and Civilization; Children and Youth in Global Context; Women and Development and Education for Global Peace offer the opportunity to bring a variety of international disciplines and perspectives together in one classroom.

Graduate Programs

Graduate students may enroll in the International Development or Peace and Reconciliation Graduate Interdisciplinary Studies Programs to earn certificates in the fields. These programs, like the undergraduate programs, do not result in a degree, but enhance a student's degree in any field.

Graduate students may engage in educational activities abroad as a part of their plan of study through programs that are prearranged with the students' graduate advisor and sanctioned by Colorado State University and International Education. Students may also participate in short-term international field experience with cooperating faculty and programs.

Nationally competitive scholarship programs for graduate study abroad are facilitated through International Education. The programs include, but are not limited to, the Fulbright Graduate Study Program, the Boren National Security Education Program (NSEP), and the Rotary Ambassadorial Scholarship Program. Contact the Office of International Programs for more information.

Peace Corps Master's International Programs

Colorado State University and Peace Corps participate in several cooperative master's degree programs giving students the opportunity to earn a master's degree and gain hands-on experience internationally. These are offered in any field within the Warner College of Natural Resources, the College of Agricultural Sciences, the Department of English, and the Department of Food Science and Human Nutrition. Students take approximately three semesters on campus, then complete Peace Corps service and return to campus to complete their professional paper or portfolio. The program allows students to integrate graduate study with international development practice through Peace Corps field experience. Students must apply for and be accepted for both graduate study and Peace Corps to complete the program. For more information contact the Office of International Programs, International Education, at (970) 491-3065.

Other Opportunities

Weekly seminars, special programs such as exhibits, special speakers, and cultural programs are also offered to assist students in advancing their international educational goals.

Study Abroad

*Office in Laurel Hall
(970) 491-5917*

www.studyabroad.colostate.edu

Study abroad opportunities are central to Colorado State University's international mission. Study abroad actively engages students in an international arena and allows them to gain new perspectives on their studies, to broaden their knowledge of international affairs, and to deepen their understanding of other cultures. In addition to enhancing a student's degree program, study abroad provides students with direct experience developing intercultural skills necessary for success in an increasingly diverse and globally interdependent workforce.

The Study Abroad unit of the Office of International Programs manages Colorado State University's study abroad and reciprocal exchange programs throughout the world. Study Abroad advisers provide individual and group advising to students on educational opportunities abroad, program selection, financial aid, scholarships, and credit transfer. In addition, Study Abroad offers support services such as pre-departure orientations, workshops for returnees, and serves as the student's primary liaison to other campus offices while abroad.

All students considering study abroad are required to work with study abroad advisors in the Office of International Programs in preparation for their time abroad. Advance planning helps assure that study abroad programs will not unnecessarily prolong the period of time needed to get a degree. Advance planning also assures that students meet application deadlines which can range anywhere from two months to eighteen months before a program begins.

Credit from approved study abroad programs may be applied towards a student's overall degree program at Colorado State. Students participating in an approved study abroad program, even those sponsored by another institution or organization, register in the study abroad course (SA 482) and pay an administrative charge. Registration in SA 482 maintains the student's full-time enrollment at Colorado State and allows for the release of financial aid to cover program costs. Students who successfully complete (with a grade of C- or better) a

minimum of 12 credits through an approved study abroad program are eligible for a waiver of the All-University Core Curriculum Global and Cultural Awareness requirement.

Further information on eligibility requirements, deadlines, policies, procedures, financial aid, and costs related to study abroad may be found at:

www.studyabroad.colostate.edu

Scholarships for Study Abroad

As part of Colorado State's Internationalization Plan, the Office of International Programs (OIP) has developed a new scholarship program specifically to support undergraduate study abroad. Awards ranging from \$250 for the summer, \$500-\$750 for a semester, and \$750-\$1,000 for an academic year will be granted by the scholarship committee. Application and scholarship criteria for the OIP Undergraduate Study Abroad Scholarship Program can be found at www.studyabroad.colostate.edu.

Various competitive scholarships are available for international study, including NSEP, Gilman, Freeman-Asia, and Rotary International fellowships. Students interested in scholarships should contact the Office of International Programs as early in their college career as possible since many scholarship deadlines are as much as a year in advance.

In addition to formal study abroad, there are many other opportunities for undergraduate students to enjoy a significant international experience through volunteer programs, work-based experience, internships, and experiential learning. The Office of International Programs maintains information on these opportunities in the International Resource Center in Laurel Hall.

International Student and Scholar Services

*Office in Laurel Hall
(970) 491-5917*

iss.colostate.edu/index.asp

Mark Hallett, Director

International Student and Scholar Services (ISSS) provides immigration documentation and advising services to international students, scholars, and their families. ISSS support services include issuance of immigration documents, orientation, workshops, support during cross-cultural adjustment, and immigration advising. ISSS serves as liaison to U.S. Government

departments, academic departments, other campus offices, sponsoring agencies, and embassies. Special services are provided to agency-sponsored students including placement and billing.

New and transfer international students are required to report to campus at an earlier date. Due to the importance of orientation, attendance is required for all new and transfer international students.

ISSS offers an integrated series of programs and services for international students, scholars, and their families at Colorado State University. These programs address cultural adjustment needs, academic success, immigration benefit processing, health and wellness topics, and re-entry issues. Another key element is maintenance of connections between international students, scholars, and their families with their home countries and a focus on understanding Americans and American culture. Programs include World Unity Fair, the Day in the Mountains, and the cross-cultural interactions of international students and U.S. students through the Council of International Student Affairs and through community outreach programs sponsored by the Fort Collins International Center.

INTERNATIONAL STUDENT APPLICATION AND EXPENSES

Application Procedures

The initial inquiry about admission should indicate the applicant's academic background, proposed program of study, and the source and amount of financial support for study at Colorado State. Applicants are required to submit the Certificate of Issuance of Immigration Document and financial support statements for immigration processing.

Obtaining an Application

Students are encouraged to apply for admission online at www.admissions.colostate.edu, or through the Common Application at www.commonapp.org. Paper applications can be requested by e-mail to <mailto:admissions@colostate.edu>, calling (970) 491-6909, or writing the Office of Admissions, Spruce Hall, Colorado State University, 1062 Campus Delivery, Fort Collins, CO 80523-1062. Paper applications may also be available through high school guidance offices and community college transfer centers.

Completing an Application

Unless otherwise indicated, all applicants are required to submit the following documents in order to complete an application for admission. In some cases, additional information may be required before an admission decision can be rendered.

International Applicants:

- Application for admission (online preferred)
- \$50 non-refundable processing fee
- One official transcript from each university attended (if applicable). If transcripts are not in English, a certified English translation must also accompany each document.
- One official secondary school transcript. If transcripts are not in English, a certified English translation must also accompany each document.
- Official TOEFL results
- Personal essay (minimum 250 words)
- A recommendation from a teacher, school counselor, or other person who can attest to the applicant's personal character and potential to succeed **academically** at CSU.

Application Processing Fee

A \$50 nonrefundable processing fee is required. This fee is not refunded if admission is denied nor is it applicable to tuition and fees if the student enrolls. Pay online or make payable to Colorado State University a check or money order on which is indicated the applicant's full, legal name, and date of birth.

Application Deadlines

Applications are processed up to 14 months before the requested date of entrance.

Completed applications from international students must be submitted by May 1 for fall semester (August-December) and October 1 for spring semester (January-May).

Applications that are completed or received after the deadline may be updated to the next consecutive semester or withdrawn.

Enrollment Deposit and Admission Confirmation

As part of the admission confirmation process, all newly admitted freshman and transfer students must submit a \$300 enrollment deposit before they can register for their first semester courses. The non-refundable deposit is

applied to first semester tuition. The deadline for submitting the enrollment deposit is May 1 for the fall semester, December 1 for the spring semester, or within two weeks of receiving the offer of admission (whichever is later). Admitted students beginning in a summer term also must submit the enrollment deposit before they can register for courses; summer course registration begins in February.

Good Standing Requirement

Applicants for admission to Colorado State whose records indicate they are under disciplinary censure generally may not be admitted until they have cleared their disciplinary records.

Personal Identifier

The personal identifier for all CSU students is the CSUID. The CSUID is a nine-digit unique numeric identifier that begins with the digit 8 and is assigned by the ARIES student information system. The social security number (SSN) is not used at CSU as a personal identifier.

All students are requested to submit a social security number (SSN) at the time of admission or before initial enrollment at the University. The social security number is maintained as a secure data element in the student information system and is not accessible as directory information or to unauthorized persons. International students are encouraged to file for a social security number although they are not eligible for social security benefits. *Students' disclosure of the social security number is required for financial aid purposes, employment, and state and federal reports required by law.*

The social security number is released to agencies or individuals outside the University only at the request of the student or in accordance with federal and state requirements in regard to financial aid awards; Internal Revenue Service for student employee salary reporting and 1098T/1098E reporting; and State Controller's debt collection procedure. The University has strict policies protecting and prohibiting the use of SSN and uses every reasonable effort to protect and not disclose the SSN.

Immunization Policy

Colorado State University, in compliance with Colorado State laws and Health Department regulations, requires persons born January 1, 1957, or later to show proof of two vaccinations for measles, mumps, and rubella (MMR) or laboratory evidence for proof of immunity by submitting an immunization certificate to the Hartshorn Health Service *prior* to arrival at school. Additional

information concerning immunization should be directed to Immunizations, Hartshorn Health Service, 8031 Campus Delivery, Colorado State University, Fort Collins, CO 80523-8031.

Immunization Office

Hartshorn Health Service, Room C114
(970) 491-6548
mailto:csuhm_immunize@mail.colostate.edu

English Proficiency

Colorado State University requires all students whose first language is not English, regardless of citizenship, to demonstrate a high level of English proficiency. Applicants from Australia, Canada, Ireland, New Zealand, and the United Kingdom whose first language is English are exempt from this requirement. While alternative English language proficiency measurements may be considered for conditional admission, the TOEFL (Test of English as a Foreign Language) and the IELTS (International English Language Testing Service) exams are preferred. To be considered for clear (unconditional) admission, undergraduate applicants must present strong academic preparation and a minimum TOEFL score of 197 on the computer-based exam, 71 on the internet-based exam, 525 on the paper-based exam, or a minimum IELTS score of 6. To be considered for conditional admission, applicants must present strong academic preparation and a minimum TOEFL score of 130 on the computer-based exam, 44 on the internet-based exam, 450 on the paper-based exam, or a minimum IELTS score of 5.

Expenses and Costs

Authority to set tuition rates is vested in the governing boards of Colorado's state institutions of higher education. The tuition rates which apply to any succeeding fiscal year will not be known until June of each year. *The Board of Governors of the Colorado State University System, therefore, reserves the right to change tuition and fee schedules and related policies, including the time, date, and method for payment, at any time.*

Student Financial Services

Office in Centennial Hall
(970) 491-6321
www.sfs.colostate.edu

Schedule of Tuition and Fees

The most current listing of tuition and fees will be found at www.registrar.colostate.edu.

In addition to the charges listed under each category, students may pay supplemental tuition, appropriate charges for technology, university technology fee, university facility fee, and/or special course fees. Tuition and fees for a student registering for a combination of regular on-campus courses or continuing education courses will be assessed individually according to the schedule established for each.

Students who are off campus for full-time internships, practica, and professional affiliations, and are not concurrently enrolled in other on-campus experiences or courses, will be assessed a reduced student fee.

Tuition and Fee Adjustments

Registration Cancellation

Before classes begin for a particular term, all courses can be canceled via the Web registration system (RAMweb) with no charge and no charges will be assessed. Students not planning on attending must cancel their registration before the fall or spring semester begins or they will be assessed a portion of tuition and fees.

Registration Changes

Tuition and fees will be adjusted (not cancelled) for undergraduate students if credits are added or dropped during the schedule change period at the beginning of the semester. Specific dates are listed in the on-line class schedule. After this deadline, there is no adjustment in tuition and fees if a student drops part of his or her schedule.

University Withdrawal

Once the semester begins in fall or spring, students dropping all courses and leaving the University must contact the Center for Advising and Student Achievement (CASA), Room 121, The Institute for Learning and Teaching (TILT), 801 Oval Drive.

The schedule for tuition and fee adjustments for students withdrawing from the University may be found on the Registrar's website at <http://registrar.colostate.edu/>

Exceptions to the pro-rated tuition and fees adjustments may be made in the following situations:

1. Withdrawing students who received financial aid are subject to specific federal, state, and University withdrawal policies regarding tuition and fees, housing charges, return of funds to financial aid

programs, and repayments resulting from their withdrawal.

A withdrawal may require an immediate return of financial aid funds. Returns are calculated according to Federal Student Assistance General Provisions regulations. The date of a student's withdrawal, financial aid disbursements to the student's account, and University charges, are used to calculate the return amount.

The student may have to repay those funds which are in excess of an amount based on their length of enrollment.

All calculated refunds and repayments of University charges will be allocated to financial aid programs first, and any remaining amount to the student.

2. University room and board charges will be assessed through the vacate date from University housing.
3. In the case of a student death, a refund of tuition and fees may be made any time during the semester.
4. Withdrawal as a result of serious illness, disabling accident, military draft, or activation of reserves or National Guard units, initiated at the Center for Advising and Student Achievement (CASA), Room 121, The Institute for Learning and Teaching (TILT), will be subject to review by the Office of the Vice President for Student Affairs which may recommend a variation from the normal adjustment policy.

Please note: No financial adjustment will be made for a student who is suspended, dismissed, or expelled for breach of discipline.

Special Fees

The International Student and Scholar Services administrative charge is \$90 the first semester and \$45 for each subsequent semester. Fees are subject to change.

Nonrefundable Fees*

Admission application fee	
New and transfer students	\$ 50.00
GUEST students	\$ 60.00
Application fee for admission to professional program in Veterinary Medicine	\$ 60.00
Enrollment Deposit and Admission Confirmation (new and transfer students)	\$ 300.00
Composition Placement Examination	\$ 22.00
Mathematics Placement Examination	\$ 15.00
Credit Established by Challenge Examination	

per credit attempted	\$ 20.00
Dissertation microfilming fee	\$ 65.00
Language Placement Examination (one-time charge; no charge for retakes)	\$ 10.00
Charge for technology, per term (college-wide): ¹	
Agricultural Sciences	\$ 86.15
Applied Human Sciences ²	\$ 68.00
Business	\$ 94.50
Engineering	\$ 170.00
Intra-University	\$ 35.50
Liberal Arts	\$ 54.58
Natural Resources	\$ 94.50
Natural Sciences	\$ 94.50
Veterinary Medicine and Biomedical Sciences	\$ 90.00
Transcript fee per copy	
Secure Electronic Transcripts	\$ 11.00
Paper Transcript, first class mail	\$ 13.00
Paper Transcript, student pick-up next day	\$ 15.00
Paper Transcript, student pick-up same day	\$ 20.00
University Technology Fee	\$ 20.00

*Fees are subject to change.

¹For full-time resident and nonresident undergraduates and graduates. Graduate students in the Colleges of Natural Sciences and Veterinary Medicine and Biomedical Sciences are not assessed a charge. Students enrolled for ten or more credits are considered full time and required to pay the full amount according to their college affiliation. Part-time undergraduate and graduate students pay a prorated amount.

²The College of Applied Human Sciences is the only college that applies their charge during the summer session.

Special Course Fees

Certain courses require enrolled students to pay fees for special services and/or materials. Courses with fees are indicated by (\$) in the Courses of Instruction section of this catalog. Special course fees are updated in June for the upcoming academic year. For the most current listing of special course fees, visit the Provost and Executive Vice President's web page at: www.provost.colostate.edu/files/course_fee/SCFComprehensiveListFY13.pdf

There are four types of special course fees:

1. For some courses, enrolled students are assessed a uniform fee during registration to cover costs such as the rental of external facilities, the expenses of field placements, the provision of special equipment and materials that the University would not otherwise maintain, and/or the costs of off-campus travel of students with supervising faculty members.
2. For some courses, enrolled students are assessed a fixed or variable fee by the department based upon

actual use of expended materials supplied by the department and used by the student in the creation, construction, and/or fabrication of an object of value, such as a class project that becomes the student's property. These fees are designed for situations in which it is more efficient for the departments to supply the expendable materials because of the inability to make individual purchases economically.

3. For some courses, enrolled students are assessed variable fees by the department based upon actual damage or non-return of equipment used in the courses.
4. For some courses, enrolled students are assessed a fixed fee to provide funds for replacement or upgrade of equipment that was purchased originally through department funds and cannot be maintained appropriately without this type of student fee support.

All special course fees will be assessed and collected through normal student accounts receivable procedures. *No fees should be paid directly to academic departments or individuals.*

Additional Expenses

Personal and Living Expenses

Students from other countries should anticipate expenses considerably higher than those quoted in the chapter on Financial Services for Students. The following estimates do not include costs of deposits for off-campus housing, transportation, international travel, clothing (particularly winter clothing for those coming from warmer climates), living expenses during vacation periods and during the summer months for those who choose to remain on campus, the cost of keeping an automobile and insuring it, babysitting, shipping books and other belongings home, taxes owed on U.S. source income, and items of personal use which cannot be brought in a suitcase and which must be purchased in the United States after arrival. An annual inflation rate of 3-5% should be anticipated in all calculations. These figures, therefore, are subject to change. For an up-to-date list of estimated expenses, please see: www.international.colostate.edu

The minimum amount of financial support necessary per academic year (nine months) for a single, undergraduate student is based on current tuition and fee amounts. The actual total may exceed this minimum, as it reflects a relatively modest standard of living.

In addition, expenses for graduate students may run considerably higher than for undergraduate students because of research costs, thesis expenses, field trips,

special equipment, and more expensive textbooks. Students enrolled in specialized training courses in non-degree schools should refer to the specific program document for costs.

Students accompanied by dependents must allow additional funds, please see the Estimates Family of Expenses below.

2011-2012 Estimate of Expenses for International Students

(Summer Expenses are additional unless otherwise noted)

Estimate of Student Expenses for One Academic Year (9 months)

EXPENSE	UNDERGRADUATE	GRADUATE
Tuition ¹	\$ 23,736	\$ 21,322
Living Expenses	11,014	11,014
Room & Board	8,622	8,622
Miscellaneous	2,392	2,392
Other Expenses	3,221	3,221
Books	1,126	1,126
Health Insurance ²	2,095	2,095
TOTAL	\$ 37,971	\$ 35,557

¹Non-resident tuition for fall and spring semesters.

Undergraduate full-time enrollment requires a minimum of 12 credit hours per semester. Graduate full-time enrollment requires a minimum of 9 credit hours per semester

²Mandatory, 12-month coverage.

The minimum amount of financial support necessary per calendar year (twelve months) for a single graduate student is based on current tuition and fee amounts. In general, most graduate students remain on campus year round in order to pursue their research. Expenses for graduate students are higher than for undergraduate students because of research costs, thesis expenses, field trips, special equipment, and more expensive textbooks. The actual total may exceed this minimum, as it reflects a relatively modest standard of living.

Estimates of Family Expenses for One Calendar Year (12 months)

Married students and scholars who wish to bring their family to the United States need proof of additional support. Minimum required amounts are indicated below.

Additional Expenses for Student plus Spouse

EXPENSE	UNDERGRADUATE	GRADUATE
Student Costs	\$ 37,971	\$ 35,557
Spouse Additional	7,330	7,330
Living Expenses	3,000	3,000
Health Insurance ¹	4,330	4,330

TOTAL \$ **45,301** \$ **42,887**

¹Mandatory, 12-month coverage.

Additional Expenses for Student plus Spouse and Children

EXPENSE	UNDERGRADUATE	GRADUATE
Student + Spouse	\$ 45,301	\$ 42,887
EXPENSE	UNDERGRADUATE	GRADUATE
Additional for:		
1 Child	5,000	5,000
2 Children	7,400	7,400
3 Children	9,800	9,800
Health Insurance ¹	2,600	2,600
TOTALS:		
1 Child	\$ 50,301	\$ 47,887
2 Children	\$ 52,701	\$ 50,287
3 Children	\$ 55,101	\$ 52,687

¹Mandatory, 12-month coverage for one or more children.

These figures are relatively conservative budget estimates for a student who budgets carefully and shares living quarters with at least one other person. While some students can live comfortably on this amount, others find that they need more.

Satisfactory proof of finances covering all required expenses must be provided before Colorado State University will issue an I-20 or DS-2019.

Tuition and fees, as well as other expenses listed above, are subject to change due to annual inflation. Increases become effective as of July 1 each year. Refer to admissions.colostate.edu/Data/Sites/1/pdf/internationalstudentexpenses.pdf for the most current information on expenses.

Medical Insurance

All non-immigrant students and accompanying dependents are required to enroll in the Student Health Service insurance program (or to show proof of equivalent or better protection).

Housing

All newly admitted first-year students without previous college experience, who are single, under 21 years of age, and not living with their parents in the Fort Collins area, are required to live their first two consecutive semesters in a residence hall. Credits taken concurrent with high school and/or credits attained through Advanced Placement (AP) do not apply toward living experience.

First year students are guaranteed a room in one of thirteen residence halls on campus. Visit www.housing.colostate.edu/halls for more information. Students with families, graduate students, and upper class undergraduate students can find information on university apartments at www.housing.colostate.edu/apartments. Off-campus housing information can be found at Off-Campus Life, www.ocssral.colostate.edu/

Residence Halls

Students have thirteen residence halls to choose from on campus. The halls offer double and single rooms in standard and suite halls. Students in the residence halls have a choice of meal plans and can eat at any one of six dining centers including four late night operations, three express locations, and a sports grill. The halls also offer professional staff, 24/7 security, and a wide variety of social and educational programs. For more information visit www.housing.colostate.edu.

University Apartments

The University Apartments offer one, two, and three bedroom apartments in four areas for students with families, graduate students, and undergraduate students who have met the freshman live-in requirement, and CSU faculty and staff. For more information visit: www.housing.colostate.edu/apartments/index.htm.

Third Party Billing

All agencies and other entities sponsoring international students, which utilize third party billing privileges, will be assessed a \$320 base service fee per student per academic term. This fee applies to all international students who receive services regardless of whether the student is registered for credit-bearing classes. For a copy of the Service Schedule and/or a detailed list of estimated expenses, send a request to: Advisor, Sponsored Degree Programs, Office of International Programs, 1024 Campus Delivery, Colorado State University, Fort Collins, CO 80523-1024.

Exchange Students

International students attending Colorado State as a part of one of Colorado State’s two-way reciprocal exchange programs should direct questions about their study and expenses to the Office of International Programs, 1024 Campus Delivery, Colorado State University, Fort Collins, CO 80523-1024.

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Policies and Guiding Principles

Colorado State University is a community dedicated to higher learning in which all members share in pursuit of knowledge, development of students, and protection of essential conditions conducive for the learning environment. These protections are presented in the form of university policies, applicable federal and state laws, and statements of fundamental rights and responsibilities which govern both the academic setting and the university community as a whole. Some of the policies and expectations in this chapter are relevant to students, faculty and staff; others are focused specifically on the student population.

Colorado State University expects students to maintain standards of personal integrity that are in harmony with the educational goals of the institution; to observe national, state, and local laws, and University regulations; and to respect the rights, privileges, and property of other people. Principles of academic honesty, respect for diversity, and pursuit of lifestyles free of alcohol and drug abuse are examples of these standards. Students are not only members of the academic community; they are, additionally, members of the larger society and thus retain the rights, protection guarantees, and responsibilities which are held by all citizens.

GUIDING PRINCIPLES

Commitment to Diversity

As a comprehensive research land grant university, Colorado State University has a fundamental responsibility to offer equal educational opportunities to all individuals with the courage, desire, and dedication to pursue an education and fulfill their aspirations and dreams in a democratic and pluralistic society. The University strives to educate Colorado's and the nation's future leaders who represent a diversity of perspectives and ethnic and cultural experiences.

Freedom of Expression and Inquiry

The faculty of Colorado State University considers freedom of discussion, inquiry, and expression to be in keeping with the history and traditions of our country and to be a cornerstone of education in a democracy. Colorado State University is committed to valuing and respecting diversity,

including respect for diverse viewpoints. If any members of our campus community (students, faculty, or staff) feel that they have been treated unfairly because of their views, they should contact the Office of Conflict Resolution and Student Conduct Services in Aylesworth Hall NW, Room 325. The policy of Colorado State University is to encourage members of the University community to engage in discussion, to exchange ideas and opinions, and to speak, write, and publish freely in accordance with the guarantees and limitations of our state and national constitutions.

Faculty and students have not only a right, but also a responsibility, to examine critically the insights, understandings, values, issues, and concerns which have evolved in the various areas of human activity. Consequently, it is the policy that University-registered student organizations may extend invitations for guest lecturers, exhibitors, performers, and exhibitions of works of art with no restrictions of form or content other than those imposed by law. It is understood that inviting a speaker, performer, or exhibit does not imply concurrence of the University or of the sponsoring organization with the opinions, beliefs, or values expressed.

In exercising their rights, members of the University community should understand that the public may judge the institution by their actions. Hence, they should at all times strive to be honest and accurate, exercise appropriate restraint, and show appropriate respect for the opinions of others.

Freedom from Personal Abuse

The University acknowledges the right of all people to freedom from personal abuse. Abusive treatment of individuals on a personal or stereotyped basis prevents the attainment of the University objective to create and maintain an environment which supports, nurtures, and encourages people to excel in teaching, learning, and creativity. Therefore, the University deplores, condemns, and will act energetically to prevent all forms of personal abuse, including sexual harassment. For statements of University policy concerning personal abuse, see the University Guiding Policies section and Student Rights and Responsibilities section within this chapter.

GUIDING POLICIES

Office of Equal Opportunity of Colorado State University
Office in 101 Student Services Building
(970) 491-5836
www.oeo.colostate.edu

Diana Prieto, Director

Nondiscrimination Policy

Colorado State University does not discriminate on the basis of race, age, color, religion, national origin or ancestry, sex, gender, disability, veteran status, genetic information, sexual orientation, or gender identity or expression. The University complies with the Civil Rights Act of 1964, related Executive Orders 11246 and 11375, Title IX of the Education Amendments Act of 1972, Sections 503 and 504 of the Rehabilitation Act of 1973, Section 402 of the Vietnam Era Veterans' Readjustment Assistance Act of 1974, as amended, the Age Discrimination in Employment Act of 1967, as amended, Americans with Disabilities Act of 1990, the Civil Rights Act of 1991, the ADA Amendments Act of 2008, the Genetic Information Nondiscrimination Act of 2008, and all civil rights laws of the State of Colorado. Accordingly, equal opportunity of employment and admission shall be extended to all persons. The University shall promote equal opportunity and treatment in employment through a positive and continuing affirmative action program for ethnic minorities, women, persons with disabilities, and veterans.

Admission of students, employment, and availability and access to Colorado State programs and activities are made in accordance with these policies of nondiscrimination. Off-campus householders who desire to list student accommodations with the University must certify that they will comply with the University's policy on nondiscrimination in student housing.

Any student or University employee who encounters acts of discrimination because of race, age, color, religion, national origin or ancestry, sex, gender, disability, veteran status, genetic information, sexual orientation, or gender identity or expression either on or off campus is urged to report such incident to the Office of Equal Opportunity of Colorado State University, located in 101 Student Services. Any person who wishes to discuss a possible discriminatory act without filing a complaint is welcome to do so.

Any of the above discriminatory acts can also be the subject of complaints to the Department of Education, Office for Civil Rights, as well as to the Office of Federal Contract Compliance Programs, Equal Employment Opportunity Commission, and the Colorado Civil Rights Division; information on filing complaints with any of these agencies

is available in the Office of Equal Opportunity or at www.oeo.colostate.edu.

Sexual Harassment Policy

Colorado State University does not tolerate sexual harassment among students, employees, or other members of its community. Sexual harassment is prohibited in the employment context by Title VII of the 1964 Civil Rights Act, as amended, and in the education context by Title IX of the Educational Amendments of 1972.

Sexual Harassment is defined as any unwelcome sexual advance, request for sexual favors, or other written, verbal, or physical conduct of a sexual nature. Such conduct constitutes sexual harassment when: submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment, submission to or rejection of such conduct by an individual is used as a basis for employment decisions affecting such individual, or such conduct has the purpose or effect of unreasonably interfering with an individual's work performance or creating an intimidating, hostile, or offensive work environment. Quid pro quo (this for that) harassment occurs when sexual favors or conduct of a sexual nature are explicitly or implicitly a condition of employment or academic standing. Quid pro quo normally arises in the context of an authority relationship. Hostile environment sexual harassment occurs when unwelcome sexual conduct unreasonably interferes with academic or work performance. It is conduct that creates an intimidating, hostile, or offensive learning or work environment. Tangible employment action harassment is when a significant change in employment status is as a result of harassing conduct by a person in authority. If harassment by a supervisor results in a tangible employment action, the employer is liable.

Generally, a single sexual joke, offensive epithet, or request for a date does not constitute sexual harassment; however, being subjected to such jokes, epithets, or requests repeatedly may constitute hostile environment sexual harassment. In determining whether the alleged sexual harassing conduct warrants corrective action, all relevant circumstances, including the context in which the conduct occurred, will be considered. Facts will be judged on the basis of what is reasonable to persons of ordinary sensitivity and not on the particular sensitivity or reaction of an individual.

In cases of alleged sexual harassment, the protections of the First Amendment must be considered if issues of speech or artistic expression are involved. Free speech rights apply in the classroom and in all other education programs and activities of public institutions, and First Amendment rights apply to the speech of students and teachers. Great care must

be taken not to inhibit open discussion, academic debate, and expression of personal opinion, particularly in the classroom. Nonetheless, speech or conduct of a sexual or hostile nature that occurs in the context of educational instruction may exceed the protections of academic freedom and constitute prohibited sexual harassment if it meets the definition of sexual harassment and (1) is reasonably regarded as nonprofessional speech, or (2) lacks accepted pedagogical purpose or is not germane to the academic subject matter.

The University can respond to sexual harassment only if it is aware of its existence. Any member of the University community who believes that she or he has experienced sexual harassment or reprisal shall contact the Office of Equal Opportunity to request advice and information about possible ways to proceed, including use of the University's informal and formal complaint processes pursuant to the procedures. Similarly, any member of the University community who believes that she or he observed an incident of sexual harassment in the University learning and working environment or who receives report of alleged sexual harassment from an employee or student should seek assistance from the Office of Equal Opportunity. In all situations, confidentiality is maintained on a strict need-to-know basis; however, confidentiality can only be respected insofar as it does not interfere with the University's obligation to investigate allegations of misconduct that require the University to take corrective action.

Full details of the Colorado State Sexual Harassment Policy, including what is involved in bringing a complaint and the procedures for informal and formal resolution are available from the Office of Equal Opportunity or online at the Colorado State University web site on the A-Z list under "Sexual Harassment Policy" or directly at oeo.colostate.edu/sexual-harassment.aspx

Consensual Relationships Policy

The University is committed to the principle that its personnel shall carry out their duties in an objective and ethical fashion and in an atmosphere in which conflicts of interest are identified and managed. The University does not interfere with private choices regarding personal relationships when these relationships do not interfere with the goals and policies of the University. However, consensual romantic or sexual relationships in which one party retains a direct supervisory or evaluative role over the other party have the potential to interfere with these goals and policies. Therefore, consistent with its commitment to objectivity and ethical behavior, the University is required to intervene in such circumstances.

A romantic, intimate, or sexual relationship in which one individual is in a position to Exercise Authority over the other creates conflicts of interest and perceptions of undue advantage or disadvantage. When both parties have consented at the outset to a romantic, intimate, or sexual relationship, this consent does not remove grounds for a charge of conflict of interest, sexual harassment, or violation of applicable parts of Section D.9, Code of Ethical Behavior, based upon subsequent unwelcome conduct.

The following definitions shall apply:

- a. "Consensual Relationship" shall mean and refer to any relationship, either past or present, which is romantic, intimate, or sexual in nature and to which both parties consent or consented. This includes marriage.
- b. "Student" shall mean and refer to any person applying to the University or currently enrolled, either full-time or part-time, in any course or academic program associated with Colorado State University.
- c. "Employee" shall mean and refer to any person currently employed by Colorado State University, either full-time or part-time, in any location and in any capacity. "Employee" shall include, but is not limited to, administrators, faculty, administrative professionals, state classified staff, graduate assistants, student hourly employees, non-student hourly employees, non-paid staff, and student work-study employees.
- d. "Exercise(s) Authority" shall mean and refer to evaluating, providing oversight, supervising, academic advising, mentoring, coaching, counseling, providing extracurricular oversight, and/or otherwise participating in or influencing votes or decisions that may reward or penalize a Student or subordinate Employee.
- e. "Supervisor" shall mean the individual who performs the Employee's annual evaluation.

A faculty member shall not enter into a new Consensual Relationship with a Student over whom the faculty member Exercises Authority.

An Employee shall report immediately to his or her Supervisor the following:

- a. Past or preexisting Consensual Relationships with a Student for whom the Employee is in a position to Exercise Authority. Examples include, but are not limited to, a Student research assistant, a Student in a current class, a Student intern, or a Student advisee.
- b. Past or present Consensual Relationships with a subordinate Employee over whom the supervising Employee Exercises Authority. An Employee who is the subordinate Employee in a Consensual Relationship also is encouraged to report that relationship to the Supervisor of the individual with whom he or she is involved.

Within fifteen (15) working days of receiving a report of a Consensual Relationship, the Supervisor shall consult with his or her supervisor to develop a plan to manage or eliminate conflicts of interest and mitigate adverse effects on the involved parties and other third parties. This plan shall document in writing the actions that shall be taken, including one or more of the following actions:

- a. Transferring supervisory, decision-making, evaluative, academic, and/or advisory responsibilities;
- b. Providing an additional layer of oversight to the supervisory role;
- c. Transferring one of the individuals to another position; and/or
- d. Taking any other action reasonably necessary to manage or eliminate the actual or potential conflict of interest and/or mitigate adverse effects.

Every effort should be made to preserve confidentiality, sharing names and pertinent information only with individuals directly involved in these actions and only as necessary.

If an Employee has a Consensual Relationship with another Employee who is not a subordinate, then he or she shall refrain from participating in or influencing votes or decisions that may reward or penalize that Employee (such as votes or decisions regarding tenure and/or promotion). A violation of this policy may lead to disciplinary action, as permitted by University policy and law, up to and including termination of employment.

Retaliation against persons who report concerns about Consensual Relationships is prohibited and constitutes a violation of this Policy. Full details of the Colorado State Consensual Relationships Policy are available on the Office of Equal Opportunity's website at: www.oeo.colostate.edu/consensual-relationships.aspx.

STUDENTS' RIGHTS

A summary of the University policies dealing with a wide range of student life and activity follows. For more information regarding additional student life policies at Colorado State University, please contact the Office of the Vice President for Student Affairs, 201 Administration Building.

As members of the University community, students can reasonably expect the following:

1. Students have the right to freedom from discrimination or harassment on the basis of race, ethnicity, gender,

sexual orientation, religion, creed, political beliefs, national origin, age, or disability.

2. The University shall not interfere with the rights of students to join associations.
3. Students should have accurate information relating to maintenance of acceptable academic standing, graduation requirements, program student learning outcomes, and individual course objectives and requirements.
4. Student records will be maintained in keeping with the Family Education Rights and Privacy Act of 1974 and subsequent amendments and the guidelines for implementation.
5. In all instances of general discipline, academic discipline, and academic evaluation, the student has the right to fair and impartial treatment.
6. Colorado State University considers freedom of inquiry and discussion essential to a student's educational development. Thus, the University recognizes the right of all students to engage in discussion, to exchange thought and opinion, and to speak, write, or print freely on any subject in accordance with the guarantees of Federal or State constitutions. This broad principle is the cornerstone of education in a democracy.
7. Students have the right to be free from illegal searches and seizures.
8. Students have the right to freely exercise their full rights as citizens. In this light, the University affirms the right of students to exercise their freedoms without fear of University interference for such activity.

Student Bill of Rights – Colorado Revised Statute 23-1-125

The Colorado Student Bill of Rights focuses on various aspects of student academic life including advising, transferability of credits, and degree completion.

One particular segment of the Student Bill of Rights notes that a student may formalize a plan to obtain a degree in four years. Colorado State University supports this timeline for graduation by publishing advising guidelines under which a student may expect to graduate in four years, and also publishes curriculum check sheets defining a common four-year course progression for each major. These check sheets and advising guidelines are available in each department office and in the Center for Advising and Student Achievement (CASA), Room 121, The Institute for Learning and Teaching (TILT). There are some majors

which a student may not be able to complete in four years because of additional degree requirements recognized by the Colorado Department of Higher Education.

Students' Rights Regarding Their Educational Records

Students have certain rights concerning their "education records" under the Family Education Rights and Privacy Act (FERPA), as amended, 20 U.S. 1232g et. seq. These include:

1. The right to inspect and review the student's educational records within 45 days of the day the University receives request for access. Students should submit to the Registrar's Office, or in the case of graduate studies, to the Graduate School, written requests that identify the record(s) they wish to inspect. The University official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the University official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

All enrolled and former students may have access to their educational records maintained within the University. Those individuals and agencies having access to a student's records include "school officials," defined below, with legitimate educational interests; parents claiming a student as a dependent on their federal income tax; scholarship and other financial aid organizations supporting the student; organizations conducting studies for, or on behalf of, educational agencies or institutions for the purpose of developing, validating, or administering predictive tests, student aid programs, or to improve instruction; organizations carrying out accrediting functions of programs offered by the University; appropriate person(s) in an emergency; and any party designated by judicial order or subpoena, provided that, except for subpoenas and orders issued for law enforcement purposes, the University first notifies the student of the order or subpoena. Any other individual or organization must have a student's written consent to view or have access to the educational record.

A student may receive one copy of each item of information contained in the educational record at a cost of \$.25 (charge subject to change) per page.

2. The right to request the amendment of the student's education records that the student believes are inaccurate or misleading.

Students may ask the University to amend a record that they believe is inaccurate or misleading. They should write the University official responsible for the record, clearly identify the part of the record they want changed, and specify why it is inaccurate or misleading.

If the University decides not to amend the record as requested by the student, the University will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.

3. The right to consent to disclosure of personally identifiable information contained in the student's educational records, except to the extent that FERPA authorizes disclosure without consent.

An exception exists for public release of "directory information" which is published in university directories and may be released to third parties.. If a student wishes to exercise their rights under FERPA and limit release of directory information, see the Registrar's website for procedures to apply restrictions on directory information.

Colorado State defines "directory information" as the following:

- Student name
- Current mailing address
- E-Mail address
- Telephone number
- Major field of study
- Classification level (freshman, sophomore, junior, senior, graduate)
- Dates of attendance
- Current or previous enrollment status (full-time, half-time, and/or less than half-time)
- Anticipated date/term of graduation and expected degree(s)
- Honors and degrees awarded
- Participation in officially recognized activities and sports
- Height and weight of athletic team members
- Video and photographic images of students with the exception of the official CSU identification photograph

Another exception allows disclosure of information about the student to school officials with legitimate educational interests. A school official is a person employed by the University in an administrative, supervisory, academic or research, or support staff position (including law enforcement unit personnel in an educational role and health staff); a person or company with whom the University has contracted (such as an attorney, auditor, or collection agent); a person serving on the governing board of the University; or a student serving on an official committee, or in a volunteer capacity, such as a peer mentor or member of a disciplinary or grievance committee, or assisting another school official in performing his or her tasks. Such officials have legitimate educational interests when they need to review a student's educational records to fulfill their responsibilities to the University. As an example of a company with whom Colorado State University has contracted, the University works with the National Student Clearinghouse which provides a Current Enrollment Verification Certificate and/or degree verification to students and vendors indicating whether the students are enrolled for part-time or full-time status at CSU.

Furthermore, the University discloses students' educational records without consent, upon request, to officials of other schools in which a student seeks to or intends to enroll.

4. The right to file a complaint with the U.S. Department of Education concerning alleged failures by the University to comply with the requirements of FERPA. The name and address of the office that administers FERPA is: Family Policy Compliance Office, U.S. Department of Education, 400 Maryland Ave. SW, Washington, DC 20202-4605.

Personally Identifiable (Private) Information

Personally identifiable, or private, information includes age, date and place and birth. It also includes grades, Social Security Number, CSUID number, class schedule, residency, and class rank. None of these items may be released without the student's permission, except as otherwise allowed by FERPA.

Deceased Student Information Disclosure

Due to the sensitivity and privacy issues involved in student deaths, a Confidential Information alert will be placed on the deceased student's accounts and records to block public access to all personal and academic information once verification of the death is confirmed.

Right to Discuss Concerns with Department Heads/Chairs

Academic department heads are expected to incorporate student input into decisions affecting academic instruction, advising, and student learning assessment. This input usually takes form through departmental advisory committees and student evaluation of faculty members. Individual students, however, may make appointments with their department heads to discuss specific problems, plans, or suggestions.

Right to File a Grade Appeal

Instructors are responsible for stating clearly the instructional objectives of the course at the beginning of each term and for evaluating student achievement in a manner consistent with these objectives. Students are responsible for maintaining standards of academic performance established for each course in which they are enrolled. Instructors are responsible for determining and assigning final course grades. Graded examinations, papers, and other materials used as a basis for evaluating a student's achievement will be available to the student for inspection and discussion.

Students may appeal instructors' grading decisions. The burden of proof, however, rests with the student. See complete detail of the grade appeal process in the About Grades section of the Advising and Registration chapter.

Freedom of Expression and Right to Peaceful Assembly

The University acknowledges the right of students and others to assemble in groups for peaceful purposes. At such gatherings, the University expects the rights and privileges of all persons to be respected and that there will be no endangerments to health or safety. Such gatherings must in no way disrupt the normal conduct of University affairs or endanger University property.

The University may, consistent with the Constitution, establish *reasonable* regulations regarding the time, place, and manner in which persons exercise their free speech rights to the extent necessary to prevent disruption of the normal conduct of University affairs or endangerment of health and safety of persons or damage to property. Accordingly, persons planning such assemblies on the University campus must coordinate their activities and plans in advance through the Lory Student Center Event Planning Office. This coordination is requested so as to prevent disruption of normal University educational activities and avoid endangering the health or safety of persons or damage to property. The sponsoring individual or group must

assume responsibility for compliance with all state and municipal laws and University policies. Assistance from staff is available to help plan such events, and the assistance of University police may be requested to help with traffic or crowds.

Any act by demonstrators or groups which interferes with the rights of others, disrupts the normal functioning of the University, damages property, or endangers health or safety is grounds for suspension or dismissal from the University and/or removal from University property. In addition, such actions may also be the basis for criminal charges by law enforcement authorities. Demonstrations are prohibited in any special-use facility, classrooms, or in any place or manner that interferes with educational and other normal functions and operations of the institution. Demonstrators refusing to vacate premises upon request are subject to immediate temporary suspension and arrest under applicable municipal and state laws.

Commercial speech may be regulated by the University to a greater extent than noncommercial speech and expressive activities. Commercial speech is any form of expression or activity that is primarily intended to advertise, market, sell or promote goods and services on behalf of any person or entity that is not a CSU department or affiliated organization. (Soliciting for charitable contributions or donations is included in the definition of commercial speech). The University is under no obligation to make any campus areas or facilities available for commercial activities. When permitted, commercial speech should promote an educational, rather than commercial atmosphere on campus, prevent commercial exploitation of students, and preserve the tranquility of the campus. In order to promote these objectives, the Campus Activities Director acts as, or may designate, a coordinator for commercial events held on campus, including (but not limited to) events at the Lory Student Center Plaza. The coordinator is responsible for working with student organizations, other sponsors, and vendors to assure that events are in accordance with University regulations.

Right to Seek Membership in Student Organizations

Colorado State officially recognizes a great variety of student organizations. Policies established by the Board of Governors prohibit any recognized student organization from excluding students from membership on the basis of race, color, religion, national origin, gender, sexual orientation, age, veteran status, or disability.

All recognized student organizations must assure the University that their membership policies and procedures are

in compliance with this University policy. Local chapters of regional, national, or international organizations must assure the University that membership policies of the parent organization do not require the local chapter to exclude any student from membership on the basis of race, color, religion, national origin, gender, sexual orientation, age, veteran status, or disability.

Victims' Rights

The University is committed to providing appropriate support and referrals to persons who have been the victims of crimes or violations of University policy. Persons who have been victimized by a Colorado State University student may choose to report the incident to the Colorado State University Police or the Office of Conflict Resolution and Student Conflict Services to initiate criminal and/or disciplinary action. Victims also have the opportunity to receive personal support from appropriate University resources.

RESOURCES

Students who have questions, concerns or need assistance with application of rights listed above may contact the pertinent resource including: Office of Conflict Resolution and Student Conduct Services, Office of the Vice President for Student Affairs, Office of Equal Opportunity, Provost/Senior Vice President's Office, or academic department office. If you are unclear as to which office to approach, contact the Conflict Resolution and Student Conduct Services Office to begin with.

STUDENTS' RESPONSIBILITIES

Colorado State University has twice been ranked among the nation's Top Character Building Institutions by the Templeton Foundation www.news.colostate.edu/Release/1943. Through curricular and co-curricular programs, students at Colorado State University develop knowledge and skills to engage as respectful citizens in a diverse society, recognize the implications of their many choices, and become ethically responsible individuals.

Academic Integrity

The foundation of a university is truth and knowledge, each of which relies in a fundamental manner upon academic integrity and is diminished significantly by academic misconduct. Academic integrity is conceptualized as doing and taking credit for one's own work. A pervasive attitude

promoting academic integrity enhances the sense of community and adds value to the educational process. All within the University are affected by the cooperative commitment to academic integrity.

Faculty/instructors shall work to enhance a culture of academic integrity at the University (see the *Colorado State University General Catalog* for the Academic Integrity Policy).

Each course faculty/instructor shall clearly state in his or her course syllabus that the course will adhere to the Colorado State University General Catalog Academic Integrity Policy and Student Conduct Code. In addition, by the end of the second week of classes and/or in the syllabus, the faculty/instructor shall address academic integrity as it applies to his or her course by providing guidelines about course elements for the students.

Each course faculty/instructor shall provide the opportunity for students to sign an affirmative honor pledge on any course components of the faculty/instructor's choosing. The honor pledge shall include one of the following statement and may be expanded according to faculty/instructor's, department, or college practices and policies:

HONOR PLEDGE: I have not given, received, or used any unauthorized assistance.

HONOR PLEDGE: I will not give, receive, or use any unauthorized assistance.

A course faculty/instructor may offer the student the opportunity to write out the pledge if deemed practicable. Students may be given the opportunity to include an honor pledge along with electronic submissions of their work. A student's decision to forego signing the honor pledge shall not be used as evidence of academic misconduct and shall not negatively impact a student's grade.

Academic misconduct (see examples below) undermines the educational experience at Colorado State University, lowers morale by engendering a skeptical attitude about the quality of education, and negatively affects the relationship between students and faculty/instructors.

Faculty/Instructors are expected to use reasonably practical means of preventing and detecting academic misconduct. Any student found responsible for having engaged in academic misconduct will be subject to academic penalty and/or University disciplinary action.

Students are encouraged to positively impact the academic integrity culture of the University by reporting incidents of academic misconduct.

Examples of academic misconduct include (but are not limited to):

1. *Cheating in the Classroom* – Cheating includes using unauthorized sources of information and providing or receiving unauthorized assistance on any form of academic work. Examples include copying the work of another student on an exam, problem set, or quiz; taking an exam or completing homework for another student; possessing unauthorized notes, study sheets, answer codes, programmed calculators, or other materials during an exam; and falsifying exams or other graded paper results.

2. *Plagiarism* – Plagiarism includes the copying of language, structure, ideas, or thoughts of another, and representing them as one's own without proper acknowledgment. Examples include a submission of purchased research papers as one's own work; paraphrasing and/or quoting material without properly documenting the source.

3. *Unauthorized Possession or Disposition of Academic Materials* – Unauthorized possession or disposition of academic materials includes the unauthorized selling or purchasing of examinations or other academic work; stealing another student's work; unauthorized entry to or use of material in a computer file; theft or mutilation of library materials; and using information from or possessing exams that an faculty/instructor did not authorize for release to students.

4. *Falsification* – Falsification encompasses any untruth, either verbal or written, in one's academic work. Examples include receiving unauthorized assistance or working as a group on a take-home exam, independent exam, or other academic work without authorization, or lying to avoid taking an exam or turning in other academic work. Furthermore, falsification of any University document is a violation of academic integrity. Examples include student identification numbers, transcripts, grade sheets, credentials, University status, or letters of recommendation. Forging a signature is another specific example of falsification.

5. *Facilitation of Cases of Academic Misconduct* – Facilitation of any act of academic misconduct including cheating, plagiarism, and/or falsification of documents also constitutes violation of Colorado State University's academic integrity. Examples include knowingly discussing specifics of the content of a test or examination you have taken with another student who has not yet taken that test or examination or facilitating, by sharing one's own work, a student's efforts to cheat on an exam or other academic work.

Procedures for Dealing with Academic Misconduct

Faculty/Instructors are expected to use reasonably practical means of preventing and detecting academic misconduct. If a faculty/instructor has evidence that a student has engaged in an act of academic misconduct in his or her course, prior to assigning any academic penalty, the faculty/instructor shall notify the student of the concern and make an appointment with the student to discuss the concern. The student shall be given the opportunity to give his or her position on the matter. After being given the opportunity, if the student admits to engaging in academic misconduct, or if the faculty/instructor judges that the preponderance of evidence supports the allegation of academic misconduct, the faculty/instructor may then assign an academic penalty. Examples of academic penalties include assigning a reduced grade for the work, a failing grade in the course, removing the Repeat/Delete option for that course, or other lesser penalty as the faculty/instructor deems appropriate. The faculty/instructor shall notify the student in writing of the infraction and the academic penalty to be imposed. A copy of this notification shall be sent to the Office of Conflict Resolution and Student Conduct Services.

Faculty/instructors have a responsibility to report to the Office of Conflict Resolution and Student Conduct Services all cases of academic misconduct in which a penalty is imposed. Incidents which the faculty/instructor considers major infractions (such as those resulting in the reduction of a course grade or failure of a course) should be accompanied by a recommendation that a hearing be conducted to determine whether additional university disciplinary action should be taken.

If the student disputes the decision of the faculty/instructor regarding alleged academic misconduct, he or she may request a hearing with the Office of Conflict Resolution and Student Conduct Services. The request must be submitted or postmarked, if mailed, no later than 30 calendar days after the first day of classes of the next regular semester following the date the grade for the course was recorded. If no appeal is filed within the time period, the decision of the faculty/instructor will be final.

If, after making reasonable efforts, the faculty/instructor is unable to contact the student or is unable to collect all relevant evidence before final course grades are assigned, he or she shall either:

1. Assign an interim grade of Incomplete and notify the student in writing of the reason for this action; or
2. Refer the case to the Office of Conflict Resolution and Student Conduct Services for a hearing before deciding on a penalty.

A hearing will be conducted with the Office of Conflict Resolution and Student Conduct Services to determine whether a preponderance of evidence exists in support of the allegations of academic misconduct. If the Hearing results in a finding of insufficient evidence to support the allegation or clears the student of the charges, the faculty/instructor will determine a grade based on academic performance and without reflection of the academic misconduct charge and change any previously assigned grade accordingly. If the Hearing results in finding of academic misconduct, the Hearing Officer and faculty/instructor will confer regarding appropriate sanctions. The faculty/instructor will make the final determination regarding academic penalties, which may include, among other options, assigning a reduced grade for the course, assigning a failing grade in the course, removal of the Repeat/Delete option for that course, or other lesser penalty as the course faculty/instructor deems appropriate. The Hearing Officer will make the final determination regarding University disciplinary sanctions.

In a case of a serious incident or repeat offense of academic misconduct that is upheld through a hearing, the Hearing Officer and the faculty/instructor shall decide whether the student's transcript will be marked with a notation of "AM," which will be explained on the student's transcript as a "finding of Academic Misconduct." A notation of "AM" will be made on the student's transcript only if the Hearing Officer and the faculty/instructor agree that this penalty should be imposed.

Grades marked on the student's transcript with the designation "AM" will not be eligible for the Repeat/Delete Policy described in the Advising and Registration – About Grades section of this catalog.

Information about incidents of academic misconduct is kept on file in the Office of Conflict Resolution and Student Conduct Services. No further action is initiated unless the incident constitutes a major infraction, the student has a prior record of University infractions, or there are subsequent reports of misconduct.

Classroom Behavior

The classroom instructor is responsible for all classroom conduct, behavior, and discipline. University policy permits only enrolled students, persons authorized by the instructor, and administrative personnel to be admitted to instructional areas during scheduled periods. University policy and Colorado state law also prohibit all forms of disruptive or obstructive behavior in academic areas during periods of scheduled use or any actions which would disrupt scheduled academic activity. Use of classrooms and other areas of academic buildings during nonscheduled periods is

permitted only in accordance with departmental, college, or University practices.

Any person or persons in unauthorized attendance or causing a disturbance during scheduled academic activity shall be identified by the instructor and asked to leave. Persons refusing such a request may be removed by the University police and are liable to legal prosecution and/or disciplinary action.

Colorado State University Student Conduct Code

The Student Conduct Code exists to notify students, faculty, and staff of the specific expectations Colorado State University holds related to student behavior and the rights and responsibilities that accompany being a student and participating in student clubs or organizations.

Colorado State University expects students to maintain standards of personal integrity that are in harmony with the educational goals of the institution and to assume responsibility of their actions; to observe national, state, and local laws, and University regulations; and to respect the rights, privileges, and property of other people.

Pursuit of a college education is a voluntary association with a community of scholars which provides an opportunity for exploration of new ideas, experimentation, self-examination, formation of new friendships, and development of ideals and direction. A university environment is a place where the free exchange of ideas and concepts can take place among faculty and students in an atmosphere which allows for civil debate and dialogue on contemporary issues.

In order to protect these privileges and opportunities, the student assumes the personal responsibility for upholding standards reasonably imposed by Colorado State University relevant to its mission, processes and functions. Foundational principles of academic honesty, personal integrity, respect for diversity, civility, freedom from violence, and pursuit of lifestyles free of alcohol and drug abuse are examples of these standards.

The new Student Conduct Code is available:

1. On the web at www.conflictresolution.colostate.edu
2. In hard copy at
 - Office of Conflict Resolution and Student Conduct Services, 325 NW Aylesworth
 - Vice President for Student Affairs, 201 Administration Building
 - Housing and Dining Services, Palmer Center
 - Residence hall front desks

- Off-Campus Life, 142 Lory Student Center
- Student Organizations, Lory Student Center Lower Level
- Greek Life Office, Lory Student Center Main Level
- ASCSU Office, Lory Student Center Main Level

The Conduct Code contains:

Preamble – which describes the University foundational principles and the rights and responsibilities of students.

- I. Definitions – particularly related to student status, faculty status, university premises, academic misconduct, students accused of policy violations, students submitting complaints and those related to Student Organizations.
- II. Student Conduct Code Authority – describes the roles of university staff and students in administering the Conduct Code.
- III. Proscribed Conduct – this section specifically outlines the rules and regulations which would subject a student or student organization to disciplinary action if committed. Additionally, jurisdiction related to academic units, violations of law, interim suspensions, student clubs and organizations, and fraternities and sororities is described.
- IV. Procedures – specifically describes the procedures used in determining disciplinary charges, notification of charges and hearings, options for resolution of charges, the hearing procedure, decisions, sanctions, and appeals related to individual students.
- V. Procedures – describing those related to Student Clubs and Organizations
- VI. Disciplinary Records – describes the keeping of internal disciplinary records and specific instances when disciplinary action becomes part of the student's official transcript.
- VII. Victims – description of support available for victims, processes related to information and records related to victims and reporting options available.
- VIII. Interpretation and Revision of the Code

Prohibited Conduct

The list below describes the prohibited actions published in the Student Conduct Code. Students have an obligation to know and follow the regulations of the University. Violations will form the basis for University intervention or disciplinary action. The following actions are prohibited.

1. Academic misconduct including but not limited to: cheating, plagiarism, unauthorized possession or disposition of academic materials, falsification, or facilitation of acts of misconduct. Plagiarism includes the copying of language, structure, images, ideas, or thoughts of others and is related only to work submitted for credit. Disciplinary action will not be taken for academic work in draft form. Specific procedures for cases of academic misconduct are also described in the Academic Integrity Policy in the General Catalog, the Graduate Student Bulletin, the Faculty Manual, or the Honor Code of the Professional Veterinary School as applicable.
2. Knowingly furnishing false information to any University official, faculty member, office, or organization or on any University applications. Intentionally initiating or causing to be initiated any false report any warning or threat of fire, explosion, or any other emergency.
3. Forgery, alteration, misuse, mutilation, or unauthorized removal of any University document, record, identification, educational material, or property.
4. Disruption or obstruction of teaching, classroom or other educational interactions, research, administration or disciplinary proceedings, residential communities, or participation in an activity that disrupts normal University activities, and/or threatens property or bodily harm or intentionally interferes with the right of access to University facilities or freedom of movement of any person on campus.
5. Engaging in behavior or activities that obstruct the right of free speech or expression of any person on campus. (For more information, refer to the CSU policy on Freedom of Expression and Inquiry, which addresses student rights and responsibilities related to political expression, and contact the Office of Conflict Resolution and Student Conduct Services if you believe you have been treated differently because of your political, or other, perspectives.)
6. Abusive conduct, including physical abuse, verbal abuse, threats, intimidation, stalking, coercion, and/or other conduct which threatens or endangers the physical or psychological health, safety, or welfare of one's self, another individual or a group of individuals.
7. Harassment, meaning verbal or physical harassment on the basis of gender, race, sexual orientation, religion, or physical disability. (Refer to the CSU Sexual Harassment policy and contact the Office of Equal Opportunity for more information on these issues.)
8. Sexual misconduct including but not limited to: obscene, lewd, or indecent behavior; deliberate observation of others for sexual purposes without their consent; taking or posting of photographs/images of a sexual nature without consent; possession or distribution of illegal pornography; viewing or posting pornography in public venues; non-consensual sexual contact or penetration; engaging in coercion or constraint; or engaging in sexual activity with a person who is incapacitated or otherwise unable to give consent.
9. Rioting, aiding, abetting, encouraging, participating in or inciting a riot. Failing to disperse at the direct request of police or University officials.
10. Failure to comply with the verbal or written directions of any University officials or law enforcement officers acting in the performance of their duties and in the scope of their employment, or resisting police officers while acting in the performance of their duties, including failure to identify oneself to those persons when requested to do so.
11. Attempted or actual theft of, damage to, use of, or possession of other persons' or University property or identity or unauthorized use of such; unauthorized entry, use, or occupation of University facilities, property, or vehicles; or unauthorized possession, duplication, or use of University keys or access devices.
12. Illegal use or possession on University property of firearms or simulated weapons; other weapons such as blades larger than pocket knives; ammunition or explosives; dangerous chemicals; substances, or materials; or bombs, or incendiary devices prohibited by law. Use of any such item, even if legally possessed, in a manner that harms, threatens, or causes fear to others. Weapons for sporting purposes shall be stored with the University Police.
13. Violations of any rules, contracts, or agreements governing residence in or use of University owned or controlled property, and athletic or other authorized special events. Violation of any University policy, rule, or regulation, which is published in hard copy or available electronically on the University web site.
14. Unauthorized soliciting or selling in violation of the University solicitation policy.

15. Violation or conviction of any federal or state law or local ordinance.
16. Use, possession, manufacturing, or distribution of alcoholic beverages except as expressly permitted by law or University policy. Alcoholic beverages may not be used by, possessed by, or distributed to any person under twenty one (21) years of age.
17. Use, possession, manufacturing, or distribution of illegal drugs, including but not limited to marijuana, narcotics, methamphetamine, cocaine, opiates, LSD, mushrooms, heroin, designer drugs such as Ecstasy and GHB, or other controlled substances are prohibited. Use or possession of prescription drugs other than for the person prescribed, or for use other than the prescribed purpose are prohibited. Possession or use of drug paraphernalia including but not limited to equipment, products, and materials used to cultivate, manufacture, distribute, or use illegal drugs are prohibited.
18. Abuse of computer facilities or technological resources including but not limited to: unauthorized entry to, or use of computers, access codes, telephones and identifications belonging to the University or other members of the University community; unauthorized entry to a file to use, read, transfer, or change the contents, or for any other purpose; interfering or disrupting the work of any University member; sending abusive or obscene messages or images; disrupting the normal operation of the University computing systems; violating copyright laws; or any other violation of the University computer use policy.
19. Abuse of the Student Conduct System including failure to obey the notice to appear for a meeting or hearing; falsification, distortion, or misrepresentation of information; disruption or interference with the orderly conduct of a hearing; failure to comply with any requirements involving no contact with Complainants or witnesses or limitations related to access to specific facilities; harassment or intimidation of any person involved in a conduct proceeding; failure to comply with disciplinary sanctions or requirements.
20. Assisting, conspiring, or inciting others to commit any act of misconduct set forth in 1 through 19 above.

Colorado State University reserves the right at any time, without notice, to change, modify, or cancel any course, program, procedure, policy, financial requirement, or disciplinary arrangement set forth in this catalog whenever, in its sole discretion, it determines such action to be appropriate. Furthermore, Colorado State will not be responsible for any failure to present or complete any course or program or to perform any other activity, function, or obligation mentioned in this catalog. Since changes may occur at any time, students must check the relevant website (as noted throughout various chapters in this catalog).

Advising and Registration

ACADEMIC ADVISING

Academic advising is a relationship with mutual responsibilities between an adviser and student advisee, for timely consultation, sharing of accurate and complete information, careful listening, critical evaluation, and respectful interchange. Academic advising can be facilitated by a professional staff person or a faculty member.

All students are entitled to a quality advising system. The following factors characterize such a system:

- Accessible to students;
- Adequate time spent in advising sessions;
- Advisors who are well-versed in the requirements of University programs;
- Advisors who relate successfully to a wide variety of students;
- Information available about resources for meeting students' needs;
- Maintenance of adequate records.

Adviser Role and Responsibilities

The academic adviser's responsibilities (whether faculty or staff) include the following:

- Help students define and develop realistic educational and career goals.
- Assist students in planning a program consistent with their abilities and interests.
- Assist students in monitoring and evaluating their educational progress.
- Discuss relationships between instruction program and career. Assist students in identifying career opportunities. This includes utilizing the Career Center.
- Inform students of the nature of the adviser/student advisee relationship.
- Interpret and provide rationale for instructional policies, procedures, and requirements.
- Monitor all designated educational transactions, *e.g.*, course selection, changes of major, graduation requirements, etc.
- Maintain an advising record for each student.
- Designate and post hours available for advising.

Advisee Role and Responsibilities

Students carry important responsibilities in the advising process. In the interest of successfully completing a degree program, a student must be proactive in finding the necessary resources needed for attaining a degree. In order to contribute to an effective advising relationship, students are expected to:

- Schedule and attend advising sessions each semester prior to course registration. Advising sessions may be conducted via email or telephone, depending on the adviser or the advisee.
- Clarify personal values, abilities, interests, and goals.
- Become knowledgeable of all graduation requirements and adhere to institutional policies, procedures, and deadlines.
- Prepare for each advising session.
- Follow through on actions identified during each advising session.
- Responsibly evaluate his/her adviser in order to strengthen the quality of advisement.

Become familiar with the Career Center and other campus resources.

Academic Adviser Contact

Where do you find your academic adviser? If you have declared a major, go to the academic department office for your major. If you are an undeclared student, contact the Center for Advising and Student Achievement (CASA), at the Institute for Learning and Teaching (TILT).

In addition to your assigned adviser, you may work with another adviser if you are interested in a professional program such as medicine, law, veterinary medicine, or education. You will also have more than one adviser if you are completing a double major, minor, interdisciplinary studies program, or study abroad. The Center for Advising and Student Achievement has initial contact information.

You need to go see your adviser within the first month of arriving on campus, again for registration preparation, and anytime that you have a question or problem. It is important to see your academic adviser for assistance with

course selection, major information or exploration, career planning, graduation requirements, and campus resource information.

Advising Resources

In order for you to get the best from your academic advising experience, you are encouraged to utilize the many advising tools that are available. For instance you need to have a major check sheet which outlines all the graduation requirements for your major (www.core.colostate.edu). The Degree Audit Report (DARS) is a degree audit that shows you what graduation requirements you have completed and what requirements you still need to complete. This audit can be viewed any time via RAMweb. All majors, minors, and interdisciplinary studies requirements will be displayed.

In the *General Catalog*, the chapter on All-University Core Curriculum (AUCC) outlines the general education requirements for graduation, which may also be found at www.core.colostate.edu. Academic and Career Horizons information sheets describe the interests, skills, and career opportunities for each major. Additionally, the exploratory course list suggests introductory courses and the key adviser list provides a faculty contact for all majors in the University. All this information is available at www.casa.colostate.edu/Advising/.

Along with tools for academic exploration, various resources are available for the career exploration and planning process. Information about working with a career counselor, learning about career resources, gathering information about internships, and preparing to get a job can be found on career.stuser.colostate.edu/.

Tools to assist you in your academic success at Colorado State include the GPA calculation on RAMweb, tutoring information, and campus resources such as the Learning Assistance Center and the Writing Center.

ACADEMIC CREDIT

Credit Hour and Credit Load

A credit hour is defined as 50 minutes of lecture or discussion/recitation per week for 16 weeks (800 minutes in a semester), 100 minutes of laboratory per week for 16 weeks (1600 minutes in a semester) when outside preparation is required, or 150 minutes of laboratory per week for 16 weeks (2400 minutes in a semester) when no outside preparation is required. For workload planning

purposes (and to graduate with 120 credits in eight semesters), students should plan on an average of 15 credits per semester and should expect that each credit hour will require approximately two to three hours (for some students in some classes, more time and in a few classes less time) of effort per week to attend classes and to accomplish readings and out-of-class assignments in preparation for successful completion of the course requirements.

Undergraduate Classification

Student level (class) is determined by the number of credits at Colorado State and credits accepted in transfer. Transfer credits may or may not be acceptable in meeting degree requirements.

<i>Student Level</i>	<i>Semester Credits</i>
Freshman	0-29
Sophomore	30-59
Junior	60-89
Senior	90 and over

Full-Time/Half-Time Enrollment Status

Enrollment status (full-time, half-time) is determined by the number of credits which the student has completed or is pursuing for the term in which the certification is requested. Courses from which the student has withdrawn or is auditing are not included. (The following schedule for enrollment status differs from the full-time/part-time schedule for tuition and fees. See Registrar's web site: www.registrar.colostate.edu. Credit requirements are as follows:

Fall/Spring Semesters:

Undergraduates	
Full-time	12 or more credits
Half-time	6-11 credits
Graduate Students	
Full-time	9 or more credits
Half-time	5-8 credits

Summer Session:

Undergraduates	
Full-time	6 or more credits
Half-time	3-5 credits
Graduate Students	
Full-time	5 or more credits
Half-time	3-4 credits

Credit Overload

Undergraduate students who wish to register for more than 18 credits per term must have an overload approved and submitted through ARIESweb by their adviser. Graduate students should consult the *Graduate and Professional Bulletin* at: graduateschool.colostate.edu/index.asp?url=catalog. Approval of an overload for graduate students must be obtained from the department head or adviser and Vice Provost for Graduate Studies.

Undergraduates Taking Graduate-level Courses

Undergraduates may enroll for a maximum of nine credits of course work which may be applied toward a graduate degree at Colorado State provided that such course work:

- 1) is not used to meet bachelor's degree requirements; and
- 2) has been approved by the chairperson of the department in which a graduate degree will be sought.

Although 500-level courses cannot be required in undergraduate programs of study, elective credits taken at the 500 level may be used to fulfill the upper-division requirement. Undergraduate students may not enroll in courses numbered 600-699 to satisfy undergraduate degree requirements. Undergraduate students may not enroll in courses numbered 700-799.

Earning Alternative Credits

College-Level Examination Program (CLEP)

See additional details in the Undergraduate Admissions Policies and Procedures chapter in this catalog.

Credit awarded for CLEP, Advance Placement, or International Baccalaureate cannot be used in meeting the Colorado State residency requirement for the baccalaureate degree. See "In Residence" Requirement in the chapter, "Graduation Requirements and Procedures."

CLEP General Examinations

The General Examinations measure college-level achievement in five basic areas of the liberal arts: English composition, humanities, mathematics, natural sciences, and social science-history.

Credit granted on the basis of the General Examinations will be treated as general elective transfer credit without a grade but will count toward graduation. Credit granted cannot be used to meet the University written communication or mathematics requirements.

CLEP Subject Examinations

See the website, www.registrar.colostate.edu, use the drop down menu under "Students," select "Transfer Evaluation," and then select "CLEP-Equivalencies" for a list of the Subject Examinations for which Colorado State credit will be granted.

Advanced Placement

The Advanced Placement Tests administered by The College Board are used by Colorado State University to award credit and advanced placement in any of several fields in which a student may have participated in high school. For more information about Advanced Placement please see the Registrar's Office website at www.registrar.colostate.edu, use the drop down menu under "Students," select "Transfer Evaluation," and then select "AP Equivalencies." See also the College Board website at www.collegeboard.com/student/testing/ap/about.html.

International Baccalaureate (IB) Credit

Students who graduate from high school with an International Baccalaureate Diploma or have completed International Baccalaureate examinations may receive University credit for scores of four or higher. A list of courses for which credit will be granted can be found at www.registrar.colostate.edu, by selecting "Students" – "Transfer Evaluation" and then select "IB-Equivalencies" in the drop down menu.

Credit for Study Abroad

Students are encouraged to participate in accredited study abroad programs. Credit is granted for courses taken in programs approved in advance by the University, subject to certain conditions. To apply for credit, a student must process a "Study Abroad Transfer Credit Form" available in the Study Abroad Office, Laurel Hall.

Challenging Colorado State Courses for Credit

The opportunity to challenge the content of a course on the basis of an examination may be permitted. This option is at the discretion of the individual department and may exclude courses where a laboratory or practicum is an integral part of the course being challenged.

A fee of \$20 (subject to change) per credit attempted is assessed and is not refundable. Upon successful completion of an exam, a grade of S (satisfactory) is recorded on the student's academic record. No record of unsuccessful attempts is recorded.

A course may not be challenged under the following conditions:

- To satisfy the residence requirement for graduation.
- When the person seeking credit is not currently registered at Colorado State University at the time the examination is administered.
- When a student has previously failed a placement or challenge exam for the course.

Students wishing to establish credit by challenge may obtain information from the University Testing Service at 970-491-6498, 100 NE Aylesworth.

CHANGING A MAJOR, OR ADDING OR DROPPING A MINOR OR SECOND MAJOR

Change of Undergraduate Major

In many, but not all cases, an undergraduate student regularly enrolled in the University may change from one major to another. Some majors—considered competitive- or controlled-entry majors--require specific entrance requirements (portfolio, audition, etc.). Students wishing to change from one major to another can obtain information about any restrictions or requirements that may be in place, as well as the actual process involved, from their advisor, the relevant academic department, or from the Center for Advising and Student Achievement (CASA). A change of major form is available from Registrar's office in Centennial Hall. All change of major forms are processed through the Registrar's office.

Newly admitted students who have not begun classes must contact the Admissions Office to change their major.

Adding or Dropping a Minor or Major

Students wishing to add or drop a minor or second major should use a change of major form available from the Registrar's Office, First Floor in Centennial Hall. After the student receives the appropriate approvals, the Registrar's Office will process the change.

A student seeking to add an interdisciplinary minor needs to contact the department, academic unit, or office overseeing the program for advising and approval. Refer to the University-Wide Instructional Programs chapter for more detailed information.

REGISTRATION/SCHEDULE CHANGES

Class Schedule

Class schedule information is available online through RAMweb or at www.classschedule.colostate.edu prior to the beginning of registration for a given term. The class schedule provides registration procedures and courses offered for that specific term.

Registration Process

Students register for classes, including adding or dropping courses, online through RAMweb at www.ramweb.colostate.edu. Before registering for classes, students must complete the Registration Ready portion of the process. In order to communicate quickly and effectively with students, the University requires each enrolled student to provide an email address at Registration Ready. Students are also required to maintain a current mailing address. Once Registration Ready is complete, a student may then register for classes.

Registration and payment deadlines must be met in order for registration to proceed. Students should respond to correspondence from the University, including email correspondence, in a timely manner to avoid missing crucial deadlines.

Registration Waitlist

C.S.U. provides Registration Waitlists for students attempting to register for undergraduate class sections that are already full. Students may sign up for a waitlist when attempting to register for a class that has reached capacity and shows that a waitlist is available. Not all undergraduate sections offer waitlists.

Please go to RAMweb or the Registrar's webpage at www.registrar.colostate.edu for frequently asked questions and answers about the registration waitlist.

Course Overrides

Even when a course has reached its formal enrollment limit, the instructor may give special permission for a student to register in the course. Overrides are processed electronically by the department offering the course. Once granted an override, the student must still register for the course through RAMweb.

Late Registration

A **late registration charge of \$50** (subject to change) is assessed for adding the first course **on or after the first day of classes** or for late adds after the registration period.

Registration Cancellation

Prior to the beginning of the semester, all courses can be canceled via the web registration system with no charge.

Assessment of Tuition and Fees Based on Registration Changes in Full- or Part-Time Status

Tuition and fees will be adjusted for students who go above or below the nine-credit assessment cut-off during the add/drop period at the beginning of the semester. The specific dates are listed in the appropriate on-line class schedule. After this deadline, there is no adjustment in tuition and fees if students drop any portion of the courses they are registered for.

Repeating a Course

Students may register for and complete a course more than once but it can only be used one time to fulfill graduation requirements. The original grade and grades earned in repeated courses are used in calculating grade point averages, unless a student exercises the Repeat/Delete policy explained in the section below.

Schedule Changes and the Add/Drop and Withdrawal Periods¹

Periods for changing schedules (adds, drops, changes of sections, grading options, or credits) are listed in the University Calendar at the front of this catalog and in the applicable on-line class schedule.

During the regular 16-week Fall and Spring semesters, courses may be added without an override through 11:59 PM Sunday at the end of the first week of classes. Beginning Monday of the second week of classes, courses may be added with an instructor override through the census date, which is the 12th day of classes of the

semester. Course instructors may authorize their department offices to perform these overrides.

Regular courses may be dropped without an override through the census date, which is the 12th day of classes of the semester. Restricted-drop courses must be dropped before 11:59 PM Friday at the end of the first week of classes without an override. Courses dropped during this period are not reflected on the student's academic record, and tuition and fees may be adjusted as a result. Consult the appropriate on-line class schedule for course drop deadlines. No drops may be made after the end of the add/drop period.

The course withdrawal period begins after the add/drop period and closes at the end of the eighth week of the semester. A "W" (withdrawal) will be recorded on the academic record, except in the case of the 60-credit English composition and mathematics requirements (see the All-University Core Curriculum section of this catalog). See also Class Attendance Regulations in this section of the catalog. Tuition and fees will not be adjusted for withdrawals during the course withdrawal period. See also Tuition and Fees Adjustments in the Financial Services for Students chapter of the catalog.

Courses taught in terms of less than 16 weeks are subject to shorter add/drop periods.

Students withdrawing from the University may not use the drop procedure to drop their last class, but must contact the Center for Advising and Student Achievement (CASA), first floor, TILT Building. See also University Withdrawal (UW) in this section.

Registration Alternatives

Independent Study

Independent study is a type of learning that supplements regular, supervised classroom instruction by permitting the student to carry such learning even further, working independently under necessary and sufficient guidance of a supervising instructor. While details of each independent study project are negotiated by the student and instructor, the expectation is that at least three hours per week of directed effort on the student's part is required for each credit. Personal contact (face-to-face, telephone, Internet, or other forms of communication) is expected.

The instructor and the student shall specify in writing the requirements the student should fulfill to complete the course, including due date, contact expectations, number of credits, and other pertinent information. The instructor, student, and department head shall sign this statement and retain a copy. Upon completion of the project, a copy or

¹ New add/drop policy to become effective Spring Semester 2012.

description of the work involved shall be retained in the department for at least seven years.

GUEST Program

Granting a University Enrollment for a Specific Term (GUEST) is a registration option for individuals who want to take University classes without applying for formal admission to a degree program. GUEST students are cleared to take classes one term at a time providing the prerequisites have been met and there is space available in the class. Submitting a GUEST application each term (fall and spring) is required. The GUEST application is available in July for fall and December for spring. GUEST participants register the Saturday before classes begin and are limited to registration in six (6) credits per academic semester, restricted from certain high demand courses, and ineligible for financial aid and campus housing. A term GPA of 2.0 must be achieved in order to remain eligible for the next term's GUEST program.

GUEST applications are available online at www.admissions.colostate.edu or by calling the Office of Admissions; (970) 491-6909. The Center for Advising and Student Achievement (CASA), first floor, TILT Building, provides academic advising to GUEST students.

Senior Citizen Visitation Privilege

At the discretion of the instructor in charge, senior citizens may attend any class as a visitor without formal registration provided classroom space is available. The following regulations are applicable to these visitations for senior citizens:

- Participant must be 55 years of age or older.
- Participation is subject to the approval of the instructor and available space in the class.
- Approval for visitation cannot be obtained prior to the first day of class, in order to serve tuition-paying students first.
- Academic credits or grades will not be assigned or awarded upon completion of the visitation nor will a record of participation be maintained by the University.
- Instructors are under no obligation to grade assignments or tests submitted by visitors.
- Student services are not available to visitors such as: student health, counseling, athletic event tickets, ID cards, etc., without payment as appropriate.
- Tuition, facility fees, and student technology fees will not be assessed; however, course fees (i.e., transportation expenses, breakage fees, consumable supplies associated with labs, etc.) as published in the class schedule will be assessed.

Taking Courses at Another Institution

Enrolled students who wish to take undergraduate courses at another institution to transfer to Colorado State University should first determine how the courses will be accepted in transfer. To do so the student will need to access u.select at www.transfer.org/uselect/login.htm. For more information about u.select please see the Registrar's Office website at www.registrar.colostate.edu.

If u.select does not list the desired course or its institution, or it shows an equivalent course different from what the student is seeking, the student may petition a department to approve a course equivalent using the Transfer Course Equivalency Pre-Approval Form, available on the Registrar's Office website at registrar.colostate.edu/faculty/forms.aspx. The appropriate academic department must determine if the course can be accepted as the desired equivalent. If a department approves a course as an equivalent, they will complete and sign the form. The student then returns the signed form to the Registrar's Office prior to transferring the course.

Students wishing to take courses at an international institution will need to have the Registrar's Office evaluate the courses to determine how they will be accepted in transfer. To do so the student must supply the Registrar's Office with an English copy of the course description and/or syllabus of each course they wish to take by email at registrarsoffice@colostate.edu, by fax at (970) 491-2283, or in person at Centennial Hall.

Students are responsible for ensuring an official transcript is sent to the Registrar's Office after the completion of the off-campus course work. No credit will be evaluated until an official transcript has been received. Courses with less than a C- grade are not accepted as transfer credit toward a degree at any time, in any major.

The student must file an Intent to Return form with the Office of Admissions prior to leaving campus if the course work is taken in any term other than summer session.

See also Study Abroad, in the International Programs and Services chapter of this catalog.

Community College Cooperative Registration Agreement

Under a cooperative program with Aims Community College (Greeley), Colorado State students may register for one course (maximum of five credits) per term without additional tuition assessment.

Eligibility – Students must be enrolled at Colorado State in resident instruction courses, i.e., not Continuing Education or Placement.

Credit Load – For the above corresponding terms, Colorado State University students must be registered for 12 credits (9 credits in the summer) to attend Aims Community College.

Course Restriction – Registration for a maximum of one undergraduate, resident instruction course (maximum of five credits) is authorized. Registration will be subject to the availability of the course and the student meeting the prerequisites.

Tuition – Tuition and student fees for the course taken under this agreement will not be charged to the eligible student but applicable course fees will be paid by the student. If the student is determined to be ineligible for this cooperative registration privilege, applicable tuition and student fees will be assessed, and the student will be responsible for payment of these charges.

Registration – Applicable forms are available on the Registrar’s Office website at www.registrar.colostate.edu or in the Registrar’s Office in Centennial Hall .

Colorado Exchange Program

Colorado State University, in cooperation with the Colorado School of Mines, the University of Northern Colorado, and the University of Colorado, provides tuition-free instruction for graduate students through a reciprocal agreement. The following conditions must be met to qualify for the program:

1. The graduate student is registered and paying full tuition and fees at the home institution.
2. The course requested is part of a regular load – *not an overload*.
3. The student is pursuing a program leading to an advanced degree. All courses requested must be required for the degree program or a prerequisite for one of the required courses
4. The course is not offered on the student’s own campus when that student can take advantage of it.
5. The request is presented prior to registration for the semester the course is to be taken.
6. The request is presented any term except the graduation semester.
7. A separate request form is completed for each course taken.
8. Space is available.

Additional information and registration forms are available in the Registrar’s Office, First Floor, Centennial Hall.

ABOUT GRADES

Traditional Grading

Term grades are reported using the scale below.

Faculty use of +/- grading is optional. Course instructors should indicate on the course syllabus and/or policy statement the grading system used in the course.

<u>Grade</u>	<u>Grade points per credit</u>
A+	4.000
A (Excellent)	4.000
A-	3.667
B+	3.334
B (Good)	3.000
B-	2.667
C+	2.334
C (Satisfactory)	2.000
D (Poor, but passing)	1.000
F (Failure)	0.000
S (Satisfactory)	**
U (Unsatisfactory)	*
I (Incomplete)	*
W (Withdrawal)	*
H (Honors)	**
AU (Audit)	*
NG (No Grade Reported)	*
NGC (Non Graded Component)	*

* Credits not used to compute grade point average (GPA) and not counted toward graduation.

** Credits not used to compute GPA but counted toward graduation.

Credits for courses graded F are used to compute GPA, but they do not count toward graduation.

When an X is placed before a grade, e.g., XA, XB, etc., the student has been granted an academic fresh start. These grades are not calculated into the grade point average.

When an R is placed before the grade, the student has elected to repeat the course under the terms of the University’s Repeat/Delete policy. The original course grade is not calculated into the grade point average.

When an AM is placed before the grade, it indicates a finding of academic misconduct by the student in the particular course. For more information, see “Procedures for Dealing with Academic Misconduct” in the Academic Integrity section of the Policies and Guiding Principles chapter.

Students may contest whether or not an assigned grade was recorded accurately in the educational record by following the procedures described under the Grade Appeal section.

Student Option Satisfactory/Unsatisfactory

Students may elect satisfactory/unsatisfactory grading in one course per term in courses offered for student option Satisfactory/Unsatisfactory grading under the following conditions:

Undergraduate students, except first-term freshmen and transfers, with a cumulative Colorado State grade point average of 2.000 or better and with the adviser’s consent, may register for approved courses on a student option Satisfactory/Unsatisfactory basis. This work may not be in areas of study required in the student’s major, minor, teacher licensure, or for All-University Core Curriculum requirements (i.e., it must consist of free electives not specified as to general area of study. A 3-credit social science requirement, for example, would not be considered free electives.) Students must register for the course first, then complete the Student Option Satisfactory/Unsatisfactory and Audit Grading form to elect this option. The form can be found at the Registrar’s Office, First Floor, Centennial Hall, or online at www.registrar.colostate.edu. Changes to Satisfactory/Unsatisfactory grading can only be made during the add/drop period.

Performance equivalent to a grade of C or better is recorded as S (pass). Performance equivalent to D or F is recorded as U (fail). Neither the S or U grades are used in calculating the Colorado State grade point average; however, courses graded S may apply to graduation requirements.

A grade for a course taken as satisfactory/unsatisfactory may not be converted to a traditional grade for purposes of improving the GPA to meet graduation or scholastic requirements. In situations where students change their major or minor to include required courses taken previously for satisfactory/unsatisfactory grades, the major department will determine if such courses may be considered as fulfilling degree requirements. When it is determined that an ineligible student is or has been

registered for a satisfactory/unsatisfactory course, a traditional grade will be assigned. A correct satisfactory/unsatisfactory registration including adviser approval is the express responsibility of each student.

Pass/fail registration policies for graduate students are described in the *Graduate and Professional Bulletin*, <http://graduateschool.colostate.edu/index.asp?url=catalog>.

Auditing a Class

A student wanting to attend a class without earning credits may register as an auditor. Auditing a course requires prior approval of the instructor of the course. If an instructor determines that an auditor’s attendance or participation is unsatisfactory, the course will not be recorded on the student’s academic record. Changes to or from audit status must be made during the registration or add/drop period. Tuition and fees are assessed for audited credits. Audits do not count for full-time status for loan deferments, financial aid, etc., and are not eligible for the College Opportunity Fund (COF). Students must register for the course first, then complete the Student Option Satisfactory/Unsatisfactory and Audit Grading form. The form can be found at the Registrar’s Office.

Incompletes

At the discretion of the instructor, a temporary grade of “I” may be given to a student who demonstrates that he/she could not complete the requirements of a course due to circumstances beyond the student’s control and not reasonably foreseeable. A student must be passing a course at the time that an incomplete is requested unless the instructor determines that there are extenuating circumstances to assign an incomplete to a student who is not passing the course. When an instructor assigns an “I”, he/she shall specify in writing the requirements the student shall fulfill to complete the course as well as the reasons for granting an “I” when the student is not passing the course. The instructor shall retain a copy of this statement in his/her grade records and provide copies to the student and the department head or his/her designee. *The student **should not** register for the course the following semester (to complete the coursework).* After successful completion of the makeup requirements, incomplete grades will be changed by the instructor of record or the department head, in absence of the instructor of record. After one year, an incomplete will be automatically changed to an “F” (failure) unless the course has been previously completed and a grade change submitted by the instructor or the department head. The temporary grade of “I” **must** be changed to a grade (e.g.,

A, B, C, D, F, S, U) prior to the student being awarded his/her diploma from Colorado State University.

Discontinuing a Class (Student Non-Attendance)

If a student discontinues attending a class and has not officially dropped through the Registrar's Office, the grade of F (failure) is recorded.

Repeat/Delete Policy

Repeat/Delete is a one-time per course grading option that may be used by undergraduate students who repeat a course. Once a student has graduated from CSU, a student may not repeat/delete any CSU course taken prior to the date of graduation. The following rules apply when the Repeat/Delete option is applied:

1. The grade received in the repeated course will be used in calculating the student's GPA, regardless of whether the repeated grade is higher, the same as, or lower than the initial grade received. The initial grade will remain on the transcript, but will not be used in calculating the GPA when the Repeat/Delete option is applied.
2. It is the student's responsibility to request the Repeat/Delete option from the Registrar's Office, before the expiration of the course withdrawal period in the semester in which the course is first repeated.
3. The Repeat/Delete option may be used for a maximum of ten (10) credit hours and no more than three courses. The Repeat/Delete option may not be applied to a course for which the final grade was given as a penalty for academic dishonesty in accordance with the academic integrity policy under section I.7.2 of the academic faculty and administrative staff manual.
4. If the course is repeated at any time subsequent to the use of the Repeat/Delete option, all grades in that course, except the initial grade, are used in computing the student's GPA.
5. Although a course may be repeated as often as a student chooses, the Repeat/Delete option can be used only the first time a course is repeated.
6. The Repeat/Delete option will not retroactively affect academic standing for previous terms. For example, use of the repeat/delete option may change a student's cumulative grade point average, but will not change the notation of probation previously recorded on the student's record.

Note: Although the University does not use the original Repeat/Delete grade for GPA calculation, other educational institutions and potential employers may use this grade in their GPA calculation. Medical schools, many law schools, and other graduate programs, for example, may recalculate cumulative GPA using ALL grades on a transcript.

Grade Appeals

Instructors are responsible for stating clearly the instructional objectives of the course at the beginning of each term and for evaluating student achievement in a manner consistent with these objectives. Students are responsible for maintaining standards of academic performance established for each course in which they are enrolled. Instructors are responsible for determining and assigning final course grades. Graded examinations, papers, and other materials used as a basis for evaluating a student's achievement will be available to the student for inspection and discussion.

Students may appeal instructors' grading decisions. The burden of proof, however, rests with the student to demonstrate that the grading decision was made on the basis of any of the following conditions:

1. A grading decision was made on some basis other than performance and other than as a penalty for academic dishonesty.
2. A grading decision was based on standards unreasonably different from those which were applied to other students.
3. A grading decision was based on a substantial, unreasonable, or unannounced departure from previously articulated standards.

Before making an appeal, the student should discuss the situation with the instructor(s) involved in the decision.

To appeal a grading decision, the student shall submit a written request to the department chairperson. The request must set forth the basis for the appeal, identifying one of the three categories set forth above. The request must be submitted or postmarked, if mailed, no later than 30 calendar days after the first day of classes of the next regular semester following the date the grade was recorded. If no appeal is filed within this time period, the grade shall be considered final.

Within 30 days of receipt of the request for an appeal, the student's appeal shall be provided to the instructor(s) who assigned the grade and an appeals committee formed in accordance with the departmental policies. If the request is received prior to or during the summer session when instructor(s) who assigned the grade or other faculty may

not be available, then the appeals committee will be formed no later than 30 days from the beginning of the following fall semester. This committee shall be composed of two faculty members and two students from within the department and one outside faculty member who shall serve as a voting chair.

The appeals committee will review the written appeal and response of the instructor(s). They may elect to separately interview both the student and the instructor(s) before rendering a decision. The decision of the appeals committee will be based upon whether one of the conditions for an appeal set forth above has been met. At the conclusion of the deliberations, the committee shall render one of the following decisions: 1) the original grading decision is upheld, or 2) the department chair or his/her designee(s) will reevaluate the student's achievement of the instructional objectives of the course and assign a grade accordingly.

Written notice of the committee's decision and the reasons for the decision normally will be sent to the student and the instructor(s) within 30 calendar days of the appointment of the committee. The appeal committee's decision is the final decision of the University. Written summaries of the hearing and decision, together with a rationale for that decision, shall be provided to the student and the instructor who assigned the grade and shall be retained in the department office for a period of one year.

Semester Grades

Students may access their semester grades through RAMweb three business days after the week of final exams of each term.

Transcripts

Transcripts of students' official academic records are maintained by the Registrar's Office. Official and unofficial copies of a student's transcript may be obtained by the student through RAMweb.

Enrollment or Degree Verification

For verification of enrollment status, term(s) of attendance, or degree awarded, go to www.ramweb.colostate.edu. For other verifications contact the Registrar's Office.

ABOUT WITHDRAWALS

Withdrawal from a Course

The course withdrawal period begins after the add/drop period has ended and closes at the end of the eighth week of the term for most full-term courses. A "W" grade notation (withdrawal) will be recorded on the academic record and displayed on the official transcript, except in the case of the 60-credit English composition and mathematics requirements (see the All-University Core Curriculum chapter of this catalog). For additional information see Schedule Changes and the Add/Drop and Withdrawal Periods under Registration/Schedule Changes in this chapter.

Withdrawal from Colorado State

University withdrawal (to drop *all* courses and leave the University) is different from dropping one or more courses. If the first day of the semester has not yet begun, students may cancel their course schedule through RAMweb without any charge. Once classes have started, students who are planning to drop all courses and leave the University for any reason during the fall or spring term *must* contact the Center for Advising and Student Achievement (CASA), Room 121, The Institute for Teaching and Learning (TILT), prior to their departure to complete the withdrawal process. Unless this procedure is followed, students are not eligible for any adjustment (if appropriate) of tuition and fees and will receive failing grades in all courses.

Called to Active Military Duty

The University will assist any student called to active military service with reasonable accommodations and in making the best possible transition. As a primary point-of contact, students are encouraged to work with the Office of Veterans Services in order to review all options prior to leaving the University. Depending on when in the semester the student is called to duty, they will have different options, including University withdrawal, late withdrawals or incompletes.

If the student chooses to withdraw from the University as a result of the amount of time required away from his/her studies during military service, upon presentation of military orders, the tuition paid for the semester will be refunded. All students need to contact the Center for Advising and Student Achievement (CASA) to process a University withdrawal.

If the student has completed most of the semester in which they are called to active duty, they may work with their individual instructors to assess whether or not incompletes are a viable option. The Office of Veterans'

Affairs will assist students in this process. At the discretion of the instructor, a temporary grade of “I” may be assigned to a student passing a course. The student and instructor will complete a contract for course completion. The student called to military duty will have an extended time allowed for course completion, that being one full year after the student has returned to the University. There are no refunds associated with receiving incompletes and no fees associated with completing courses.

If a student encounters a different scenario during the semester, such as being gone for a limited amount of time, they are encouraged to work with the Office of Veterans Services in order to work on reasonable accommodations in their courses or selected withdrawals from individual courses.

University Withdrawal for Call to Active Duty:

1. To complete a **University Withdrawal** while an academic term is in progress, contact Center for Advising and Student Achievement (CASA) located in the TILT Building, 801 Oval Drive, to meet with an advisor. Walk-in hours are Monday through Friday, 10:00 to 2:00. If you prefer, you can make an appointment by calling (970) 491-7095.
2. Ideally, you will HAVE YOUR DEPLOYMENT ORDERS IN HAND when you visit CASA so that the tuition appeal can be expedited at that time. If you do not have your orders with you, or can only complete the withdrawal over the phone, then you can fax the orders to CASA at (970) 491-1133. When CASA receives the orders, your tuition assessment will be adjusted to 0%.
3. If you are deployed between academic terms (for example, at the end of the semester or over the summer), you do not need to contact CASA to withdraw; however, you do need to be sure you have cancelled your registration for the upcoming term.
4. Graduate students: Please be sure to review your options for Continuous Registration versus the Graduate Form IB (Graduate Application for Readmission) as you make arrangements for your deployment.
5. Short-term deployments may not require a University Withdrawal, depending upon the length of the deployment and when in the semester it occurs. Students given orders for a short-term deployment should work directly with their instructors, who are strongly encouraged to accommodate deployed students with a reasonable plan for making up work. Students who are advised they may be assessed a penalty for the absence should contact Adult Learner and Veteran Services to discuss their options. If you

have any questions about the withdrawal process, be sure to speak to a CASA advisor.

To return to C.S.U. (whether you were deployed during the academic term or between terms):

1. Returning undergraduate students should go to the Admissions Online Applications website at admissions.colostate.edu/Apply/OnlineApp.aspx, and select the Undergraduate Intent to Return Form under the Returning Undergraduate Students heading. While it is possible to print and complete a paper application for admission in order to notify us of your return plans. The paper application is much longer and contains many unnecessary fields. The online application is preferred.
2. The Intent to Return form asks you which semester you plan to return to C.S.U. As soon as you know when you will return, you should submit the form so that you can register for classes in a timely manner. Please note the relevant application deadline, found at admissions.colostate.edu/Returning/Deadlines.aspx. Keep your academic advisor apprised of your plans—by phone or email if necessary—so that he or she can make sure that you have a schedule figured out for your returning semester.
3. Returning graduate students who have not utilized Continuous Registration must complete and submit a Graduate School Form IB, *Graduate Application for Readmission*, found at graduateschool.colostate.edu/documents/GSIB.pdf, and a copy of the deployment orders in order to **have the \$150 readmission fee waived**.
4. Graduate students who choose to utilize Continuous Registration (see graduateschool.colostate.edu/current-students/student-resources/continuous-registration-policy.aspx) during their deployment are not required to reapply when they return, but they will be charged \$150 per academic term that they are away, and the continuous registration fee is NOT waived for deployment.

Important note: If you were admitted to CSU and were not able to enroll due to deployment, you may be required to submit a new application for admission and new support documents depending upon your original term of admission. Enrollment deferrals of up to one year beyond the original term of admission are allowed in such cases but must be arranged in advance; deadlines apply.

If you have questions about the return process (for enrolled students) or about obtaining an enrollment deferral (for newly admitted students), please contact the Office of Admissions at admissions@colostate.edu.

Retroactive Withdrawal

A student may request that all grades in an academic period (one or more semesters of continuous enrollment) be retroactively removed and be replaced by entries of “W” on his or her transcript. A retroactive withdrawal may be granted only when a student could neither function normally during the academic period nor be reasonably expected to complete a university withdrawal due to extenuating circumstances such as an incident leading to major physical or mental trauma.

Failure to academically perform due to factors such as the following would not generally qualify a student for retroactive withdrawal:

- Bad habits or poor judgment
- Time management issues
- Failed relationships/roommate problems
- Failure to use University resources
- Ignorance of University policies

A retroactive withdrawal is not allowed if a student has earned a degree from Colorado State and the semester in question was used to meet University, college, or departmental requirements for the degree. Generally, requests are not allowed after four years have elapsed since the end of the last semester covered by the request.

Students are allowed two requests for the same period, the second request requiring additional supportive documentation. If granted, assessment of tuition and fees remains unchanged. The student’s academic record will remain unchanged if a request is denied.

An undergraduate or graduate student applying for a retroactive withdrawal must submit a written request with supportive, written documentation from a credible source to the Center for Advising and Student Achievement (CASA) in Room 121, The Institute for Learning and Teaching (TILT). The request will be forwarded to the Faculty Council Committee on Scholastic Standards. In addition, students must meet with an academic adviser at CASA to review the application process.

CLASS ATTENDANCE AND FINAL EXAMS

Class Attendance Regulations

Students should attend all classes for which they are registered to obtain maximum educational benefits. Absence or lateness does not excuse students from required course work.

Instructors and departments are responsible for establishing class attendance policies. These policies must accommodate student participation in University-sanctioned extracurricular/co-curricular activities. Students must inform their instructors prior to the anticipated absence and take the initiative to make up missed work in a timely fashion. Instructors must make reasonable efforts to enable students to make up work which must be accomplished under the instructor’s supervision (e.g., examinations, laboratories). In the event of a conflict in regard to this policy, individuals may appeal using established University procedures.

For purposes of this regulation, University-sanctioned activities include competitions, events and professional meetings in which students are officially representing the institution. Appropriate sanctioned activities include:

- Intercollegiate athletics;
- Collegiate club sports and competitions;
- Conferences and workshops recognized by the University not related to academics;
- Commitments on behalf of the University (ASCSU, band, etc.); and
- Professional activities recognized by the University related to academics.

Department heads or their designated representatives must approve sanctioned professional and departmental activities. Other sanctioned activities must be approved by the appropriate program director on record with the Division of Student Affairs offices or the Department of Athletics. A list of the appropriate approving authority is available at www.studentaffairs.colostate.edu/resources/staff/class-absence-list.asp.

University policy permits only enrolled students, persons attending with the permission of the instructor, and administrative personnel of the University to be present in a classroom during scheduled classroom periods.

At the discretion of the instructor in charge, any full-time student, faculty member, or senior citizen may attend any class without formal registration provided adequate classroom space is available.

Academic departments may replace any students in a course who fail to attend both of the first two regularly scheduled meetings of the class (one meeting for laboratory courses or for classes which meet once each week), unless the students have notified the department in advance. Since this procedure is a department option, students remain responsible for dropping courses they do not intend to complete and within the required time period for drops.

Final Examinations

Final examinations, as appropriate, are given during the final week of each semester. During this week, classes are rescheduled to meet for two-hour periods.

The following procedures apply to all courses during the final week of the semester:

1. Final examination week is part of the regular semester. Student attendance shall be consistent with University policy.
2. The final in-class examination period is intended for the end-of-semester examination. No in-class examination constituting more than 10% of the final course grade may be given in undergraduate courses during the week preceding the final examination period of the semester; laboratory, performance, and other alternative classes (e.g., courses in the individualized mathematics program) excluded. It is the responsibility of the department head, or, where appropriate, the school head, to ensure compliance with this policy.
3. Courses for less than four credits shall meet for one period. Courses for four or more credits may meet for two periods.
4. Classes that begin at times other than on the hour (i.e., 9:30, 2:10, 3:35, etc.) will use the time period assigned for the hour (i.e., 9:00, 2:00, 3:00, etc). For

example, a 4:30 TR class would use the 4:00 TR assigned final examination period.

5. Classes shall meet only at the times indicated on the final examination schedule.
6. Any exception of regulations 3 or 5 above, e.g., special types of examinations which need more time or special locations to conduct, must be approved by the Assistant Registrar in Classroom Scheduling prior to the second week of class and announced in classes by the second week.
7. If a student has three or more final examinations (not classes) scheduled for the same day or if conflicts of examination times occur, the student may negotiate a time change with the instructors involved. If the parties involved cannot find a mutually agreeable time, the Registrar's office indicates which courses must be changed. Note: The Assistant Registrar, Classroom Scheduling, must be notified at least one week prior to final examination week to allow instructors time to make appropriate accommodations.

Any student who has a conflict with the examination schedule must inform the instructor as soon as possible before the examination. If an agreement cannot be reached between the instructor and student as to the appropriateness of a make-up examination, the student should appeal to the department head.

Colorado State University reserves the right at any time, without notice, to change, modify, or cancel any course, program, procedure, policy, financial requirement, or disciplinary arrangement set forth in this catalog whenever, in its sole discretion, it determines such action to be appropriate. Furthermore, Colorado State will not be responsible for any failure to present or complete any course or program or to perform any other activity, function, or obligation mentioned in this catalog. Since changes may occur at any time, students must check the relevant website (as noted throughout various chapters in this catalog).

Scholastic Standards

*Center for Advising and Student Achievement (CASA)
Offices in Room 121, The Institute for Learning and
Teaching (TILT)
(970) 491-7095*

Gaye DiGregorio, Executive Director

Scholastic standards are mandated by the faculty through the Faculty Council Committee on Scholastic Standards. Procedures relative to scholastic standards are administered through the Center for Advising and Student Achievement (CASA). Those students whose scholastic achievement is less than that required for graduation are placed on probation or dismissed from the University

Policies regarding probation, dismissal, and appeal are determined by the faculty and the University in their absolute discretion subject to acceptance by the governing board of Colorado State.

MINIMUM CUMULATIVE GRADE POINT AVERAGE

In order to graduate, a minimum cumulative grade point average (CUM GPA) of 2.000 on a 4.000 scale must be earned at Colorado State University. A student is expected to maintain a CUM GPA of 2.000 or higher at all times. All grades earned in regular credit courses, including those taken through the Division of Continuing Education or the Colorado State summer session, will count toward the CUM GPA. For students who have been granted a Fresh Start, all grades earned prior to the Fresh Start will not count toward the student's CUM GPA.

Failure to maintain a CUM GPA of 2.000 or higher will result in one of the following actions.

ACADEMIC PROBATION

Failure to maintain a CUM GPA earned at Colorado State University of 2.000 or higher will result in academic probation for a period of two regular semesters (fall and spring). Grades earned in regular credit courses through the Division of Continuing Education or the Colorado State summer session will count toward the CUM GPA regardless of when those classes are taken. At any time that the CUM

GPA is raised to a 2.000 or higher, the student will return to regular academic standing.

Students who withdraw from Colorado State while on probation will remain on probation if they return to the University. Students on academic probation who return to Colorado State after attending another institution will continue their probation, since transfer credits are not computed within the CUM GPA earned at Colorado State.

ACADEMIC DISMISSAL

Students on academic probation who do not raise their CUM GPA to a 2.0 or higher after two regular semesters (fall and spring) will be dismissed from Colorado State University. Students who have been academically dismissed from Colorado State University have three options to seek readmission. First, they can take classes through the GUEST program, through the Colorado State University Summer Session, or through the Division of Continuing Education, but they are not eligible to apply for readmission until the CUM GPA is raised to 2.000 or higher.

The second option available to students who have been academically dismissed is to enroll at another accredited institution and meet the requirements to be admitted as a transfer student to Colorado State University. Upon transferring back to Colorado State University, students will have two semesters following re-enrollment to raise their CUM GPA earned at Colorado State University to 2.000 or higher or face academic dismissal again. Transfer credits are not computed within the CUM GPA earned at Colorado State University.

Students who have raised the CUM GPA to 2.000 or higher or who apply as students transferring from another institution may apply for readmission to the University subject to any enrollment limitation as set by the Colorado Department of Higher Education or the governing board.

Appeal of Academic Dismissal

Students may appeal academic dismissal. An online appeal may be submitted to the Center for Advising and Student Achievement for consideration by the Faculty Council Committee on Scholastic Standards. All appeals must be submitted in accordance with written instructions.

All appeals of academic dismissal will be acted upon by the Faculty Council Committee on Scholastic Standards no later than seven business days prior to the first day of classes for the next regular academic semester (either fall or spring).

ACADEMIC FRESH START

Former Colorado State undergraduate students may apply for an academic Fresh Start, a policy which allows students to establish a new academic record. A student may be granted a Fresh Start only once.

An academic Fresh Start may be granted only after at least five years have elapsed since the student's last term of enrollment as an admitted, degree-seeking student, regardless of the number of credits taken. Courses taken through the Division of Continuing Education or the Colorado State University Summer Session after being dismissed or ceasing enrollment as an admitted degree-seeking student will not count against the five-year interval required for a Fresh Start.

Applications for a Fresh Start will be made through the Center for Advising and Student Achievement and should be

submitted one semester prior to the academic term in which a student wishes to enroll in the University. Receipt of a Fresh Start does not guarantee admission, but may aid the student in normal admissions procedures.

A student granted a Fresh Start and enrolled will have a demarcation on the permanent academic record to delineate the previous record from the new academic record achieved under the Fresh Start policy. Credits for those courses in which a grade of at least C- or S was awarded prior to the Fresh Start may be applied toward graduation requirements under the Fresh Start policy. Only grades earned after the Fresh Start demarcation will be computed in the new GPA. A Fresh Start may have implications regarding other requirements for graduation, such as upper-division and in-residence requirements. See these sections of the General Catalog for details.

If a student receives a Fresh Start, he or she must successfully complete at least 30 upper-division credits of coursework in residence at CSU after the Fresh Start is granted in order to graduate.

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Student Services

DIVISION OF STUDENT AFFAIRS

Office in the Administration Building, Room 201
(970) 491-5312
www.studentaffairs.colostate.edu/

Blanche Hughes, Vice President for Student Affairs

The Division of Student Affairs seeks to create a campus environment that fully engages students in the integration of their academic and personal development through quality programs and services.

We believe in collaboration that maximizes the use of resources and services across the Division, across campus, and throughout the community. Collaborative efforts include housing, residential dining, wellness programs, safety, academic support services, leadership and civic engagement opportunities, student activities and recreation, recruitment and retention efforts, enrollment and registration services, assessment and research programs, development of learning environments, education of issues of diversity and difference, and creation of a civil and inclusive campus community. Student Affairs staff work closely with academic faculty to build an environment maximizing student growth and academic success.

To achieve these goals, the Division of Student Affairs is committed to providing campus facilities that foster the student life experience, technology that supports high quality communication, and well-trained professional staff who enhance the delivery of services to students and the University community.

STUDENT DIVERSITY PROGRAMS AND SERVICES

Adult Learner and Veteran Services

Office in Lory Student Center, Room 195
(970) 491-3977/491-3906
www.adultstudents.colostate.edu
www.veterans.colostate.edu

Adult Learner and Veteran Services (ALVS) assists the transition of student veterans and adult learners to college and facilitates academic success through services and programs designed to support adult learners and student veterans through graduation at Colorado State University. Students who meet one or more of the following criteria may identify as an adult learner or student veteran: has one or more children; served or is currently serving in the military; married, partnered, single, divorced or widowed; working full-time, or part-time; low income; returning to school to finish a degree after an extended time away, etc. ALVS facilitates the academic success of adult learners and student veterans through individual meetings, referrals, and programs that focus on education, leadership and involvement. ALVS is located in Room 195, Lory Student Center, the hub of campus life. The office includes a student lounge that promotes networking, community building and access to resources.

- Student lounge with computers and kitchenette
- RamWelcome events and orientations
- Family-focused programs and events
- Veteran-focused programs and events
- Scholarships and textbook awards
- Honor Societies for adult learners and veterans
- Spring Recognition Ceremony
- Information and referral

Asian/Pacific American Cultural Center

Office in Lory Student Center, Room 212
(970) 491-6154
www.apacc.colostate.edu

JoAnn Yoshida Cornell, Director

The Asian/Pacific American Cultural Center provides programs and services to support the retention, graduation and success of students. The office contributes to an inclusive campus environment by providing resources for Asian/Pacific American awareness and education.

Specific programs include:

- Academic support programs
- Connections with community

- Educational and cultural programs/resources
- Student organization support
- Student leadership development.

Black/African American Cultural Center

Office in Lory Student Center, Room 204
(970) 491-5781
www.baacc.colostate.edu/

The Black/African American Cultural Center promotes a diverse, inclusive campus environment and serves as a resource to the campus community as well as surrounding communities, through academic, professional, cultural and personal development programs that embrace Black and African American experiences. The primary goal is to enhance the overall college experience so that students achieve academically and are able to compete in a global society.

Specific programs include:

- Black History Month—Programs during the month of February
- GPS—A program for C.S.U. students to mentor Poudre Valley African American Middle and High School students
- Newsletter, *The GRIOT*
- The Rites of Passage Program – a year-long transitional program for first-year and transfer students, includes a new student off-campus retreat
- Sophomore Year Experience: Albert C. Yates Leadership Development Institute—A year-long mentoring and leadership training program providing opportunities to enhance student leadership, foster civic responsibility, and promote shared responsibility.
- Junior Year Experience: Donald Wilson Mentoring Program—Programs and individual mentoring for selected students by faculty/staff/graduate students.
- Senior Capstone Seminar—A one-semester non-credit seminar to prepare students for graduate/professional school or the work force.

El Centro

Office in Lory Student Center, Room 178
(970) 491-5722
<http://www.elcentro.colostate.edu/>

El Centro Student Services provides an inclusive learning environment that welcomes all students. El Centro supports

and strengthens the academic and cultural experience of students by providing workshops, leadership opportunities and Latina/o cultural awareness programs that promote student success and retention.

Specific programs include:

- Academic counseling
- Mentoring
- Academic referrals
- Academic and cultural enrichment workshops
- K-12 volunteer Triunfo Tutoring program
- Scholarships
- Community and public school outreach programs
- Campus and community referrals
- Volunteer and leadership opportunities
- Job opportunities.
- A place to study and make connections with students

Gay, Lesbian, Bisexual, and Transgender Resource Center

Office in Lory Student Center, Room 174
(970) 491-4342
<http://www.glbtrc.colostate.edu/>

The Gay, Lesbian, Bisexual, and Transgender Resource Center supports and affirms the diverse identities and lives of lesbian, gay, bisexual, transgender queer, questioning (LGBTQ), Two-Spirit, and same-gender loving people as individuals and as groups, especially students, staff, and faculty of Colorado State University and their allies, through the cultivation of safe space, educational outreach, advocacy, increased visibility of LGBTQ issues, information and referral resources, and academic and leadership opportunities.

The Gay, Lesbian, Bisexual, and Transgender Resource Center is a space for all members of the University communities to explore and increase their understanding of aspects regarding sexual orientation, gender identity, and gender expression in an open and nonjudgmental environment.

Services include:

- Advising
- Referrals to other University and external support programs
- Educational outreach programs
- Support to those individuals who have reported discrimination, harassment, or intimidation

Native American Cultural Center

*Office in Lory Student Center, Room 218
(970) 491-1332*

<http://www.nacc.colostate.edu/>

Native American Cultural Center ensures a successful educational experience for students by providing support and services related to recruitment, retention, graduation, and community outreach. The office embraces and encourages a supportive environment based on the traditions and cultures of Native American peoples.

The office strives to:

- Assist in personal, social, and academic growth by empowering students with the skills and strategies that will ensure a successful transition from traditional home culture to university life.
- Help students to make a positive transition to college life while maintaining the best of their native culture by emphasizing harmony and balance in daily life.
- Recruit students through professional and personal contacts with Native American reservation schools and other communities with large Native American populations.
- Serve as an advocate for students at Colorado State University.

Some of the programs and resources include the Eagle Feather Tutoring Program; North Star Mentoring Program; All Nations Leadership Retreat; Women's Talking Circle; and a resource library and computer lab.

Native American Cultural Center also has information on the American Indian Science & Engineering Society (AISES) and the Native American Student Association (NASA). AISES is a private, non-profit organization that nurtures the building of community by bridging science and technology with traditional native values. Through its educational program, AISES provides opportunities for American Indian and Alaskan Natives to pursue studies in science, engineering, business, and other academic areas. NASA is a campus organization recognized by Associated Students of Colorado State University (ASCSU), the Colorado State University student government. NASA provides activities and programs during the year for its members and the community such as the Colorado State University Powwow.

Resources for Disabled Students

*Office in General Services Building, Room 100
(970) 491-6385*

rds.colostate.edu/

Resources for Disabled Students (RDS) recognizes that disability reflects diverse characteristics and experiences, and is an aspect of diversity integral to society. To that end, we collaborate with students, instructors, staff, and community members to create useable, equitable, inclusive and sustainable learning environments. RDS is also committed to supporting Colorado State University as a non-discriminating environment for qualified students with disabilities as mandated by Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990.

Services include:

- Alternative testing
- Alternative text conversion
- Note taking support
- Accessible transportation
- Sign language/oral interpreting.

Women and Gender Advocacy Center

*Office in Student Services Building, Room 112
(970) 491-6384*

www.wgac.colostate.edu

The Women and Gender Advocacy Center provides programs and resources focusing on all genders, social justice, and interpersonal violence prevention. Staff and volunteers also provide advocacy and support for victims of sexual violence, stalking, sexual harassment and relationship violence. Programs concentrate on examining the intersections of oppression and creating conditions that allow all people to equally access opportunities in a safe University environment.

- Information, resources, and referral
- Sexual Assault Victim Assistance Team (VAT)
- Gender Education and Sexual Violence Prevention programming
- Outreach programming – “Women at Noon,” Annual Women's Conference, Sexual Assault Awareness Month
- The Resource Center (lending library)
- SAGE (Student Alliance for Gender Education)
- GASA (Greeks Against Sexual Assault)

STUDENT SERVICES AND ORGANIZATIONS

Academic Advancement Center/ TRIO Student Support Services

*Office in Gibbons Building, Room 117
(970) 491-6129
www.aac.colostate.edu*

The Academic Advancement Center provides academic support for eligible participants including: academic coaching, tutoring, facilitated group study, study and life skills strategies instruction, peer mentoring, career planning, and other academic and cultural activities. Program eligibility criteria include: neither parent has a bachelor's degree, **and/or** meets low-income criteria, **and/or** student has a disability, and is a U.S. citizen or resident alien. Please call (970) 491-6129 for more information. Applications are available at AAC, 117 Gibbons Building, or visit the AAC web site at www.aac.colostate.edu.

Access Center, The

*Office in Student Services Building, Room 304
(970) 491-6473
accesscenter.colostate.edu*

As part of its Land Grant Mission, Colorado State University is committed to making education accessible to those who, due to economic or social conditions, have not previously been offered full participation in post secondary education.

It is with this mission in mind that the Access Center was created. The Access Center strives to develop the talents of those who have been traditionally underrepresented in higher education (first generation, low income, ethnically or racially diverse, and non-traditional age) during their pre-college years by:

- Nurturing college bound aspirations
- Increasing academic skills and motivation
- Reaching out to Colorado's historically underserved secondary students
- Facilitating the college application, enrollment and student aid process
- Assisting in the transition to college
- Supporting retention efforts

Specific programs include:

- The Alliance High School Partnership unites students, families, high school personnel, and the Colorado State University community in a common goal: to envision education beyond high school and send a greater number of students to college. The University collaborates with ten high schools that were selected based on a number of factors, including: the percentage of students eligible for the free or reduced lunch program; racial and ethnic makeup of the student population; number of students who represent the first generation in their family to attend college; and schools that represent diverse geographic regions of the state.
- Bridge Scholars Program facilitates students' high school to college transition through campus life and academic experiences in an eight-week, summer residential program.
- Dream Project: The Dream Project is a student-initiated high school outreach program that partners CSU students with first-generation and low-income students in Fort Collins area high schools to assist in the college admissions process (including SAT prep, applications, writing essays, applying for financial aid, and finding scholarships).
- Educational Opportunity Center assists continuing, returning, first-time, or prospective adult students with admissions and financial aid forms, career exploration, and referral to campus and community resources.
- Reach Out: The Colorado State Advantage is a synergistic effort to advance learning opportunities of CSU students and Colorado's historically underserved secondary students by providing a platform for educational outreach while directly supporting and advancing university strategic goals in the areas of outreach, diversity, and curricular innovation.
- Talent Search nurtures the educational aspirations of youth through campus visits, college preparatory and personal growth workshops, academic guidance, summer residential programs, and cultural and educational study tours.
- Upward Bound develops skills and motivation through academic instruction and guidance, campus visits, cultural and educational study tours, and a six-week academically-focused summer campus experience.

Advising and Student Achievement, Center for (CASA)

Undeclared & Health Professions Advising, Outreach & Support Programs: *Office in Room 121, The Institute for Learning and Teaching (TILT), (970) 491-7095*

www.casa.colostate.edu

Key Learning Communities: *Office in Room 202 Aylesworth NE, (970) 491-3658*

www.casa.colostate.edu

Orientation & Transition Programs: *Office in Room 202 Aylesworth NE, (970) 491-6011*

www.casa.colostate.edu

CASA provides the following services for students:

- Academic advising for undeclared students, students exploring majors, GUEST and Continuing Education students.
- Pre-professional advising for human and animal health careers, including chiropractic, dentistry, medicine, nursing, occupational therapy, optometry, pharmacy, physical therapy, physician assistant, podiatry and veterinary medicine.
- Orientation and Transition Programs for new students, including CSU Connect, Preview (first year student orientation), Next Step (transfer student orientation), Ram Welcome, first year and transfer student mentoring, and second year student programs.
- Learning Communities including Key Academic, Key Service, Key Explore and Key Plus.
- Outreach and support programs for identified populations to facilitate academic success.
- Coordination of Scholastic Standards, academic dismissal appeals and University withdrawals.

Associated Students of CSU (ASCSU)

Office in Lory Student Center, ASCSU Complex (970) 491-5931

www.ascsu.colostate.edu

All full-time Colorado State students are members of Associated Students (ASCSU), the student governing body that promotes the interests and welfare of the students. ASCSU comprises three main branches: Senate, Cabinet, and Supreme Court. Student senators and the ASCSU cabinet represent all CSU students. Programs and services provided by ASCSU include Ram Road Trips, RamRide, Ram Leadership Team, the ASCSU Handbook Planner, and the For-Ever-Green shirts.

Closely affiliated with student government are student-faculty committees including the Student Funding Board, Athletic Advisory Committee, Lory Student Center Governing Board, Student Health Advisory Committee, and Student Fee Review Board.

In addition, ASCSU students are elected annually by Faculty Council as voting members to the following Faculty Council Standing Committees: The Committee on Intercollegiate Athletics, The Committee on Libraries, The Committee on Scholarship, Research, and Graduate Education, The Committee on Strategic and Financial Planning, The Committee on Teaching and Learning, The Committee on University Programs, and The University Curriculum Committee.

Bookstore, CSU

Lory Student Center, Main Level

(970) 491-0546

www.bookstore.colostate.edu

Proceeds from the CSU Bookstore go back to Colorado State University. CSU insignia items, school supplies, and art supplies are available as well as textbooks for every class at Colorado State.

Campus Activities

Office in Lory Student Center, Lower Level

(970) 491-6626

www.sc.colostate.edu/campus-activities.aspx

Our mission at Campus Activities is to create incredible experiences that reach all students through programming and services. We hope that you will find a way to get involved with our office.

ASAP is the student-led group that selects and brings comedians, performers, speakers, films, and other entertainment to campus. Choose the performers. Promote the events. Organize the day of the show. Meet the performers. Come and find a way to get involved that fits your life and schedule. For more information about ASAP and our events, stop by our office on the lower level of the Lory Student Center or email us at ASAP_Recruitment@mail.colostate.edu.

I-Box At campus information and the campus box office, you will find students that are here to serve you. Whether it's selling tickets or answering a variety of questions, the IBOX prides itself on providing the best customer service to CSU and the surrounding community. Questions can be directed to the management staff at: lsc_campus_infomanager@colostate.edu or lsc_cbomanager@colostate.edu

[.edu](#).

LSC Arts Program Ever heard that art galleries are stuffy and boring? Well, forget that stereotype because the Lory Student Center Arts Program is designed to be fun and interactive. Please stop by and visit the variety of exhibits in the Curfman Gallery on the main level of the LSC throughout the year, visit the Duhesa Lounge to view Native American Art or view a variety of collections throughout the LSC. To learn about the behind the scenes working of a gallery, join the Exhibitions Crew to help choose, install and staff the art exhibitions. For more information contact us at lsc_artsmanager@mail.colostate.edu or check out www.curfman.colostate.edu.

Diversity and Social Justice Programming The Diversity and Social Justice Area of Campus Activities was created in 2007 to increase inclusivity of Campus Activities programming and provide a bridge to the Student Diversity Offices, student organizations, and other groups doing related programming on campus. Most of our programming is very collaborative, so if you or your organization have an idea for a program, we would love to work with you! Campus Activities helps to coordinate some incredible campus-wide programs, including the annual CSU-Fort Collins Martin Luther King Jr. Holiday Celebration and the annual Cesar Chavez Holiday Celebration, as well as smaller programs providing opportunities to connect with others on a deeper level. For more information please contact lsc_ca_student@mail.colostate.edu.

The Flea Market The Flea Market is a resource for student organizations to promote their organization's activities, and it is the only place in the Lory Student Center where outside vendors can come to sell their products. The payments received from outside vendors directly support student organizations the Diversity Grant and Campus Activities programming. For more information, call (970) 491-1114 or visit www.sc.colostate.edu/fleamarket.aspx.

Campus Recreation

Office in the Student Recreation Center
(970) 491-6359
www.campusrec.colostate.edu

Campus Recreation actively promotes the pursuit of a balanced, healthy lifestyle to the CSU Community by providing quality programs, facilities, and services that encourage personal growth, leadership development, and employment opportunities.

- Student Recreation Center is the campus health club, available seven days per week for informal, drop-in recreation from early morning to late evening.

- Fitness Programs offer numerous wellness and fitness opportunities focusing on balance for the mind and body.
- Activity classes provide a variety of specialized and alternative activities allowing participants to experience something new or enhance a specific skill.
- Intramural Sports offers competition in various organized, safe, and friendly sporting activities. Sport offerings range from traditional sports such as basketball and volleyball to non-traditional sports such as inner tube water polo and dodge ball. The goal is for every participant to have fun.
- Sport Clubs are student-run competitive sport organizations that compete with other colleges and the opportunity to play for national championship sport club titles.
- The Outdoor Program offers a variety of outdoor activities to enable students to experience the great Colorado outdoors.
- The Challenge Course is the premier experience for team building and personal challenges on the low and high elements of the course.

To learn more about Campus Recreation at Colorado State University, pick up a copy of the Campus Recreation Guide or check out Campus Recreation at www.campusrec.colostate.edu.

Career Center

Office in Lory Student Center, Lower Level
(970) 491-5707
www.career.colostate.edu

The Career Center provides career exploration, planning, and job/internship search services for students in all majors and colleges.

Services include:

- Career counseling, interest assessment, and career workshops
- Resume and job/internship correspondence writing skills
- On-campus recruiting program, including
 - Two annual all-campus career fairs and several specialized fairs
 - Career interviewing opportunities through CareerRAM
- Available career and internship positions with area, regional, and national employers—information through CareerRAM
- The Career Center website with extensive information and links at www.career.colostate.edu, and The Career Resource Guide.

Conflict Resolution and Student Conduct Services

Office in 325 Aylesworth Hall, NW
(970) 491-7165; FAX (970) 491-1800
www.conflictresolution.colostate.edu/

Our purpose is to:

- Foster a safe and welcoming environment
- Support students as they overcome mistakes
- Engage in character development with an emphasis on ethical decision-making and integrity
- Resolve conflict at the lowest level possible

We offer the following services:

- Conflict resolution services, including consultation, coaching, and mediation.
- Training/outreach related to conflict management, academic integrity, and civility
- Student consultation team
- Advising of student peer conduct boards
- Pre-admission hearings
- Student conduct hearings
- Restorative Justice Program for repairing harm and restoring relationships
- Outcomes/education, including referrals to the Drugs, Alcohol, and You (DAY) Programs, Party Partners, and skill-building workshops
- Appeals process

Counseling Center, University

Office in 123 Aylesworth NW
(970) 491-6053
www.health.colostate.edu/pages/services/counseling-services.aspx

Based on a mental health model stressing personal development and prevention as well as remediation of problems, the University Counseling Center (UCC) offers a variety of confidential services and programs to students. Hours of operation are 8:00 a.m.-5:00 p.m., Monday through Friday, with emergency services available after hours by calling 491-7111. If students are interested in visiting the UCC for personal concerns, they need to come to Hartshorn Health Services between the hours of 10am and 4pm. They will be asked to complete paperwork and then have a brief, confidential meeting with triage counselor who will determine the most appropriate services or resources for their particular concerns.

Services include:

- Therapy offered in group and individual formats as well as couples counseling
- Stress management for the reduction of personal, test-taking, math, and public speaking anxiety
- Learning assistance for study skills as well as diagnostic and remediation services for learning disabilities and attention deficit disorder
- Testing Services in conjunction to counseling, automated test scoring for classroom exams through Faculty Test Scoring Service, administration of challenge exams, CLEP's, GED's, and national admissions tests (e.g., SAT, ACT)
- Administration of national exams such as the GRE, MCAT, TOEFL through Computer Based Testing in C82 Clark, 491-5060.
- Outreach and Prevention Programs
- Substance abuse treatment through DAY (Drugs, Alcohol and You).

CSU Health Network

www.health.colostate.edu/index.aspx
(See also Counseling Center, University, and Medical Services)

Greek Life

Office in Lory Student Center, Campus Activities Center
(970) 491-0966
www.csugreeks.com

The Greek Life Office provides assistance and support to the social fraternity and sorority chapters at Colorado State as well as advising to Greek supplemental programs, Intrafraternity Council, Panhellenic Council, Multicultural Greek Council, National Pan-Hellenic Council, Up 'til Dawn, and the Order of Omega.

Medical Services

Office in the Hartshorn Health Center
(970) 491-7121
www.health.colostate.edu/pages/services/medical-services.aspx

Hartshorn Health Service provides health care and health education for the students and student families of Colorado State University.

- Primary healthcare including illness/injury care, contraceptive care, routine physicals, mental health care
- Other clinical services include immunizations, travel medicine, allergy/asthma, dermatology, orthopedics, and sports medicine
- Health education including cultural care, tobacco cessation, nutrition services, drug/alcohol education/services, programming, student academic experiences, and volunteering opportunities
- Ancillary services including X-ray, laboratory, pharmacy, physical therapy, dental care
- Health insurance – this plan is optional and available for students and dependents. It provides primary coverage for most student healthcare needs.

Housing & Dining Services

*Offices in the Palmer Center, 1005 W. Laurel
(970) 491-6511
www.housing.colostate.edu*

The mission of Housing & Dining Services is to create dynamic housing and dining experiences that enhance personal growth and global engagement.

Residence Halls

*Office in the Palmer Center, Room 111
(970) 491-4719
www.housing.colostate.edu/halls*

The University residence halls provide services, programs, and facilities that are designed to enhance each student's total campus experience. Students who live in the residence halls have a choice of several different room and floor types to choose from. Students in the halls also have the option to join one of our thirteen Residential Learning Communities that are centered around students' academic and personal interests. Students who live on campus have access to resources like our professional staff as well as 24/7 security.

Residence hall living allows students to actively participate in a variety of academic and social activities. These activities provide experiences in leadership development and co-curricular education that supplement classroom instruction and greatly enhance the quality of on-campus University life.

First-Year Students

Experience and research has demonstrated that students who live on campus adjust to college life faster and have higher GPAs than students who live off campus. For this reason, *all newly admitted first-year students without previous college experience, who are single, under 21 years of age, and not*

living with their parents in the Fort Collins area, are required to live their first two consecutive semesters in a residence hall. Credits taken concurrent with high school and/or credits attained through Advanced Placement (AP) do not apply toward living experience.

All residents are required to sign a contractual agreement, which includes meals, and is binding for the entire academic year. Inquiries regarding this regulation, including guidelines for requesting an exemption, should be directed to Residence Life at (970) 491-4720.

Housing Assignments

The Housing Guide is mailed to all newly admitted students a few days after the admissions acceptance packet. Inquiries from continuing students should be directed to Residence Life at (970) 491-4719 or assign@colostate.edu.

Residential Learning Communities

Residential Learning Communities (academic and themed floors in the residence halls) provide students with an opportunity to quickly develop a sense of community at a large university like Colorado State. Developed around academic majors and personal interests, these communities assist students in succeeding both academically and socially. Through a wide variety of programs, tutoring, and involvement opportunities, students in an RLC have the chance to get the most from their college experience.

The following Residential Learning Communities are available in the residence halls:

- Engineering Learning Community
- Equine Community
- Global Village
- Health and Exercise Science Community
- Honors Learning Community
- Ingersoll Residential College (College of Natural Sciences)
- Key Academic Community
- Key Explore Community
- Key Plus Community
- Key Service Community
- Leadership Development Community
- Live Green Community
- Living Substance Free Community

For more information on these communities, see Residential Learning Communities in the Broadening Your Horizons chapter or visit the website at www.housing.colostate.edu/halls.

Residential Dining Services

*Office in the Palmer Center, Room 108
(970) 491-4754*

www.housing.colostate.edu/dining

Residential Dining Services operates six dining centers, two Express locations, a Sports Grill and RAMwich, an online sandwich ordering system with pick-up at Braiden Dining Center. "Late Night" dining options are available at four convenient locations. Each dining center features a unique combination of food concepts, offering choices such as sushi, pizza, pasta, stir-fry, vegan/vegetarian options, Tex-Mex, and made-to-order sandwiches. Extensive salad bars feature fresh fruits and vegetables as well as fat-free dressings. Our in-house bakery provides a wide range of breads, desserts, and specialty items.

The room and board contract includes a choice of meal plans with access to any dining center. We invite students to experience all our food concepts in each of our dining centers.

University Apartment Housing Apartment Life

*Office in the Palmer Center, Room 208
(970) 491-4743*

www.housing.colostate.edu/apartments

The University Apartments offer 908 apartments in four areas that provide housing for undergraduate and graduate students as well as CSU faculty and staff members. Academic year or month-to-month leases are available. We offer individual leases in shared apartments. The Apartment Life web site offers rental rates, 3D floor plans, and a video on each apartment village.

A Housing Guide is mailed to all newly admitted students along with their admission to CSU. Inquiries from continuing students should be directed to Apartment Life at (970) 491-4743.

Couples and Family Housing

Aggie Village and University Village feature centralized laundry facilities, playground areas, a fitness center, and community center. Aggie Village is located across the street from the academic core of campus and offers 288 apartments with single-level floor plans in two-story buildings. University Village is located west of campus. University Village offers over 400 two and three bedroom townhouse style apartments.

Graduate Student Housing

Lory Apartments and International House offer one and two bedroom apartments with centralized laundry facilities and a community center. Lory Apartments are located on the northwest side of the main campus. The International House is west of campus on Elizabeth Street. The one bedroom apartments are rented to one student and the two bedroom apartments are designed to be shared by two students.

Undergraduate Student Housing

The Intercultural Connections Community (ICC) is a global community for undergraduate students in University Village. The ICC offers two bedroom apartments with individual leases to students who are interested in diversity, global/international affairs, study abroad, and an international living experience in a family-friendly community.

Colorado State University Visitors Center

*Located in Admissions Welcome Center, Ammons Hall
(970) 491-4636*

www.colostate.edu/visiting-campus.aspx

The Colorado State University Visitors' Center offers service-oriented brochures, campus maps, and use of a computer for access to the Colorado State University web site, as well as directions to various campus locations for additional information. Visitor parking permits are available for purchase.

Conference Services

*645 South Shields Street (intersection of Laurel and Shields,
west side)*

(970) 491-6222

www.conferences.colostate.edu

The Office of Conference Services assists University and non-University program sponsors in organizing and conducting conferences, meetings, special events, seminars, workshops, and other short-term educational activities. Support services such as coordination and registration are available all year for programs meeting on campus, in Fort Collins hotels, and at other sites around the state. In addition, services are available for program meetings throughout the United States. While campus lodging facilities are available only in summer months, certain campus meeting facilities can be used during the academic year, especially during University breaks. The Conference Services staff works with more than 100 programs per year, accommodating over 20,000 participants on campus, as well as assisting with conference registration for various

conferences.

Pingree Park Campus

(970) 491-7377

www.pingree.colostate.edu

Pingree Park, the mountain campus of Colorado State University, is located 53 miles west of Fort Collins. The 1,300 acre campus lies at the foot of the Mummy Range on the north side of Rocky Mountain National Park at an elevation of 9,000 feet. The campus includes the Ramsey-Koenig State Historic District. From May through October, Pingree Park offers modern accommodations and facilities for academic courses, research activities, conferences, workshops, and retreats. The cafeteria offers nutritious meals. Meeting rooms, audio-visual equipment, and other conference supplies are available. There is also a high and low element Challenge Course. The Pingree Park campus is open to the public for educational purposes.

Lory Student Center

(970) 491-6444

www.sc.colostate.edu

The Lory Student Center is the dynamic hub of campus, serving 18,000 people each day. It encourages the lifelong learning development of students, faculty, staff, and other community members.

Lory Student Center services and programs create a stimulating and supportive atmosphere to complement academic learning and social enrichment. Inside the LSC are resources that include everything from the CSU Bookstore and the Curfman Art Gallery, to a florist, and bike repair shop.

Reservable space includes private dining areas, meeting rooms, ballrooms, and a 670-seat theater. Lory Student Center Catering can also complement any activity with a full range of dining services from banquets to small meetings.

Off-Campus Life

Office in Lory Student Center, Room 142

(970) 491-2248/491-6196

www.ocl.colostate.edu

Off-Campus Life provides services and programs to meet the diverse needs of off-campus and commuter students and to assist students in successfully transitioning, integrating and engaging in the local community. Off-Campus Life is located in the Lory Student Center, the hub of campus life,

and provides a place for students to meet, study, and access resources.

Services include:

- Information on housing options in the community, including online rental listing service
- Help in finding roommates
- Transportation information
- Tenant rights and responsibilities, including ordinance information
- Connection with community members through volunteer opportunities
- Tools and resources for students to have a successful off-campus living experience.

Orientation

(See Advising and Student Achievement, Center for)

University RamCard

Office in Lory Student Center, Room 31

(970) 491-2344

www.housing.colostate.edu/ramcard/index.htm

RamCards (university identification cards) for students, faculty, and staff are used by campus departments for a wide range of activities including identification, meal plans, RamCash accounts, building access, library materials checkout, sporting and cultural events, and entrance to exams. The RamCard can be obtained during normal business hours at the RamCard Office in the Lory Student Center. An existing government-issued picture ID such as a driver's license, passport, or military ID is required to obtain a RamCard. The initial card cost is \$20 and replacement cards cost \$25 (subject to change).

Registrar's Office

Centennial Hall (970) 491-4860

www.registrar.colostate.edu/

The Registrar's Office is responsible for student academic records and registration information. This includes classroom scheduling, degree certification, transfer evaluation, and veterans' services.

Student Financial Services

Office in Centennial Hall

(970) 491-6321

www.sfs.colostate.edu

Student Employment Services
Centennial Hall
(970) 491-5714
www.ses.colostate.edu

Student Financial Services administers a variety of institutional, state, federal, and private financial assistance programs for qualified students. Financial assistance programs include scholarships, grants, loans, and employment. Employment opportunities available include the Work-Study Program, on-campus departmental positions, and community part-time employment.

Student Leadership, Involvement, and Community Engagement (SLiCE)

Office in Lory Student Center, Room 113
(970) 491-1682
www.slce.colostate.edu

The SLiCE office works collaboratively with students, staff, faculty, and the community to offer and sustain a broad range of leadership, involvement, and volunteer opportunities for student development and growth.

Through the programs at SLiCE, students can find both support and resources to graduate as engaged, active participants in their local, national, and global communities.

The office also assists recognized student organizations in obtaining official university recognition, program planning, public relations, financial/budgetary matters, and leadership development for organizational officers, members, and advisers. More than 325 campus organizations reflect interests such as academic, political, religious, sport clubs, programming/service, governance, social, Greek, and special interests.

The wide range of curricular and co-curricular programs can be divided into three broad categories:

- Developing Student Leadership, preparing students to become leaders both as citizen participants in public service and in their career fields. Related programs include The President's Leadership Program and Rams Engaging in Active Leadership (REAL).
- Engaging with Communities, including volunteer activities and other sustainable collaborations with community-based, philanthropic, and governmental organizations. Related programs include Cans Around the Oval, CSUnity, Alternative Breaks, Praxis and Special Needs Swim.
- Encouraging student involvement in learning and growth opportunities to augment the student's overall

educational experience. Related programs include a variety of conferences and retreats like Leadershape[®] and Campus Step Up, along with the multitude of student organizations on campus.

Student Legal Services

Office in Lory Student Center, Room 182
(970) 491-1482
sls.colostate.edu

Student Legal Services provides free legal advice to fee-paying students on a variety of legal matters. Students who don't pay the student fee package may, in appropriate cases, pay SLS's semester fee (less than \$10) and receive services. Common cases involve housing issues, criminal law, consumer complaints, and debt problems, but all questions are welcome. Some services such as preparation of wills and powers of attorney carry an additional nominal charge. The staff also educates clients about their legal rights and responsibilities and, where helpful, guides students in the use of negotiation, mediation, and small claims court to resolve their disputes. Educational presentations by the SLS attorneys are always available.

Student Media

Office in Lory Student Center, Room 28
(970) 491-1683
www.collegian.com/

The department supports student staff members who produce a daily newspaper, a quarterly student magazine, a student television production facility, and a 10,000-watt radio station. Every medium is student-run, meaning the students determine the medium's content. In addition, the department hosts the Colorado High School Press Association, a statewide organization of about 150 high school journalism advisers and their students.

- First published in 1891, the *Rocky Mountain Collegian* is one of the longest continuously published student newspapers in the nation. Today the *Collegian* is a four-color daily that provides news, entertainment, sports, editorials, opinion columns, and letters from readers.
- CTV is a student-run and campus-oriented television production group offering programs weeknights during the semester on CSUTV, cable channel 11 in Fort Collins. CTV students produce news, sports, public affairs, and entertainment programs targeting the University community. Student volunteers learn many aspects of television news, management, productions, and promotion.

- KCSU-FM offers students the opportunity to learn management, programming, news, and broadcast operations for the 10,000-watt station at 90.5 on the FM band. Programming is determined by students and features music, campus-oriented news, and public service announcements.
- *College Avenue* magazine was begun in 2005 as a medium for which students can produce lengthy features, photo stories, and other graphic arts and journalistic packages. It is produced and distributed quarterly.
- The Colorado High School Press Association was founded in 1970 and moved to Colorado State University in 2002. CHSPA hosts the annual Journalism Day at CSU every October and the Summer Advisers

Workshop every July. Last year, more than 1,200 students and their advisers attended CHSPA events at CSU.

Wellness Programs (see Campus Recreation Center, CSU Health Network, Hartshorn Health Service, and University Counseling Center)

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University Facilities, Libraries, Services, and Outreach

FACILITIES AT COLORADO STATE UNIVERSITY

*Office of Facilities Management
Facilities Services Center, North
(970) 491-0005
www.facilities.colostate.edu/*

Steve Hultin, Director

The University spans five primary campuses on 4874 acres, plus numerous Agricultural Experiment Stations, Cooperative Extension offices, and Colorado State Forest Service sites across the state that cover an additional 3994 acres. Altogether, the University has 739 buildings including 301 classrooms and 1242 laboratories totaling 9,242,147 gross square feet. In addition to acres owned, the University manages an additional 9,978,537 acres throughout the state, most of which is the Colorado State Forest.

The main campus is a 583-acre site located in the older section of Fort Collins. It borders the city's central business district and is the heart of the University. It accommodates undergraduate and graduate academic courses, laboratories, athletics, housing, and support services. Student housing includes 13 residence halls plus 1,776 apartment units capable of housing 29% of the student body, all within a 10- to 20-minute walk of the main campus core.

The oldest section of main campus is known as the Oval; this is the original campus and contains buildings that are 50 to 100 years old. The tree-lined Oval epitomizes the higher education environment and is prominent in local history and alumni memories. All of these buildings have been or soon will be updated and remodeled while maintaining their historic character. The Institute for Learning and Teaching (TILT) recently received extensive renovation, including restoration of the Great Hall for student study and tutoring. The building, vacated when the Music Department relocated to the University Center for the Arts in Summer 2008, caters to student advising and tutorial needs, housing offices for The Institute for Learning and Teaching and the Center for Advising and Student Achievement (CASA). The restoration

of the Great Hall houses student tutoring and a concierge service to help connect students with the services they need.

The new Computer Science building opened for classes in Jan 2009. The building is in a prominent location, at the crossroads of the CSU plaza across from the Lory Student Center and Morgan Library. It will be an engine for Computer Science and Information Technology research, and will, most importantly, be the focal point for generations of students learning computer science principles and practice on our campus. There are three main labs on the ground floor and one lab is open 24 hours a day.

The University Center for the Arts, located in the historic Old Fort Collins High School, was completed in Aug 2008. It houses performing arts venues including the Griffin Concert Hall, Runyan Music Hall, Bohemian Theatre Complex, and University Dance Theater as well as dance studios, recital and rehearsal chambers, and classrooms to enable students and members of our community to learn about and benefit from the arts. It also includes the Colorado State University Art Museum with four discrete galleries for the exhibition of the University's permanent art collections and traveling exhibitions, and historic costume and textile gallery. In addition, the center provides clinic space for the Music Therapy program and the Center for Biomedical Research in Music. These spaces bring the University's performing and visual arts programs together under one roof, opening doors to entirely new avenues in learning and creative expression.

The south campus contains the Veterinary Teaching Hospital's research and teaching programs and the federal Natural Resources Research Center. The three-story, 113,440 GSF Diagnostic Medicine Center is located on the South Campus in close proximity to the Veterinary Teaching Hospital (VTH) and is the architectural focus of this section of CSU. The following programs occupy the new facility:

- CSU Veterinary Diagnostic Laboratory
- CSU Integrated Livestock Management Program
- CSU Extension, Veterinary Medicine Section
- Colorado Department of Agriculture - State Veterinarian and Animal Health Laboratory

Two miles west of main campus is the 1438-acre foothills campus, home to much of the University's research activities and the Colorado State Forest Service nursery. The new 13,430 gross square foot Atmospheric Science West building, programmed to accommodate Multi-Scale Modeling of Atmospheric Processes (MMAP) is located in the existing Atmospheric Sciences building complex on the Colorado State University Foothills Campus, and opened Fall 2008.

The Bioenvironmental Research Building Expansion Project was completed May 2007. The new 70,500sf Research Innovation Center will support the existing Regional Biocontainment Laboratory, and promote opportunities for the latest in research innovation and discovery to make its way into the private sector. The building is expected to be completed summer 2010.

The Environmental Learning Center (ELC), one mile east of Fort Collins, is a 179-acre educational and research unit managed by the Department of Human Dimensions of Natural Resources. The ELC consists of four major habitats, each supporting a rich mix of plant and animal life, and houses the Rocky Mountain Raptor Program and Operation Osprey.

The Agriculture Research Development Education Center (ARDEC) Phase I, on 873 acres northeast of Fort Collins, provides a field laboratory for agricultural research scientists, a demonstration site for Cooperative Extension, and field plots for instructional use. The Department of Animal Science Phase II consists of 550 acres. Forty-two acres of the site includes a 300-seat conference center with a classroom seating 40 and the Norgen Conference Room seating 12. The feedlot cattle research facilities include 50 10-head pens, 48 individual pens, and a state-of-the-art working facility. The intensive monogastric and ruminant nutrition building includes 12 metabolic stalls and 24 individual feeding stalls, plus laboratory and office space.

Pingree Park, a 1,177-acre area bordering Rocky Mountain National Park, is located 50 miles west of Fort Collins, and is used for a variety of conferences, the local elementary schools' Eco-Week, and summer camps sponsored by universities around the country. Historic preservation grants have been received to revitalize the original tool shed and chicken house and to allow archaeological review of the original homestead.

Along with construction on all campuses is a very defined, controlled maintenance program. Projects include updating mechanical systems, addition of the cooling loop to campus to eventually provide air conditioning to all campus buildings, addition of backflow preventers to all campus buildings, and replacement of roofs. Although not as visible

as the larger projects, this is a vital part of the University to ensure the health and safety of all faculty, staff, and students. Besides the traditional academic environment prevalent on the main campus, Colorado State's land-grant mission demands support of a wide variety of research and specialized studies with facilities such as animal facilities, greenhouses, wind tunnels, and observatories. Outlying campuses cater to a range of research activities including crops research, animal reproduction, and watershed management.

In addition, Colorado operates 12 research centers statewide to conduct research and experiments in various scientific fields.

UNIVERSITY LIBRARIES

Office in Morgan Library
lib.colostate.edu

Patrick Burns, Dean of Libraries

The University Libraries connects Colorado State University to information and knowledge critical for research and learning. With a diverse collection of more than 2 million items and a broad range of research services, the Libraries provides faculty and students with opportunities to develop projects and ideas. These services include library instruction, research assistance, archives, electronic reserves, desktop resource delivery, and interlibrary loan.

Enhancing the collection is a wide selection of electronic resources accessible from the library web page (lib.colostate.edu). Electronic books, databases (search tools), and more than 24,000 electronic journals are available from the desktop. Digital collections include thousands of images and primary resource materials that are multidisciplinary in scope. Finding aides and selected images are also accessible electronically for noted special collections in Water Resources and Colorado Agricultural Archives.

William E. Morgan Library, located in the center of the main campus, offers nearly 300,000 square feet of research and learning space and houses a large part of the paper collection, which includes books, maps, journals, technical reports, archives, and manuscripts. The Electronic Information Center includes labs for instruction, specialized assistive technology rooms, and 300 computers for accessing a full array of electronic materials and services. A variety of spaces including high-tech presentation practice rooms are available to accommodate both group and individual study needs. Two hundred laptops are also available for checkout and the building is equipped with a

wireless network. In addition to the main facility, there are two branch libraries, one at the Foothills Campus and one at the Veterinary Teaching Hospital. The Libraries also maintains two storage facilities, the University Libraries Depository and the Archives Annex.

The University Libraries is a member of the Association of Research Libraries (ARL), Greater Western Library Alliance (GWLA), and the Colorado Alliance of Research Libraries. These memberships enable the Libraries to participate in preservation, resources sharing, and collection development programs on a national scale. Resource sharing is further enhanced by the Libraries' locally developed RAPIDILL system now linking the collections of more than 90 research libraries around the world.

UNIVERSITY SERVICES

Academic Computing and Networking Services

*Office in University Services Center, Sixth Floor
(970) 491-5133*

www.acns.colostate.edu

Scott K Baily, Director

Academic Computing and Networking Services (ACNS) provides information technology services to the University community in addition to those local resources available in colleges and departments.

ACNS services include support and maintenance of central computing server systems; implementation, support, and maintenance of campus networks; implementation, support, and maintenance of instructional technology in classrooms, negotiation of software, hardware, and maintenance contracts for campus-wide use; and the sale of computer software and supplies. See www.acns.colostate.edu for specific information about the services offered by ACNS.

Classroom Support Services (CSS), another division of ACNS, is responsible for installation, support, and repair of instructional technology, including audio and video hardware, in the general assignment classrooms. CSS also supplies video playback to media-equipped rooms across campus through the University cable TV system.

Account information, documentation, and assistance with personal computers and the University's central computing systems are available from the Computing Help Desk, now located in Morgan Library (970) 491-7276. Computer supplies, software, and manuals may be purchased at

RAMtech, located in the Lory Student Center. A University identification card is required for cash purchases.

Division of Continuing Education

*Drake Hall
2545 Research Blvd
Fort Collins, CO 80526
(970) 491-5288
www.online.colostate.edu/*

*Additional offices in Learning Center classrooms in
downtown Denver, Brighton, and Loveland, CO*

Hunt Lambert, Associate Provost

The Division of Continuing Education offers a wide range of credit and noncredit educational opportunities available on campus in Fort Collins, at learning centers throughout the Front Range, and by various online and distance education delivery methods. Programs include academic, degree-oriented courses and programs, as well as professional development and training courses and certificates to meet the specific needs of individuals, groups, and employers.

Online/Distance Degree and Certificate of Completion Programs offer credit courses toward graduate and undergraduate degrees and certificates, online and via distance methods (including videotape, audio conferencing, and correspondence), with no face-to-face class time requirement. Courses are available in a wide range of disciplines including adult education and training, agricultural sciences, business administration, computer science, educational leadership, engineering, fire services administration, human development and family studies, industrial/organizational psychology, liberal arts, natural resources, and statistics.

Classroom-Based Degree and Certificate of Completion Programs offer credit courses toward graduate degrees and certificates utilizing traditional classroom-based instruction, or a blend of in-class and online instruction. Classes are held at one of the Learning Centers, and program offerings include graduate degrees in education, organizational performance and change, and social work.

Noncredit Programs include courses and workshops for personal and professional development conducted face-to-face, online, and at a distance via distance delivery methods. Some noncredit programs offer continuing education units (CEUs) and professional development units (PDUs), a measurement which enables organizations and professions to recognize participation in continuing education programs. Continuing Education is responsible for program evaluation

and administration in awarding CEUs/PDUs. Noncredit courses also include certificate of completion programs in work-related areas such as project management, construction management, and green building.

Advising Services for Continuing Education students are available through the Center for Advising and Student Achievement (CASA), Room 121, The Institute for Teaching and Learning (TILT). Information is provided on financial aid and various student services.

The *Denver Learning Center* is an ideal solution for working professionals in the Denver area who want to further their education with a graduate degree or certificate program. Colorado State University Denver Learning Center (410 17th Street between 16th and 17th Streets) serves those who desire face-to-face instruction and aren't able to commute to Fort Collins. The Center is located in the heart of Denver's financial district, close to businesses, dining, shopping, and secure daytime and evening parking. Master's programs currently available include: executive M.B.A., Adult Education and Training, and Organizational Performance and Change.

Colorado State University's *Brighton Learning Center* provides working professionals in the Brighton, Northern Colorado, Northeastern Colorado, or North Denver region access to professional development and graduate degree programs. This Learning Center (1850 Egbert St., Brighton) currently offers master's programs in Social Work and master's and Ph.D. programs in Organizational Performance and Change.

Colorado State University's *Loveland Learning Center* is the optimal location for Northern Colorado professionals. Just minutes from Loveland, Fort Collins, Greeley, and Longmont (near the intersection of Interstate 25 and Highway 34), the Loveland Learning Center offers professional development courses and certificate programs. The Learning Center (2915 Rocky Mountain Ave, Loveland) offers the use of classroom facilities for non-CSU entities.

In partnership with the Bernard Osher Foundation, the *Osher Lifelong Learning Institute (OLLI)* at Colorado State University is an innovative educational membership program designed for people 50 years of age or better (or anyone with a curious mind) to meet new friends while learning about topics ranging from cultural awareness to personal development. Classes promote an enthusiasm for learning in a relaxed and engaging atmosphere with no tests, no prerequisites, and no stress.

Office of Equal Opportunity and Diversity

Office in 101 Student Services
(970) 491-5836
www.oeo.colostate.edu

Diana Prieto, Director

The Office of Equal Opportunity is the unit responsible for developing, implementing, monitoring and evaluating programs, policies and procedures in compliance with the University's equal opportunity, equal access, and affirmative action regulatory requirements in addition to ensuring Colorado State University's legal and philosophical commitment to equal access and opportunity in employment, education, scholarly and outreach activities to all individuals by providing an environment of excellence in which all individuals can participate to the full level of their capabilities, realize their aspirations, and contribute to the global society in which we all live.

The following are key programs and activities of the Office of Equal Opportunity:

- Develop and implement the University's Affirmative Action Program.
- Develop procedures for, and monitor, all academic faculty and administrative professional searches to ensure compliance with Affirmative Action and nondiscrimination requirements.
- Work in conjunction with Human Resource Services in the hiring process used for state classified employees to ensure compliance with Affirmative Action and nondiscrimination requirements.
- Develop and implement procedures for the investigation and resolution of complaints of discrimination and sexual harassment.
- Coordinate University compliance with the Americans with Disabilities Act and the ADA Amendments Act.
- Coordinate University compliance with the Americans with Title IX of the Education Amendments Act of 1972.
- Provide education and training to students, staff, faculty, and external constituencies in the areas of equal opportunity, equal access and affirmative action.

Department of Public Safety

Office in Green Hall
(970) 491-6425
publicsafety.colostate.edu

Wendy S. Rich-Goldschmidt, Chief of Police

Given the heightened emphasis on safety and emergency response on college campuses nationwide, Colorado State

University has developed a more coordinated infrastructure for addressing campus safety issues with the creation of the Department of Public Safety. The unit includes CSU Police Department, Environmental Health Services, Parking Services, the University Special Events Advisory Group, CSU's Emergency Management Team, and Foothills Campus Security. This new structure will assure better coordination campus-wide in terms of access control, infrastructure security, hazardous materials management, and emergency planning.

CSU Police Department

Office in Green Hall
(970) 491-6425
police.colostate.edu

Wendy Rich-Goldschmidt, Chief of Police

The CSU Police Department is a full-service, accredited law enforcement agency whose officers are armed and have full law enforcement authority on all property owned or controlled by Colorado State. Officers are committed to a philosophy of community based policing and work in partnership with others to augment campus safety. CSU officers also possess peace officer commissions from the State of Colorado, the City of Fort Collins, and are commissioned deputy sheriffs in Larimer County. The police department operates 24 hours a day, every day of the year. "911" access is TDD compatible and a TDD service line is available at (970) 491-2323.

CSU police enforce criminal and traffic laws, investigate all crimes that occur on campus, make arrests, and maintain full integration with the criminal justice system, including close working relationships with the District Attorney's Office, Fort Collins Police, Larimer County Sheriff's Department, and other state and federal law enforcement agencies and investigation bureaus. The programs and services of the department are designed to meet the demands and needs of a growing and thriving University community.

The Bicycle Education and Enforcement Program (BEEP) is a unit of the police department designed to address bicycling issues on campus. Bicyclists on campus are expected to maintain compliance with Colorado State Bicycle Regulations which regulate the operation and parking of bicycles on campus. Bicyclists are expected to obey all traffic laws while operating a bicycle on campus or in the City of Fort Collins. Any persons who are affiliated with Colorado State must register their bicycle with the police department if they intend to ride their bicycle on campus. A copy of the regulations is available at the police department during normal business hours or the department Web site.

The Safe Walk Program is a service designed to assist those who walk during the hours of darkness. Trained Campus Service Officers are available to walk people to and from their destination within a defined service area. Call (970) 491-1155 or use any police service callbox on campus.

Parking Services

Office at 1508 Center Avenue
Lake Street Garage
(970) 491-7041
parking.colostate.edu/

Dave Bradford, Director

Parking at Colorado State University is provided for faculty, staff, students and visitors and does require a parking permit.

- Faculty, staff and student permits can be purchased at the University Parking Services office or on-line. Faculty and staff can buy annual permits by using payroll deduction;
- Students can pay for annual permits by using their student accounts. Visitor permits can be purchased at the University Parking Service's Office, Lory Student Center information desk and at pay and display machines (daily permit) located in various parking lots throughout campus. Please see a parking map or visit the Parking Services website parking.colostate.edu for pay and display locations.
- Short term pay by space parking (pay by the hour) is available in the Engineering Parking Lot and the Lake Street Garage as well as various other lots on campus; please see parking map or visit the Parking Services website.

Colorado State has over 13,000 parking spaces on campus allocated to promote the best interests of the entire campus community.

OUTREACH UNITS OF THE UNIVERSITY

Agricultural Experiment Station

Office in Shepardson 121
(970) 491-5371
www.colostate.edu/Depts/AES

Lee E. Sommers, Director

Agricultural research has been part of Colorado State University since the institution's beginning. In 1888, the Colorado General Assembly established the Colorado Agricultural Experiment Station (CAES) as a contributor to the federally-created state agricultural experiment station system, currently encompassing all fifty states and a number of United States territories.

The CAES is an integral part of Colorado State University and a unit within the College of Agricultural Sciences. The CAES supports faculty, staff, and students who conduct research on agricultural and natural resource problems. These research programs are conducted by academic departments in Fort Collins and by off-campus research centers located throughout Colorado. The AES is not a single location, rather it is an integrated, statewide research system.

The mission of the Colorado Agricultural Experiment Station is to conduct research that addresses the economic viability, environmental sustainability, and social acceptability of agricultural and natural resource systems in Colorado and the related impacts on consumers.

Agricultural research programs include the traditional areas of producing and processing food products such as wheat, beef, potatoes, fruits, and vegetables as well as areas such as human nutrition, textiles, floriculture, ornamental plants, rangelands, water quantity and quality, and wildlife. The food production system involves use of human and financial capital to manage natural resources.

The CAES supports research projects conducted by faculty in the Colleges of Agricultural Sciences, Applied Human Sciences, Engineering, Liberal Arts, Natural Resources, Natural Sciences, and Veterinary Medicine and Biomedical Sciences. In addition to on-campus research programs, the CAES conducts applied research at 9 off-campus research centers: Agricultural Research Development, and Education Center (ARDEC), Fort Collins; Arkansas Valley, Rocky Ford; Eastern Colorado, Akron; Plainsman, Walsh; San Luis Valley Center; Southwest Colorado, Yellow Jacket; and Western Colorado at Fruita, Orchard Mesa, and Rogers Mesa. A number of farmers and ranchers cooperate with the CAES in various studies, and some research is conducted cooperatively with other state and federal agencies, especially the Agricultural Research Service, United States Department of Agriculture.

The CAES disseminates research results through technical bulletins and reports, journal articles, and other types of publications, as well as seminars, workshops, and other presentations to clientele, scientists, and government agencies. These results are also disseminated by Extension in a variety of formats.

Colorado State Forest Service

*Office in Foothills Campus Building 1050
(970) 491-6303
csfs.colostate.edu*

Jeff J. Jahnke, Director

The Colorado State Forest Service (CSFS) assists other state and federal agencies, counties, communities, and private landowners with forest stewardship, community forestry, fire protection, and conservation education. The CSFS State Office is located on the CSU foothills campus; 17 district offices are located throughout Colorado.

A service and outreach agency of the Warner College of Natural Resources, the Colorado State Forest Service maintains cooperative relationships with Colorado State University Extension and other federal, state, and local agencies and organizations. The Colorado State Forest Service provides forestry-related information to the citizens of Colorado via media, the web, publications, and technical assistance.

Extension

*Offices in University Square, Room 102
(970) 491-6281
www.ext.colostate.edu*

Lou Swanson, Vice President for Engagement and Director of Extension.

Colorado State University Extension (CSUE) provides information and education that encourages the application of research-based knowledge in response to local, state, and national issues affecting individuals, families, businesses, and communities of Colorado

Extension was established in 1914 by federal legislation, accepted by Colorado's General Assembly in 1915, and reaffirmed in 1979. It is funded by county, state, and federal appropriations. Extension also functions as the educational arm of the U.S. Department of Agriculture, through each state's land grant university. CSUE has 57 off-campus offices and serves 59 of Colorado's 64 counties.

Extension's outreach educational objectives fall within the scope of their land-grant mission and address high-priority needs and issues in Colorado in the broad areas of agriculture and natural resources, family and consumer sciences, 4-H youth development, and community development. Ongoing program teams focus on critical areas including: strong families, healthy homes; nutrition, health, and food safety; 4-H and youth development; community

resource development; natural resources—including water and alternative energy; and competitive and sustainable agriculture systems.

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Degree Programs

UNDECLARED ADVISING

*Center for Advising and Student Achievement
Offices in Room 121, The Institute for Learning and
Teaching
(970) 491-7095
www.casa.colostate.edu*

“Undeclared” is a special designation for students who have a rich and diverse set of interests that span the University curriculum and want to explore majors. Through the Undeclared advising process students are able to learn about various academic opportunities while keeping their options open as they begin their college experience. Professional academic advisers in the Center for Advising and Student Achievement (CASA) are knowledgeable about the academic requirements to assist students in the process of selecting a major. Advisors help students plan their schedules, provide information on career options, and refer students to other resources. Students are encouraged to declare a major by the time they earn 45 credits.

Undeclared students, in the semester where their census-date registration would lead them to achieve a total of 60 or more credits, and any semester afterwards, will have a hold placed upon subsequent registrations, and will be required to visit the CASA office to discuss selection of a major and to ensure they are aware of the possible consequences of delaying this choice. Such consequences may include, but may not be limited to, the inability to graduate within 4 years, and loss of the College Opportunity Fund (after reaching the maximum allowed credits) and possible other financial aid. At this meeting in order to have their hold removed, undeclared students will sign a document indicating that they understand these possible consequences, and will indicate when they intend to select a major, how long it will take for them to complete this major, or how they intend to gain entrance into a competitive major if that is their goal.

UNDERGRADUATE DEGREES

Undergraduate Majors

Major Requirements

The student wishing to graduate must complete the requirements for a major and the All-University Core Curriculum (see that chapter of the catalog). A major is a sequence of courses in a subject-matter area or discipline which, when accompanied by appropriate supporting courses, leads to a degree. A minimum of 27 semester credits constitutes a major. Completion of a major is shown on both the student’s diploma and academic record. Students may elect to complete the requirements for two or more majors. To graduate with more than one major, students must complete all the requirements for each major (some majors will accept, as fulfilling their own category 4A-C requirements, with the fulfillment of the category 4A-C requirements in another declared major the student completes). Common requirements may count in meeting the curriculum requirements for each major, but each major must have a minimum of 27 unique credits. [The requirements for multiple degrees are described in the section below.]

Concentration Requirements

Some majors have concentrations (or specialization areas). A concentration is a sequence of at least 12 semester credits of designated courses within a major designed to accommodate specific interests of students. Completion of a concentration is shown on a student’s academic record if completed in conjunction with a degree program, but are not noted on the diploma.

Options

Some majors have options which are a sequence of courses within a major or concentration of either guided electives or electives selected from areas of interest as approved by the student’s adviser. Options do not appear on diplomas or a student’s academic record. (Courses taken to complete an option do appear on the student’s transcript.)

Undergraduate Students With More Than One Major

If all the completed majors are of the same degree type (e.g., B.A., B.S., B.M., B.F.A., B.S.W.) and the student has fewer than 150 credits, the student will be awarded a single diploma which displays all majors earned.

Students with fewer than 150 credits who have completed multiple majors that are of different degree types will be given the following choices at the time they file their graduation contract:

1. One diploma showing all majors conferred.
2. The Bachelor of Arts and Sciences (B.A.S.) if one major is a B.A. and another is a B.S.

Students must complete degree requirements for the first major before they can graduate. Students that have declared two majors must complete all degree requirements before the degrees can be conferred.

Second Baccalaureate Degree Requirements

A second baccalaureate degree can be earned either concurrently (i.e., at the same time a student graduates with the first degree) or sequentially (i.e., when a student who previously graduated from Colorado State University or another accredited institution with a baccalaureate degree returns to school to earn a second undergraduate degree).

Second Degrees Earned Concurrently

Students with multiple majors, who have successfully completed a minimum of 150 credits, a minimum of 27 unique credits for each major, and the AUCC category 4A-C requirements for each major, may request separate baccalaureate degrees. A maximum of two baccalaureate degrees (e.g., B.A. and B.S.,) can be earned concurrently.

Degrees Earned Sequentially

Students enrolling at Colorado State University after previously graduating with one or more baccalaureate degrees may earn an additional undergraduate degree in a different major if they fulfill the following requirements:

1. A minimum of 30 semester credits in residence in addition to the credits earned at the time the student graduated with his/her previous baccalaureate.
2. All curriculum requirements for the major including All-University Core Curriculum requirements (see that section of this catalog).

The earlier baccalaureate degree(s) may be from Colorado State University or from another institution accredited by a regional accrediting agency recognized by the U.S. Department of Education, the Council for Higher Education Accrediting, or equivalent. Regionally Accredited accepted coursework will fulfill the All-University Core Curriculum (AUCC) requirements with the exception of those AUCC courses in category 4 that are required in the major. Students with a degree equivalent to a U.S. bachelor's degree earned at an International Institution must complete all AUCC requirements in addition to any major curriculum requirements.

List of Majors

The following is an alphabetical list of majors offered by Colorado State University and the department/college in which they are housed. For information on requirements for undergraduate degrees, see Graduation Requirements and Procedures and college and department sections of this catalog. This list is subject to change.

[Title (Degree) – Department/College]

Agricultural Business (B.S.) – Agricultural and Resource Economics/Agricultural Sciences

Agricultural Economics (B.S.) – Agricultural and Resource Economics/Agricultural Sciences

Agricultural Education (B.S.) – interdepartmental major/Agricultural Sciences

Animal Science (B.S.) – Animal Sciences/Agricultural Sciences

Anthropology (B.A.) – Anthropology/Liberal Arts

Apparel and Merchandising (B.S.) – Design and Merchandising/Applied Human Sciences

Applied Computing Technology (B.S.) – Computer Science/Natural Sciences

Art (B.A., B.F.A.) – Art/Liberal Arts

Biochemistry (B.S.) – Biochemistry and Molecular Biology/Natural Sciences

Biological Science (B.S.) – Biology/Natural Sciences

Biomedical Engineering and Chemical and Biological Engineering (dual degree, B.S.) – interdepartmental/Engineering

Biomedical Engineering and Electrical Engineering (dual degree, B.S.) – interdepartmental/Engineering

Biomedical Engineering and Mechanical Engineering (dual degree, B.S.) – interdepartmental/Engineering

Biomedical Science (B.S.) – Biomedical Sciences/Veterinary Medicine and Biomedical Sciences

Business Administration (B.S.) – interdepartmental major/Business

Chemical and Biological Engineering (B.S.) – Chemical and Biological Engineering/Engineering

Chemistry (B.S.) – Chemistry/Natural Sciences

Civil Engineering (B.S.) – Civil and Environmental Engineering/Engineering
Communication Studies (B.A.) – Communication Studies/Liberal Arts
Computer Engineering (B.S.) – Electrical and Computer Engineering/Engineering
Computer Science (B.S.) – Computer Science/Natural Sciences
Construction Management (B.S.) – Construction Management/Applied Human Sciences
Economics (B.A.) – Economics/Liberal Arts
Electrical Engineering (B.S.) – Electrical and Computer Engineering/Engineering
Engineering Science (B.S.) – interdepartmental major/Engineering
English (B.A.) – English/Liberal Arts
Environmental Engineering (B.S.) – Civil and Environmental Engineering/Engineering
Environmental Health (B.S.) – Environmental and Radiological Health Sciences/Veterinary Medicine and Biomedical Sciences
Environmental Horticulture (B.S.) – Horticulture and Landscape Architecture/Agricultural Sciences
Equine Science (B.S.) – Animal Sciences/Agricultural Sciences
Ethnic Studies (B.A.) – Ethnic Studies/Liberal Arts
Family and Consumer Sciences (B.S.) – School of Education/Applied Human Sciences
Fire and Emergency Services Administration (B.S.) – Education/Applied Human Sciences
Fish, Wildlife, and Conservation Biology (B.S.) – Fish, Wildlife, and Conservation Biology/Natural Resources
Forestry (B.S.) – Forest and Rangeland Stewardship/Warner Natural Resources
Geology (B.S.) – Geosciences/Natural Resources
Health and Exercise Science (B.S.) – Health and Exercise Science/Applied Human Sciences
History (B.A.) – History/Liberal Arts
Horticulture (B.S.) – Horticulture and Landscape Architecture/Agricultural Sciences
Hospitality Management (B.S.) – Food Science and Human Nutrition/Applied Human Sciences
Human Development and Family Studies (B.S.) – Human Development and Family Studies/Applied Human Sciences
Interior Design (B.S.) – Design and Merchandising/Applied Human Sciences
International Studies (B.A.) – College of Liberal Arts
Journalism and Technical Communication (B.A.) – Journalism and Technical Communication/Liberal Arts
Landscape Architecture (B.S.) – Horticulture and Landscape Architecture/Agricultural Sciences
Languages, Literatures, and Cultures (B.A.) – Foreign Languages and Literatures/Liberal Arts
Liberal Arts (B.A.) – interdepartmental major/Liberal Arts
Mathematics (B.S.) – Mathematics/Natural Sciences

Mechanical Engineering (B.S.) – Mechanical Engineering/Engineering
Microbiology (B.S.) – Microbiology, Immunology and Pathology/Veterinary Medicine and Biomedical Sciences
Music (B.A., B.M.) – Music, Theatre, and Dance/ Liberal Arts
Natural Resource Recreation and Tourism (B.S.) – Human Dimensions of Natural Resources/Warner Natural Resources
Natural Resources Management (B.S.) – Forest and Rangeland Stewardship/Warner Natural Resources
Natural Sciences (B.S.) – interdepartmental major/Natural Sciences
Nutrition and Food Science (B.S.) – Food Science and Human Nutrition/Applied Human Sciences
Performing Arts (B.A.) – Music, Theatre, and Dance/ Liberal Arts
Philosophy (B.A.) – Philosophy/Liberal Arts
Physics (B.S.) – Physics/Natural Sciences
Political Science (B.A.) – Political Science/Liberal Arts
Psychology (B.S.) – Psychology/Natural Sciences
Rangeland Ecology (B.S.) – Forest and Rangeland Stewardship/Warner Natural Resources
Social Work (B.S.W.) – Social Work/Applied Human Sciences
Sociology (B.A.) – Sociology/Liberal Arts
Soil and Crop Sciences (B.S.) – Soil and Crop Sciences/ Agricultural Sciences
Watershed Science (B.S.) – Ecosystem Science and Sustainability/Warner Natural Resources
Zoology (B.S.) – Biology/Natural Sciences

Undergraduate Minors

Minor Requirements

Minor programs of study are optional and are offered by certain departments. A minor consists of a minimum of 21 specified credits of course work outside the major. A minimum of 12 of the 21 credits must be course work at the upper-division level (300-400) and a minimum of 12 credits must be from course work within the department offering the minor. Minors are noted on the student's academic record if completed in conjunction with a degree program, but are not noted on the diploma.

List of Minors

This list is subject to change.

[Title – Department/College]

Aerospace Studies – All-University

Agricultural and Resource Economics – Agricultural and Resource Economics/Agricultural Sciences
Anthropology – Anthropology/Liberal Arts
Applied Statistics – Statistics/Natural Sciences
Art History – Art/Liberal Arts
Biochemistry – Biochemistry and Molecular Biology/Natural Sciences
Biomedical Sciences – Biomedical Sciences/Veterinary Medicine and Biomedical Sciences
Botany – Biology/Natural Sciences
Business Administration – interdepartmental/Business
Chemistry – Chemistry/Natural Sciences
Chinese – Foreign Languages and Literatures/Liberal Arts
Computer Science – Computer Science/Natural Sciences
Criminology and Criminal Justice – Sociology/Liberal Arts
Ecological Restoration – Forest and Rangeland Stewardship/Warner Natural Resources
Economics – Economics/Liberal Arts
English – English/Liberal Arts
Entomology – Bioagricultural Sciences and Pest Management/Agricultural Sciences
Environmental Engineering – Civil and Environmental Engineering/Engineering
Environmental Health – Environmental and Radiological Health Sciences/Veterinary Medicine and Biomedical Sciences
Environmental Horticulture – Horticulture and Landscape Architecture/Agricultural Sciences
Ethnic Studies – Ethnic Studies/Liberal Arts
Fishery Biology – Fish, Wildlife, and Conservation Biology/Warner Natural Resources
Forestry – Forest and Rangeland Stewardship/Warner Natural Resources
French – Foreign Languages and Literatures/Liberal Arts
General Philosophy – Philosophy/Liberal Arts
General Sociology – Sociology/Liberal Arts
Geology – Geosciences/Natural Resources
Geography – Anthropology/Liberal Arts
German – Foreign Languages and Literatures/Liberal Arts
History – History/Liberal Arts
Horticulture – Horticulture and Landscape Architecture/Agricultural Sciences
Japanese – Foreign Languages and Literatures/Liberal Arts
Mathematical Biology – Mathematics/Natural Sciences
Mathematics – Mathematics/Natural Sciences
Media Studies – interdepartmental/Liberal Arts
Merchandising – Design and Merchandising/Applied Human Sciences
Microbiology – Microbiology, Immunology, and Pathology/Veterinary Medicine and Biomedical Sciences
Military Science – All-University
Music – Music, Theatre, and Dance/Liberal Arts

Nutrition – Food Science and Human Nutrition/Applied Human Sciences
Physics – Physics/Natural Sciences
Plant Health – Bioagricultural Sciences and Pest Management/Agricultural Sciences
Political Science – Political Science/Liberal Arts
Range Ecology – Forest and Rangeland Stewardship/Warner Natural Resources
Religious Studies – Philosophy/Liberal Arts
Soil Resources and Conservation – Soil and Crop Sciences/Agricultural Sciences
Spanish – Foreign Languages and Literatures/Liberal Arts
Spatial Information Management – Forest and Rangeland Stewardship/Warner Natural Resources
Statistics – Statistics/Natural Sciences
Studio Art – Art/Liberal Arts
Theatre-Acting/Directing – Music, Theatre, and Dance/Liberal Arts
Theatre-Design/Technical Theatre – Music, Theatre, and Dance/Liberal Arts
Watershed Science – Ecosystem Science and Sustainability/Warner Natural Resources
Wilderness Management – Human Dimensions of Natural Resources/Warner Natural Resources
Zoology – Biology/Natural Sciences

Interdisciplinary Studies Programs

Interdisciplinary Studies

An interdisciplinary studies program is a specified series of courses focused upon a particular area of concern providing insight from a variety of disciplinary perspectives. Credits earned in these courses can be used in meeting the requirements for a degree.

Undergraduate interdisciplinary studies programs are called interdisciplinary minors. The minimum number of credits required for an interdisciplinary minor is 21, of which 12 must be upper division (300- to 400-level). In addition, 12 credits of the 21 required must be taken at C.S.U. Graduate interdisciplinary studies programs vary in the minimum number of credits.

Completion of requirements for an interdisciplinary studies program is noted on the student's academic record (transcript) but not on the diploma. The programs of study for the interdisciplinary studies programs are found in the University-Wide Instructional Programs chapter of this catalog.

List of Interdisciplinary Minors (Undergraduate) and Interdisciplinary Study Programs (Graduate)

[Title (Level) – Coordinating Body(ies)]

- Arabic Studies* (Undergraduate) – Coordinated by the Department of Foreign Languages and Literatures
- Asian Studies* (Undergraduate) – Coordinated by Asian Studies Board and the Office of International Programs.
- Biomedical Engineering* (Undergraduate) – Coordinated by a Faculty Advisory Board and the Department of Mechanical Engineering.
- Conservation Biology* (Undergraduate) – Coordinated by a Faculty Advisory Board and the Office of the Dean, College of Natural Resources.
- Diversity in Law* (Undergraduate) – Coordinated by an Advisory Board and the Associate Dean, College of Liberal Arts.
- Energy Engineering* (Undergraduate) – Coordinated by a Faculty Advisory Board and the College of Engineering
- Environmental Affairs* (Undergraduate) – Coordinated by a Faculty Advisory Board and the Department of Political Science.
- Extreme Ultraviolet and Optical Science and Technology* (Graduate) – Coordinated by a Faculty Advisory Board and the Department of Electrical and Computer Engineering.
- Film Studies*(Undergraduate) Coordinated by the Department of Communication Studies.
- Food Science and Safety* (Undergraduate and Graduate) – Coordinated by a Faculty Advisory Board.
- Gerontology* (Undergraduate) – Coordinated by the Dean’s Office, College of Applied Human Sciences.
- Global Environmental Sustainability* – Coordinated by the School of Global Environmental Sustainability.
- Information Science and Technology* (Undergraduate) – Coordinated by the Center for Information Science and Technology.
- Integrated Resource Management* (Undergraduate) – Coordinated by the Western Center for Integrated Resource Management.
- International Development* (Undergraduate and Graduate) – Coordinated by the International Development Board and the Office of International Programs.
- Italian Studies* (Undergraduate) – Coordinated by the Department of Foreign Languages and Literatures.
- Latin American and Caribbean Studies* (Undergraduate) – Coordinated by a Faculty Advisory Board and the Office of International Programs.
- Linguistics and Culture* (Undergraduate) – Coordinated by a Faculty Advisory Board and administered through the Department of English.

- Mathematics* (Graduate) – Coordinated by the Department of Mathematics.
- Merchandising* (Graduate) – Coordinated by the Department of Design and Merchandising. The program is offered in online format by the Great Plains Interactive Distance Education Alliance.
- Molecular Biology* (Undergraduate) – Coordinated by Faculty Advisory Board and the Department of Biochemistry and Molecular Biology.
- Molecular, Cellular and Integrative Neurosciences* (Graduate) – Coordinated by the Graduate Faculty of the Molecular, Cellular, and Integrated Neurosciences Program and the Offices of the Deans, Colleges of Natural Sciences and Veterinary Medicine and Biomedical Sciences.
- Organic Agriculture* (Undergraduate) – Coordinated by a Faculty Advisory Board and the cooperation of the Departments of Agricultural and Resource Economics, Bioagricultural Sciences and Pest Management, Horticulture and Landscape Architecture, and Soil and Crop Sciences.
- Peace and Reconciliation Studies* (Undergraduate and Graduate) – Coordinated by a Faculty Advisory Board and administered through the Office of International Programs.
- Political Economy* (Graduate) – Coordinated by a Faculty Advisory Board.
- Religious Studies* (Undergraduate) – Coordinated by a Faculty Advisory Board and the History Department.
- Systems Engineering* (Graduate) – Coordinated by a Faculty Advisory Board and the College of Engineering
- Water Resources* (Undergraduate) – Coordinated by the Colorado Water Resources Research Institute.
- Women’s* (Undergraduate and Graduate) – Coordinated by a Faculty Advisory Board and the Department of Ethnic Studies.

GRADUATE DEGREES

The following is a list of graduate and professional degree programs offered by Colorado State. For information on requirements for graduate and professional degrees, visit the Graduate School website at graduateschool.colostate.edu/index.aspx. An online version of the *Graduate and Professional Bulletin* is available at: graduateschool.colostate.edu/current-students/bulletin.aspx.

[Title (Degree) – Department/College]

- Agricultural and Resource Economics* (M.S., Ph.D.) – Agricultural and Resource Economics/Agricultural Sciences
- Animal Sciences* (M.S., Ph.D.) – Animal Sciences/ Agricultural Sciences

Anthropology (M.A.) – Anthropology/Liberal Arts
Applied Developmental Science (Ph.D.) – Human Development and Family Studies/Applied Human Sciences
Atmospheric Science (M.S., Ph.D.) – Atmospheric Science/Engineering
Bioagricultural Sciences (M.S., Ph.D.) – Bioagricultural Sciences and Pest Management/Agricultural Sciences
Biochemistry (M.S., Ph.D.) – Biochemistry and Molecular Biology/Natural Sciences
Bioengineering (M.S., Ph.D.) – intra-University
Biomedical Sciences (M.S., Ph.D.) – Biomedical Sciences/ Veterinary Medicine and Biomedical Sciences
Botany (M.S., Ph.D.) – Biology/Natural Sciences
Business Administration (M.S.) – college-wide, Business
Cell and Molecular Biology (M.S., Ph.D.) – intra-University
Chemical Engineering (M.S., Ph.D.) – Chemical and Biological Engineering/Engineering
Chemistry (M.S., Ph.D.) – Chemistry/Natural Sciences
Civil Engineering (M.S., Ph.D.) – Civil and Environmental Engineering/Engineering
Clinical Sciences (M.S., Ph.D.) – Clinical Sciences/ Veterinary Medicine and Biomedical Sciences
Communication Studies (M.A.) – Communication Studies/ Liberal Arts
Computer Science (M.S., Ph.D.) – Computer Science/ Natural Sciences
Conservation Leadership (M.S.) – Human Dimensions of Natural Resources/Warner Natural Resources
Construction Management (M.S.) – Construction Management/Applied Human Sciences
Design and Merchandising (M.S.) – Design and Merchandising/Applied Human Sciences
Earth Sciences (Ph.D.) – joint between Geosciences and Forest and Rangeland Stewardship/Warner Natural Resources
Ecology (M.S., Ph.D.) – intra-University
Economics (M.A., Ph.D.) – Economics/Liberal Arts
Education and Human Resource Studies (M.Ed., Ph.D.) – School of Education/Applied Human Sciences
Electrical Engineering (M.S., Ph.D.) – Electrical and Computer Engineering/Engineering
English (M.A.) – English/Liberal Arts
Environmental Health (M.S., Ph.D.) – Environmental and Radiological Health Sciences/Veterinary Medicine and Biomedical Sciences
Ethnic Studies (M.A.) – Ethnic Studies/Liberal Arts
Fish, Wildlife, and Conservation Biology (M.S., Ph.D.) – Fish, Wildlife, and Conservation Biology/Warner Natural Resources
Food Science and Nutrition (M.S., Ph.D.) – Food Science and Human Nutrition/Applied Human Sciences
Forest Sciences (M.S., Ph.D.) – Forest and Rangeland Stewardship/Warner Natural Resources
Geosciences (M.S.) – Geosciences/Warner Natural Resources
Health and Exercise Science (M.S.) – Health and Exercise Science/Applied Human Sciences
History (M.A.) – History/Liberal Arts
Horticulture (M.S., Ph.D.) – Horticulture and Landscape Architecture/Agricultural Sciences
Human Bioenergetics (Ph.D.) – Health and Exercise Science/Applied Human Sciences
Human Development and Family Studies (M.S.) – Human Development and Family Studies/Applied Human Sciences
Human Dimensions of Natural Resources (M.S., Ph.D.) – Human Dimensions of Natural Resources/Warner Natural Resources
Languages, Literatures, and Cultures (M.A.) – Foreign Languages and Literatures/Liberal Arts
Mathematics (M.S., Ph.D.) – Mathematics/ Natural Sciences
Mechanical Engineering (M.S., Ph.D.) – Mechanical Engineering/Engineering
Microbiology (M.S., Ph.D.) – Microbiology, Immunology, and Pathology/Veterinary Medicine and Biomedical Sciences
Occupational Therapy (M.S.) – Occupational Therapy/ Applied Human Sciences
Occupation and Rehabilitation Science (Ph.D.) – Occupational Therapy/ Applied Human Sciences
Pathology (Ph.D.) – Microbiology, Immunology, and Pathology/Veterinary Medicine and Biomedical Sciences
Philosophy (M.A.) – Philosophy/Liberal Arts
Physics (M.S., Ph.D.) – Physics/Natural Sciences
Political Science (M.A., Ph.D.) – Political Science/Liberal Arts
Psychology (M.S., Ph.D.) – Psychology/Natural Sciences
Public Communication and Technology (M.S., Ph.D.) – Journalism and Technical Communication/Liberal Arts
Radiological Health Sciences (M.S., Ph.D.) – Environmental and Radiological Health Sciences/ Veterinary Medicine and Biomedical Sciences
Rangeland Ecosystem Science (M.S., Ph.D.) – Forest and Rangeland Stewardship/Warner Natural Resources
Social Work (Ph.D.) – Social Work/Applied Human Sciences
Sociology (M.A., Ph.D.) – Sociology/Liberal Arts
Soil and Crop Sciences (M.S., Ph.D.) – Soil and Crop Sciences/Agricultural Sciences
Statistics (M.S., Ph.D.) – Statistics/Natural Sciences
Student Affairs in Higher Education (M.S.) – School of Education/Applied Human Sciences
Systems Engineering (M.S., Ph.D.) -- Engineering
Watershed Science (M.S.) – Ecosystem Science and Sustainability/Warner Natural Resources
Zoology (M.S., Ph.D.) – Biology/Natural Sciences

Professional Degrees

Doctor of Veterinary Medicine (D.V.M.) –
interdepartmental/Veterinary Medicine and Biomedical
Sciences

Master of Accountancy (M.Acc.) – Accounting/Business

Master of Agriculture (M.Agr.) – Agricultural Sciences

Master of Agricultural Extension Education (M.A.E.E.) –
college wide/Agricultural Sciences

*Master of Applied Industrial and Organizational
Psychology (M.A.I.O.P.)* – Psychology/Natural
Sciences

Master of Applied Statistics (M.A.S.) – Statistics/Natural
Sciences

Master of Business Administration (M.B.A.) – Business

Master of Computer Science (M.C.S.) – Computer
Science/Natural Sciences

Master of Education (M.Ed.) – School of Education/
Applied Human Sciences

Master of Engineering (M.E.) – Engineering

Master of Fine Arts (M.F.A.) – Art/Liberal Arts;
Creative Writing/Liberal Arts

*Master of Fish, Wildlife, and Conservation Biology
(M.F.W.B.)* – Fish, Wildlife, and Conservation
Biology/Warner Natural Resources

*Master of Applied Industrial/Organizational Psychology
(M.A.I.O.P.)* – Psychology/Natural Sciences

Master of Landscape Architecture (M.L.A.) –
Horticulture and Landscape Architecture/Agricultural
Sciences

Master of Management Practice (M.M.P.) –
Management/Business

Master of Music (M.M.) – Music/Liberal Arts

Master of Natural Resources Stewardship (M.N.R.S.) –
Forest and Rangeland Stewardship/ Warner Natural
Resources

Master of Natural Science Education (M.N.S.E.) –
Natural Sciences

Master of Occupational Therapy (M.O.T.) –
Occupational Therapy/ Applied Human Sciences

Master of Professional Natural Sciences (M.P.N.S.) –
Natural Sciences

Master of Public Health (M.P.H.) – Intra-University

Master of Social Work (M.S.W.) – Social Work/Applied
Human Sciences

Master of Tourism Management (M.T.M.) – Human
Dimensions of Natural Resources/Warner Natural
Resources

Colorado State University reserves the right at any time, without notice, to change, modify, or cancel any course, program, procedure, policy, financial requirement, or disciplinary arrangement set forth in this catalog whenever, in its sole discretion, it determines such action to be appropriate. Furthermore, Colorado State will not be responsible for any failure to present or complete any course or program or to perform any other activity, function, or obligation mentioned in this catalog. Since changes may occur at any time, students must check the relevant website (as noted throughout various chapters in this catalog).

Graduation Requirements and Procedures

Registrar's Office
Centennial Hall, First Floor

THE STUDENT BILL OF RIGHTS – GRADUATING IN FOUR YEARS

The Student Bill of Rights (also known as Colorado Revised Statute 23-1-125) notes that a student may formalize a plan to obtain a degree in four years. Colorado State University supports this timeline for graduation by publishing advising guidelines under which a student may expect to graduate in four years and also publishes curriculum check sheets defining a common four-year course progression for each major. These check sheets and advising guidelines are available in each department office and in the Center for Advising and Student Achievement (CASA), Room 121, The Institute for Learning and Teaching (TILT). There are some majors which a student may not be able to complete in four years because of additional degree requirements recognized by the Colorado Department of Higher Education.

GENERAL REQUIREMENTS

The following apply to all students entering Colorado State University who enroll Summer Session 2000 or thereafter.

Students are required to complete *all* curricular requirements in place in the current catalog at the time of graduation. (See Changes in Undergraduate Curriculum Requirements in this chapter.)

The list of general requirements below is a sufficient guide for academic planning, but does not represent *all* rules which might apply to a particular student or program of study.

GRADUATION CREDIT REQUIREMENTS

To meet requirements for the bachelor's degree, a student must fulfill:

Minimum Credit Requirement

A bachelor's degree requires a minimum of 120 semester credits; however, individual programs in colleges and departments may exceed the minimum.

Minimum Grade Requirement

Only credits completed with grades of A+, A, A-, B+, B, B-, C+, C, C-, D+, D, D-, and S may count toward the graduation total. [Note: Effective Fall Semester 2008, C-, D+, and D- grades will no longer be assigned.] Some majors require a minimum grade of C or C- in required courses. For further information refer to your Undergraduate Degree Plan/Degree Audit or contact the department offering the major.

Graduation Average Requirement

The minimum cumulative grade point average acceptable for graduation is 2.000 computed only for courses attempted at Colorado State. The C.S.U. GPA calculation is carried to the third decimal place and is not rounded.

Total credits earned and counted toward graduation may differ from total credits used in computing a scholastic average, since the scholastic average is computed by dividing the total grade points at Colorado State by the total GPA credit including credits for grades of A+, A, A-, B+, B, B-, C+, C, C-, D+, D, D-, and F. Credits graded S may count toward graduation. [Note: Effective Fall Semester 2008, grades of C-, D+, and D- will no longer be assigned.]

Upper-Division Credit Requirement

A minimum of 42 semester credits in upper-division courses (300-400 level) is required of all students completing a bachelor's degree program. Although 500-level courses cannot be required in undergraduate programs of study, elective credits taken at the 500 level may be used to fulfill the upper-division requirement.

Use of 500-Level Courses Within an Undergraduate Program

With written approval of advisor, junior and senior undergraduate students may use 500-level courses to fulfill major requirements, either by selecting from an approved department list of courses, or by exception signed by advisor. However, students are never required to take 500-level courses to complete an undergraduate program of study, whether a major or a minor.

“In residence” Requirement

A minimum of 30 upper-division semester credits must be completed in residence at Colorado State University. “In residence” courses include any authorized Colorado State University course recorded as Colorado State credit on the Colorado State transcript. As an approved exception, “in residence” may also be satisfied by pre-approved upper-division credits earned in authorized study abroad programs and designated domestic exchange programs, if simultaneously enrolled in designated C.S.U. courses. Pre-approval procedures are required.

Senior Year Requirement

Of the last 30 semester credits earned immediately preceding graduation, no more than 15 may be completed at other colleges or universities.

Academic Fresh Start Requirement

If a student receives a Fresh Start, he or she must successfully complete at least 30 upper-division credits of coursework in residence at C.S.U. after the Fresh Start is granted in order to graduate.

CHANGES IN UNDERGRADUATE CURRICULUM REQUIREMENTS

Students who entered the University as first-year students

(freshmen) in Summer Session 2000 or thereafter must complete the All-University Core Curriculum (AUCC) requirements.

Students are held for curricular requirements (including AUCC requirements) as set forth in the current catalog at the time of graduation, except: 1) if so doing will extend the time normally required to complete the degree; or 2) if so doing will force students classified as juniors or seniors to take additional lower-division courses, exclusive of AUCC requirements. A request for waivers or substitutions for major program requirements must be approved by the adviser and department head. Ultimate responsibility for ensuring that AUCC curriculum requirements are observed and that substitution of equivalent courses or waivers are for good and sufficient academic reasons rests with the Provost/Senior Executive Vice President.

Degree Audit Reporting System (DARS)

DARS is the degree audit tool used for verification of university, program, minor, options and interdisciplinary requirements. The audit provides a dynamic and concise report, viewed in hard copy, on-line, and over the web, that is used for advising as well as for final graduation certification. The degree audit provides students with current and accurate transfer and course information to enhance their degree and program planning. Students are able to view a What-If degree audit for display of how their credits would be used to fulfill another major's requirements.

EXCLUSION OF COURSES FROM THE BACHELOR'S DEGREE

Undergraduates may enroll for a maximum of nine credits of graduate-level course work that may be applied toward a graduate degree at Colorado State, provided such course work is not used to meet bachelor's degree requirements. Students who enroll in 500-level courses not applied toward a bachelor's degree may request that an exclusion statement be placed on their academic records for those courses, making them potentially applicable to a Colorado State graduate degree. Students cannot exclude any courses below the 500-level under this policy. (See the Key to Courses of Instruction section for additional information.) Courses at the 600-level are automatically excluded from use for an undergraduate degree. Undergraduate students may not enroll in courses numbered 700-799.

A written request must be filed in the Degree and Transfer Evaluation unit of the Registrar's Office no later than the end of the term in which the excluded course is taken.

Exclusion of these courses from the bachelor's degree does

not assure acceptance of this credit toward a graduate degree program. These excluded courses are computed in the undergraduate grade point average.

TIME LIMITATION ON CREDIT

Courses completed within the preceding ten years may apply toward a bachelor's degree. After ten years, course work is reviewed by the department head and college dean or a designee to determine its appropriateness to the major requirements.

GRADUATION PROCEDURES AND INFORMATION

Checking undergraduate University graduation requirements is the responsibility of the Registrar's Office. Curriculum requirements are checked by the department head of the first major and the second major and/or minor if applicable.

Students planning on transferring coursework from another post-secondary institution in order to meet the requirements for degree completion should contact the Degree & Transfer Evaluation unit for assistance. It is very important that all grades/transcripts are received by the end of the 4th week after the semester has ended. If grades/transcripts are not received within this timeframe students will experience a delay regarding the formal posting of their official graduation for that semester as well as delays printing their diploma.

Requests for waivers of or substitutions for program requirements must be approved by the adviser and department head (see Changes to Undergraduate Curriculum Requirements in this chapter). Requests for waivers or substitutions of the All-University Core Curriculum must be submitted on an appeal form found at www.core.colostate.edu, signed by the adviser and department head and turned in to Degree and Transfer Evaluation unit of the Registrar's Office.

Admission to Degree Program

Students are required to be admitted into a degree-seeking program in the term for which they plan to graduate. Contact the Office of Admissions for application procedures.

Intent to Graduate

Students will file their Intent to Graduate during registration via the Registration Ready Tool in RAMweb upon

completion of 85 credits. The student will be prompted to verify their curriculum, their correct graduation term, and to give their desired name for their diploma.

Contract for Completion of a Major or Minor

Students seeking to graduate must complete a graduation contract for each major and minor in which they are enrolled. Graduation contracts must be completed and signed by the Friday of the second week of classes of the student's graduation term. Graduation contracts consist of the most updated version of the Degree Audit Report (DARS), which will be used for final graduation certification, and will be signed in consultation with the student's advisor(s) at each department where the student is enrolled in a major or minor program of study. Students who do not complete the degree requirements in their graduation term must sign another contract or contracts at the beginning of the term in which all requirements will be completed.

Good Standing Status

A student must be in good standing to receive a Colorado State degree. Accordingly, any student who is subject to suspension or probation for scholastic or disciplinary reasons will not graduate until the conditions of suspension or probation have been satisfied.

Graduation List

The official graduation list is prepared each term by the Registrar's Office. Students may not graduate unless their names appear on the list as approved by the Faculty Council during the graduation term.

Off-Campus Completion of Degree Requirements

Seniors who are registered for final course work at another institution, either in residency or by correspondence or extension, must have their contracts for Completion of Major/Minor on file in the Registrar's Office by the end of the add/drop period of the graduation term. Official transcripts showing completion of work from another institution must be on file in this office no later than the fourth week after the graduation term. (See Senior Year Requirement earlier in this chapter.)

Degree Conferral

Degree conferral only occurs three times each year, after the conclusion of the Fall, Spring, and Summer terms. The

conferral date is the date which will be posted on the official transcript and the diploma. This is the date when the degree is considered officially awarded. A degree is a credential. There are three documents that provide evidence of that credential: an official transcript, a diploma, and a formal letter of completion from the Registrar’s Office.

CSU degrees will not be posted on the student’s record until the official degree conferral date has been reached for the semester in which the degree is being awarded. Completion of all requirements prior to the official degree conferral date will not result in an early conferral of the degree. A student in this situation may request an official “Completion Letter” from the Registrar’s Office showing pending conferral of the degree. The degree will be conferred for the term in which the requirements are completed.

Degrees Awarded Posthumously

In exceptional circumstances, the Board of Governors of Colorado State University may award degrees posthumously. Recommendations for such an award will only be considered when the student had completed nearly all of the requirements for his or her degree before dying, and when the student’s academic record clearly indicates that the degree would have been successfully completed had death not intervened. Nominations for posthumous awards of degree will be initiated by the student’s department and approved internally by the relevant college dean and the Provost. The posthumous nature of the recommended degree award shall be made explicit when the recommendation is forwarded to the Board of Governors. The Provost/Senior Vice President’s Office shall be responsible for presenting the degree to appropriate survivors.

COMMENCEMENT (GRADUATION CEREMONIES)

Commencement is held each year at the end of each fall and spring semester. Students completing degree requirements during any term receive their diplomas by mail within 6-8 weeks after the degree conferral date, if there is no outstanding financial obligation to the university. Candidates must appear in appropriate academic attire at commencement exercises.

GRADUATION WITH DISTINCTION

Colorado State recognizes outstanding scholarship by granting the baccalaureate degree “Cum Laude,” “Magna Cum Laude,” and “Summa Cum Laude” to those students in each college who have achieved unusually high academic excellence in their undergraduate programs. To be eligible for graduation with distinction, students must meet the following requirements:

Minimum grade point average required for graduation with distinction.

To qualify for graduation with distinction, a minimum of 60 credits completed at Colorado State University is required. Students who have been granted Fresh Start must have completed 60 credits after the Fresh Start designation to qualify for graduation with distinction.

Transfer credits are not considered when determining a) candidacy for graduation with distinction or b) graduation with distinction.

The Current Breakdown of Acceptable GPA’s for a Distinction Designation:

<u>College</u>	Summa	Magna	
	<u>Cum Laude</u>	<u>Cum Laude</u>	<u>CumLaude</u>
Agricultural Sciences	3.980	3.850	3.710
Applied Human Sci.	3.960	3.840	3.660
Business	3.960	3.850	3.720
Engineering	3.960	3.910	3.700
Liberal Arts	3.960	3.870	3.700
Natural Resources	3.980	3.850	3.740
Natural Sciences	3.980	3.900	3.760
Veterinary Medicine & Biomedical Sciences	3.990	3.950	3.890

These minimum cumulative grade point averages will be reviewed every four years and may be changed if needed to maintain appropriate academic standards. Such changes will become effective the semester following approval by Faculty Council and publication in the *General Catalog*. Each of the minimum grade point averages needed to graduate with distinction will be adjusted at the end of each four year period only if the percentage of students graduating with distinction in a distinction category and college have shown a statistically verifiable deviation from the target percentages of:

Summa Cum Laude	1%
Magna Cum Laude	3%
Cum Laude	6%

Candidates for graduation with distinction are recognized at the time of commencement. A student’s candidacy is determined by their cumulative grade point average through the semester preceding graduation. “Candidacy” for graduation with distinction does not guarantee graduation with distinction. Graduation with distinction is based on the

student's cumulative grade point average at the time of graduation. The C.S.U. GPA calculation is carried to the third decimal place and is not rounded.

Students seeking a second bachelor's degree are eligible for distinction designation. To qualify for graduation with distinction, a minimum of 60 credits completed at Colorado State is required after the first degree. In determining the grade point average of the student, only grades earned after the first degree are considered.

GRADUATION AS A UNIVERSITY AND/OR DISCIPLINE HONORS SCHOLAR

Students who complete the University Honors Program academic requirements and achieve at least a cumulative 3.5 grade point average earn the designation of University Honors Scholar and/or Discipline Honors Scholar. Scholars are recognized at graduation by the Honors Program and during the colleges' commencement ceremonies. The Honors Scholar designation appears on diplomas and transcripts.

For information about admission to the University Honors Program, visit or contact the Honors Program Office, Academic Village, Fort Collins, CO 80523-1025; (970) 491-5679 or visit on-line at www.honors.colostate.edu. Also see the chapter: Broadening Your Horizons.

COLORADO STATE UNIVERSITY HONORARY SOCIETIES

www.provost.colostate.edu/files/students/honorcsu.asp

Outstanding academic achievement is recognized by inviting students who have achieved superior scholastic records to join one or more of the all-University, college, or departmental honorary societies on campus. For further

information, contact the societies' respective academic department or visit the web site listed above.

All University

Alpha Lambda Delta – *Freshmen*
Gamma Beta Phi
Golden Key
Mortar Board
National Society of Collegiate Scholars
Order of Omega
Phi Beta Kappa
Phi Kappa Phi
Pinnacle International – *Non-Traditional Students*
Sigma Alpha Lambda – *National Leadership and Honors Organization*
Sigma Xi – *Scientific Research*

Agricultural Sciences

Alpha Zeta
Gamma Sigma Delta – *Agricultural and Related Sciences*
Pi Alpha Xi – *Horticulture*

Applied Human Sciences

Phi Alpha – *Social Work*
Pi Theta Epsilon – *Occupational Therapy*

Business

Alpha Sigma Gamma International Real Estate Honorary Society – *Real Estate*
Beta Alpha Psi – *Accounting*
Beta Gamma Sigma

Engineering

Alpha Epsilon – *Agricultural Engineering*
Chi Epsilon – *Civil Engineering*
Eta Kappa Nu – *Electrical and Computer Engineering*
Omega Chi Epsilon – *Chemical Engineering*
Pi Tau Sigma – *Mechanical Engineering*
Tau Beta Pi – *Engineering*

Liberal Arts

Kappa Tau Alpha – *Technical Journalism*
Lambda Pi Eta – *Speech Communication*
Omicron Delta Epsilon – *Economics*
Phi Alpha Theta – *History*
Pi Sigma Alpha – *Political Science*

Natural Resources

Xi Sigma Pi

Natural Sciences

Psi Chi – *Psychology*
Sigma Pi Sigma – *Physics*
Upsilon Pi Epsilon – *Computer Science*

Veterinary Medicine and Biomedical Sciences

Phi Zeta – *Veterinary Medicine*

Colorado State University reserves the right at any time, without notice, to change, modify, or cancel any course, program, procedure, policy, financial requirement, or disciplinary arrangement set forth in this catalog whenever, in its sole discretion, it determines such action to be appropriate. Furthermore, Colorado State will not be responsible for any failure to present or complete any course or program or to perform any other activity, function, or obligation mentioned in this catalog. Since changes may occur at any time, students must check the relevant website (as noted throughout various chapters in this catalog).

All-University Core Curriculum

Office of Vice Provost for Undergraduate Affairs
Administration Building, Room 108
core.colostate.edu

ALL-UNIVERSITY CORE CURRICULUM (AUCC)

All Colorado State University students share a learning experience in common. Faculty from across the University contribute to that experience.

Each baccalaureate Program of Study must incorporate the following elements:

- | | <i>Credits</i> |
|--|----------------|
| 1. Basic Competencies (6 credits) | |
| A. Intermediate Writing ¹ | 3 |
| B. Mathematics ¹ | 3 |
| 2. Advanced Writing (3 credits) ^{2, 3} | |
| 3. Foundations and Perspectives (22 credits) | |
| A. Biological/Physical Sciences
(At least one course will have an associated lab) | 7 |
| B. Arts/Humanities | 6 |
| C. Social/Behavioral Sciences | 3 |
| D. Historical Perspectives | 3 |
| E. Global and Cultural Awareness | 3 |
| 4. Depth and Integration | |
| A. Each major must designate courses that build upon the Core Competencies of writing, speaking, and problem solving in an integrative and complementary way. | |
| B. Each major must designate courses that build upon the foundations of knowledge and intellectual perspectives of Core Category 3 in an integrative and complementary way. | |
| C. Every major must require a capstone experience at the senior level that consists of a designated course or sequence of courses that offer the opportunity for integration and reflection on students' nearly completed baccalaureate education. | |

¹ The composition and mathematics requirements **must** be completed within the first 60 credits (CSU and transfer) taken. More information on this requirement is at the end of this section of the catalog.

² First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (category 2). Some programs of study have specific requirements. For advanced writing, see the particular program of study.

Students are advised to see if their preferred program of study has particular recommendations for satisfying All-University Core Curriculum requirements.

A student must earn a cumulative grade point average of 2.000 or better in the courses used to satisfy categories 1 through 3 of the All-University Core Curriculum requirements.

What follows is a brief description of each category in the All-University Core Curriculum and a list of the courses currently approved to meet that category. Note: No courses are listed in more than one category; courses listed in one category cannot be used to fulfill any other category in the AUCC.

Category 1. Basic Competencies

A. Intermediate Writing.¹ The ability to write correctly and effectively is necessary for success in any academic program and enhances the possibility of one's success in personal and professional life. The objective of courses in this category is to provide instruction in the skills essential to effective written communication, extensive practice in the use of those skills, and evaluation of students' writing aimed to guide them in improving their skills.

CO	150	College Composition (GT-CO2) ²	3
HONR	193	Honors Seminar (must be enrolled in University Honors program)	3

¹ The composition requirement **must** be completed within the first 60 credits (CSU and transfer) taken. More information on this requirement is at the end of this section of the catalog.

² Certain Colorado State University courses have been approved by the Colorado Department of Higher Education (CDHE) as general education courses guaranteed to transfer statewide among all public higher education institutions in Colorado. The subcode refers to the specific statewide general education category the course fulfills. For more information visit the CDHE website:

higher.colostate.gov/Academics/Transfers/gtPathways/curriculum.html

³ First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (category 2). Some programs of study have specific requirements; see the particular program of study.

B. Mathematics.¹ The objective of the Mathematics requirement is to ensure that students develop mathematical

skill and understanding essential for describing events, experiences, and the knowledge base of other disciplines. Mathematics encourages a mode of thought that encompasses abstraction and generalization and permits careful analysis as well as explicit calculation.

MATH	117	College Algebra in Context I (GT-MA1) ²	1
MATH	118	College Algebra in Context II (GT-MA1)	1
MATH	124	Logarithmic and Exponential Function (GT-MA1)	1
MATH	125	Numerical Trigonometry (GT-MA1)	1
MATH	126	Analytic Trigonometry (GT-MA1)	1
MATH	130	Math in the Social Sciences (GT-MA1)	3
MATH	133	Financial Mathematics (GT-MA1)	3
MATH	135	Patterns of Phenomena I (GT-MA1)	3
MATH	141	Calculus in Management Sciences (GT-MA1)	3
MATH	155	Calculus for Biological Scientists I (GT-MA1)	4
MATH	160	Calculus for Physical Scientists I (GT-MA1)	4
MATH	161	Calculus for Physical Scientists II (GT-MA1)	4
MATH	255	Calculus for Biological Scientists II (GT-MA1)	4

¹ The mathematics requirement **must** be completed within the first 60 credits (CSU and transfer) taken. More information on this requirement is at the end of this section of the catalog.

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Category 2. Advanced Writing. (3 credits)¹

Building on and adapting basic skills and strategies already developed in the course in Written Communication, the objective of this requirement is enhancement of skills in written communication is to extend rhetorical knowledge, to extend experience in writing processes, to extend mastery of writing convention, to demonstrate comprehension of content knowledge at the advanced level through effective communication strategies.

BUS	300	Business Writing and Communication	3
CHEM	301	Advanced Scientific Writing: Chemistry	3
CO	300	Writing Arguments (GT-CO3)	3
CO	301A	Writing in the Disciplines-Arts and Humanities (GT-CO3)	3
CO	301B	Writing in the Disciplines-Sciences (GT-CO3)	3
CO	301C	Writing in the Disciplines-Social Sciences (GT-CO3)	3
CO	301D	Writing in the Disciplines-Education (GT-CO3)	3
CO	302	Writing Online (GT-CO3)	3
JTC	300	Professional and Technical Communication (GT-CO3)	3
LB	300	Specialized Professional Writing	3

¹ First-time students entering a college or university on or after July 1, 2008, **must** take an advanced writing course (category 2). Some programs of study have specific requirements for advanced writing, see the particular program

of study.

Category 3. Foundations and Perspectives.

The Core rests on acquiring foundations of knowledge and understanding intellectual perspectives. Courses in this category of the Core are designed to bring the skills developed in Core Competencies to life and give them direction and purpose. Elements of *foundation* offer exemplary introductions to fields and areas of study that explore their distinctive characteristics as well as critical links within and among them. Elements of *perspective* promote coherence and integration of knowledge within and among fields and areas of study, often through the exploration of significant thematic issues. *Foundation* elements frequently will be introduced in disciplinary contexts. *Perspective* elements typically will be structured comparatively and enlivened through interdisciplinary contexts.

A. Biological/Physical Sciences.¹ (7 credits) The objective of the Biological/Physical Sciences requirement is to instill a clear understanding of the basic scientific viewpoint, to master scientific knowledge at a level that facilitates communication in an increasingly technological society, to employ and build on core competencies in mathematics and logical/critical thinking, to enable students to learn and use the scientific method, and to evaluate the impacts of science and technology on society.

AA	100	Introduction to Astronomy (GT-SC2) ²	3
AA	101	Astronomy Laboratory (GT-SC1)	1
ANTH	120	Human Origins and Variation (GT-SC2)	3
ANTH	121	Human Origins and Variation Laboratory (GT-SC1)	1
BSPM	102	Insects, Science, and Society (GT-SC2)	3
BZ	101	Humans and Other Animals (GT-SC2)	3
BZ	104	Basic Concepts of Plant Life (GT-SC2)	3
BZ	105	Basic Concepts of Plant Life Laboratory (GT-SC1)	1
BZ	110	Principles of Animal Biology (GT-SC2)	3
BZ	111	Animal Biology Laboratory (GT-SC1)	1
BZ	120	Principles of Plant Biology (GT-SC2)	4
CHEM	103	Chemistry in Context (GT-SC2)	3
CHEM	104	Chemistry in Context Laboratory (GT-SC1)	1
CHEM	107	Fundamentals of Chemistry (GT-SC2)	4
CHEM	108	Fundamentals of Chemistry Laboratory (GT-SC1)	1
CHEM	111	General Chemistry I (GT-SC2)	4
CHEM	112	General Chemistry Laboratory I (GT-SC1)	1
FW	104	Wildlife Ecology and Conservation (GT-SC2)	3
GEOL	120	Exploring Earth: Physical Geology ³ (GT-SC2)	3
GEOL	121	Introductory Geology Laboratory ⁴ (GT-SC1)	1
GEOL	122	The Blue Planet: Geology of Our Environment ³ (GT-SC2)	3
GEOL	124	Geology of Natural Resources ³ (GT-SC2)	3
HORT	100	Horticultural Sciences	4
LAND	220	Fundamentals of Ecology (GT-SC2)	3
LIFE	102	Attributes of Living Systems (GT-SC1)	4
LIFE	201A	Introductory Genetics-Applied Genetics ⁵ (GT-SC2)	3

LIFE	201B	Introductory Genetics-Molecular ⁵ (GT-SC2)	3
LIFE	220	Fundamentals of Ecology (GT-SC2)	3
MIP	101	Introduction to Human Disease (GT-SC2)	3
NR	120A	Environmental Conservation (GT-SC2)	3
NR	130	Global Environmental Systems ⁶	3
NR	150	Oceanography	3
PH	110	Descriptive Physics (GT-SC2)	3
PH	111	Descriptive Physics Laboratory (GT-SC1)	1
PH	121	General Physics I (GT-SC1)	5
PH	122	General Physics II (GT-SC1)	5
PH	141	Physics for Scientists and Engineers I (GT-SC1)	5
PH	142	Physics for Scientists and Engineers II (GT-SC1)	5
WR	304	Principles of Watershed Management	3

¹ At least one course must have a laboratory component. Sometimes the laboratory component is a separate course number.

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higher.ed.colorado.gov/Academics/Transfers/gtPathways/curriculum.html.

³ Credit allowed for only one of the following: GEOL 120, GEOL 122, GEOL 124, GEOL 150, G CC 130, G 140.

⁴ Credit allowed for only one of the following: GEOL 121, GEOL 150, G 140.

⁵ Credit not allowed for both LIFE 201A and LIFE 201B.

⁶ Credit not allowed for both NR 130 and G CC 130 and NR 130.

B. Arts/Humanities. (6 credits) The arts and humanities explore expressions that are uniquely human. The objective of the Arts/Humanities requirement is to investigate the cultural character and literatures of human experiences, fundamental questions of value and meaning, and, both in word and beyond words, the symbols and creative expressions of human life.

ART	100	Introduction to the Visual Arts (GT-AH1) ¹	3
D	110	Understanding Dance (GT-AH1)	3
E	140	The Study of Literature (GT-AH2)	3
E	232	Introduction to Humanities (GT-AH2)	3
E	242	Reading Shakespeare (GT-AH2)	3
E	270	Introduction to American Literature (GT-AH2)	3
E	276	Survey of British Literature I (GT-AH2)	3
E	277	Survey of British Literature II (GT-AH2)	3
ETST	240	Native American Cultural Expressions (GT-AH2)	3
HONR	392	Seminar (must be enrolled in University Honors program)	3
LARA	200	Second Year Arabic I ² (GT-AH4)	4
LARA	201	Second Year Arabic II ² (GT-AH4)	4
LARA	250	Arabic Language, Literature, and Culture in Translation (GT-AH2)	3
LCHI	200	Second Year Chinese I ² (GT-AH4)	5
LCHI	201	Second Year Chinese II ² (GT-AH4)	5
LCHI	250	Chinese Language, Literature, and Culture in Translation (GT-AH2)	3
LFRE	200	Second Year French I ² (GT-AH4)	3
LFRE	201	Second Year French II ² (GT-AH4)	3
LFRE	250	French Language, Literature, and Culture in Translation (GT-AH2)	3
LGER	200	Second Year German I ² (GT-AH4)	3
LGER	201	Second Year German II ² (GT-AH4)	3

LGER	250	German Language, Literature, and Culture in Translation (GT-AH2)	3
LJPN	200	Second Year Japanese I ² (GT-AH4)	5
LJPN	201	Second Year Japanese II ² (GT-AH4)	5
LJPN	250	Japanese Language, Literature, and Culture in Translation (GT-AH2)	3
LRUS	200	Second Year Russian I ² (GT-AH4)	3
LRUS	201	Second Year Russian II ² (GT-AH4)	3
LRUS	250	Russian Language, Literature, and Culture in Translation (GT-AH2)	3
LSPA	200	Second Year Spanish I ² (GT-AH4)	3
LSPA	201	Second Year Spanish II ² (GT-AH4)	3
LSPA	250	Spanish Language, Literature, and Culture in Translation (GT-AH2)	3
MU	100	Music Appreciation (GT-AH1)	3
MU	111	Music Theory Fundamentals (GT-AH1)	3
MU	131	Introduction to Music History and Literature (GT-AH1)	3
PHIL	100	Appreciation of Philosophy (GT-AH3)	3
PHIL	103	Moral and Social Problems (GT-AH3)	3
PHIL	110	Logic and Critical Thinking (GT-AH3)	3
PHIL	120	History and Philosophy of Scientific Thought (GT-AH3)	3
SPCM	100	Communication and Popular Culture (GT-AH1)	3
SPCM	201	Rhetoric in Western Thought (GT-AH3)	3
TH	141	Introduction to Theatre (GT-AH1)	3

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higher.ed.colorado.gov/Academics/Transfers/gtPathways/curriculum.html

² No more than three credits of intermediate foreign language (L** 200, L** 201) may be used toward this category.

C. Social/Behavioral Sciences. (3 credits) The social/behavioral sciences use similar methods of description and analysis to study the complex behaviors of individuals and their relationships with others in families, public associations, and cultures. The objective of the Social/Behavioral Sciences requirement is to explore the forms and implications of individual and collective behaviors, their ties to formal institutions, and the methods by which they are studied.

ANTH	100	Introductory Cultural Anthropology (GT-SS3) ¹	3
AREC	202	Agricultural and Resource Economics (GT-SS1)	3
AREC	240	Issues in Environmental Economics (GT-SS1)	3
ECON	101	Economics of Social Issues (GT-SS1)	3
ECON	202	Principles of Microeconomics (GT-SS1)	3
ECON	204	Principles of Macroeconomics (GT-SS1)	3
ECON	212	Racial Inequality and Discrimination (GT-SS1)	3
ECON	240	Issues in Environmental Economics (GT-SS1)	3
EDUC	275	Schooling in the U.S. (GT-SS3)	3
GR	100	Introduction to Geography (GT-SS2)	3
HDFS	101	Individual and Family Development (GT-SS3)	3
HONR	492	Senior Seminar (must be enrolled in University Honors program)	3
JTC	100	Media in Society (GT-SS3)	3

POLS	101	American Government and Politics (GT-SS1)	3
POLS	103	State and Local Government and Politics (GT-SS1)	3
PSY	100	General Psychology (GT-SS3)	3
SOC	100	General Sociology (GT-SS3)	3
SOC	105	Social Problems (GT-SS3)	3
SOWK	110	Contemporary Social Welfare (GT-SS1)	3

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highered.colorado.gov/Academics/Transfers/gtPathways/curriculum.html

D. Historical Perspectives. (3 credits) The objective of the Historical Perspectives requirement is to engage students in an analytical, chronological study of significant, multi-dimensional human experiences. It should also provide students with a foundation for relating beliefs about the past to aspirations for the future.

AMST	100	Self/Community in American Culture, 1600-1877 (GT-AH2)	3
AMST	101	Self/Community in American Culture Since 1877 (GT-AH2)	3
ANTH	140	Introduction to Prehistory (GT-HI1)	3
ETST	250	African American History (GT-HI1) ¹	3
ETST	252	Asian American History (GT-HI1)	3
ETST	255	Native American History (GT-HI1)	3
HIST	100	Western Civilization, Pre Modern (GT-HI1)	3
HIST	101	Western Civilization, Modern (GT-HI1)	3
HIST	115	Islamic World to 1500 (GT-HI1)	3
HIST	120	Asian Civilizations I (GT-HI1)	3
HIST	121	Asian Civilizations II (GT-HI1)	3
HIST	150	U.S. History to 1876 (GT-HI1)	3
HIST	151	U.S. History Since 1876 (GT-HI1)	3
HIST	170	World History, Ancient-1500 (GT-HI1)	3
HIST	171	World History, 1500-Present (GT-HI1)	3
HIST	250	African American History (GT-HI1)	3
HIST	252	Asian American History (GT-HI1)	3
HIST	255	Native American History (GT-HI1)	3
NR	320	Natural Resources History and Policy	3

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highered.colorado.gov/Academics/Transfers/gtPathways/curriculum.html

E. Global and Cultural Awareness.^{1, 3} (3 credits) The objective of the Global and Cultural Awareness requirement is to engage students in the study of particular cultural identities, explore the interactions among these cultural identities, and consider the ways in which these patterns of interaction are related to the larger global context in which they take place.

AGRI	116	Plants and Civilization (GT-SS3)	3
AGRI	270	World Interdependence-Population and Food (GT-SS3) ²	3
AM	250	Clothing, Adornment, and Human Behavior (GT-SS3)	3

ANTH	200	Cultures and the Global System (GT-SS3)	3
E	238	20th Century Fiction (GT-AH2)	3
E	245	World Drama (GT-AH2)	3
ECON	211	Gender in the Economy (GT-SS1)	3
ETST	100	Introduction to Ethnic Studies (GT-SS3)	3
ETST	205	Ethnicity and the Media (GT-SS3)	3
ETST	253	Chicana/o History and Culture (GT-HI1)	3
ETST	256	Border Crossings: People/Politics/Culture (GT-SS3)	3
HORT	171	Environmental Issues in Agriculture (GT-SS3)	3
IE	116	Plants and Civilizations (GT-SS3)	3
IE	270	World Interdependence-Population and Food (GT-SS3)	3
IE	370	Model United Nations	3
LB	170	World Literatures to 1500 (GT-AH2)	3
LB	171	World Literatures-The Modern Period (GT-AH2)	3
PHIL	170	World Philosophies (GT-AH3)	3
POLS	131	Current World Problems (GT-SS1)	3
POLS	232	International Relations (GT-SS1)	3
POLS	241	Comparative Government and Politics (GT-SS1)	3
SA	482	Approved Study Abroad Courses (Contact the Office of International Programs)	12
SOC	205	Contemporary Race-Ethnic Relations (GT-SS3)	3
SOCR	171	Environmental Issues in Agriculture (GT-SS3)	3

¹ Courses listed in this category may have been approved as meeting arts/humanities, history, or social/behavioral sciences in the gtPathways statewide transfer program (see note 2), but they do not fulfill any of those categories of the AUCC. They only satisfy category 3E, global and cultural awareness, in the AUCC.

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highered.colorado.gov/Academics/Transfers/gtPathways/curriculum.html

³ Students who took HIST 100, HIST 115, HIST 120, HIST 170, LARA 250, LCHI 250, LFRE 250, LGER 250, LJPN 250, LRUS 250, or LSPA 250 during Fall Semester 2007, Spring Semester 2008, and Summer Session 2008 may count those courses in category 3E.

Note Regarding the All-University Core Curriculum

Credits earned in the College Board Advanced Placement Program (AP), the College-Level Examination Program (CLEP), and International Baccalaureate (IB) can be used to satisfy particular All-University Core Curriculum requirements.

ENGLISH COMPOSITION REQUIREMENT

The University English composition requirement must be fulfilled by all undergraduate students prior to completion of 60 credits. Students can complete the requirement in one of five ways:

1. Satisfactory completion of CO 150, College Composition.
2. Fulfillment of the CO 150 requirement by achieving a score of 5 on the Advanced Placement English Composition and Literature Test; or a score of 4 or 5 on the Advanced Placement English Language and Composition Test; or placing in CO 150, section 550 (automatic credit for CO 150) on the Department of English Composition Placement/Challenge Examination (see below).
3. Transfer of equivalent credits from another college. Students who transfer with less than 2.6 semester credits in composition will be required to take the Composition Placement/Challenge Examination before enrolling in CO 150.
4. Satisfactory completion of **BOTH HONR 192 AND HONR 193** (honors students only).
5. Submission of International Baccalaureate scores that document a 5, 6, or 7 earned for English and thus have satisfied the All-University Core Curriculum requirement for CO 150.

Credit for CO 150 will not be given for high scores on the College-Level Examination Program (CLEP).

Students (except first semester transfer and readmitted students) who have earned 60 or more Colorado State and transfer semester credits and who have not met this requirement will have a COMPOSITION HOLD placed on their record. Transfer and readmitted students will be allowed the initial term of enrollment before this restriction is imposed.

COMPOSITION HOLD Removal Procedure

The procedure to remove a COMPOSITION HOLD is as follows: If a student has completed or has transfer credit for CO 130 (Academic Writing), he or she can contact the Registrar's Centennial Hall Office (or (970) 491-4860) to register for CO 150. If a student scored 600 or higher on the SAT critical reading or 26 or higher on the ACT English and submitted those scores to Colorado State, he or she can contact the Records Office to register for CO 150. (Students who were enrolled at CSU and taking classes prior to Fall 2008 are eligible to register for CO 150 with an SAT verbal score of 500 or higher or an ACT English score of 20 or higher). Otherwise, the student should take the Composition Placement/Challenge Examination (see below). Once a student's Composition Placement/Challenge Exam score has been entered into the system, he or she can contact the Registrar's Centennial Hall Office (or (970) 491-4860) to register for the composition class they placed into. The Registrar's Office will remove the COMPOSITION HOLD and register the student for either CO 130 or CO 150. If a student drops or withdraws from the course or does not earn a passing grade, the grade of record will become an "F."

This grade of "F" will be included in the calculation of both the semester GPA and the cumulative GPA as a consequence of not completing the 60-credit completion requirement.

Composition Placement/Challenge Exam and Placement Procedures

Students who score 600 or higher on the SAT critical reading or 26 or higher on the ACT English are eligible to register for CO 150. (Students who were enrolled at CSU and taking classes prior to Fall Semester 2008 are eligible to register for CO 150 with an SAT verbal score of 500 or higher or an ACT English score of 20 or higher). Students with CO 130 (Academic Writing) credit are eligible to register for CO 150. Students who have not satisfied the University English composition requirement in one of the five ways explained above or who do not have the appropriate SAT/ACT score or CO 130 credit, must take the English Composition Placement/Challenge Exam. For more information refer to writing.colostate.edu/comp/placement.cfm. All students taking this exam will be assessed a service charge of \$18.00, which will be billed to their student account. The proctored examination is offered at the beginning of each semester and during preregistration each semester (contact the Department of English for time and place, (970) 491-6428). Incoming students may take the Composition Placement/Challenge Exam one time in a non-proctored (online) setting prior to their term of admission using a compatible personal computer. They may retake the test on campus in a proctored setting only **ONCE**. If a student does choose to retake the test, they will be charged the \$18 service charge. Students can check their composition placement by logging onto RAMweb. On the homepage, under Records, select Composition Placement/Challenge Exam Results. On the basis of this examination students are placed as follows:

1. If placement scores indicate a lack of basic writing skills, students can prepare for CO 150 through either a tutorial program in the Writing Center (Eddy 6) or placement into CO 130 – a course designed to provide an intensive writing experience. Students completing the Writing Center Tutorial will then enroll in CO 130. The Writing Center tutorial does not require registration and does not carry University credit. Students will need to stop by the Writing Center the first or second week of the fall or spring semester to schedule their tutorial hour. Students will work with a tutor for one hour a week, for at least one semester, strengthening their writing skills. For tutorial assignment, students should contact the Writing Center (Eddy 6), (970) 491-0222.
2. If placement scores indicate adequate preparation in writing skills, students are placed in CO 150, College Composition.

3. If placement scores indicate superior writing skills, students are placed in CO 150-Section 550, College Composition-By Exam. Students receiving CO 150-Section 550 credit will be automatically enrolled in CO 150-Section 550 and will receive three semester credits of CO 150.

MATHEMATICS REQUIREMENT

To satisfy the requirements of category 1B of the All-University Core Curriculum (AUCC), students must earn three credits in mathematics. These credits may be earned by

1. scoring well on the Colorado State University Mathematics Placement Exam (MPE);
2. presenting AP calculus scores from high school of 3, 4, or 5 on either AB or BC exam;
3. taking mathematics courses at Colorado State; or
4. presenting suitable transfer credits from another accredited institution.

The MPE covers pre-college algebra and college algebra, logarithmic and exponential functions, and trigonometry. All entering freshmen are required to take the MPE, unless they can satisfy point 2) or 4) above. All other students must also take the MPE and obtain a satisfactory score before taking any mathematics course, unless they can satisfy either points 2) or 4) above.

A student who displays proficiency on the MPE may place out of one or more of the pre-calculus mini-courses—MATH 117, MATH 118, MATH 124, MATH 125, and MATH 126 without earning credit. Placement out of a mini-course on the MPE will satisfy University prerequisites. A student who demonstrates a higher level of proficiency may

earn credit in one or more of those courses. Only earned credits count toward the three-credit University mathematics requirement.

A student (except a first semester transfer or a first semester readmitted student) who has earned 60 or more Colorado State and transfer semester credits and who has not completed the requirements of category 1B of the All-University Core Curriculum must enroll in a course that will fulfill this requirement in order to have a hold lifted from his/her registration. If a student drops or withdraws from the course or does not earn a passing grade, the grade of record will become an "F." This grade of "F" will be included in the calculation of both the semester GPA and the cumulative GPA as a consequence for not completing the 60-credit completion requirement as defined by this policy. A transfer or readmitted student will be allowed the initial term of full-time enrollment before this restriction is imposed.

Appeals Process

A student wishing to appeal this registration restriction must write a detailed rationale as to why he or she was unable to complete the course within the first 60 credits. This appeal must be received by the student's academic adviser and department head. If both the adviser and department head approve the appeal, it is then sent to the dean's office of the student's primary major for approval or disapproval. If the dean supports the appeal, it must be presented through the Records Office, First Floor, Centennial Hall (formerly Administration Annex), to the Vice Provost for Undergraduate Affairs who holds authority for final approval or disapproval.

Colorado State University reserves the right at any time, without notice, to change, modify, or cancel any course, program, procedure, policy, financial requirement, or disciplinary arrangement set forth in this catalog whenever, in its sole discretion, it determines such action to be appropriate. Furthermore, Colorado State will not be responsible for any failure to present or complete any course or program or to perform any other activity, function, or obligation mentioned in this catalog. Since changes may occur at any time, students must check the relevant website (as noted throughout various chapters in this catalog).

University-Wide Instructional Programs

Many academic programs at Colorado State University have an all-university focus and are not found in one particular college. This catalog section summarizes:

Environmental Studies Programs
Health Professions Programs
Interdisciplinary Minors and Graduate Interdisciplinary Studies Programs
Reserve Officers' Training Program
University Honors Program

ENVIRONMENTAL STUDIES

Supported by colleges and departments throughout Colorado State University (see listing below)

The broad spectrum of environmental studies at Colorado State is uniquely dispersed in 100 majors and concentrations housed in departments throughout the University. As a land-grant institution, a key component of Colorado State's mission is to provide education in environmental management, science, and policy. It is difficult to find a degree or department that does not directly address environmental issues at local, national, and international scales. Campus-wide participation in environmental science and management is a result of fundamental linkages between basic science and management of critical environmental issues. Consequently, a unique strength of Colorado State University is a tradition of interdisciplinary research, teaching, and service, which is essential in understanding the environmental problems of today's world.

Programs engaged in environmental studies at Colorado State University have goals that include:

- Understanding that scientific knowledge, policy considerations, and ethical issues are necessarily joined;
- Comprehending the interrelationships among the environment, natural resources, and human society.
- Perceiving the need to integrate diverse social, political, legal, institutional, and scientific considerations inherent in attaining environmental goals;

- Educating students to be articulate, sensitive, and knowledgeable about the complexity of environmental issues facing society;
- Providing a balanced understanding of the natural and social processes as they relate to the environment.

Some examples of the many areas in environmental studies at Colorado State University are: air pollution assessment and management; air quality; biological control and pest management; climate change and global warming; biodiversity and conservation biology; ecology and ecosystem management; ecotourism; ecotoxicology; environmental engineering; environmental ethics; environmental history and policy analysis; environmental soil science; environmental geology, land ethics, and stewardship; natural resources and environmental management; occupational health and workplace management/control; park and protected areas management; pesticide management; pollution control; reproductive and environmental risk factors; risk assessment and management; solid and hazardous waste management; sustainable building design and construction; and water chemistry, quality, and management.

The programs at Colorado State University that engage in environmental studies are incorporated within existing majors in the following colleges (departments): *College of Agricultural Sciences* (Agricultural and Resource Economics; Bioagricultural Sciences and Pest Management [graduate only]; Horticulture and Landscape Architecture; Soil and Crop Sciences); *College of Applied Human Sciences* (Construction Management); *College of Engineering* (Atmospheric Science [graduate only]; Chemical and Biological Engineering; Civil and Environmental Engineering; Mechanical Engineering); *College of Liberal Arts* (Anthropology; English; History; Philosophy; Political Science; Sociology); *Warner College of Natural Resources* (Fish, Wildlife, and Conservation Biology; Forest, Rangeland, and Watershed Stewardship; Geosciences; Human Dimension of Natural Resources, Natural Resource Ecology Laboratory); *College of Natural Sciences* (Biology; Chemistry; Physics; Psychology); *College of Veterinary Medicine and Biomedical Sciences* (Biomedical Sciences; Environmental and Radiological Health Sciences;

Microbiology, Immunology, and Pathology). In addition, Colorado State University offers an Environmental Affairs Interdisciplinary Minor (see the program description later in this section of the catalog) and an Undeclared Environmental/Natural Resource Interest for students who first wish to explore options with environmental studies campus-wide before selecting a major (contact the Warner College of Natural Resources for more information on the undeclared option). For further information about specific environmental studies-focused majors, please contact the respective college/department and see their program descriptions within this catalog.

School of Global Environmental Sustainability (SoGES)

*Office in Johnson Hall, Room 108
(970) 492-4215
sustainability.colostate.edu/*

Professor Diana Wall, Director

The School of Global Environmental Sustainability (SoGES) seeks to prepare students to meet today's pressing environmental challenges. Using an interdisciplinary approach within a framework of sustainability, students will be led in innovative research leading to the knowledge and understanding needed to approach and solve problems of the human-environment interaction. SoGES' vision encompasses laying the foundation and defining the principles and practices that will ensure long-term environmental sustainability, while continuing to meet the needs of people around the earth.

HEALTH PROFESSIONS

*Center for Advising and Student Achievement
Offices in Room 121, The Institute for Learning and Teaching (TILT)*

Human Health Professions Advising

Colorado State University does not offer specific "pre-health" majors because health professions programs neither prefer nor recommend particular undergraduate majors. Students interested in a career in the health professions may select a major from among the many choices offered by the University. After declaring an academic major, a student is assigned an academic adviser from that department to ensure they fulfill the requirements for that major.

Undergraduates who intend to pursue careers in the health professions will want to be sure the courses they take also

satisfy the prerequisites for acceptance into one of the professional and post-baccalaureate programs. Health Professions Advisers assist students in planning for entrance into accredited programs of dentistry, medicine, nursing, occupational therapy, optometry, pharmacy, physical therapy, physician assistant, podiatry, chiropractic, and other human health professions. Advisers assist students in determining which courses to take, help them gain the experiences needed to make them viable candidates, and assist them in preparing their applications to professional programs.

Pre-Veterinary Medicine Advising

Pre-veterinary advising provides guidance for students in any major who are interested in pursuing a career in veterinary medicine. Placement into professional veterinary medical programs is extremely competitive and a successful applicant needs to be well informed regarding course requirements and other factors considered by veterinary admissions committees.

Students work with their academic adviser to ensure that they fulfill the graduation requirements in their major and the pre-veterinary adviser to be sure that their courses also satisfy admission requirements for professional veterinary programs.

Student Clubs

Offices for several student clubs related to the health professions are located in The Institute for Learning and Teaching (TILT) on the Oval. Staff members serve as advisers for the PreMedica, Pre-Vet, Pre-Dental, Pre-Occupational Therapy, Pre-Physical Therapy, Pre-Pharmacy, and Pre-Optometry clubs and provide assistance and support for club activities.

UNIVERSITY INTERDISCIPLINARY STUDIES PROGRAMS

An interdisciplinary studies program is a series of courses focused upon a particular problem or area of concern and providing a variety of disciplinary perspectives. The program includes a core of required courses, with some selectivity, and also a wide choice of supporting courses.

Completion of the requirements for an interdisciplinary studies program does not lead to a degree. Courses are noted on the student's academic record (transcript) if completed in conjunction with a degree program, but are not noted on the diploma. Credits earned in interdisciplinary studies programs can be used in meeting the requirements for a degree.

Undergraduate interdisciplinary studies programs are called Interdisciplinary Minors. A minimum of 21 credits is required for an interdisciplinary minor. A minimum of 12 of the 21 credits must be course work at the upper-division level (300-400).

Graduate interdisciplinary programs are called Graduate Interdisciplinary Studies Programs. No minimum number of credits is specified at the graduate level.

Arabic Studies Interdisciplinary Minor

Office in C104 Andrew G. Clark Building
languages.colostate.edu

Coordinated by the Department of Foreign Languages and Literatures

The Arabic Studies Interdisciplinary Minor is designed to give students a comprehensive knowledge of different aspects of Arabic language, culture, history and artistic expressions, according to the students' interests. The program requires 25 credits, of which at least 12 need to be at the upper-division level. Credits from study abroad programs will be properly evaluated as part of the overall program.

Program details are available from the Department of Foreign Languages and Literatures.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
LOWER DIVISION LANGUAGE¹		
LARA 105 ^P	First-Year Arabic I	5
LARA 107 ^P	First-Year Arabic II	5
LARA 200 ^P	Second-Year Arabic I	4
LARA 201 ^P	Second-Year Arabic II	4
LOWER DIVISION ELECTIVES¹		
HIST 115	Islamic World to 1800	3
PHIL 172	Religions of the East	3
LARA 250	Arabic Language, Literature and Culture in Translation	3
LOWER DIVISION TOTAL		9
UPPER DIVISION ELECTIVES²		
<i>Select at least 12 credits from at least two different disciplines:</i>		
HIST 303 ^P	Hellenistic World: Alexander to Cleopatra	3
HIST 308 ^P	Ancient Christianity to 500 A.D.	3
HIST 421 ^P	Africa: Colonialism to Independence	3
HIST 422 ^P	Modern Africa	3
HIST 430 ^P	Ancient Near East	3
HIST 431 ^P	Ancient Israel	3
HIST 432 ^P	Sacred History in the Bible and the Qur'an	3
HIST 433 ^P	Muhammad and the Origin of Islam	3
HIST 435 ^P	Jihad and Reform in Islamic History	3
HIST 438 ^P	The Modern Middle East	3
HIST 468 ^P	Islamic Gunpowder Empires, 1500-1800	3
HIST 469 ^P	The Crusades	3
LARA 300 ^P	Third-Year Arabic	3
LARA 301 ^P	Oral Communication—Arabic	3
POLS 449 ^P	Middle East Politics	3
PHIL 335	Islam: Cosmology and Practice	3
PHIL 379 ^P	Mysticism East and West	3
PHIL 455 ^P	Islamic Philosophy	3
UPPER DIVISION TOTAL		12

<u>Course</u>	<u>Title</u>	<u>Cr</u>
PROGRAM TOTAL = minimum of 21 credits at least 12 credits must be upper division (300-400) level*		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.
*Additional course work may be required due to prerequisites.

¹ LARA 200 and LARA 201 are required. Students placed out of or directly into LARA 201 need to replace 5-9 lower division credits from the list of lower-division electives. A maximum of 9 lower-division credits may be counted for the minor.

² At least 12 credits must be upper-division (300-400 level).

Asian Studies Interdisciplinary Minor

Office in Laurel Hall

international_initiatives.colostate.edu/forms/ASP_Checksheet_611.pdf

Coordinated by the Asian Studies Board and the Office of International Programs

The Asian Studies Interdisciplinary Minor introduces students to the historic and contemporary cultures of Asia. The program offers courses in a wide variety of disciplines, enabling students to gain a broader and deeper appreciation of the diverse regions of Asia. This background prepares students for possible graduate work in Asian studies and for careers in a variety of fields. Students from any department may enroll in the program.

Program details are available from International Education.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
Courses must be taken with at least <i>three</i> different subject codes, representing three different disciplines.		
CORE COURSES (6-8 credits required)¹		
<i>Select one course from each section:</i>		
Section I		
HIST 120	Asian Civilizations I	3
HIST 121	Asian Civilizations II	3
PHIL 106	Wisdom of the East-Oriental Philosophy	3
PHIL 172	Religions of the East	3
Section II		
ART 112	History of Asian Art	3
HIST 115	Islamic World to 1800	3
LCHI 105 ^P	First-Year Chinese I	5
LJPN 105 ^P	First-Year Japanese I	5
LKOR 105 ^P	First-Year Korean I	5
ASIAN STUDIES AREA COURSES (13-15 credits required, including at least 12 credits of upper division courses)^{1,2}		
Lower Division Courses		
ART 112	History of Asian Art	3
IE 271	India	3
LCHI 107 ^P	First-Year Chinese II	5
LCHI 200 ^P	Second-Year Chinese I	5
LCHI 201 ^P	Second-Year Chinese II	5
LCHI 250	Chinese Language, Literature, Culture in Translation	3
LJPN 107 ^P	First-Year Japanese II	5
LJPN 200 ^P	Second-Year Japanese I	5
LJPN 201 ^P	Second-Year Japanese II	5
LJPN 208 ^P	Kanji Study ³	1
LJPN 250	Japanese Language, Literature, Culture in Translation	3
Upper Division Courses.⁴		
ANTH 312 ^P	Modern Indian Culture and Society	3

Course	Title	Cr
ANTH 314 ^P	Southeast Asian Cultures and Societies	3
ART 316 ^P	Art of the Pacific	3
E 356	Asian Literature	3
HIST 430 ^P	Ancient Near East	3
HIST 431 ^P	Ancient Israel	3
HIST 433 ^P	Muhammad and the Origins of Islam	3
HIST 438 ^P	The Modern Middle East	3
HIST 440 ^P	Modern South Asia	3
HIST 441 ^P	South Asian Since Independence	3
HIST 450 ^P	Ancient China	3
HIST 451 ^P	Medieval China and Central Asia	3
HIST 452 ^P	China in the Modern World, 1600-Present	3
HIST 455 ^P	Tokugawa and Modern Japan, 1600-Present	3
LCHI 304 ^P	Third-Year Chinese I	3
LCHI 305 ^P	Third-Year Chinese II	3
LCHI 309	Contemporary Chinese Literature and the Arts	3
LCHI 496	Group Study—Chinese	1-5
LGEN 465B	Studies in Foreign Film-Asia	3
LJPN 304 ^P	Third-Year Japanese I	3
LJPN 305 ^P	Third-Year Japanese II	3
LJPN 365 ^P	Introduction to Japanese Cinema Studies	3
LJPN 404 ^P	Historical Aspects of the Language and Society	3
LJPN 405 ^P	Integrated Japanese: Beyond Words	3
LJPN 408 ^P	Advanced Kanji Study ³	1
LJPN 495 ^P	Independent Study—Japanese	1-6
LJPN 496 ^P	Group Study-Japanese	1-5
PHIL 335	Islam: Cosmology and Practice	3
PHIL 349 ^P	Philosophies of East Asia	3
PHIL 360 ^P	Topics in Asian Philosophy	3
PHIL 371	Contemporary Eastern Religious Thought	3
PHIL 455 ^P	Islamic Philosophy	3
POLS 445 ^P	Comparative Asian Politics	3
PROGRAM TOTAL = minimum of 21 credits*		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

¹ Courses taken to meet the Core requirement may not also count toward the Area Courses requirement.

² Students may petition to include up to 6 credits of coursework from outside the Asian Studies Interdisciplinary Minor. To count toward the completion of the Asian Studies Interdisciplinary Minor, 30 percent or more of the class content should focus on Asia. Students must submit to the Advisory Board a syllabus and brief description of individual work completed for each proposed class.

³ May count only once toward the minor.

⁴ HIST 532 and HIST 533 may also be selected with approval of advisor.

Biomedical Engineering Interdisciplinary Minor

Office in Engineering Building, Room AR204
(970) 491-7157

www.engr.colostate.edu/sbme/students/undergraduate/certificate.html

The Biomedical Engineering Interdisciplinary Minor coordinated by the School of Biomedical Engineering, offers students a interdisciplinary approach to biomedical engineering education and research. This unique program combines veterinary medicine, engineering, and the life sciences to improve health and well-being, fight disease, and aid persons with disabilities. Students are required to complete core courses in bioengineering, human physiology, and medical terminology. To complete the program, students take technical electives which vary depending on the individual student's major (engineering or non-engineering).

Program details are available at www.engr.colostate.edu/sbme/students/undergraduate/certificate.html or by calling (970) 491-7157, or from the Biomedical Engineering Office, College of Engineering.

The interdisciplinary minor requires completion of 21 credits with at least 12 credits greater than or equal to 300-level courses. All undergraduates are required to complete 8 credits of core courses. The 13 credits of electives are chosen according to the student's major (engineering or non-engineering).

Course	Title	Cr
The undergraduate program requires completion of 21 credits with at least 12 credits greater than or equal to 300-level courses. All undergraduates are required to complete 8 credits of core courses. The 13 credits of electives are chosen according to the student's major (engineering or non-engineering).		
CORE COURSES		
BIOM 470 ^P	Biomedical Engineering	3
BMS 300 ^P	Principles of Human Physiology	4
OT 215	Medical Terminology	1
TOTAL		8

ELECTIVE COURSES (minimum of 13 credits)

Engineering Courses

Non-engineering students must select at least 9 credits from the following:

BIOM 306 ^E /	Bioprocess Engineering	4
BTEC 306 ^P		
CBE 201 ^P	Material and Energy Balances	3
CBE 210 ^P	Thermodynamic Process Analysis	3
CBE 320 ^P	Chemical and Biological Reactor Design	3
CBE 331 ^P	Momentum Transfer and Mechanical Separations	3
CBE 406 ^P	Introduction to Transport Phenomena	3
CBE 430 ^P	Process Control and Instrumentation	3
CIVE 260 ^P	Engineering Mechanics-Statics	3
CIVE 261 ^P	Engineering Mechanics-Dynamics	3
ECE 201 ^P	Circuit Theory	3
ECE 204 ^P	Introduction to Electrical Engineering	3
ECE 303 ^P /	Introduction to Communication Principles	3
STAT 303 ^P		
ECE 331 ^P	Electronics Principles I	4
ECE 341 ^P	Electromagnetic Fields and Devices I	3
MECH 237 ^P	Introduction to Thermal Sciences	3
MECH 307 ^P	Mechatronics and Measurement Systems	4
MECH 331 ^P	Introduction to Engineering Materials	4
MECH 342 ^P	Mechanics and Thermodynamics of Flow Processes	3
PH 245 ^P	Introduction to Electronics	3
TOTAL		9

Science, Engineering, Animal Research, Bioethics, and Entrepreneurship Courses

Engineering students must select at least 13 credits from the following. Non-

engineering students must select at least 4 credits from the following:

BC 351 ^P	Principles of Biochemistry	4
BIOM 486A-B ^E	Biomedical Clinical Practicum	2-4
BMS 301 ^P	Human Gross Anatomy	5
BMS 325 ^P	Cellular Neurobiology	3
BMS 345 ^P	Functional Neuroanatomy	4
BMS 405 ^P	Nerve and Muscle-Toxins, Trauma, and Disease	3
BMS 420 ^P	Cardiopulmonary Physiology	3
BMS 430 ^P	Endocrinology	3
BUS 205	Legal and Ethical Issues in Business ¹	3
BZ 310 ^P	Cell Biology	4
CHEM 245 ^P	Fundamentals of Organic Chemistry	4
CHEM 246 ^P	Fundamentals of Organic Chemistry Laboratory	1
CHEM 345 ^P	Organic Chemistry I	4
HES 207	Anatomical Kinesiology	3
HES 307 ^E	Biomechanical Principles of Human Movement	3
HES 403 ^P	Physiology of Exercise	4
HES 405 ^P	Exercise Testing Instrumentation	2
HES 420 ^P	Electrocardiography and Exercise Management	3
HES 476 ^P	Exercise and Chronic Disease	3
LIFE 103 ^P	Biology of Organisms-Animals and Plants	4
MGT 420 ^P	New Venture Creation ¹	3
MGT 440 ^P	New Venture Management ¹	3
MIP 300 ^P	General Microbiology	3

Course	Title	Cr
PHIL 205 ^P	Introduction to Ethics ¹	3
PHIL 305E	Philosophical Issues in the Professions-Animal Science ¹	3
PSY 456 ^P	Sensation and Perception	3
PSY 457 ^P	Sensation and Perception Laboratory	2
STAT 315 ^P	Statistics for Engineers and Scientists	3
TOTAL		4-13

PROGRAM TOTAL = 21 credits minimum*

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

¹ Only three credits of non-technical courses may count toward minimum requirements.

Conservation Biology Interdisciplinary Minor

Office in Natural Resources Building, Room 101
warnercnr.colostate.edu/docs/fwcb/conserv.pdf

Coordinated by a Faculty Advisory Board and the Office of the Dean, Warner College of Natural Resources

The Conservation Biology Interdisciplinary Minor is designed to benefit students interested in contemporary environmental issues that deal with the loss of biological diversity. In addition, the program will prepare students to manage for biological diversity in present-day landscapes. Program details are available from the Office of the Dean, Warner College of Natural Resources.

Course	Title	Cr
Core Curriculum		
<i>Select one course from the following:¹</i>		
BZ 220 ^P	Introduction to Evolution	3
BZ 350 ^P	Molecular and General Genetics	4
SOCR 330 ^P	Principles of Genetics	3
LIFE 320 ^P	Ecology	3
NR 300 ^P	Biological Diversity	3
SOC 320 ^P	Population-Natural Resources and Environment	3
<i>Select 9-10 credits from the following:²</i>		
BZ 349 ^P	Tropical Ecology and Evolution	3
F 311 ^P	Forest Ecology	3
FW 400 ^P	Conservation of Fish in Aquatic Ecosystems	3
FW 469 ^P	Conservation in Management of Large Mammals	4
FW 477 ^P	Habitat for Wildlife	3
HIST 355 ^P	American Environmental History	3
NR 353 ^P	Global Change Ecology, Impacts and Mitigation	3
NR 440	Land Use Planning	3
NR 460 ^P	Wilderness Management	3
PHIL 345 ^P	Environmental Ethics	3
POLS 361 ^P	U.S. Environmental Politics and Policy	3
RS 300 ^P	Rangeland Conservation and Stewardship	3
RS 331 ^P	Rangeland Ecogeography	3
RS 351 ^P	Wildland Ecosystems in a Changing World	3

PROGRAM TOTAL = minimum of 21 credits*

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

* Additional course work may be required because of prerequisites.

¹ Select one of the courses listed or any other genetics or evolution course.

² Select enough credits to bring program total to a minimum of 21 credits, of which 12 must be upper division.

Diversity in Law Interdisciplinary Minor

Office in Clark Building, Room C207

secure.casa.colostate.edu/applications/achoriz/majorDescription.cfm?major=IP07

Liberal Arts Advising Center

One of the many challenges facing our society is to create institutions, including a legal system, that reflect, include, and serve its diverse members. Effective engagement between citizens and the rule of law requires an understanding of the legal system and an appreciation of the diversity of cultures, perspectives, lifestyles, and people in society. The Diversity in Law Interdisciplinary Minor is designed to increase students' knowledge and appreciation of both law and diversity in the United States as well as to stimulate thoughtful and critical analysis of our contemporary legal institutions and their relationship to people. The program is intended for students from any major who are interested in these issues.

Program details are available from the Liberal Arts Advising Center.

Course	Title	Cr
Students should select two courses from A, one course from B, and four courses from C, to include a minimum of 12 upper-division (300- or 400-level) credits:		

A. <i>Select two courses from the following:</i>		
POLS 101	American Government and Politics	3
SOC 100	General Sociology	3
OR		
SOC 105	Social Problems	3
SOC 253 ^P	Introduction to Criminal Justice	3
TOTAL		6

B. <i>Select one course from the following:</i>		
ETST 100	Introduction to Ethnic Studies	3
ETST 250/	African American History	3
HIST 250		
ETST 252/	Asian American History	3
HIST 252		
ETST 253	Chicana/o History and Culture	3
ETST 255/	Native American History	3
HIST 255		
TOTAL		3

C. <i>Select four courses from the following; must include at least two different subject codes:¹</i>		
ANTH 318 ^P /	Peoples and Cultures of the Southwest	3
ETST 318 ^P		
ANTH 414/	Development in Indian Country	3
ETST 414		
ANTH 422 ^P /	Comparative Legal Systems	3
SOC 422 ^P		
ETST 312	African American Situation	3
ETST 316/	Multiculturalism and the Media	3
JTC 316		
ETST 324	Asian Pacific Americans and the Law	3
ETST 332	Contemporary Chicano/a Issues	3
ETST 352/	Indigenous Women, Children, and Tribes	3
SOWK 352		
ETST 404	Race Formation in the United States	3
ETST 405	Ethnicity, Class, and Gender in the U.S.	3
ETST 444/	Federal Indian Law and Policy	3
SOC 444		
HDFS 403	Families in the Legal Environment	3

<u>Course</u>	<u>Title</u>	<u>Cr</u>
HIST 360 ^P	United States Immigration History	3
JTC 415	Communications Law ²	3
POLS 410 ^P	American Constitutional Law	3
POLS 413 ^P	U.S. Civil Rights and Liberties	3
POLS 431 ^P	International Law	3
SOC 332 ^P	Comparative Majority/Minority Relations	3
SOC 455 ^P	Sociology of Law	3
SPCM 334	Co-Cultural Communication	3
SPCM 349	Freedom of Speech ²	3
SPCM 434	Intercultural Communication	3
TOTAL		12

PROGRAM TOTAL = 21 credits*

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

¹ Students may substitute up to two courses in this group with approval of advisor.

² Credit is not allowed for both JTC 415 and SPCM 349 in this program.

<u>Course</u>	<u>Title</u>	<u>Credits</u>
MECH 237 ^P	Introduction to Thermal Sciences	3
MECH 337 ^P	Thermodynamics	4
PH 361 ^P	Physical Thermodynamics	3
TOTAL		3-4

ENERGY TECHNICAL ELECTIVES¹

Select a minimum of 11 credits from the following:

ECE 342 ^P	Electromagnetic Fields and Devices II	3
ECE 411 ^P	Control Systems	3
ECE 441 ^P	Optical Electronics	3
ECE 444 ^P	Antennas and Radiation	3
ECE 461 ^P	Power Systems	3
ECE 466 ^P	Integrated Lighting Systems	2
MECH 417 ^P	Control Systems	3
MECH 432 ^P	Engineering of Nanomaterials	3
MECH 437 ^P	Internal Combustion Engines	3
MECH 463 ^P	Building Energy Systems	3
MECH 468 ^P	Space Propulsion and Power Engineering	3
TOTAL		11-12

PROGRAM TOTAL = 22-24 credits*

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

* Additional course work may be required because of prerequisites.

¹Select enough credits in consultation with engineering academic advisor to bring program total to a minimum of 22 credits, of which 12 must be upper division.

Energy Engineering Interdisciplinary Minor

Office in Engineering Building, Room 202

Coordinated by a Faculty Advisory Board

The Energy Engineering Interdisciplinary Minor is designed to provide students in Engineering and the sciences with an understanding of renewable and non-renewable energy systems; clean energy technologies; basic principles of operation of energy extraction, conversion, storage and transmission systems; and depth in current and new energy methods and applications (e.g., PV, batteries, biofuels, etc.).

The goal of the program is to empower engineers and scientists to be technological catalysts for sustainable solutions to the grand challenges of energy.

The interdisciplinary minor requires completion of 22-24 credits, with at least 12 credits greater than or equal to 300-level courses. All undergraduates are required to complete 5 credits of core courses and a 3 credit science elective. The remaining 14-16 credits of technical electives are chosen according to the student's major and interests.

<u>Course</u>	<u>Title</u>	<u>Credits</u>
CORE COURSES		
ECE 465 ^P	Electrical Energy Generation Technologies	2
MECH 303 ^P	Energy Engineering	3
TOTAL		5
CORE SCIENCE ENERGY ELECTIVE		
<i>Select one course from the following:</i>		
ATS 150	Science of Global Climate Change	3
BZ 353 ^P / NR 353 ^P	Global Change Ecology, Impacts and Mitigation	3
TOTAL		3
CORE ENGINEERING SCIENCE ENERGY ELECTIVE		
<i>Select one course from the following:</i>		
CBE 210 ^P	Thermodynamic Process Analysis	3
ECE 341 ^P	Electromagnetic Fields and Devices	3

Environmental Affairs Interdisciplinary Minor

Office in Clark Building, Room C138

www.colostate.edu/Programs/eap/index.html

Coordinated by a Faculty Advisory Board

The Environmental Affairs Interdisciplinary Minor is designed for students with a particular interest in environmental topics, focusing on a core of social sciences and humanities courses that are supplemented with required science courses as well as environmental electives from six colleges. Courses address domestic and international issues of concern with both current and historical perspectives, and will provide students with a well-rounded program of study. The program is open to all students and designed to be an additional component to the student's major. Colorado State University has environmental expertise and this program provides undergraduate students with an opportunity to broaden their education as they prepare themselves for environmental careers or graduate study.

Program details are available from the Department of Political Sciences, College of Liberal Arts.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
Students must complete a minimum of 21 credits, at least 12 of which must be upper division (300- or 400-level).		
Environmental Affairs Core		
<i>Select three courses with three different subject codes from the following:</i>		
ANTH 330 ^P	Human Ecology ¹	3

University-Wide Instructional Programs

Course	Title	Cr
ANTH 414/	Development in Indian Country ¹	3
ETST 414		
ANTH 415	Indigenous Ecologies and the Modern World ¹	3
E 403 ^P	Writing the Environment	3
ECON 340 ^P /	Introduction to Economics of Natural Resources	3
AREC 340 ^P		
HIST 355 ^P	American Environmental History	3
JTC 461 ^P	Writing about Science, Health, and Environment	3
PHIL 345 ^P	Environmental Ethics	3
POLS 361 ^P	U.S. Environmental Politics and Policy ²	3
POLS 362 ^P	Global Environmental Politics ²	3
SOC 460 ^P	Society, and Environment	3
	TOTAL	9

Environmental Science

A. Select one course from the following:

ERHS 220 ^P	Environmental Health	3
F 210 ^P	Forest Ecogeography	3
GEOL 122	The Blue Planet: Geology of Our Environment ³	3
GEOL 124	Geology of Natural Resources ³	3
GR 210	Physical Geography	3
LIFE 320 ^P	Ecology	3
NR 120A	Environmental Conservation	3
NR 120B ^P	Environmental Conservation	4
NR 130	Global Environmental Systems	3
SOCR 240 ^P	Introductory Soil Science	4

B. Select a second course from the A list OR select one course from the B list below OR select another

science course in consultation with adviser. Courses in B must have a strong environmental focus.

AGRI 116/	Plants and Civilization	3
IE 116		
ATS 350	Introduction to Weather and Climate	2
	AND	
ATS 351 ^P	Introduction to Weather and Climate Laboratory	1
BSPM 102	Insects, Science, and Society	3
CIVE 322 ^P /	Basic Hydrology	3
ENVE 322 ^P		
CIVE 413 ^P	Environmental River Mechanics	3
CIVE 425 ^P	Soil and Water Engineering	3
ERHS 320 ^P	Environmental Health Water Quality	3
F 324 ^P	Fire Effects and Adaptation	3
FW 100 ^P	Wildlife Fundamentals (concurrent reg. in FW 192 for freshmen)	2
FW 200 ^P	Wildlife Conservation	3
GR 100	Introduction to Geography	3
NR 150		3
	Oceanography	
NR 300 ^P	Biological Diversity	3
NR 326 ^P	Forest Vegetation Management	3
NRRT 452 ^P	Management of the Wilderness Resource ⁴	4
RS 300 ^P	Rangeland Conservation and Stewardship	3
RS 478 ^P	Restoration Ecology	3
SOCR 421 ^P	Crop and Soil Management Systems II	4
WR 304	Principles of Watershed Management	3
	TOTAL	6

Liberal Arts Electives

Select one course from the list below OR a different course with strong environmental focus may be used with approval of adviser.

ANTH 330 ^P	Human Ecology ⁵	3
E 403 ^P	Nature Writing ⁵	3
ECON 240/	Issues in Environmental Economics	3
AREC 240		
ECON 340 ^P /	Introduction to the Economics of Natural Resources ⁵	3
AREC 340 ^P		
ECON 344 ^P	Economics of Energy Resources	3
ECON 346 ^P /	Economics of Outdoor Recreation	3
AREC 346 ^P		
ETST 344	Native American Religious History and Issues	3
ETST 414/	Development in Indian Country ⁷	3
ANTH 414		
HIST 351 ^P	American West to 1900	3
HIST 352 ^P	American West Since 1900	3
HIST 355 ^P	American Environmental History ⁵	3
HONR 492 ^P	Honors Senior Seminar	3
JTC 461 ^P	Writing About Science, Health, and Environment ⁵	3
PHIL 330/	Agricultural Ethics	3
AGRI 330		
PHIL 345 ^P	Environmental Ethics ⁵	3
POLS 361 ^P	U.S. Environmental Politics and Policy ^{2,5}	3

Course	Title	Cr
POLS 362 ^P	Global Environmental Politics ^{2,5}	3
SOC 320 ^P	Population-Natural Resources and Environment	3
SOC 364 ^P	Agriculture and Global Society	3
SOC 460 ^P	Society and Environment ⁷	3
SOC 461 ^P	Water, Society, and Environment	3
	TOTAL	3

Select from Other Colleges

Select a minimum of three credits from the list below OR a different course with a strong environmental component may be used with approval from adviser.

AGRI 330/	Agricultural Ethics	3
PHIL 330		
AREC 202	Agricultural and Resource Economics	3
AREC 240/	Issues in Environmental Economics	3
ECON 240		
AREC 340 ^P /	Introduction to Economics of Natural Resources	3
ECON 340 ^P		
AREC 342 ^P	Economic Analysis-Water Resource Development	3
AREC 346 ^P /	Economics of Outdoor Recreation	3
ECON 346 ^P		
AREC 375 ^P	Agricultural Law	3
AREC 460 ^P	Economics of World Agriculture	3
AREC 478 ^P	Agricultural Policy	3
CIVE 438 ^P /	Pollution Control Engineering	4
ENVE 438 ^P		
CIVE 439 ^P /	Environmental Engineering Chemical Concepts	3
CBE 439 ^P		
CIVE 440 ^P	Nonpoint Source Pollution	3
CON 450/	Travel Abroad-Sustainable Building	3
INTD 450		
ENVE 441 ^P	Water and Wastewater Characterization	1
ERHS 410 ^P	Environmental Health Waste Management	3
ERHS 446 ^P	Environmental Toxicology	3
F 322 ^P	Economics of the Forest Environment	3
F 330 ^P	Timber Harvesting and the Environment	3
GR 320 ^P	Cultural Geography	3
GR 342	Geography of Water Resources	3
GR 345 ^P	Geography of Hazards	3
HORT 466 ^P	Community Forestry	3
LAND 110	Introduction to Landscape Architecture	3
LAND 120	History of the Designed Landscape	3
NR 320	Natural Resources History and Policy	3
NR 355 ^P	Contemporary Environmental Issues ⁴	3
NR 365	Environmental Education	3
NRRT 330	Social Aspects of Natural Resource Management	3
NRRT 462 ^P	Environmental Communication-Natural Resources	3
PSY 316 ^P	Environmental Psychology	3
SOCR 320	Forage and Pasture Management	3
SOCR 370 ^P	Irrigation Principles	2
SOCR 377 ^P /	Geographic Information Systems in Agriculture	3
CIVE 377 ^P		
	TOTAL	3

PROGRAM TOTAL = 21 credits*

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

¹ Only one ANTH course can be used for the environmental affairs core.

² Students may not get credit for both POLS 361 and POLS 362 in this program.

³ GEOL 121 is also recommended.

⁴ Offered as a correspondence or telecourse course only.

⁵ May be taken if not selected in the Environmental Affairs Core.

Extreme Ultraviolet and Optical Science and Technology Graduate Interdisciplinary Studies Program

euverc.colostate.edu/

Coordinated by a Faculty Advisory Board

The Extreme Ultraviolet Science and Technology Graduate Interdisciplinary Studies Program is designed to serve individuals who are seeking to gain knowledge and experience in the generation and applications of coherent extreme ultraviolet or soft x-ray light. This type of light holds great potential in applications in nanotechnology, nanoelectronics, photochemistry, material science, and biology. While in the past the use of coherent EUV light required a trip to a national facility, new developments in compact sources will soon make it widely available. The objective of the program is to provide scientists or engineers many of the fundamentals required to generate or proficiently make use of this portion of the electromagnetic spectrum.

This interdisciplinary studies program is inherently interdisciplinary including: lasers, optical, plasma, material, chemical and biological sciences and engineering. With its NSF Center for Extreme Ultraviolet Science and Technology, a partnership with the University of Colorado and the University of California, Berkeley, Colorado State has unique expertise in this area.

The program is open to graduate students, and professionals, who hold a B.S. degree in engineering, physics, chemistry, biology, mathematics or other scientific discipline. The program is offered through the Department of Electrical and Computer Engineering, College of Engineering, Colorado State University.

The program requires a total of fifteen credits comprising six core credits and nine electives. The six core credits are two very fundamental courses that any graduate student with a background in hard sciences and engineering could master. This, coupled with the fact that graduate students in any discipline are not held to undergraduate prerequisite courses, make this interdisciplinary studies program widely accessible. Elective credits are tailored to the candidate's interests from the major the student pursues. Within these a course in another discipline outside the major of the candidate must be included.

Course	Title	Cr
Core Courses		
ECE 504 ^P	Physical Optics	3
ECE 650 ^P	Extreme Ultraviolet and Soft X-Ray Radiation	3
	TOTAL	6
Elective Courses (Select nine credits from the following)		
BC 511 ^P	Structural Biology I	4
BC 565 ^P	Molecular Regulation of Cell Function	4
BC 611 ^P	Structural Biology II	2
CHEM 532 ^P	Advanced Chemical Analysis II	3
CHEM 563A ^P	Physical Methods in Inorganic Chemistry-Group Theory	1
CHEM 571 ^P	Quantum Chemistry	3
CHEM 773 ^P	Atomic and Molecular Spectroscopy	3
ECE 503 ^P	Ultrafast Optics	3
ECE 505 ^P	Nanostructures: Fundamentals and Applications	3
ECE 506 ^P	Optical Interferometry and Laser Metrology	3
ECE 507 ^P	Plasma Physics and Applications	3
ECE 546 ^P	Laser Fundamentals and Devices	3
ECE 773 ^P	Topics in Solid State Electronics	3
MATH 560 ^P	Linear Algebra	3

Course	Title	Cr
PH 451 ^P	Introductory Quantum Mechanics I	3
PH 452 ^P	Introductory Quantum Mechanics II	3
PH 521 ^P	Introduction to Lasers	3
PH 522 ^P	Introductory Laser Laboratory	1
PH 572 ^P	Mathematical Methods for Physics II	3
PH 641 ^P	Electromagnetism I	3
PH 642 ^P	Electromagnetism II	3
PH 651 ^P	Quantum Mechanics I	3
PH 652 ^P	Quantum Mechanics II	3
	TOTAL	9

PROGRAM TOTAL = 15 credits*

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

Film Studies Interdisciplinary Minor

*College of Liberal Arts Advising Center, Clark Building,
Room C207, 491-3117*

Coordinated by a Faculty Advisory Committee

Film Studies is an interdisciplinary academic discipline that deals with historical, theoretical, and critical approaches to film; it is concerned with exploring the narrative, artistic, cultural, economic, and political implications of cinema. The United States' film industry is second worldwide only to India and continues to grow, as does the study of film. A minor in Film Studies will enable you to develop media fluency in film: the ability to analyze, contextualize, and use the medium within the broad context of humanistic studies, as well as provide you with a solid background in critical thinking and writing, skills that will serve you well in any career you choose.

Program details are available from the College of Liberal Arts Advising Center.

Course	Title	Cr
Select a minimum of 21 credits, of which at least 18 credits must be upper division (300- to 400-level), from the following list:^{*1}		
E 350 ^P	The Gothic in Literature and Film	3
ETST 320	Ethnicity and Film: Asian-American Experience	3
ETST 324	A Century of Black Cinema	3
ETST 425	Indigenous Film and Video	3
ETST 454/	Chicano/a Film and Video	3
SPCM 454		
JTC 456 ^P /	Documentary Film as a Liberal Art	3
LB 456 ^P		
LCHI 365 ^P	Introduction to Chinese Cinema Studies ¹	3
LFRE 365 ^P	Introduction to French Cinema Studies ¹	3
LGEN 465A-D	Studies in Foreign Film	3
LGER 365 ^P	Introduction to German Cinema Studies ¹	3
LITA 365	Studies in Foreign Film—Italian ²	3
LJPN 365 ^P	Introduction to Japanese Cinema Studies ¹	3
LRUS 365 ^P	Introduction to Russian Cinema Studies ¹	3
LSPA 365 ^P	Studies in Foreign Film—Spanish ¹	3
LSPA 465A ^P	Studies in Foreign Film—Spain ¹	3
LSPA 465B ^P	Studies in Foreign Film—Latin America ¹	3
SPCM 278C	Communication Skills: Film Festivals	1

Course	Title	Cr
SPCM 350	Evaluating Contemporary Film	3
SPCM 354	History and Appreciation of Film	3
SPCM 357	Film and Social Change	3
SPCM 455 ^P / LB 455 ^P	Narrative Fiction Film as a Liberal Art	3
TOTAL		21
PROGRAM TOTAL = 21 credits*		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

*Additional Coursework may be required because of prerequisites.

¹ Course is taught in the respective language.

Food Science/Safety Interdisciplinary Studies Programs

www.fshn.caahs.colostate.edu/academic_programs/isp_food_science_safety/Default.aspx

Coordinated by a Faculty Advisory Board

Are you interested in the safety and quality of food from “farm to fork?” The Food Science/Safety Interdisciplinary Studies Programs provide students with the interdisciplinary background necessary for understanding the roles and responsibilities of growers, producers, processors, retailers, consumers, and others working within the food system to ensure that food is safe and healthful. These programs are a cooperative effort by faculty from several departments and colleges within the University who share a common interest in food quality and safety, and integrated production and processing. Students enrolling in a program will receive their degree from their home department. Completion of requirements for the interdisciplinary studies program will be noted on the transcript.

The programs are available at both the undergraduate and graduate levels. Program details are available from the Office of the Dean in the Colleges of Agricultural Sciences, Applied Human Sciences, or Veterinary Medicine and Biomedical Sciences, or from one of the collaborating departments.

Food Science/Safety Interdisciplinary Minor (Undergraduate Program)

The interdisciplinary minor in Food Science/Safety is designed to complement the student’s major. It consists of a core of required courses (6 credits), foundation courses in the sciences (6 credits), and a selection of advanced courses (12 credits minimum) taken from at least three of the six collaborating departments: Animal Sciences; Environmental and Radiological Health Sciences; Food Science and Human Nutrition; Horticulture and

Landscape Architecture; Microbiology, Immunology, and Pathology; and Soil and Crop Sciences.

Course	Title	Cr
Required Courses		
FTEC 400 ^P	Food Safety ¹	3
OR		
MIP 334 ^P	Food Microbiology ¹	3
LIFE 205	Survey of Microbial Biology	3
OR		
MIP 300 ^P	General Microbiology	3
TOTAL		6

Foundation Courses (minimum of 6 credits chosen from the following:)		
BC 351 ^P	Principles of Biochemistry	4
OR		
BC 401 ^P	Comprehensive Biochemistry I	3
FSHN 150	Survey of Human Nutrition	3
CHEM 245 ^P	Fundamentals of Organic Chemistry ²	4
FTEC 110	Food-From Farm to Table	3
FTEC 447 ^P	Food Chemistry	2
HORT 100	Horticultural Science	4
LIFE 206 ^P	Microbial Biology Laboratory	2
OR		
MIP 302 ^P	General Microbiology Laboratory	2
SOCR 240 ^P	Introductory Soil Science	4
TOTAL		6

Advanced Courses (minimum of 12 credits – must include at least three prefixes from the collaborating departments (ANEQ, ERHS, FSHN/FTEC, HORT, MIP, SOCR))		
ANEQ 300L ^P	Topics in Animal Sciences-Health Programs/Quality Assurance	2
ANEQ 360 ^P	Principles of Meat Science	3
ANEQ 361	Introduction to Meat Product Evaluation	3
ANEQ 460 ^P	Meat Safety	2
ANEQ 470 ^P	Meat Processing Systems	4
BTEC 306 ^P / BIOM 306 ^P	Bioprocess Engineering	4
ERHS 220 ^P	Environmental Health	3
ERHS 332 ^P	Principles of Epidemiology	3
ERHS 430	Human Disease and the Environment	3
FSHN 300 ^P	Food Principles and Applications	3
FSHN 350 ^P	Human Nutrition	3
FTEC 400 ^P	Food Safety ¹	3
FTEC 420 ^P	Quality Assessment of Food Products	3
FTEC 460 ^P	Brewing Science and Technology	3
HORT 401 ^P	Medicinal and Value-Added Uses of Plants	3
HORT 424 ^P / SOCR 424 ^P	Topics in Organic Agriculture	3
HORT 450A ^P	Cool Season Vegetable Production	1
HORT 450B ^P	Warm Season Vegetable Production	1
HORT 450C ^P	Small Fruit Production	1
HORT 450D ^P	Tree Fruit Production	1
HORT 454 ^P	Horticulture Crop Production and Management	2
HORT 475 ^P	Environmental Requirements of Horticultural Plants	3
MIP 302 ^P	General Microbiology Laboratory ³	2
MIP 334 ^P	Food Microbiology ¹	3
MIP 335 ^P	Food Microbiology Laboratory	2
SOCR 330 ^P	Principles of Genetics	3
SOCR 430 ^P	Applications of Plant Biotechnology	3
	Independent Study/Group Study/Internship ⁴	3
TOTAL		12

500-level courses that may be selected as Advanced Courses by high achieving undergraduates:⁵

ANEQ 522 ^P	Animal Metabolism	3
ANEQ 565 ^P	Interpreting Animal Science Research	3
ANEQ 567 ^P	HACCP Meat Safety	3
FTEC 570 ^P	Food Product Development	2
FTEC 572 ^P	Food Biotechnology	2
FTEC 574	Current Issues in Food Safety	2
FTEC 576 ^P	Cereal Science	2
FTEC 578 ^P	Bioactives and Probiotics for Health	3
MIP 540 ^P	Biosafety in Research Laboratories	2
VS 570/ AGRI 570	Issues in Animal Agriculture	2

PROGRAM TOTAL = 24 credits (12 credits must be upper-division: 300- or 400-level)*

^P This course has at least one prerequisite. Check the Courses of Instruction section

of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

¹ If both FTEC 400 and MIP 334 are taken, credit for one class may be used for Advanced Courses credit.

² Or higher level organic chemistry course.

³ Cannot double count as a Foundation course.

⁴ Maximum of three upper-division (300- or 400-level) credits allowed for Independent Study/Group Study/Internship. Select from subject codes ANEQ, ERHS, FSHN/FTEC, HORT, MIP, SOCR.

⁵ With approval of advisor.

Food Science/Safety Interdisciplinary Studies Program (Graduate Program)

The international reputation of the faculty members and their ability to attract strong extramural support for research in the areas of food science and food safety resulted in the creation of the Food Science/Safety graduate interdisciplinary studies program. Focusing on interdisciplinary research and education, this program is a cooperative effort by faculty in six departments: Animal Sciences; Clinical Sciences; Food Science and Human Nutrition; Horticulture and Landscape Architecture; Microbiology, Immunology, and Pathology; and Soil and Crop Sciences. Faculty research interests include food microbiology, food safety education, food processing, and integrated production/processing. Students interested in the safety and processing of foods and commodities are encouraged to apply.

Students wishing to pursue the Food Science/Safety Graduate Interdisciplinary Studies Program must declare their intent with the chair of the Faculty Advisory Board. See the program website for admissions and program information (www.fshn.caahs.colostate.edu/academic_programs/isp_food_science_safety/Default.aspx). The program is customized to fit the student's interests and long-term objectives. Students are strongly encouraged to interact with faculty from more than one department. Basic training in food science comes from an integrated curriculum featuring core courses in food science, microbiology, nutrition, and commodity production. Opportunities exist for students to rotate through various laboratories. Students also participate in a weekly interdisciplinary group study course that includes papers given by students, participating faculty, and distinguished visiting scientists, and visits to member laboratories. The group study course is designed to enhance interaction and facilitate research opportunities among the food science/safety community, including students, faculty, postdoctoral fellows, and staff. It may be offered by the participating departments on a rotational basis.

Students receive a degree from their home department and an endorsement on their transcript indicating successful completion of the program requirements.

Course	Title	Cr
Prerequisite Course		

Course	Title	Cr
MIP 334 ^P	Food Microbiology	3
Core Courses		
FSHN 696A	Group Study-Food Science	1-2
FTEC 400 ^P	Food Safety	3
	Thesis or dissertation in home department ¹	Var
Supporting Courses – Select at least six credits from the following courses or additional courses approved by the Faculty Advisory Board. These courses must include at least two prefixes.		
ANEQ 470 ^P	Meat Systems	3
ANEQ 567 ^P	HACCP Meat Safety	2
ANEQ 660 ^P	Topics in Meat Safety	3
ANEQ 676 ^P	Molecular Approaches to Food Safety	3
ERHS 532 ^P	Epidemiologic Methods	3
FTEC 570 ^P	Food Product Development	2
FTEC 572 ^P	Food Biotechnology	2
FTEC 574	Current Issues in Food Safety	2
FTEC 576 ^P	Cereal Science	2
FTEC 578 ^P	Bioactives and Probiotics for Health	3
HORT 401 ^P	Medicinal and Value-Added Uses of Plants	3
HORT 424 ^{P/}	Topics in Organic Agriculture	3
SOCR 424 ^P		
HORT 675 ^P	Plant Stress Physiology	3
MIP 335 ^P	Food Microbiology Laboratory	2
MIP 443 ^P	Microbiology Physiology	4
MIP 450 ^P	Microbial Genetics	3
MIP 540 ^P	Biosafety in Research Laboratories	2
MIP 550 ^P	Microbial and Molecular Genetics Laboratory	4
MIP 533 ^{P/}	Epidemiology of Infectious Diseases/Zoonoses	3
VS 533 ^P		
MIP 624 ^P	Advanced Topics in Microbial Ecology	2
SOCR 755 ^P	Advanced Soil Microbiology	3
VS 570/	Issues in Animal Agriculture	2
AGRI 570		
VS 533 ^{P/}	Epidemiology of Infectious Diseases/Zoonoses	3
MIP 533 ^P		
VS 648 ^{P/}	Food Animal Production and Food Safety	2
VM 648 ^P		
PROGRAM TOTAL = a minimum of 19-20 credits*		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

¹ Six or more credits, approved by Faculty Advisory Board for the Graduate Interdisciplinary Studies Program in Food Science/Safety.

Gerontology Interdisciplinary Minor

Office in Behavioral Sciences Building
hdfs.caahs.colostate.edu/students/undergrad/gerontology.aspx

College of Applied Human Sciences

The Gerontology Interdisciplinary Minor is a cooperative effort among faculty from different departments and colleges of the University who share a common interest in gerontology, the study of human aging. The primary purpose of the program is to provide students with background academic knowledge and practicum/internship experience to work effectively with and for older adults in a variety of settings, and to enter professions in which there is a need to combine insight and skills derived from their major with knowledge about older individuals and the aging process.

For information about the program, please consult with your academic adviser or visit the following website at hdfs.cahs.colostate.edu/students/undergrad/gerontology.aspx.

Course	Title	Cr
Core Requirements		
AHS 201 ^P	Perspectives in Gerontology	3
FSHN 444 ^P	Nutrition and Aging	1
HDFS 312 ^P	Adult Development-Middle Age and Aging	3
HES 444 ^P	Successful Aging: Role of Physical Activity	2
SOWK 371E	Social Work with Selected Populations-Social Gerontology	3
<i>Select a minimum of three credits practicum or internship directly related to aging from the following:</i>		
AHS 487 ^P	Internship in Human Services	3
HDFS 488D ^P	Field Placement: Programming for Adults and Later Life Families	3
SOWK 488 ^P	Field Placement	3
TOTAL		15

Elective Courses		
<i>Select 6-8 credits from the following:</i> ¹		
FSHN 450 ^P	Medical Nutrition Therapy	5
HDFS 332 ^P	Death, Dying, and Grief	3
HDFS 402 ^P	Family Studies	3
HDFS 403	Families in the Legal Environment	3
OT 355 ^P	Handicapped Individual in Society	2
PHIL 366	Philosophy of Aging	3
PSY 296	Group Study	1-3
PSY 320 ^P	Abnormal Psychology	3
PSY 496A-F	Group Study	1-3
SOWK 410 ^P	Social Welfare Policy	3
TOTAL		6-8

PROGRAM TOTAL = 21-23 credits*²

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

¹ Students may select from the courses below or from a department list of courses with approval of adviser.

² Of the 21 minimum credits required to complete the minor, a minimum of 12 credits must be upper-division (300- or 400-level).

Global Environmental Sustainability Interdisciplinary Minor

sustainability.colostate.edu/education/minor-global-environmental-sustainability

The School of Global Environmental Sustainability (SoGES) seeks to prepare students to meet today's pressing environmental challenges. Using an interdisciplinary approach within a framework of sustainability, students will be led in innovative research leading to the knowledge and understanding needed to approach and solve problems of the human-environment interaction. SoGES' vision encompasses laying the foundation and defining the principles and practices that will ensure long-term environmental sustainability, while continuing to meet the needs of people around the earth.

Course	Title	Cr
Required Courses		
GES 101	Foundations of Environmental Sustainability	3
GES 470	Applications of Environmental Sustainability	3

Course	Title	Cr
TOTAL		6
<i>Select one course from each category A, B, and C. At least 3 credits of these courses must be upper division (300-400 level). Courses may not fulfill two categories.</i>		
Group A: Society and Social Processes		
AGRI 116/IE 116	Plants and Civilizations	3
AGRI 330/PHIL 330	Agricultural Ethics	3
ANTH 200	Cultures and the Global System	3
ANTH 320 ^P /GR 320 ^P	Cultural Geography	3
ANTH 330 ^P	Human Ecology	3
ANTH 415	Indigenous Ecologies and the Modern World	3
ANTH 453 ^P	Human Impacts on Ancient Environments	3
ETST 256	Border Crossings: People/Politics/Culture	3
GR 100	Introduction to Geography	3
GR 320 ^P /ANTH 320 ^P	Cultural Geography	3
HIST 355 ^P	American Environmental History	3
HIST 470 ^P	World Environmental History, 1500-Present	3
HIST 471	History of Antarctica, 1800-Present	3
HORT 424 ^P /SOCR 424 ^P	Topics in Organic Agriculture	3
IE 116/AGRI 116	Plants and Civilizations	3
NR 320	Natural Resources History and Policy	3
NR 425 ^P	Natural Resource Policy and Sustainability	3
PHIL 320	Ethics of Sustainability	3
PHIL 330/AGRI 330	Agricultural Ethics	3
PHIL 345 ^P	Environmental Ethics	3
POLS 361 ^P	U.S. Environmental Politics and Policy	3
POLS 362 ^P	Global Environmental Politics	3
SOC 220	Global Environmental Issues	3
SOC 320 ^P	Population-Natural Resources, and Environment	3
SOC 364 ^P	Agriculture and Global Society	3
SOC 460 ^P	Society and Environment	3
SOC 461 ^P	Water, Society, and Environment	3
SOC 463 ^P	Sociology of Disaster	3
SOCR 424 ^P /HORT 424 ^P	Topics in Organic Agriculture	3
Group B: Biological and Physical Processes		
ANTH 453 ^P	Impacts on Ancient Environments	3
BSPM 308 ^P	Ecology and Management of Weeds	4
BZ 348 ^P /MATH 348 ^P	Theory of Population and Evolutionary Ecology	4
BZ 353 ^P /NR 353 ^P	Global Change Ecology, Impacts and Mitigation	3
BZ 471 ^P	Stream Biology and Ecology	3
ERHS 320 ^P	Environmental Health Water Quality	3
ERHS 430	Human Diseases and the Environment	3
ERHS 448 ^P	Environmental Contaminants: Exposure and Fate	3
GEOL 122	The Blue Planet: Geology of Our Environment	3
GR 100	Introduction to Geography	3
GR 210	Physical Geography	3
GR 410 ^P	Climate Change: Science, Policy, Implications	3
HORT 171/SOCR 171	Environmental Issues in Agriculture	3
LAND 220 ^P /LIFE 220 ^P	Fundamentals of Ecology	3
LAND 364 ^P	Design and Nature	4
LAND 444 ^P	Ecology of Landscapes	3
LIFE 220 ^P /LAND 220 ^P	Fundamentals of Ecology	3
LIFE 320 ^P	Ecology	3
MATH 348 ^P /BZ 348 ^P	Theory of Population and Evolutionary Ecology	4
NR 120A	Environmental Conservation	3
NR 130	Global Environmental Systems	3
NR 353 ^P /BZ 353 ^P	Global Change Ecology, Impacts and Mitigation	3
RS 351 ^P	Wildland Ecosystems in a Changing World	3
SOCR 171/HORT 171	Environmental Issues in Agriculture	3
SOCR 341 ^P	Soil Ecology	1
SOCR 343 ^P	Composting Principles and Practices	1
SOCR 440	Pedology	4
WR 304	Principles of Watershed Management	3
Group C: Economy and Profitability		

<u>Course</u>	<u>Title</u>	<u>Cr</u>
AREC 202 ^P	Agricultural and Resource Economics	3
AREC 240/	Issues in Environmental Economics	3
ECON 240		
AREC 340 ^{P/}	Introduction: Economics of Natural Resources	3
ECON 340 ^P		
AREC 346 ^{P/}	Economics of Outdoor Recreation	3
ECON 346 ^P		
AREC 415 ^P	International Agricultural Trade	3
AREC 442 ^P	Water Resource Economics	3
AREC 460 ^P	Economics of World Agriculture	3
BZ 348 ^{P/}	Theory of Population and Evolutionary Ecology	4
MATH 348 ^P		
ECON 240/	Issues in Environmental Economics	3
AREC 240		
ECON 340 ^{P/}	Introduction: Economics of Natural Resources	3
AREC 340 ^P		
MGT 360 ^P	Social and Sustainable Venturing	3
NR 425 ^P	Natural Resource Policy and Sustainability	3
Select at least one upper division course (minimum of 3 credits) from category D not taken in another category:		
Group D: Skills		
AREC 442 ^P	Water Resource Economics	3
BZ 348 ^{P/}	Theory of Population and Evolutionary Ecology	4
MATH 348 ^P		
HORT 344 ^P	Organic Greenhouse Production	1
HORT 345 ^{P/}	Diagnosis and Treatment in Organic Fields	2
SOCR 345 ^P		
HORT 368 ^{P/}	Landscape Irrigation and Water Conservation	3
LAND 368 ^P		
LAND 364 ^P	Design and Nature	4
LAND 368 ^{P/}	Landscape Irrigation and Water Conservation	3
HORT 368 ^P		
MATH 348 ^{P/}	Theory of Population and Evolutionary Ecology	4
BZ 348 ^P		
MGT 477 ^P	Sustainable Supply Chain Management	3
NR 320	Natural Resources History and Policy	3
SOC 320 ^P	Population-Natural Resources and Environment	3
SOC 463 ^P	Sociology of Disaster	3
SOCR 345 ^{P/}	Diagnosis and Treatment in Organic Fields	2
HORT 345 ^P		
SOCR 440	Pedology	4
SOCR 478 ^P	Environmental Soil Sciences	3
Select 3 credits of upper division elective(s) from categories A-D with a subject code not previously taken:		
	Upper Division Elective	3
PROGRAM TOTAL = minimum 21 credits*¹		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog at <http://catalog.colostate.edu> to see the course prerequisites.
 *Additional course work may be required due to prerequisites.
¹ Students must complete a minimum of 21 credits for the minor, of which at least 12 must be upper division.

Information Science and Technology Interdisciplinary Minor

Office in Clark Building, Room C242
istec.colostate.edu/education/ISP_MIPS.pdf

Associate Professor Peter B. Seel, Coordinator

This interdisciplinary minor is sponsored by five departments in different colleges across the University: Computer Information Systems, Computer Science, Electrical and Computer Engineering, Journalism and Technical Communication, and Psychology. The program is designed for students seeking a broad foundation in information technology, but not seeking to major in a

specific information technology-related field. The program requires 21 credits and is open to students majoring in any field other than computer science, computer information systems, and electrical and computer engineering.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
Computer Application Requirement – Before a student is admitted to this program (s)he must demonstrate mastery of the following skill:		
	• Computer applications software – demonstrated by completion of BUS 150, Business Computing Concepts and Applications, or CS 110, Personal Computing.	
Required Courses		
CIS 210	Information Technology in Business	3
JTC 413	New Communication Technologies and Society	3
	TOTAL	6
Elective Courses: Select five of the following courses¹		
CIS 240 ^P	Application Design and Development	3
CIS 301	End User Computing	3
CIS 340 ^P	Advanced Application Design and Development	3
CIS 355 ^P	Business Database Systems	3
CS 150 ^P	Interactive Programming with Java	4
CS 160 ^P	Foundations in Programming	4
CS 161 ^P	Object-Oriented Problem Solving	4
CT 310 ^P	Web Development	4
CT 320 ^P	Network and System Administration	4
ECE 421 ^P	Telecommunications I	3
JTC 300 ^P	Professional and Technical Communication	3
JTC 335 ^P	Digital Photography	3
JTC 340 ^P	Digital Video Editing	3
JTC 372 ^P	Web Design and Management	3
PSY 354 ^P	Human-Computer Interaction	3
	Total Elective Credits	15-20
PROGRAM TOTAL = 21-26 credits*		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu> to see the course prerequisites.
 *Additional course work may be required due to prerequisites.
¹ Nine credits must be from upper division courses.

Integrated Resource Management Interdisciplinary Minor

Office in University Square, Room 2
www.wcirm.colostate.edu/

Kraig Peel, Coordinator

The Integrated Resource Management Interdisciplinary Minor offers students from all majors an opportunity for additional specialized course work for training in integrated resource management. The core curriculum consists of courses in the Department of Agricultural and Resource Economics; Animal Sciences; and Forest, Rangeland, and Watershed Stewardship. The core curriculum is supplemented with several courses focused on integration of the information provided in the disciplinary courses and developing skills in systems analysis. This interdisciplinary minor is aimed at providing training for students interested in careers involving the businesses associated with land and animal management.

Course	Title	Cr
LOWER DIVISION		
LAND 220 ^P	Fundamentals of Ecology	3
LIFE 220 ^P		
SOCR 240 ^P	Introductory Soil Science	4
	OR	
SOCR 320	Forage and Pasture Management	3
TOTAL		6-7
UPPER DIVISION		
AGRI 383 ^P	U.S. Travel-Integrated Resource Management	2
NR 383 ^P		
ANEQ 300E ^P	Topics in Animal Science-Family Ranching	1
ANEQ 472 ^P	Sheep Systems	3
	OR	
ANEQ 478 ^P	Beef Systems	3
AREC 305 ^P	Agricultural and Resource Enterprise Analysis	3
AREC 310	Agricultural Marketing	3
AREC 478 ^P	Agricultural Policy	3
RS 300 ^P	Rangeland Conservation and Stewardship	3
SOC 341 ^P	Sociology of Rural Life	3
TOTAL		21

PROGRAM TOTAL = 27-28 credits without prerequisites*

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.
*Additional course work may be required due to prerequisites.

International Development Interdisciplinary Studies Programs

Office in Laurel Hall

international_initiatives.colostate.edu/index.asp?url=acad_pro_ie

Coordinated by the International Development Studies Board and International Education, Office of International Programs

The International Development Interdisciplinary Studies Programs at Colorado State University introduces students to international development as it is defined within distinct disciplines. Students take a common international development course to learn theory, assumptions and values, applications, and the impact of development. The international development program exposes students to a variety of approaches to development, both philosophical and practical, and to the breadth and complexity of international development efforts today. A 21 credit undergraduate minor and a 12 credit graduate interdisciplinary studies program are available.

International Development Interdisciplinary Minor (Undergraduate Program)

Course	Title	Cr
Core Courses		
<i>Select six credits from the following:</i>		
ANTH 200	Cultures and the Global System	3
ECON 460 ^P	Economic Development	3
GR 100	Introduction to Geography	3
IE 270/	World Interdependence-Population and Food	3
AGRI 270		

Course	Title	Cr
IE 470	Women and Development	3
IE 471	Children and Youth in Global Context	3
POLS 232	International Relations	3
IE 479 ^P /	International Development Theory and Practice	3
ANTH 479 ^P		
TOTAL		9

Supporting Courses Group A¹

Select at least 9 credits from the following courses or from additional upper division courses approved by the International Development Board and advisor:

ANTH 310 ^P	Peoples and Cultures of Africa	3
ANTH 312 ^P	Modern Indian Culture and Society	3
ANTH 314 ^P	Southeast Asian Cultures and Societies	3
ANTH 319 ^P /	Latin American Peasantries	3
ETST 319 ^P		
ANTH 329 ^P	Cultural Change	3
ANTH 340 ^P	Medical Anthropology	3
ANTH 413 ^P	Indigenous Peoples Today	3
ANTH 414/	Development in Indian Country	3
ETST 414		
ANTH 415	Indigenous Ecologies and the Modern World	3
ANTH 441 ^P	Method in Cultural Anthropology	3
AREC 415 ^P	International Agricultural Trade	3
AREC 460 ^P	Economics of World Agriculture	3
ECON 332 ^P /	International Political Economy	3
POLS 332 ^P		
ECON 370 ^P	Comparative Economic Systems	3
ECON 440 ^P	International Economics I	3
ECON 442 ^P	International Economics II	3
ETST 319 ^P /	Latin American Peasantries	3
ANTH 319 ^P		
FIN 475 ^P	International Business Finance	3
GR 320 ^P	Cultural Geography	3
IE 472 ^P	Education for Global Peace	3
INST 300 ^P	Approaches to International Studies	3
JTC 412	International Mass Communication	3
L*** ^P	Foreign languages ²	3-6
LFRE 433A-B ^P	Advanced French/Francophone Cultures ³	3
MGT 475 ^P	International Business Management	3
MKT 365 ^P	International Marketing	3
NRRT 320	International Issues-Recreation and Tourism	3
PHIL 320	Ethics of Sustainability	3
PHIL 345 ^P	Environmental Ethics	3
POLS 331	Politics and Society Along Mexican Border	3
POLS 431 ^P	International Law	3
POLS 433 ^P	International Organization	3
POLS 444 ^P	Comparative African Politics	3
POLS 445 ^P	Comparative Asian Politics	3
POLS 446 ^P	Politics of South America	3
POLS 447 ^P	Politics in Mexico, Central America, Caribbean	3
SOC 320 ^P	Population-Natural Resources and Environment	3
SOC 341 ^P	Sociology of Rural Life	3
SOC 364 ^P	Agriculture and Global Society	3
SOC 366 ^P	Peoples and Institutions of Latin America	3
SOC 429 ^P	Comparative Urban Studies	3
SOC 460 ^P	Society and Environment	3
SOC 461 ^P	Water, Society, and Environment	3
SOC 474 ^P	Social Movements and Collective Behavior	3
SOCR 475	Global Challenges in Plant and Soil Science	3
SOWK 450/	International Social Welfare and Development	3
IE 450		
SPCM 434	Intercultural Communication	3
	Internship	1-3
TOTAL		9

Supporting Courses Group B¹

Select at least 3 credits from the following courses, OR from Core Courses or Supporting Courses Group A not previously taken, OR from additional courses approved by the International Development Board and advisor:

IE 116/	Plants and Civilizations	3
AGRI 116		
L*** ^P	Foreign languages ⁴	3-6
POLS 131	Current World Problems	3
POLS 241	Comparative Government and Politics	3
TOTAL		3

Additional Requirements

International Development Events⁵ 0

Program Total = minimum of 21 credits of which at least 12 credits must be upper division (300-400) level.*

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

¹ No more than 6 credits may be taken in any subject code from among all the supporting courses, both Group A and Group B.

² Select from upper division (300-400 level) language courses. Effective Fall 2007, foreign language courses are in separate prefixes (all starting with L and followed by three letters designating the language, e.g., LFRE is French, LGER is German, etc.).

³ Accepted only when designated "Des Questions de development a travers le cinema africain."

⁴ Select from any level language courses. Effective Fall 2007, foreign language courses are in separate prefixes (all starting with L and followed by three letters designating the language, e.g. LFRE is French, LGER is German, etc.). A maximum of 6 credits are allowed for foreign language courses.

⁵ Students are required to participate in two on-campus events focused on international development, as approved by advisor.

International Development Interdisciplinary Studies Program (Graduate Program)

Course	Title	Cr
Core Courses		
IE 679 ^P	Applications of International Development	3
ANTH 679 ^P		
<i>Select one course from the following:</i>		
ANTH 529 ^P	Anthropology and Development	3
AREC 566 ^P	Contemporary Issues of Developing Countries	3
SOC 566 ^P		
AREC 660 ^P	Economics of Agricultural Development	3
IE 470	Women and Development	3
IE 471	Children and Youth in Global Context	3
IE 517/	Perspectives in Global Health	3
PSY 517		
IE 550 ^P	Ethics and International Development	3
PHIL 550 ^P		
NR 525 ^P	World Natural Resources	3
POLS 541 ^P	Political Economy of Change and Development	3
	TOTAL	6

Supporting Courses

Students will take at least six credits from the following courses or additional courses approved by the International Development Board. Core courses not taken to meet the three-credit core requirement can be used as supportive coursework.

AM 500	Apparel Supply Chains/Social Responsibility ¹	1
AM 501	Apparel Consumers and Social Responsibility ¹	1
AM 502	Initiatives for Apparel Labor Compliance ¹	1
AM 503	Sustaining Global Apparel Supply Chains ¹	1
AM 504	Apparel Worker-Centric Social Responsibility ¹	1
AM 505	Socially Responsible Apparel: Global Policy ¹	1
AM 506	Culture and Work in the Apparel Industry ¹	1
AM 507	Redesigning Green Apparel ¹	1
AM 508	Producing Environmentally Responsible Apparel ¹	1
AM 509	Corporate Culture-Socially Responsible Apparel ¹	1
ANTH 414/	Development in Indian Country	3
ETST 414		
ANTH 515 ^P	Culture and Environment	3
ANTH 520 ^P	Women, Health, and Culture	3
ANTH 535 ^P	Globalization and Culture Change	3
ANTH 540 ^P	Medical Anthropology	3
ANTH 571 ^P	Anthropology and Global Health	3
AREC 415 ^P	International Agricultural Trade	3
AREC 460 ^P	Economics of World Agriculture	3
AREC 660 ^P	Economics of Agricultural Development	3
AREC 792B	Seminar-International	Var
BUS 662 ^P	International Business	2
CIVE 516	Water Control and Measurement	3
CIVE 524 ^P	Modeling Watershed Hydrology	3
WR 524 ^P		
CIVE 525 ^P	Water Engineering: International Development	3
CIVE 544 ^P	Water Resources Planning and Management	3
CIVE 578 ^P	Infrastructure and Utility Management	3
CIVE 639 ^P	Technology Assessment and Social Forecasting	3
SOC 639 ^P		

Course	Title	Cr
DM 518	Consumer Issues-Global Perspectives	3
E 526	Teaching English as Foreign/Second Language	3
E 527 ^P	Theories of Foreign/Second Language Learning	3
ECON 440 ^P	International Economics I	3
ECON 442 ^P	International Economics II	3
ECON 460 ^P	Economic Development	3
ECON 640 ^P	International Trade Theory	3
ECON 742 ^P	International Production and Monetary Theory	3
ECON 760 ^P	Theories of Economic Development	3
EDOD 767 ^P	Cross-Culture and International Training	3
FIN 675	International Finance	3
FSHN 661 ^P	International Nutrition	2
FW 573 ^P	Travel Abroad-Wildlife Ecology/Conservation	3
IE 471	Children and Youth in Global Context	3
JTC 412	International Mass Communication	3
L***	Upper division foreign language	3
LFRE 433A-B ^P	Advanced French/Francophone Culture ²	3
MGT 475 ^P	International Business Management	3
MKT 365 ^P	International Marketing	3
NRRT 550 ^P	Ecotourism	3
POLS 433 ^P	International Organization	3
POLS 444 ^P	Comparative African Politics	3
POLS 445 ^P	Comparative Asian Politics	3
POLS 446 ^P	Politics of South America	3
POLS 447 ^P	Politics in Mexico, Central America, Caribbean	3
POLS 531 ^P	Policy Making, Diplomacy, and World Politics	3
POLS 540 ^P	Comparative Politics	3
POLS 670 ^P	Politics of Environment and Sustainability	3
POLS 739 ^P	International Environmental Politics	3
POLS 749 ^P	Comparative Environmental Politics	3
RS 531 ^P	World Grassland Ecogeography	3
SOC 631 ^P	Sociology of Rural Development	3
SOC 660 ^P	Theories of Development and Social Change	3
SOC 661 ^P	Gender and Global Society	3
SOC 663 ^P	Sociology of Sustainable Development	3
SOC 666 ^P	Globalization and Socioeconomic Restructuring	3
SOC 667 ^P	Theories of State, Economy, and Society	3
SOC 669 ^P	Global Inequality and Change	3
SOCR 475	Global Challenges in Plant and Soil Science	3
SPCM 534 ^P	Communication and Cultural Diversity	3
WR 510 ^P	Watershed Management in Developing Countries	2
WR 524 ^P	Modeling Watershed Hydrology	3
CIVE 524 ^P		
	Internship	1-3
	Independent Study	1-3
	TOTAL	6

Additional Requirements

International Development Events³ 0

PROGRAM TOTAL = minimum of 12 credits*⁴

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

¹ Course is offered as an online course only.

² Accepted only when designated "Des Questions de development a travers le cinema africain."

³ Students are required to participate in two on-campus events focused on international development, as approved by advisor.

⁴ A minimum of 9 credits must be at 500 level or above.

Italian Studies Interdisciplinary Minor

Office in C104 Andrew G. Clark Building
languages.colostate.edu/languages/italian

Coordinated by the Department of Foreign Languages and Literatures

The Italian Studies Interdisciplinary Minor is designed to give students a comprehensive knowledge of different aspects of Italian language, culture, history and artistic expressions, according to the students' interests. Credits from study abroad programs will be properly evaluated as part of the overall program.

Program details are available from the Department of Foreign Languages and Literatures.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
The University Interdisciplinary Program in Italian Studies includes courses in English, History and Language. A minimum of 25 credits is required for the program. Students must take courses in at least three disciplines and at least twelve credits at the upper division level. Upon completion, the Interdisciplinary Program in Italian Studies will be recorded on students' academic record.		
Core Language Courses (select at least 16 credits)		
LITA 105 ^P	First-Year Italian I	5
LITA 107 ^P	First-Year Italian II	5
LITA 200 ^P	Second-Year Italian I	3
LITA 201 ^P	Second-Year Italian II	3
LITA 328A ^P	Italian Oral and Written Communication—Abroad	3
LITA 328B ^P	Approaches to Italian Literature—Abroad	3
LITA 328C ^P	Issues in Italian Culture—Abroad	3
Group A <i>Select a minimum of one course from the following:</i>		
ART 110	Art History I	3
ART 417 ^P	Roman Art	3
ART 420 ^P	Travel Abroad—Art History in Italy	3
LB 170	World Literatures to 1500	3
LITA 365	Studies in Foreign Film—Italian	3
MU 100	Music Appreciation	3
MU 131	Introduction to Music History and Literature	3
MU 334 ^P	Music History I	3
MU 335 ^P	Music History II	3
Group B <i>Select a minimum one course from the following:</i>		
E 452 ^P	Masterpieces of European Literature	3
HIST 101	Western Civilization, Modern	3
HIST 302 ^P	Roman Empire	3
HIST 310 ^P	Medieval Europe	3
HIST 317 ^P	Renaissance and Reformation Europe	3
HIST 326 ^P	European Biography	3
HIST 328 ^P	Modern Europe 1815-1914	3
HIST 329 ^P	Europe in Crisis: 1914-41	3
HIST 333 ^P	Contemporary Europe	3
HIST 334 ^P	European Culture in the 20 th Century	3
HIST 337 ^P	Modern Italy: Politics, Society, and Culture	3
Group C <i>Select a minimum of one more course from Group A or Group B</i>		
PROGRAM TOTAL = 25 credits*		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

Latin American and Caribbean Studies Interdisciplinary Minor

Office in Laurel Hall

international_initiatives.colostate.edu/index.asp?url=acad_pro_ie

Coordinated by a Faculty Advisory Board and International Education, Office of International Programs

The Latin American and Caribbean Studies Interdisciplinary Minor, seeks to broaden understanding of the languages, cultures, institutions, political and economic systems, and the processes of change in Latin

America. The program offers courses in a wide variety of disciplines, enabling students to gain a broader and deeper appreciation of the diverse regions of Latin American and the Caribbean. This background prepares students for more specialized graduate study focusing on the region and for careers in a variety of areas.

Program details are available from the Office of International Programs.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
Language Courses¹		
L***	French, Spanish, or Portuguese language	6-10
Area Courses^{2,3}		
<i>Select 15-20 credits from the following:⁴</i>		
ANTH 319 ^P	Latin American Peasantries	3
ETST 319 ^P		
ANTH 446 ^P	New Orleans and the Caribbean	3
ANTH 451 ^P	Andean Archaeology and Ethnohistory	3
ART 312 ^P	History of Pre-Columbian Art	3
ETST 319 ^P	Latin American Peasantries	3
ANTH 319 ^P		
ETST 370	Caribbean Identities	3
ETST 371	The U.S. and the Caribbean	3
HIST 353 ^P	U.S.-Mexico Borderlands	3
HIST 410 ^P	Colonial Latin America	3
HIST 411 ^P	Latin America Since Independence	3
HIST 412 ^P	Mexico	3
HIST 413 ^P	Caribbean Civilization	3
HIST 414 ^P	Revolutions in Latin America	3
HIST 460 ^P	Slavery in the Americas	3
JTC 412	International Mass Communication	3
LGEN 465A	Studies in Foreign Film—The Americas	3
LSPA 335 ^P	Issues in Hispanic Culture	3
LSPA 435 ^P	Caribbean Culture in Hispanic Literature	3
LSPA 436 ^P	Advanced Latin American Culture	3
LSPA 445 ^P	Women Writers in the Hispanic Worlds	3
LSPA 449 ^P	Spanish-American Literary Movements and Periods	3
LSPA 452 ^P	Genre Studies in Spanish	3
LSPA 453 ^P	Author Studies in Spanish ⁵	3
LSPA 465B ^P	Studies in Foreign Film—Latin America	3
LSPA 492 ^P	Seminar-Spanish Language, Literature, and Society	3
POLS 331	Politics and Society Along Mexican Border	3
POLS 446 ^P	Politics of South America	3
POLS 447 ^P	Politics in Mexico, Central America, Caribbean	3
SOC 366 ^P	Peoples and Institutions of Latin America	3
SA 482	Study Abroad (Mexico/Latin America)	
PROGRAM TOTAL = minimum 21 credits*		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

¹ At least two courses (6-10 credits) are required in Spanish, French or Portuguese. Because language proficiency is required for effective research or work in this region, students are STRONGLY URGED to complete language coursework through the 300-level or above. Language courses may be taken at Colorado State University or transferred in from an accredited institution. Independent study courses may not count toward the language requirement.

² Senior capstone courses having a focus on Latin America or the Caribbean may also be used to fulfill program requirements with approval of advisor.

³ For high-achieving students, ANTH 510 and LSPA 549 may be used as area courses with approval of advisor.

⁴ The Latin American and Caribbean Studies Interdisciplinary Minor requires a minimum of 21 credits, at least 12 of which must be upper division.

⁵ This course may be used toward the program only when a Latin American or Caribbean author is the focus.

Linguistics and Culture Interdisciplinary Minor

Office in Eddy Hall, Room 359

The Linguistics and Culture Interdisciplinary Minor is designed for students with a particular interest in language and its cultural interfaces. Its core is a pair of linguistics and anthropological linguistics courses, which are supported by courses in specific languages, and supplemented by elective courses in English, Foreign Languages and Literatures, Philosophy, and Communication Studies. Courses address current and historical descriptive, theoretical, and pedagogical issues in linguistics, cultural anthropology, philosophy of language, non-verbal communication, and the relation between communication, language and thought, providing students with a well-rounded program of study. The program is open to all students and designed to be an addition to the student's major. Colorado State University has linguistic and cultural expertise and this program provides undergraduate students with an opportunity to broaden their education as they prepare themselves for graduate study or careers requiring an analytic understanding of the nature of language and its relations with thought and culture.

Program details are available from the Departments of English and Anthropology, College of Liberal Arts.

Course	Title	Credits
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CORE COURSES

ANTH 335	Language and Culture	3
E 320	Introduction to the Study of Language	3

Select two courses from one of the following groups:

LARA 105 ^P	First-Year Arabic I	5
LARA 107 ^P	First-Year Arabic II	5
LARA 200 ^P	Second-Year Arabic I	4
LARA 201 ^P	Second-Year Arabic II	4
LCHI 105 ^P	First-Year Chinese I	5
LCHI 107 ^P	First-Year Chinese II	5
LCHI 200 ^P	Second-Year Chinese I	5
LCHI 201 ^P	Second-Year Chinese II	5
LFRE 105 ^P	First-Year French I	5
LFRE 106 ^P	First-Year French Review	3
LFRE 107 ^P	First-Year French II	5
LFRE 108 ^P	Intensive French I	5
LFRE 200 ^P	Second-Year French I	3
LFRE 201 ^P	Second-Year French II	3
LFRE 208 ^P	Intensive French II	5
LGER 105 ^P	First-Year German I	5
LGER 107 ^P	First-Year German II	5
LGER 108 ^P	Intensive German I	5
LGER 200 ^P	Second-Year German I	3
LGER 201 ^P	Second-Year German II	3
LGER 208 ^P	Intensive German II	5
LGRK 105 ^P	Classical Greek I	3
LGRK 107 ^P	Classical Greek II	3
LITA 105 ^P	First-Year Italian I	5
LITA 107 ^P	First-Year Italian II	5
LITA 200 ^P	Second-Year Italian I	3
LITA 201 ^P	Second-Year Italian II	3
LJPN 105 ^P	First-Year Japanese I	5
LJPN 107 ^P	First-Year Japanese II	5
LJPN 200 ^P	Second-Year Japanese I	5

Course	Title	Credits
LJPN 201 ^P	Second-Year Japanese II	5
LKOR 105 ^P	First-Year Korean I	5
LKOR 107 ^P	First-Year Korean II	5
LLAT 105 ^P	First-Year Latin I	5
LLAT 107 ^P	First-Year Latin II	5
LRUS 105 ^P	First-Year Russian I	5
LRUS 107 ^P	First-Year Russian II	5
LRUS 200 ^P	Second-Year Russian I	3
LRUS 201 ^P	Second-Year Russian II	3
LSGN 105 ^P	American Sign Language I	5
LSGN 107 ^P	American Sign Language II	5
LSPA 105 ^P	First-Year Spanish I	5
LSPA 106 ^P	First-Year Spanish Review	3
LSPA 107 ^P	First-Year Spanish II	5
LSPA 108 ^P	Intensive Spanish I	5
LSPA 200 ^P	Second-Year Spanish I	3
LSPA 201 ^P	Second-Year Spanish II	3
LSPA 208 ^P	Intensive Spanish II	5
TOTAL		12-16

SUPPORTING COURSES

Select 3 courses from the following:

ANTH 100	Introductory Cultural Anthropology	3
E 324 ^P	Teaching English as a Second Language	3
E 326	Development of the English Language	3
E 327	Syntax and Semantics	3
E 328	Phonology, Morphology, and Lexis	3
E 329	Pragmatics and Discourse Analysis	3
LFRE 312 ^P	Introduction to French Linguistics	3
LFRE 326 ^P	French Phonetics	3
LGER 326 ^P	German Phonetics	3
LSPA 312 ^P	Introduction to Spanish Linguistics	3
LSPA 326 ^P	Spanish Phonetics	3
PHIL 210 ^P	Introduction to Formal Logic	3
PHIL 315 ^P	Philosophy of Language	3
SPCM 331	Non-verbal Communication	3
SPCM 431	Communication, Language, and Thought	3
TOTAL		9

PROGRAM TOTAL = 21-25 credits at least 12 credits must be upper division (300-400) level*

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

* Additional course work may be required because of prerequisites.

Mathematics Graduate Interdisciplinary Studies Program

Office in Weber Building, Room 101

www.math.colostate.edu/programs/graduate/requirement.shtml#_Inter

Coordinated by the Department of Mathematics

The graduate-level interdisciplinary studies program in mathematics at Colorado State University is designed for students who seek to enrich their graduate degree by completing an additional program of study in mathematics. The program presumes a background in mathematics that includes sufficient prerequisite material to enter the courses in the program. To be admitted to the program, students must be pursuing a graduate degree in another discipline at Colorado State University.

To be considered for admission to the program, contact the graduate coordinator in the department. Each

individual program of study must be submitted to and approved by the Mathematics Graduate Committee.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
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Students must complete 12 or more credits of non-reserved number Mathematics courses with at least 9 credits at 500-level and above (excluding MATH 505). Up to 3 credits of 400-level Mathematics courses (excluding MATH 425, MATH 470) may be included. Each program of study must be arranged in consultation with the Mathematics Graduate Committee. A GPA of 3.000 or above in all mathematics courses is required to satisfy the program requirements.

Merchandising Graduate Interdisciplinary Studies Program

Office in Aylesworth Hall SE, Room 150
www.dm.caahs.colostate.edu/

Coordinated by the Department of Design and Merchandising

Merchandising is one of the inter-institutional graduate programs offered through the Great Plains Interactive Distance Education Alliance (Great Plains IDEA), a consortium of universities that have come together to offer post-baccalaureate programs through distance education to students who for various reasons are unable to complete an on-campus degree. Emphasis in the program is placed upon the movement of products through varied levels of the distribution channel, from design and development of the product, to sourcing and production of the product, through promotion and sale of the product to end use consumers.

The Merchandising Graduate Interdisciplinary Studies Program provides students with knowledge and skills necessary for managerial positions in merchandising and requires the completion of five 500-level courses (15 credits).

For more information on this program or the M.S. in merchandising (30 credits), also a distance program, contact Jennifer Ogle at (970) 491-3794 or ogle@cahs.colostate.edu.

All of the courses below are offered in a distance (on-line) format, in cooperation with the Great Plains-Interactive Distance Education Alliance (GP-IDEA).

<u>Course</u> ¹	<u>Title</u>	<u>Cr</u>
DM 510	Consumer Behavior	3
DM 520	Professional Advancement in Merchandising	3
DM 530	Product Design Development and Evaluation	3
DM 540	Promotional Strategies in Merchandising	3
DM 550	Retail Theory and Practices	3
PROGRAM TOTAL = 15 credits		

¹ All courses are offered in an online format only.

Molecular Biology Interdisciplinary Minor

Office in Molecular and Radiological Biosciences Building, Room 316
 (970) 491-5602

wsprod.colostate.edu/cwis363/csumb/undergrad/Minor_Molecular_Biology_Fa'11.pdf

Coordinated by a Faculty Advisory Board

Erwin Chargaff referred to molecular biology as “the practice of biochemistry without a license” due to the fact that most early molecular biologists were trained as chemists or physicists. This also serves to emphasize that molecular biology is an interdisciplinary field, primarily the study of macromolecular structure and of the replication and expression of the information in our hereditary material (DNA). Jacques Monod defined molecular biology as “the recognition that the essential properties of living beings could be interpreted in terms of the structures of their macromolecules.”

Molecular biology is becoming increasingly recognized as a significant area of study, particularly for students interested in the rapidly emerging field of biotechnology. The course requirements for this program complement extant life science degree programs on campus. The Molecular Biology Interdisciplinary Minor—noted on the transcript—will provide recognition that the student has completed a body of course work that provides both breadth and depth in this area. This program provides students with a strong, well-balanced background in the biological, physical, and mathematical sciences. It is ideally suited for undergraduates who wish to pursue advanced degrees in biochemistry, microbiology, molecular biology, or related life sciences; for pre-professional students in health-related fields; and for students interested in employment in the biotechnology industry. The program includes study of macromolecular structure and function; cellular biochemistry; metabolism; gene expression, DNA structure, replication, and repair; cell organization, communication, growth, aging, and death. Courses in physics, organic chemistry, statistical measurements, and research methods are required. Independent study, internships, or advanced research-oriented laboratory classes are taken during the junior and senior years to provide opportunities for experiential learning and working closely with an interdisciplinary group of faculty.

Students interested in participating in this program should contact the Department of Biochemistry and Molecular Biology (in the Molecular and Radiological Biosciences

Building, room 316, (970) 491-5602, bmbugrad@colostate.edu).

Course	Title	Cr
Mathematics Core		
MATH 155 ^P	Calculus for Biological Scientists I	4
OR		
MATH 160 ^P	Calculus for Physical Scientists I	4
STAT 301	Introduction to Statistical Methods	3
OR		
STAT 307 ^P	Introduction to Biostatistics	3
TOTAL		7

Physics Core		
<i>Select one of the following pairs of courses:</i>		
PH 121 ^P	General Physics I	5
PH 122 ^P	General Physics II	5
OR		
PH 141 ^P	Physics for Scientists and Engineers I	5
PH 142 ^P	Physics for Scientists and Engineers II	5
TOTAL		10

Chemistry Core		
CHEM 111 ^P	General Chemistry I	4
CHEM 112 ^P	General Chemistry Laboratory I	1
CHEM 113 ^P	General Chemistry II	3
CHEM 114 ^P	General Chemistry Laboratory II	1
CHEM 345 ^P	Organic Chemistry I	4
CHEM 346 ^P	Organic Chemistry II	4
TOTAL		17

Biology Core		
<i>Select one of the following sets of courses:</i>		
BZ 310 ^P	Cell Biology	4
OR		
LIFE 210 ^P	Introductory Eukaryotic Cell Biology	3
LIFE 212 ^P	Introductory Cell Biology Laboratory	2
LIFE 102 ^P	Attributes of Living Systems	4
TOTAL		8-9

Biochemistry Core		
BC 401 ^P	Comprehensive Biochemistry I	3
BC 403 ^P	Comprehensive Biochemistry II	3
BC 404 ^P	Comprehensive Biochemistry Laboratory	2
TOTAL		8

Microbiology Core		
MIP 300 ^P	General Microbiology	3
MIP 342 ^P	Immunology	4
TOTAL		7

Molecular Genetics Core		
BC 463 ^P	Molecular Genetics	3
OR		
MIP 450 ^P	Microbial Genetics	3
<i>Select one of the following sets of courses (4-6 credits):</i>		
BZ 350 ^P	Molecular and General Genetics	4
OR		
LIFE 201B ^P	Introductory Genetics- Molecular/Immunological/ Developmental	3
LIFE 203 ^P	Introductory Genetics Laboratory	2
OR		
SOCR 330 ^P	Principles of Genetics	3
SOCR 331 ^P	Genetics Laboratory	1
TOTAL		7-8

Seminar		
BC 493 ^P	Senior Seminar	1

Elective		
<i>Select one course from the following:</i>		
BC 465 ^P	Molecular Regulation of Cell Function	3
BZ 402 ^P	Molecular Cytogenetics	4
BZ 403 ^P	Comparative Endocrinology	3
BZ 433 ^P	Behavioral Genetics	3
MIP 420 ^P	Medical and Molecular Virology	4
MIP 443 ^P	Microbial Physiology	4
TOTAL		3-4

Advanced Laboratory		
<i>Select four credits from the following:</i>		
BC 475 ^P	Mentored Research	3
BC 495 ^P	Independent Study	Var.
BC 499A	Thesis-Laboratory Research Based	3
BC 499B	Thesis-Literature Based	3
BZ 495	Independent Study	Var.

Course	Title	Cr
MIP 302 ^P	General Microbiology Laboratory	2
MIP 343 ^P	Immunology Laboratory	2
MIP 425 ^P	Virology and Cell Culture Laboratory	2
MIP 495 ^P	Independent Study	Var.
TOTAL		4

PROGRAM TOTAL = 72-75 credits*

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

Molecular, Cellular and Integrative Neurosciences Graduate Interdisciplinary Program

Office in Anatomy-Zoology Building, Room W330
www.cvmb.colostate.edu/mcin

Kathryn M. Partin, Director

This interdisciplinary graduate research and education program has 26 active faculty participants from 10 departments in 5 colleges. The degree-granting departments are Biochemistry and Molecular Biology; Biology; Biomedical Sciences; Chemical and Biological Engineering; Computer Science; Environmental and Radiological Health Sciences; Microbiology, Immunology and Pathology; and Psychology. The program has been named as one of Colorado State University's Programs of Research and Scholarly Excellence. Students interested in systems neuroscience and in the cellular and molecular aspects of the nervous system, including neuronal differentiation, degeneration and regeneration, ion channels and membrane physiology, synaptic mechanisms, neuronal circuitry and chronobiology, sensory biology, systems neurobiology, artificial neural networks, and neurovirology are encouraged to apply. Strong undergraduate backgrounds in biology, chemistry, mathematics, and physics are most appropriate.

Students interested in the program should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/index.asp?url=catalog. Details are available from the program office.

Course	Title	Cr
NB 500 ^P	Readings in Cellular Neurobiology	1
NB 501 ^P	Cellular and Molecular Neurophysiology	2
NB 502 ^P	Techniques in Molecular and Cellular Biology	2
CM 502 ^P		
NB 503 ^P	Developmental Neurobiology	3
NB 505 ^P	Neuronal Circuits, Systems and Behavior	3
NB 586 ^P	Practicum-Techniques in Neuroscience II	1
NB 793	Neuroscience Seminar ¹	2
NB 795	Independent Study	Var.
NB 796A-E	Group Study ¹	2

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ Two semesters.

Organic Agriculture Interdisciplinary Minor

organic.colostate.edu

Coordinated by a Faculty Advisory Board

The Organic Agriculture Interdisciplinary Minor is designed for students with an interest in alternative agricultural production approaches, in particular, organic agriculture. The focus of this program is on the science of organic agriculture with additional courses specifically focused on organic agriculture production techniques, business management, marketing and decision making. Lecture, discussion, laboratory, and internship experiences involve experiential learning at many levels.

The program is a cooperative effort of four departments: Agricultural and Resource Economics, Bioagricultural Sciences and Pest Management, Horticulture and Landscape Architecture, and Soil and Crop Sciences. Although participating students will take courses from all four departments, they will receive their degree from their home department, and completion of requirements for the interdisciplinary minor will be noted on their transcript.

Program details are available from Adriane Elliott (Department of Soil and Crop Sciences) and Harrison Hughes (Department of Horticulture and Landscape Architecture). For more information, visit our website at organic.colostate.edu.

Course	Title	Cr
CORE COURSES		
AREC 202	Agricultural and Resource Economics	3
AREC 328 ^P	Small Agribusiness Management	3
<i>Select two of the following three groups:</i>		
BSPM 302	Applied and General Entomology	2
BSPM 303A-C ^P	Entomology Laboratory	1
OR		
BSPM 308 ^P	Ecology and Management of Weeds	3
OR		
BSPM 361 ^P	Elements of Plant Pathology	3
FSHN 150	Survey of Human Nutrition	3
HORT 100	Horticultural Science	4
OR		
SOCR 100	General Crops	4
<i>Select two courses from the following:</i>		
HORT 450A ^P	Horticulture Food Crops-Cool Season Vegetable Production	1
HORT 450B ^P	Horticulture Food Crops-Warm Season Vegetable Production	1
HORT 450C ^P	Horticulture Food Crops-Small Fruit Production	1
HORT 450D ^P	Horticulture Food Crops-Tree Fruit Production	1
HORT 452 ^P	Viticulture I-Grape Production	1
<i>Select one course from the following:</i>		

Course	Title	Cr
LAND 220 ^P	Fundamentals of Ecology	3
LIFE 220 ^P		
LIFE 320 ^P	Ecology	3
NR 120A	Environmental Conservation	3
SOCR 240 ^P	Introductory Soil Science	4
SOCR 350 ^P	Soil Fertility Management	3
SPECIFIC COURSES		
HORT 171/	Environmental Issues in Agriculture	3
SOCR 171		
<i>Select four courses from the following:</i>		
HORT 344 ^P	Organic Greenhouse Production	1
SOCR 341 ^P	Microbiology for Sustainable Agriculture	1
SOCR 342 ^P	Organic Soil Fertility	1
SOCR 343 ^P	Composting Principles and Practices	1
SOCR 344 ^P	Crop Development Techniques	1
SOCR 345 ^P /	Diagnosis and Treatment in Organic Fields ¹	2
HORT 345 ^P		
SOCR 424 ^P /	Topics in Organic Agriculture	3
HORT 424 ^P		
SOCR 487	Internship	3
OR		
HORT 487B	Internship-General	3
PROGRAM TOTAL = 46 credits*		

The following courses are recommended for additional study, but are not required.

Course	Title	Cr
AGRI 116/	Plants and Civilizations	3
IE 116		
AGRI 270/	World Interdependence-Population and Food	3
IE 270		
AREC 305 ^P	Agricultural and Resource Enterprise Analysis	3
AREC 310 ^P	Agricultural Marketing	3
AREC 478 ^P	Agricultural Policy	3
BSPM 451 ^P	Integrated Pest Management	3
HORT 310	Greenhouse Management	4
HORT 401 ^P	Medicinal and Value-Added Uses of Plants	3
HORT 450A-D ^P	Horticulture Food Crops ²	3
HORT 452 ^P	Viticulture I-Grape Production ³	1
HORT 454 ^P	Horticulture Crop Production and Management	2
HORT 476 ^P	Environmental Plant Stress Physiology	3
PHIL 330/	Agricultural Ethics	3
AGRI 330		
PHIL 345 ^P	Environmental Ethics	3
RRM 400 ^P	Food and Society	3
SOC 341 ^P	Sociology of Rural Life	3
SOC 364 ^P	Agriculture and Global Society	3
SOC 461 ^P	Water, Society, and Environment	3
SOCR 351 ^P	Soil Fertility Laboratory	1
SOCR 370 ^P	Irrigation Principles and Management	2
SOCR 420 ^P	Crop and Soil Management Systems I	3
SOCR 421 ^P	Crop and Soil Management Systems II	4

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

¹ Offered only during the eight-week summer session in alternate odd-numbered years.

² The other three modules not taken above.

³ If not taken above.

Peace and Reconciliation Studies Interdisciplinary Studies Programs

international_initiatives.colostate.edu/index.asp?url=acad_pro_ie

Coordinated by a Faculty Advisory Board and International Education, Office of International Programs

Peace and Reconciliation Studies Interdisciplinary Minor (Undergraduate Program)

The Peace and Reconciliation Studies Interdisciplinary Minor is open to all students who want to understand more about the philosophical roots of peace and reconciliation and its expression within various academic disciplines, research, and service. Knowing more about the ideas that underlie nonviolent conflict resolution, effective communication, cooperation, and mediation within cross-cultural contexts will help students evaluate how peace and reconciliation can impact their beliefs, choices, and actions. A 21 credit undergraduate minor and 12 credit graduate interdisciplinary studies program are available.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
REQUIRED COURSES (9 credits)		
PHIL 240	Philosophies of Peace and Nonviolence	3
IE 479 ^P	International Development Theory and Practice	3
ANTH 479 ^P		
<i>Select one of the following courses:</i>		
EDUC 496	Group Study	3
IE 472 ^P	Education for Global Peace	3
PHIL 497	Group Study	3
TOTAL		9

SUPPORTING COURSES (12 credits) *Select 12 credits from the following with at least 3 departments represented. At least 6 of the 12 credits must be upper division:*

Lower Division Courses

ANTH 200	Cultures and the Global System	3
BUS 205	Legal and Ethical Issues in Business	3
BUS 260 ^P	Social-Ethical-Regulatory Issues in Business	3
HIST 250/	African American History	3
ETST 250		
HIST 252/	Asian American History	3
ETST 252		
HONR 192 ^P	Honors First Year Seminar ¹	4
IE 270/	World Interdependence-Population and Food	3
AGRI 270		
SPCM 232 ^P	Group Communication	3
Upper Division Courses²		
ANTH 329 ^P	Cultural Change	3
ETST 430 ^P	Latina/o Creative Expression	3
ETST 432	Latina/o Routes to Empowerment	3
ETST 444/	Federal Indian Law and Policy	3
SOC 444		
HDFS 332 ^P	Death, Dying, and Grief	3
HIST 346 ^P	Reconstruction and the New South	3
HIST 360 ^P	United States Immigration History	3
HIST 414 ^P	Revolutions in Latin America	3
HIST 421 ^P	Africa: Colonialism to Independence	3
HIST 438 ^P	The Modern Middle East	3
HIST 460 ^P	Slavery in the Americas	3
HIST 465 ^P	Pacific Wars: Korea and Vietnam	3
IE 370	Model United Nations	3
IE 470	Women and Development	3
IE 471	Children and Youth in Global Context	3
JTC 411	Media Ethics and Issues	3
JTC 412	International Mass Communication	3
NR 440	Land Use Planning	3
POLS 331	Politics and Society Along Mexican Border	3
POLS 405 ^P	Race and Ethnicity in U.S. Politics	3
POLS 413 ^P	U.S. Civil Rights and Liberties	3
POLS 437	International Security	3
POLS 448 ^P	Comparative Racial/Ethnic Politics	3
POLS 449 ^P	Middle East Politics	3
PSY 330 ^P	Clinical and Counseling Psychology	3
PSY 437	Psychology of Gender	3
SOC 320 ^P	Population-Natural Resources and Environment	3
SOC 331 ^P	Community Dynamics and Development	3
SOC 362 ^P	Social Change	3

<u>Course</u>	<u>Title</u>	<u>Cr</u>
SOWK 330 ^P	Human Diversity Practice Issues	3
SOWK 450/	International Social Welfare and Development	3
IE 450		
SPCM 434	Intercultural Communication	3
SPCM 436	Conflict Management and Communication	3
TOTAL		12

PROGRAM TOTAL = 21 credits of which at least 12 credits must be upper division (300-400) level.*

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

¹ Entitled "Peacemaking." Must be enrolled in University Honors program.

² IE 550/PHIL 550 or SOC 564 may also be selected.

Peace and Reconciliation Interdisciplinary Studies Program (Graduate Program)

The Peace and Reconciliation Studies Graduate Interdisciplinary Studies Program is open to all students who want to understand more about the philosophical roots of peace and reconciliation, its expression and potential within various academic disciplines, research, and service. Knowing more about the ideas that underlie nonviolent conflict resolution, effective communication, cooperation, and mediation within cross-cultural contexts will help students evaluate how peace and reconciliation can impact their beliefs, choices, and actions.

Students must complete 6 credits of required coursework as well as another 6 credits of elective coursework from the list below. Elective courses must be taken in at least 3 different disciplines. Students wishing to concentrate in a particular area may petition the Board of Directors for approval. Practicum, internship, and independent study credits can also be included with approval of the Board on a case-by-case basis.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
Required Courses (6 credits)		
EDUC 696	Group Study	3
OR		
PHIL 697	Group Study	3
IE 679 ^P /	Applications of International Development	3
ANTH 679 ^P		

Students select six credits from the following with at least two departments represented.

Core Courses (3-6 credits)

ANTH 535 ^P	Globalization and Culture Change	3
EDUC 551 ^P	Multicultural and Special Populations	3
EDUC 629	Communication and Classrooms	3
EDUC 635 ^P	Educators, Systems and Change ¹	3
ETST 500	Race, Ethnicity, and Nationality	3
SPCM 540 ^P	Rhetoric, Race and Identity	3
HDFS 534 ^P	Marriage and Family Therapy	3
HDFS 624 ^P	Skills and Techniques in Family Therapy	3
IE 550 ^P /	Ethics and International Development	3
PHIL 550 ^P		
JTC 513	Impacts of New Communication Technologies	1-2
PHIL 684	Supervised College Teaching ²	1-3
POLS 541 ^P	Political Economy of Change and Development	3
POLS 670 ^P	Politics of Environment and Sustainability	3
SOC 630 ^P	Social Stratification	3
SOC 660 ^P	Theories of Development and Social Change	3
SOC 661 ^P	Gender and Global Society	3
SOC 663 ^P	Sociology of Sustainable Development	3
SOC 666 ^P	Globalization and Socioeconomic Restructuring	3
SOC 669 ^P	Global Inequality and Change	3

<u>Course</u>	<u>Title</u>	<u>Cr</u>
SOWK 551	Fundamentals of Mediation	3
SOWK 556 ^P	Divorce and Child Custody Mediation	3
SPCM 534 ^P	Communication and Cultural Diversity	3
PROGRAM TOTAL = 12 credits		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu> to see the course prerequisites.

¹ Offered only through the Division of Continuing Education.

² Only for PHIL 240, Philosophies of Peace and Nonviolence.

Political Economy Graduate Interdisciplinary Studies Program

Office in Clark Building, Room C346

www.colostate.edu/Depts/PoliSci/pec/

Coordinated by a Faculty Advisory Board

Program Requirements:

- (1) A minimum of fifteen (15) credits from among the approved courses.
- (2) A minimum of nine (9) credits from the list of Core Courses. These must be from three (3) different departments.
- (3) A maximum of six (6) credits from the list of Elective Courses.
- (4) A maximum of three (3) upper-level undergraduate credits.
- (5) A GPA of at least 3.0 in the program courses.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
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Core Courses: A minimum of nine (9) credits from three (3) different departments must be used towards the program. Additional core credits can be used to satisfy program requirements.

ANTH 528 ^P	Economic Anthropology	3
ANTH 535 ^P	Globalization and Culture Change	3
ECON 505 ^P	History of Economic Thought	3
ECON 760	Theories of Economic Development	3
POLS 532 ^P	Governance of the World Political Economy	3
POLS 541 ^P	Political Economy of Change and Development	3
SOC 666 ^P	Globalization and Socioeconomic Restructuring	3
SOC 667 ^P	Theories of State, Economy, and Society	3

Elective Courses: A maximum of six (6) credits can be used to satisfy the requirements of the program. A maximum of three (3) undergraduate credits can be used to satisfy the program requirements.

ANTH 318 ^{P/1}	Peoples and Cultures of the Southwest	3
ETST 318 ^P		
ANTH 319 ^{P/1}	Latin American Peasantries	3
ETST 319 ^P		
ANTH 413 ^P	Indigenous Peoples Today	3
ANTH 414/	Development in Indian Country	3
ETST 414		
ANTH 529 ^P	Anthropology and Development	3
ANTH 530 ^P	Humans-Environment Interactions	3
ECON 332 ^{P/1}	International Political Economy	3
POLS 332 ^P		
ECON 370 ^P	Comparative Economic Systems	3
ECON 376 ^P	Marxist Economic Thought	3
ECON 379 ^{P/1}	Economic History of the United States	3
HIST 379 ^P		
ECON 474 ^P	Recent Economic Thought	3
ECON 570 ^P	Evolution of Economic Thought	3
ECON 705 ^P	Heterodox Approaches to Economics	3
ECON 742 ^P	International Production and Monetary Theory	3

<u>Course</u>	<u>Title</u>	<u>Cr</u>
ECON 770 ^P	Economic Thought and Systems	3
ECON 772 ^P	Marxian Political Economy	3
ETST 319 ^{P/1}	Latin American Peasantries	3
ANTH 319 ^P		
HIST 321 ^P	Industrial Society in Europe, 1600-1871	3
HIST 322 ^P	Industrial Society in Europe, 1871-1989	3
HIST 333 ^P	Contemporary Europe	3
HIST 346 ^P	Reconstruction and the New South	3
HIST 348 ^P	United States, 1917-1945	3
HIST 350 ^P	United States Foreign Relations Since 1914	3
HIST 414 ^P	Revolutions in Latin America	3
HIST 422 ^P	Modern Africa	3
JTC 412	International Mass Communication	3
POLS 431 ^P	International Law	3
POLS 433 ^P	International Organization	3
POLS 670 ^P	Politics of Environment and Sustainability	3
POLS 739 ^P	International Environmental Politics	3
SOC 366 ^P	Peoples and Institutions of Latin America	3
SOC 502 ^P	Foundations of Theoretical Sociology	3
SOC 660 ^P	Theories of Development and Social Change	3
SOC 669 ^P	Global Inequality and Change	3

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu> to see the course prerequisites.

Religious Studies Interdisciplinary Minor

Office in Clark Building, Room C138

secure.casa.colostate.edu/applications/achoriz/majorDescription.cfm?major=IP24

Coordinated by a Faculty Advisory Board and the Associate Dean, College of Liberal Arts

The Religious Studies Interdisciplinary Minor permits students to use electives to complete 21 credits from a list of approved courses.

The program encompasses the major religious traditions of humankind. It enables students to integrate a field of special interest from offerings in religious studies and related areas. Consequently, students may become acquainted with religion as viewed by different disciplines, e.g., philosophy, history, psychology, sociology, and anthropology. In addition, the program encourages students to view religious phenomena in their cultural context through the media of music and the arts.

Program details are available from the Office of the Dean, College of Liberal Arts.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
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1. Students must select a minimum of twenty-one credits, ordinarily seven courses, in at least three disciplines, of which at least 12 credits must be upper division.
2. A minimum grade point average of 2.000 is required in courses selected for the program.
3. Two required courses designed to survey the religions of the world, and to introduce students to methods of studying and understanding religion:

PHIL 171	Religions of the West	3
PHIL 172	Religions of the East	3

<u>Course</u>	<u>Title</u>	<u>Cr</u>
4. In consultation with a Religious Studies advisor, select fifteen credits, of which at least 12 must be upper division (300- to 400-level), with at least three different subject codes from the following list: ¹		
ANTH 312 ^P	Modern Indian Culture and Society	3
ANTH 322 ^P	Religion, Culture, and Mind	3
ANTH 324	Folk Religion	3
ANTH 340 ^P	Medical Anthropology	3
ART 411	History of Medieval Art	3
ART 496H	Group Study-Art History ²	3
E 337	Western Mythology	3
E 460 ^P	Chaucer	3
E 463 ^P	Milton	3
ETST 344	Native American Religious History and Issues	3
HIST 115	Islamic World to 1500	3
HIST 120	Asian Civilizations I	3
HIST 308 ^P	Ancient Christianity to 500 A.D.	3
HIST 309 ^P	Medieval Christianity, 500-1500	3
HIST 310 ^P	Medieval Europe	3
HIST 317 ^P	Renaissance and Reformation Europe	3
HIST 323 ^P	Russia Before 1700	3
HIST 430 ^P	Ancient Near East	3
HIST 431 ^P	Ancient Israel	3
HIST 432 ^P	Sacred History in the Bible and the Qur'an	3
HIST 433 ^P	Muhammad and the Origins of Islam	3
HIST 438 ^P	The Modern Middle East	3
HIST 450 ^P	Ancient China	3
HIST 451 ^P	Medieval China and Central Asia	3
HIST 452 ^P	China in the Modern World, 1600-Present	3
HIST 455 ^P	Tokugawa and Modern Japan, 1600-Present	3
HIST 469 ^P	The Crusades	3
LB 170	World Literatures to 1500	3
PHIL 106	Wisdom of the East-Oriental Philosophy	3
PHIL 170	World Philosophies	3
PHIL 270 ^P	Issues in the Study of Religion	3
PHIL 335	Islam: Cosmology and Practice	3
PHIL 349 ^P	Philosophies of East Asia	3
PHIL 355 ^P	Philosophy of Religion	3
PHIL 360 ^P	Topics in Asian Philosophy	3
PHIL 370 ^P	Contemporary Western Religious Thought	3
PHIL 371	Contemporary Eastern Religious Thought	3
PHIL 372 ^P	Meaning and Truth in Religion	3
PHIL 375 ^P	Science and Religion	3
PHIL 379 ^P	Mysticism East and West	3
PHIL 455 ^P	Islamic Philosophy	3
PHIL 463	Seminar in Religious Studies	3
PHIL 497	Group Study ³	1-9
PSY 305 ^P	Psychology of Religion	3
SOC 375 ^P	Sociology of Religion and Medicine	3
PROGRAM TOTAL = 21 credits*		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional courses may be required due to prerequisites.

¹ ANTH 539 may be selected for section 4.

² Accepted only when designated "Image of the Goddess in Art."

³ Accepted only when designated selected religious themes.

Systems Engineering Graduate Interdisciplinary Studies Program

Office in Engineering Building, Room B104

Coordinated by a Faculty Advisory Board and the College of Engineering.

The Systems Engineering Interdisciplinary Studies Program is designed to address the current trend toward

increasingly complex systems that exists across a variety of disciplines, including aerospace, energy, environment, and biosciences. The objective of the program is to expose engineers and industry professionals to a disciplined development process in order to manage complex engineered systems and produce quality and reasonably priced products.

The program is open to graduate students and professionals who hold a B.S. degree. Coursework in calculus and statistics (or the ability to apply statistical methods) is also required.

The program is offered through the Department of Electrical and Computer Engineering.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
Core Courses		
CIS 600 ^P	Information Technology and Project Management	3
ENGR 501/	Foundations of Systems Engineering	3
ECE 501		
ENGR 530 ^P /	Overview of Systems Engineering Process	3
ECE 530 ^P		
ENGR 531 ^P /	Engineering Risk Analysis	3
ECE 531 ^P		
TOTAL		12
PROGRAM TOTAL = 12 credits		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

Note: To be admitted to the program, students must be pursuing a graduate degree in a discipline other than the Systems Engineering Specialization in the Master of Engineering at Colorado State University.

Water Resources Interdisciplinary Minor

Office in Engineering Building, Room E102
watercenter.colostate.edu/waterminor.PDF

Coordinated by the Colorado Water Resources Research Institute

Issues surrounding water supply, water quality, and ecological water relationships have become increasingly important in Colorado as population growth continues and water uses multiply. The complexity of these issues, and competition among various water users, demands that students interested in pursuing careers in water gain a broad introduction to the issues while specializing within a particular discipline. Colorado State University has developed considerable water resource expertise in many academic fields over the past century. The Water Resources Interdisciplinary Minor, which requires 21 credits, allows undergraduates to take advantage of this expertise and broaden their backgrounds regarding water

resources in order to prepare for employment or graduate-level work.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
CORE COURSES		
AREC 342 ^P	Economic Analysis-Water Resource Development	3
AREC 442 ^P	Water Resources Economics	3
GR 342	Geography of Water Resources	3
LAND 220 ^{P/}	Fundamentals of Ecology ¹	3
LIFE 220 ^P		
SOC 461 ^P	Water, Society, and Environment	3
WR 304	Principles of Watershed Management ²	3
	Elective	3
	TOTAL	21
ELECTIVE COURSES		
AREC 340 ^{P/}	Introduction to Economics of Natural Resources	3
ECON 340 ^P		
AREC 346 ^{P/}	Economics of Outdoor Recreation	3
ECON 346 ^P		
AREC 375 ^P	Agricultural Law	3
ATS 350	Introduction to Weather and Climate	2
BZ 315 ^P	Marine Ecology	3
BZ 321 ^P	Aquatic Vascular Plants	3
CIVE 322 ^{P/}	Basic Hydrology	3
ENVE 322 ^P		
CIVE 413 ^P	Environmental River Mechanics	3
CIVE 423 ^P	Groundwater Engineering	3
CIVE 440 ^P	Nonpoint Source Pollution	3
GR 210	Physical Geography	3
POLS 361 ^P	U.S. Environmental Politics and Policy	3
PSY 316 ^P	Environmental Psychology	3
SOC 320 ^P	Population-Natural Resources and Environment	3
SOCR 370 ^P	Irrigation Principles	2
SOCR 371 ^P	Irrigation of Field Crops	1
WR 416 ^P	Land Use Hydrology	3
WR 417 ^P	Watershed Measurements	3
WR 418 ^P	Land Use and Water Quality	3

PROGRAM TOTAL = a minimum of 21 credits*

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

¹ BZ 440 or ERHS 446 or MIP 300 may be substituted for LAND 220/LIFE 220.

² CIVE 322/ENVE 322 or WR 416 may be substituted for WR 304.

Women's Interdisciplinary Studies Programs

Office in Aylesworth Hall, 357 S.E.
(970) 491-2882

womensstudies.colostate.edu/

Coordinated by the Chair of the Center for Women's Studies and Gender Research Board

The Women's Interdisciplinary Studies Program prepares individuals for the needs and opportunities of an increasingly interconnected and interdependent world. The program builds awareness of the range of human experience, potential, and accomplishment. Women's Studies uniquely fills Colorado State University's central mission and contributes to intersectional, interpersonal, intercultural, and international understandings.

Contemporary career opportunities can be directly enhanced by students who have a women's studies background. In several areas such as journalism, communication, business, law, education, and human services, it is now common to choose a career that has a direct focus on women and gender.

In areas that have not traditionally focused on women and gender, an awareness of the history and culture of feminisms, women and the intersections of gender, race, class, and sexism can enhance a person's ability to cope with any potential obstacles. In addition, students in women's studies have the unique opportunity to apply insights from course work to their own lives, helping them to make more informed choices about careers, education, relationships, and community participation.

The program's objectives are: to enable students to explore academic disciplines from feminist and intersectional perspectives; to help develop an appreciation of the historic and contemporary contributions of women of all cultures; to explore the ideological assumptions regarding women and gender implicit in social institutions; to create opportunities for all students to acquire the knowledge and skills necessary for physical, social, and emotional well-being.

Students can take women's studies courses to satisfy University and disciplinary requirements as electives, and/or part of a women's studies program. Students interested in pursuing the undergraduate or graduate Women's Interdisciplinary Studies Program should contact the Office of Women's Programs and Studies. Completion of requirements will be noted on the student's permanent record.

Women's Studies Interdisciplinary Minor (Undergraduate Program)

Students enrolled in the undergraduate Women's Interdisciplinary Minor are required to earn a grade of C (2.000) or better in each course completed for undergraduate minor credit.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
Core Courses		
ETST 405	Ethnicity, Class, and Gender in the U.S.	3
WS 200	Introduction to Women's Studies	3
WS 472 ^P	Seminar in Women's Studies	3
	TOTAL	9
Intersectionality of Race, Sexuality and Gender¹		
<i>Select one of the following courses:</i>		
ANTH 338 ^P	Gender and Anthropology	3
ETST 254	La Chicana in Society	3
ETST 352/	Indigenous Women, Children and Tribes	3
SOWK 352		
	TOTAL	3
Elective Courses¹		
<i>Select 9 credits from the following courses:</i>		
ANTH 338 ^P	Gender and Anthropology	3
ANTH 520 ^P	Women, Health and Culture	3
AM 550 ^P	Appearance, Self, and Society	3
E 330	Gender in World Literature	3
E 332	Modern Women Writers	3
ECON 211	Gender in the Economy	3

<u>Course</u>	<u>Title</u>	<u>Cr</u>
ETST 254	La Chicana in Society	3
ETST 352/	Indigenous Women, Children and Tribes	3
SOWK 352		
HIST 320 ^P	Women and Gender in Europe 1450- 1789	3
HIST 358 ^P	American Women's History to 1800	3
HIST 359 ^P	American Women's History Since 1800	3
IE 470	Women and Development	3
PHIL 251	Feminist Philosophies	3
PSY 327 ^P	Psychological Perspective on Female Experience	3
PSY 437	Psychology of Gender	3
SPCM 335	Gender and Communication	3
WS 397	Group Study	3
WS 495	Independent Study	1-3
TOTAL		9

PROGRAM TOTAL = 21 credits (minimum of 12 upper division)*

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

¹ Courses may not be used to satisfy both the "Intersectionality of Race, Sexuality, and Gender" and the "Elective Courses" categories.

Women's Interdisciplinary Studies Program (Graduate Program)

The graduate-level program in women's studies at Colorado State is for students who for professional and/or personal reasons wish to supplement their graduate programs of study. The program presumes a background in women's studies courses or their equivalent. Entering students should be able to demonstrate competency in the methodology and subject matter of an introduction to women's studies course and one upper-division women's studies course.

Students will complete 12 credits in women's studies courses including an independent study or thesis, and will participate in non-credit colloquia.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
WS 692 ^P	Seminar in Women's Studies ¹	3
WS 695 ^P	Independent Study	3-6
OR		
WS 699 ^P	Thesis ²	3-6
	Colloquium ³	0
TOTAL		6-9

- Students may select one or more graduate-level courses approved by the Women's Studies Advisory Board. A current list of suggested courses is available to students in the Department of Ethnic Studies.
- Students may select no more than one course from the upper-division Women's Studies undergraduate offerings as a supporting course.

TOTAL 3-6

PROGRAM TOTAL = 12 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ Required.

² Ordinarily interdisciplinary work in women's studies and the candidate's major discipline. The thesis is subject to Women's Studies Board oversight and is separate from departmental thesis/dissertation.

³ Colloquium meets twice a semester with faculty and students presenting on-going research and scholarship in women's studies.

INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

Cell and Molecular Biology

*Office in the Student Services Building, Room 108E
(970) 491-0241*

cmb@colostate.edu
www.cmb.colostate.edu

*Paul Laybourn, Director
Lori William, Coordinator*

The graduate program in cell and molecular biology is an interdisciplinary degree-granting program that involves over 80 faculty members from 13 departments and 5 colleges who share common interests in cell and molecular biology. The program offers training leading to the M.S. and Ph.D. degrees in cell and molecular biology. The program includes a core of lecture courses in advanced molecular genetics and cell biology, in laboratory research techniques, and ethical conduct of science, as well as elective courses in specialized areas and in grant writing; a graduate seminar series in which students present their research; and a weekly seminar series for presentations by approximately 6 CSU faculty and 14 nationally prominent scientists each year. Core courses typically are completed during the first year. On average, the M.S. degree is completed within two years and the Ph.D. degree within five years.

Current focus areas of research include, but are not limited to: cancer biology, infectious diseases, metabolism, neuroscience, plant biology, regulation of gene expression, reproductive biology, and structural biology. Facilities include an electron microscope center (TEM, STEM, SEM, Freeze-Fracture, X-ray Microanalysis) and other research electron microscopes, a flow cytometry and cell sorting laboratory, an image analysis laboratory, including a confocal laser scanning microscope, FISH (fluorescence in situ hybridization) equipment, an NMR spectroscopy center, and Keck Foundation X-ray diffraction and protein purification facilities. The university Proteomics and Metabolomics core facility houses three mass spectrometers and an array reader for proteomic, genomic, metabolomic, and bioinformatic analyses.

Students interested in this graduate program should refer to the *Graduate and Professional Bulletin*, graduate.school.colostate.edu/index.asp?url=catalog, or www.cmb.colostate.edu for further details.

Ecology

Offices in Natural Resources Building, Rooms 237, 238
www.ecology.colostate.edu/

N. LeRoy Poff, Director

The graduate degree program in ecology offers outstanding opportunities for graduate studies in basic and applied aspects of ecology. Any ecology student enrolled in a master's or doctoral degree program within a department may participate in this University-wide, interdisciplinary ecology program, which offers M.S. and Ph.D. degrees in ecology. The program is a cooperative effort among over 155 faculty members from 17 departments and 6 colleges of the University who share a common interest in ecology.

The primary goal of the program is to provide basic training in current ecological methods, theories, concepts, controversies, and applications by drawing together individuals and synthesizing knowledge from a wider variety of traditional disciplinary areas of science.

Through the cooperation of the many academic departments and government agencies, the program offers a wide array of facilities, field research sites, equipment, and support services. Because of its location, one of the University's greatest resources is its accessibility to a wide variety of field study sites. Nearby major habitats include: shortgrass steppe and mixed grass prairies; sagebrush steppe; montane and subalpine meadows, forests; southwestern deserts; alpine peaks; river and lake systems; and numerous agroecosystems.

A description of the program may be found in the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and details are available from the program office.

Public Health

Office in Sage Hall, Rooms 100B, 100F
(970) 491-6156
www.publichealth.colostate.edu

Lorann Stallones, Director
Kendra Bigsby, Program Coordinator

The Masters of Public Health (MPH) is the primary professional degree in the field of public health. The MPH degree is intended for students who plan careers as practitioners and leaders in one or more of the core areas in public health. Core academic public health areas include biostatistics, epidemiology, environmental health sciences, health services administration, and social and behavioral sciences.

The program is operated as one component of the Colorado School of Public Health which is a cooperative program between the University of Colorado Denver Anschutz Medical Campus, the University of Northern Colorado, and Colorado State University. The Colorado School of Public Health received accreditation from the Council on Education in Public Health in 2010. Faculty from the Colleges of Veterinary Medicine and Biomedical Sciences, Applied Human Sciences, Natural Sciences, and Liberal Arts are involved in the program. An Executive Committee with membership from faculty representing the focus areas provides program direction and cohesion across the departments and colleges.

Areas of study include: animals, people and the environment; environmental and occupational health; epidemiology; global health and health disparities; health communication; health and exercise, and public health nutrition. The program also includes a dual degree program in veterinary medicine (DVM)/MPH.

A description of the program may be found in the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and details are available from the program office.

DIVISION OF ARMED FORCES SERVICES

Reserve Officers' Training Corps (ROTC)

History

An Act of Congress dated July 2, 1862, provided for military science and tactics instruction in federal land-grant colleges. Such instruction has been given at Colorado State University since its establishment.

In 1919, the Department of Military Science and Tactics of the institution was included in the Reserve Officers' Training Corps under the provisions of the First National Defense Act, July 3, 1916. The ROTC Vitalization Act of 1964 provides for a two-year ROTC program in addition to the traditional four-year program and authorizes ROTC scholarships.

General Information

The Army and Air Force four-year programs complement the four college years and include one summer encampment. Students satisfactorily completing Army or Air Force departmental requirements will be

commissioned as second lieutenants in the Army or Air Force.

Additionally, each service offers a two-year program whereby a student may earn a commission after completing two years of ROTC training during the junior and senior undergraduate years or during a two-year graduate degree program. This program is designed for transfer students or students unable to take ROTC training during their freshman and sophomore years.

Each student entering the junior year (freshman or sophomore year if a scholarship recipient) of ROTC enlists in the Army or Air Force Reserve and signs a contract. This contract includes a military service commitment and obligates the student to complete the junior and senior year ROTC courses, and to accept a commission as a second lieutenant. All contracted cadets receive a tax free stipend of \$300-\$500 per month, incremented by academic year.

Some graduates defer active duty until the attainment of graduate degrees. Opportunities also exist for graduate study while on active duty. Active duty officers may be selected for enrollment at civilian universities in graduate degree programs. When selected, such study is accomplished with full pay and allowances for an officer.

Purpose

The purpose of the Army and Air Force ROTC courses is to develop leadership capabilities, to provide expertise in organizational skills, and to qualify students for duty as officers with the Armed Forces of the United States. The courses are designed to develop self-confidence, initiative, leadership skills, honor, and a sense of duty as a citizen.

College Scholarship Program

Scholarships are available to qualifying students entering or enrolled in the University Air Force or Army ROTC programs. Scholarship consideration is predicated on student ability, performance, and potential. In order to accept the scholarship, if offered, the student must enroll in ROTC, be medically qualified for military service, pass a physical fitness test, and take an oath to defend the constitution of the United States. These ROTC scholarships may provide payment of full tuition (resident and non-resident), laboratory expenses, mandatory fees, a textbook allowance of \$900 (Air Force) and \$1,200 (Army) per year, and a tax free stipend of \$300-\$500 per month, depending on academic year.

Details of the scholarship program may be obtained at <http://www.afrotc.com> and <http://www.goarmy.com> and from the ROTC department concerned. Refer to the

following sections for names of persons who can supply additional information.

Department of Aerospace Studies

*Office in Military Science Building, 204A
(970) 491-6476
airforce.colostate.edu
www.afrotc.com*

Colonel Gregory S. Marzolf, USAF, Professor of Aerospace Studies

Air Force ROTC

The preparation of future Air Force officers is provided through the Air Force ROTC program. Enrollment is open to any student attending the University on a full-time basis. The curriculum provides the individual with a firm understanding of the concepts of aerospace power and the Air Force mission, organization, and operation.

Enrollment in AFROTC is voluntary and accomplished through the fall and spring registration periods. Scholarships are available in many academic disciplines on a competitive basis. Approximately one-third of the students hold scholarships. Depending on the semester, approximately one-quarter of the cadet corps consists of women. Almost all Air Force career fields are open to women, including pilot positions.

General Program

The four-year program consists of the General Military Course (GMC) during the freshman and sophomore years and the Professional Officer Course (POC) for the remaining two years of college. Compressed options may be available for students starting after their freshman year. Four-year cadets participate in a four-week field training period during the summer between their sophomore and junior years. Students may enroll in the Aerospace Studies courses for credit or to earn a minor; however, they are not considered members of Air Force ROTC.

Scholarships

Air Force ROTC offers college students scholarships to pay for up to \$18,000 tuition, most fees, and \$900 per year for books. In addition, all students on scholarship receive a nontaxable monthly allowance during the academic year. Currently, the monthly amount is \$300 for freshmen increasing each year up to \$500 for seniors. The program is open to college freshmen and sophomores in any major.

Summer Programs

Air Force ROTC offers many summer programs to take advantage of. Before completing the ROTC program all cadets must complete field training, which is a rigorous four-week program involving physical conditioning, weapons training, and survival training. But more than that field training is an opportunity to develop your skills as both a leader and team member. In addition to field training, cadets may choose to participate in other experiences and you will be able to tell your friends that you did something truly amazing. These summer programs include: freefall parachuting, advanced engineering, NASA research, nurse orientation, cultural and language immersion programs and several others. In addition to the experience of a lifetime, you will receive travel to and from the location, room and board, and daily training pay.

Minor in Aerospace Studies

The minor in aerospace studies is offered to any student completing the course of study listed below. In addition to studying Air Force organizations, missions, and operations, the student will gain a broad perspective of the military in general by studying the history of all Department of Defense Services and completing at least one Army ROTC course, thus emphasizing our country's focus on "joint" military operations.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
LOWER DIVISION		
AS 101 ^P	Foundations of the Air Force I*	1
AS 102	Foundations of the Air Force II	1
AS 201 ^P	Evolution of Air and Space Power I*	1
AS 202 ^P	Evolution of Air and Space Power II*	1
<i>Select one course from the following:</i>		
AS 250	Introduction to Aeronautics and Aviation	3
MLSC 101	Leadership and Personal Development	2
MLSC 102	Introduction to Tactical Leadership	2
MLSC 201	Innovative Team Leadership	2
MLSC 202	Foundations of Tactical Leadership	2
TOTAL		6-7
UPPER DIVISION		
AS 301 ^P	Air Force Leadership Studies I*	3
AS 302 ^P	Air Force Leadership Studies II*	3
AS 333 ^P	Operational Air Force Writing*	2
AS 401 ^P	National Security Affairs/Active Duty I*	3
AS 402 ^P	National Security Affairs/Active Duty II*	3
MLSC 357 ^{P/}	The American Military Experience*	3
HIST 357 ^P		
TOTAL		17
PROGRAM TOTAL = 23-24 credits without corequisites or prerequisites*		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

* Additional coursework may be required because of prerequisites or corequisites.

Introductory Flight Training

Qualified cadets, selected for pilot or navigator training, participate in an introductory flight training program following graduation and commissioning. This program provides instruction in principles of flight and Federal

Aviation Regulations (FARs), and flying training at Air Force expense.

Active Duty Obligation

There is no active duty obligation for enrolling in either the freshman or sophomore AFROTC courses. Students who complete the Air Force ROTC program and receive a commission incur a minimum four-year, active duty commitment. Pilots and navigators serve additional commitments from the time they complete their training.

Department of Military Science

*Office in Military Science Building, Room 101
(970) 491-6506
armyrotc.colostate.edu/*

Colonel Peter Bleich, Professor of Military Science

Army ROTC

The Army ROTC program provides professional education and leadership training to those students who desire to serve our country as officers in the U.S. Army upon graduation. Successful completion of the program qualifies ROTC cadets for both a commission as a second lieutenant in the Army and an opportunity to serve at least three years on active duty or at least six years in the reserve component (Army Reserve or Army National Guard).

The successful ROTC cadet may choose one of the 16 diverse and exciting career fields in which to serve as an Army officer. A list of these specialties may be obtained from the Department of Military Science.

Minor in Military Science

ROTC students can earn a minor in military science. The minor requires 22 credits, which encompass approximately 70% of the military science courses, a military history course, and summer training. This minor allows ROTC students to compete in the University Honors Program or complete majors that also require a minor.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
LOWER DIVISION		
<i>Select 8 credits from the following:</i>		
MLSC 101	Leadership and Personal Development	2
MLSC 102	Introduction to Tactical Leadership	2
MLSC 201	Innovative Team Leadership	2
MLSC 202	Foundations of Tactical Leadership	2
MLSC 250	Basic Camp Leader Internship ^{1, 2}	2-8
MLSC 295	Independent Study	1-2
	Credit awarded for prior military service ³	2-8

Course	Title	Cr
TOTAL		8
UPPER DIVISION		
<i>Select a minimum of 3 credits from the following:</i>		
HIST 339 ^P	World War II in Europe ⁴	3
HIST 345 ^P	Civil War Era ⁴	3
MLSC 357 ^{P/}	The American Military Experience*	3
HIST 357 ^P		
HIST 464 ^P	Pacific Wars: Philippines—WWII ⁴	3
HIST 465 ^P	Pacific Wars: Korea and Vietnam ⁴	3
<i>Select a minimum of 11 credits without corequisites from the following:</i>		
MLSC 301 ^P	Adaptive Tactical Leadership ^{4,5}	3
MLSC 302 ^P	Leadership in Changing Environments ^{4,6}	3
MLSC 386 ^P	Advanced Camp Practicum ⁴	8
MLSC 395	Independent Study	1-3
MLSC 401 ^P	Developing Adaptive Leaders*	3
MLSC 402 ^P	Leadership in a Complex World*	2
MLSC 495	Independent Study ⁸	1-3
TOTAL		14
PROGRAM TOTAL = 22 credits without corequisites and prerequisites*		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required due to prerequisites.

¹ Taken between the student's sophomore and junior years, the five-week Basic Camp (MLSC 250) will meet commissioning requirements for MLSC 101, MLSC 102, MLSC 201, MLSC 202. The number of 100- and 200-level MLSC courses taken will determine the number of credits awarded for MLSC 250.

² Students who have taken all of the Basic Course (MLSC 101, MLSC 102, MLSC 201, MLSC 202) or have completed Basic Training as a prior service member are not eligible to take MLSC 250.

³ Students may be given transfer credit for prior military service that can be applied to lower division credits.

⁴ Additional course work may be required because of prerequisites/corequisites.

⁵ Students must take MLSC 396, Military Science Group Study V, for one credit, as a corequisite to MLSC 301.

⁶ Students must take MLSC 397, Military Science Group Study VI, for one credit, as a corequisite to MLSC 302.

⁷ Attendance at the five-week Army ROTC Advanced Camp (MLSC 386) is normally the summer between the junior and senior years.

General Program

The military science program is subdivided into two levels. The basic course is aligned with the freshman and sophomore years and consists of the fundamentals of leadership and management, land navigation, small unit operations, survival, and rappelling. The advanced course is aligned with the junior and senior years and covers leadership assessment, military history, ethics, and professionalism. It also includes leadership skills that prepare the cadet for entry into active or reserve duty as a commissioned officer. Participation in leadership laboratories is open to all students who are enrolled in a military science class.

Two-Year and Graduate Degree Programs

A two-year program is also available for students who have not taken the first two years of ROTC or those who have completed an undergraduate degree and are seeking a two-year graduate program. This program requires the student to attend a summer course at Fort Knox, Kentucky, between the sophomore and junior years or prior to starting a graduate degree program. This four-week course consists of basic military training and allows

the student to enter the advanced course upon return to campus.

Another option to attain an officer's commission is through the Simultaneous Membership Program (SMP). This program allows a cadet who is a member of an Army Reserve component or National Guard unit to be in the advanced course of ROTC, be paid at the E-5 drill pay rate, work as an officer trainee in their unit, and compete for an Army reserve component or active duty commission. Students can also receive the GI Bill and tuition assistance benefits while in Army ROTC.

The military science curriculum is intended to enrich and supplement baccalaureate or postgraduate studies in all fields. The Army recognizes the need for officers with varied academic credentials and will award a commission to students who successfully complete ROTC.

Flight Training

After commissioning flight training is available, although competitive, to those officers who have taken and passed the flight physical and flight aptitude test and have been selected for service within the Aviation Branch. The test is normally administered during the MS III or junior year of ROTC. Training may will be rotary wing (helicopter) training.

Scholarships

Colorado State Army ROTC scholarship students may be awarded scholarships that pay full tuition (in-state or out-of-state), fees, and an additional \$1,200 per year for books. In addition a graduated stipend of \$300 per month up to a maximum of \$500 per month. Applications for the four-year scholarship can be requested by calling 1-800-USA-ROTC or apply online at www.armyrotc.com. Two- and three-year scholarships i for sophomores and freshmen, respectively, may be applied for throughout the school year.

Financial Assistance Opportunities

In addition to two-, three-, and four-year scholarships, Army ROTC has the Simultaneous Membership Program (SMP), which provides additional experience and financial assistance from two sources: a National Guard or Reserve unit and Army ROTC. SMP students may also qualify for GI Bill benefits, loan repayment money, and up to 100% tuition assistance money, based on available funding.

UNIVERSITY HONORS PROGRAM

Office in Academic Village
(970) 491-5679
www.honors.colostate.edu

Robert R. Keller, Director

See a more complete description of the University Honors Program in the *Broadening Your Horizons* chapter in this catalog.

University Honors Core Curricula

The objective of the Honors program of study is to provide exceptional academic studies that include breadth and perspectives, in-depth studies, a senior year creative activity, and Honors elective courses. Two curricular tracks provide enriched educational experiences for high ability students in all majors. For Track 1 students, the Honors Core Curriculum fulfills nearly half of the All-University Core Curriculum (AUCC) requirements, allowing Honors students to graduate on schedule and without additional cost. Track 2 students satisfy honors requirements by taking honors courses in their majors and departments.

The Honors courses enroll between 18 and 22 students and are taught by some of the University's finest teachers.

Honors Track 1

<u>Course</u>	<u>Title</u>	<u>Credits</u>	<u>AUCC</u>
FRESHMAN			
HONR 192 ^P	Honors First Year Seminar	4	
HONR 193 ^P	Honors Seminar	3	1A
	TOTAL	7	
SOPHOMORE			
	Honors course ¹	3	
JUNIOR			
HONR 392 ^P	Honors Seminar	3	3B
HONR 399 ^P	Pre-thesis	1	
	Honors course ²	3	
	TOTAL	7	
SENIOR			
HONR 492 ^P	Honors Senior Seminar	3	3C
HONR 499 ^P	Senior Honors Thesis	3	
	TOTAL	6	
PROGRAM TOTAL = 23 credits³			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Sophomore-level Honors course in the student's major, department, and/or college.

² Upper-division Honors course in the student's major, department, and/or college.

³ Students completing the Honors Core Curriculum will fulfill the All-University Core Curriculum (AUCC) core competency requirements in the following categories: 1A – Intermediate Writing; 2A – Oral Communication; three credits of the six required for 3B – Arts/Humanities; 3C – Social/Behavioral Sciences; 3D – Historical Perspectives; 3E – Global and Cultural Awareness. Students completing some, but not all, of the program will fulfill some of the AUCC core competencies. Complete details are available from the Honors Program office.

Honors Track 2

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
IU 193	Honors Seminar ²	1	
SOPHOMORE³			
JUNIOR			
HONR 399 ^P	Pre-Thesis	1	
	Honors courses in the major ⁴	6	
	TOTAL	7	
SENIOR			
HONR 499 ^P	Senior Honors Thesis	3	
	Honors courses in the major ⁴	6	
	TOTAL	9	
PROGRAM TOTAL = 16-17 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ The student's major designation (e.g., History Honors Scholar or Biology Honors Scholar) or in some cases a disciplinary designation that may be different from the student's major.

² Required for freshmen students and not required for transfers or on-campus students.

³ It is expected that most students (new freshmen, transfers, and on-campus) in Track 2 will have completed at least 30 credits, and some of these students may take an Honors course in the major and/or enroll in elective Honors courses in their first year on campus.

⁴ Twelve honors credits (upper-division, graduate level, etc.) in the major or discipline.

MENTORED RESEARCH AND ARTISTRY PROGRAM

Office in the TILT Office for Undergraduate Research and Artistry
(970) 491-2276
tilt.colostate.edu/oura/

Mark A. Brown, Director

Program Background

The faculty, staff, and students at Colorado State University are actively engaged in a wide range of scholarly activities that both anticipate and respond to the interests and needs of the people of Colorado, the nation, and the world. In these endeavors, we are recognized as one of the most highly rated public research universities in the United States. Faculty, staff, and students at Colorado State University are pioneers in a variety of disciplines that help shape our global environment. The Mentored Research and Artistry Program provides a structure for undergraduate students to engage in these activities. Whether investigating infectious disease or the benefits of music therapy, international economics or regional climate change, every undergraduate is encouraged to contribute to the scholarly output of Colorado State University.

Program Philosophy

Aristotle noted, "For the things we have to learn before we can do them, we learn by doing them." The development and application of new knowledge plays an essential role at research-intensive universities, enhancing both learning and teaching. The Mentored Research and Artistry Program allows students to initiate a learning experience under the close guidance of a faculty mentor. Research and artistry, as an extension of the learning experience beyond the classroom, leads to the acquisition of skills and unique mindsets necessary to create new ideas and expand human knowledge. Through inquiry, students become their own teachers pursuing answers to unresolved questions and enriching their educational experience. For example, a student may use techniques learned in a chemical engineering laboratory to explore alternatives for clean energy. Another student might expand the technical repertoire of acrylic painting in the context of experimenting on canvas. In all cases, each student's path to new knowledge is enhanced with the guidance and experience of a mentor. The role of faculty mentors in undergraduate inquiry is to provide input, feedback, and support while guiding students in the responsible and ethical pursuit of new knowledge and experiences.

Main Features

The Mentored Research and Artistry Program is designed to enhance and recognize the learning experiences of undergraduates who are engaged in research, artistry, or other forms of creative work. The experience allows students to distinguish themselves as undergraduate scholars in their disciplines. This opportunity is open to all undergraduate students in good academic standing who have at least two full semesters remaining before graduation. The criteria for completion of the program are rigorous, ensuring that only the most dedicated students receive the distinction of Mentored Research and Artistry Program on their transcript. Students earn the right to wear the Mentored Research and Artistry Program's Silver Ribbon with their graduation regalia and of listing this distinction among their academic achievements

Requirements

To complete the program, the following requirements must be satisfied.

- 1) Inquiry projects must be conducted under the guidance of a faculty, staff, or industry mentor for a minimum duration of two semesters. Approval of projects by the Office for Undergraduate Research and Artistry is required. Forms and

guidelines for program registration are available at <http://tilt.colostate.edu/oura/>.

- 2) Participating students must complete a workshop on the Responsible Conduct of Research (RCR), provided regularly by the Office for Undergraduate Research and Artistry. Upon completion of the RCR workshop, participants are required to complete the online RCR training and examination module available at <http://web.research.colostate.edu/rcr/>.
- 3) Students must register and actively participate in a student organization related to their discipline and approved by the Office for Undergraduate Research and Artistry. Students will be required to submit a letter from the organization's Faculty/Graduate Advisor verifying the student's active involvement for at least two semesters.
- 4) Students must complete a research methods course with a grade of C or higher. The course must be approved by the Office for Undergraduate Research and Artistry.
- 5) Inquiry projects must be presented at the University's annual Celebrate Undergraduate Research and Creativity (CURC) Showcase or another venue approved by the Office for Undergraduate Research and Artistry, such as a regional or national conference. A program highlighting the participant's project or a letter of verification from the faculty mentor must be included with the final report.
- 6) Projects must be submitted for publication in the University's *Journal of Undergraduate Research and Scholarly Excellence* or in another peer-reviewed journal, approved by the Office for Undergraduate Research and Artistry. A copy of the published manuscript or correspondence from an editor of the journal to which a manuscript has been submitted indicating the manuscript is under review should be included with the participant's final report.

Upon completion of a project, participants must submit a final report including a summary of the project, its outcomes, and a detailed reflection of the experience along with a letter from the mentor (report forms and guidelines are available at tilt.colostate.edu/oura/). The Office for Undergraduate Research and Artistry will generate an electronic file for each participant. Upon submission of the final report, the Office for Undergraduate Research and Artistry will review the file and confirm the student's successful completion of the program notifying the University Registrar's Office for transcription of the Mentored Research and Artistry Program.

Colorado State University reserves the right at any time, without notice, to change, modify, or cancel any course, program, procedure, policy, financial requirement, or disciplinary arrangement set forth in this catalog whenever, in its sole discretion, it determines such action to be appropriate. Furthermore, Colorado State will not be responsible for any failure to present or complete any course or program or to perform any other activity, function, or obligation mentioned in this catalog. Since changes may occur at any time, students must check the relevant website (as noted throughout various chapters in this catalog).

College of Agricultural Sciences

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www.agsci.colostate.edu

Dr. Craig Beyroudy, Dean
Professor Nancy A. Irlbeck, Associate Dean of Academic
Affairs
Professor Lee E. Sommers, Associate Dean for Research

UNDERGRADUATE MAJORS

Agricultural Business
Agricultural Economics
Agricultural Education
Animal Science
Equine Science
Horticulture
Landscape Architecture
Environmental Horticulture
Soil and Crop Sciences

UNDERGRADUATE MINORS

Agricultural and Resource Economics
Entomology
Horticulture
Environmental Horticulture
Plant Health
Soil Resources and Conservation

Agriculture was the first science . . . the progenitor of sciences . . . and it remains the science that supports human life. It also is a science concerned with improving the quality of life and maintaining a productive, quality environment. Agricultural programs integrate biological, physical, and social sciences with agricultural sciences. Students may look forward to careers in basic and applied research; production and utilization of food and related products; resource use and conservation; industry and business; education and public service; technical and professional services; professional, scientific, and technical communication; and institutional and governmental.

COLLEGE PROGRAMS

Undergraduate Majors

Undergraduate programs lead to a Bachelor of Science degree which requires a minimum of 120 credits with a minimum of 42 credits in upper-division courses. Most departments have a 12-credit limit for independent study and/or internship courses in fulfillment of the 120 credits (specific limits may be obtained from the individual department). Information on interdepartmental and departmental majors, the various concentrations available, and career opportunities are described on the following pages. Students may consider simultaneously completing the requirements for a second major. See Second Major Requirements in the Degree Programs chapter of this catalog for a description of the program.

Internships

Students are encouraged to select an internship with an approved cooperator. The student's department determines the number of allowable credits. Internships are available each term including the summer term. Internships normally require 40 hours of contact per academic credit and do allow a stipend to be provided. Application should be made to the department at least 30 days before the term of the internship.

Study Abroad

Study abroad programs are available to students in the College of Agricultural Sciences. Because the knowledge of at least one other culture is valuable in understanding our own, students are encouraged to study outside the United States as part of their overall program at Colorado State University. There are active programs in Australia, New Zealand, and France, in addition to other countries. Students interested in study abroad should plan in advance by discussing opportunities with their academic adviser, the Associate Dean of Academic Affairs, or by visiting the Office of International Programs in Laurel Hall, www.international.colostate.edu.

Transfer of Credits from Other Institutions

Students who expect to transfer to the College of Agricultural Sciences are advised to plan carefully and in advance of their planned transfer to insure that transfer credits meet required courses in their chosen major. Transfer evaluations are generally determined by the Registrar's Office, although departments determine transfer of courses required by the department. Students planning to transfer to C.S.U. are encouraged to access u.select through the Registrar's website www.registrar.colostate.edu and clicking on "Students," then "Transfer Evaluation," and then "Course Equivalencies (u.select)". (Note: Credits from two-year colleges are not accepted for 300 and above level courses at Colorado State.) The College of Agricultural Sciences welcomes transfer students from both two- and four-year colleges and encourages potential transfer students to work closely with the University to minimize transfer issues.

DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS

*Office in Clark Building, Room B320
(970) 491-6325
dare.colostate.edu*

*Professor Gregory Perry, Department Head
Professor W. Marshall Frasier, Undergraduate Coordinator
Professor Craig A. Bond, Graduate Coordinator*

Major in Agricultural Business

The Agricultural Business major teaches students the operating techniques and business skills used in the modern food and fiber industry. The industry requires a variety of businesses to distribute, process, package, and market agricultural commodities including grain elevators, slaughterhouses, farm real estate firms, bakers, egg processors, canners, trucking companies, breweries, fresh produce centers, wholesalers, retailers, and restaurants. Other businesses supply agricultural producers with capital, fuel, machinery, fertilizer, and management services, including farm credit services, commercial banks, farm management companies, farm supply coops, feed mills, machinery dealers, and fertilizer and seed companies.

In addition to general requirements and agricultural economics and business courses, majors take agricultural

law, agricultural sciences, communications, and statistics. Advanced courses in business areas are available for more specialized study. Strong interdisciplinary coordination in the department allows majors in Agricultural Business to strengthen their technical training by simultaneously completing a second major in animal sciences, equine science, or soil and crop sciences.

Learning Outcomes

Successful students will demonstrate:

- Technical competency including appropriate use of economic theory in formulating analytical problems, identifying and gathering appropriate data, and employing appropriate economic methods to analyze those problems, utilizing appropriate available computer technology
- Ability to solve real-world problems beyond the pedagogical context. Students will be able to identify a problem and its scope, evaluate resources to address the problem, formulate alternative solutions, and select the solution(s) most consistent with a stated objective
- Proficiency in oral and written communication including the ability to communicate critically and analytically at a professional level

Potential Occupations

Although several students from farms and ranches choose this major each year, a variety of business-oriented students have found careers in this highly diverse industry. Graduates seek and find careers in management, marketing, sales, and agricultural finance. Participating in internships and cooperative education opportunities is highly recommended to enhance practical training and development. Graduates who pursue advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

Some examples include, but are not limited to, agricultural loan officer, commodity merchandiser, commodity broker, feedlot manager, elevator manager, farm supply manager, flour mill territory manager, landscape contractor, mortgage broker, farm real estate appraiser, grain merchandiser, agricultural chemical representative, and farm machinery company representative.

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
AGRI 140	Technology in Agriculture	3	
AGRI 192	Orientation to Agricultural Systems	1	
<i>Select one course from the following:</i>			
ANEQ 101	Food Animal Science	3	
ANEQ 102	Introduction to Equine Science	4	
FTEC 110 ^P	Food-From Farm to Table	3	
HORT 100 ^P	Horticultural Science	4	3A
SOCR 100	General Crops	4	

Course	Title	Cr	AUCC
AREC 202 ^P	Agricultural and Resource Economics	3	3C
<i>Select four credits from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
OR			
BZ 120	Principles of Plant Biology	4	3A
OR			
LIFE 102 ^P	Attributes of Living Systems	4	3A
CHEM 103	Chemistry in Context	3	3A
CO 150 ^P	College Composition	3	1A
ECON 204 ^P	Principles of Macroeconomics	3	
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
	Arts and Humanities ¹	3	3B
	TOTAL	29-30	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
MATH 141 ^P	Calculus in Management Sciences	3	1B
SPCM 200	Public Speaking	3	
	Advanced writing ²	3	2
	Agricultural Science Electives ³	6	
	Foundations and Perspectives ⁴	9	3B,
			3D, 3E
	Elective	3	
	TOTAL	30	
JUNIOR			
AREC 305 ^P	Agricultural and Resource Enterprise Analysis	3	
AREC 310 ^P	Agricultural Marketing	3	
AREC 335 ^P /	Introduction to Econometrics	3	
ECON 335 ^P			
ECON 306 ^P	Intermediate Microeconomics	3	
FIN 305 ^P	Fundamentals of Finance	3	
MKT 305 ^P	Fundamentals of Marketing	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
	Agricultural Science Electives ³	3	
	Electives	6	
	TOTAL	30	
SENIOR			
<i>Select three courses from the following:</i>			
AREC 311 ^P	Agricultural and Resource Product Marketing	3	
AREC 375 ^P	Agricultural Law	3	
AREC 405 ^P	Agricultural Production Management	3	
AREC 408 ^P	Agricultural Finance	3	
AREC 412 ^P	Agricultural Commodities Marketing	3	
AREC 415 ^P	International Agricultural Trade	3	
AREC 428 ^P	Agricultural Business Management	3	4A, 4C
AREC 460 ^P	Economics of World Agriculture	3	4B
OR			
AREC 478 ^P	Agricultural Policy	3	4A,
			4B, 4C
MKT 362 ^P	Professional Selling	3	
	Agricultural Science Electives ³	3	
	AREC/ECON Electives ⁵	6	
	Electives ⁶	3-4	
	TOTAL	30-31	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B of the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 2 of the AUCC.

³ Select from the courses in AGRI, ANEQ, AREC, BSPM, FTEC, HORT, LAND, SOCR, FSHN 150, NR 120A-B, or NR 320. A maximum of 6 AREC credits may be used as agricultural science electives.

⁴ Select three courses to meet the core requirements in arts/humanities (3B), historical perspectives (3D), and global and cultural awareness (3E)

⁵ Select 6 credits from AREC and/or ECON courses.

⁶ Enough elective credits need to be selected to bring program total to 120 credits with a minimum of 42 upper-division credits.

Major in Agricultural Economics

Agricultural Economics focuses on the production and marketing of agricultural products while natural resource economics focuses on the supply and demand for natural resources and the impacts of economic activity on resource availability and the environment. Economic theory provides a framework for understanding agricultural and resource issues, predicting the likely effects of government policies and regulations, and devising solutions to pressing economic and environment problems. Most decisions by governments, businesses, or individuals must weigh tradeoffs or balance costs and benefits. Most human endeavors involve the production, distribution, or consumption of goods and services.

Learning Outcomes

Successful students will demonstrate:

- Technical competency including appropriate use of economic theory in formulating analytical problems, identifying and gathering appropriate data, and employing appropriate economic methods to analyze those problems, utilizing appropriate available computer technology.
- Ability to solve real-world problems beyond the pedagogical context. Students will be able to identify a problem and its scope, evaluate resources available to address the problem, formulate alternative solutions, and select the solution(s) most consistent with a stated objective.
- Proficiency in oral and written communication including the ability to communicate critically and analytically at a professional level.

Potential Occupations

Agricultural and resource economists are employed in a wide range of fields from education and research to business and government. Profit and non-profit organizations employ economists in overseas and community development, international relations, and environmental and conservation analyses. Students in the farm and ranch management concentration find careers in management, marketing of agricultural products and sales of feed, fertilizer, and other inputs to farmers and ranchers. Participation in internships, volunteer activities, and cooperative education opportunities is highly recommended to enhance practical training and development. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

Some examples include, but are not limited to, financial analyst, foreign trade analyst, market forecaster, commodities/stock broker, agriculture production analyst, energy resource analyst, environmental researcher/analyst, agriculture and resource policy analyst, natural resource analyst, environmental pollution analyst, environmental policy analyst, economic analyst/forecaster, land use planner, overseas development specialist, rural community organizer, community development specialist, extension agent, wholesaler, importer or exporter, feedlot manager, manager of agricultural business, farm/ranch manager, farm machinery company representative, agricultural loan officer, livestock feed marketing representative, livestock pharmaceutical product representative, commodity futures broker, farm and ranch appraiser, agricultural consultant.

Agricultural Economics Concentration

The curriculum in the Agricultural Economics concentration begins with classes in agricultural economics, physical and biological sciences, and technical agriculture. During the junior and senior years, students select courses in advanced agricultural economics, mathematics, statistics, and economic theory.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 140	Technology in Agriculture	3	
AGRI 192	Orientation to Agricultural Systems	1	
<i>Select one of the following courses:</i>			
ANEQ 101	Food Animal Science	3	
ANEQ 102	Introduction to Equine Science	4	
FTEC 110	Food—From Farm to Table	3	
HORT 100	Horticultural Science	4	3A
SOCR 100	General Crops	4	
AREC 202	Agricultural and Resource Economics	3	3C
<i>Select four credits from the following courses:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
OR			
BZ 120	Principles of Plant Biology	4	3A
OR			
LIFE 102 ^P	Attributes of Living Systems	4	3A
CHEM 103	Chemistry in Context ¹	3	3A
CO 150 ^P	College Composition	3	1A
ECON 204 ^P	Principles of Macroeconomics	3	
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
	Arts and Humanities ²	3	3B
	TOTAL	29-30	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
MATH 141 ^P	Calculus in Management Sciences	3	1B
SPCM 200	Public Speaking	3	
	Advanced Writing ³	3	2
	Foundations and Perspectives ⁴	9	3B, 3D, 3E
	Agricultural Sciences Electives ⁵	3	
	Electives	6	
	TOTAL	30	
JUNIOR			
AREC 305 ^P	Agricultural and Resource Enterprise Analysis	3	
<i>Select two courses from the following:</i>			
AREC 310 ^P	Agricultural Marketing	3	

Course	Title	Cr	AUCC
AREC 311 ^P	Agricultural and Resource Product Marketing	3	
AREC 408 ^P	Agricultural Finance	3	
AREC 412 ^P	Agricultural Commodities Marketing	3	
AREC 428 ^P	Agricultural Business Management	3	
AREC 335 ^P / ECON 335 ^P	Introduction to Econometrics	3	
AREC 340 ^P / ECON 340 ^P	Introduction: Economics of Natural Resources	3	
OR			
AREC 342 ^P	Water Law, Policy, and Institutions	3	
ECON 306 ^P	Intermediate Microeconomics	3	
FIN 305 ^P	Fundamentals of Finance	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
	Agricultural Sciences Electives ⁵	3	
	Electives	3	
	TOTAL	30	
SENIOR			
AREC 405 ^P	Agricultural Production Management	3	4A, 4C
AREC 415 ^P	International Agricultural Trade	3	
AREC 478 ^P	Agricultural Policy	3	4A, 4B, 4C
ECON 304 ^P	Intermediate Macroeconomics	3	
	Agricultural Sciences Electives ⁵	6	
	AREC, ECON Electives ⁶	9	
	Electives ⁷	3-4	
	TOTAL	30-31	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Students planning to take SOCR 240 should take CHEM 107 and CHEM 108 and reduce the number of free electives in the program.

² Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC).

³ Select from the list of courses in category 2 in the AUCC.

⁴ Select three courses to meet the core requirements in arts/humanities (3B), historical perspectives (3D), and global and cultural awareness (3E)

⁵ Select three credits from courses in AGRI, ANEQ, BSPM, AREC, FTEC, HORT, LAND, SOCR, FSHN 150, NR 120A-B, or NR 320. A maximum of three AREC credits may be used as agricultural electives.

⁶ Select nine credits from AREC and/or ECON courses.

⁷ Enough credits need to be selected to bring program total to 120 credits with a minimum of 42 upper-division credits.

Farm and Ranch Management Concentration

In addition to economics courses, the Farm and Ranch Management concentration requires courses in physical and biological sciences, technical agriculture, and business.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 140	Technology in Agriculture	3	
AGRI 192	Orientation to Agricultural Systems	1	
<i>Select one course from the following:</i>			
ANEQ 101	Food Animal Science	3	
ANEQ 102	Introduction to Equine Science	4	
FTEC 110	Food—From Farm to Table	3	
HORT 100	Horticulture Science	4	3A
SOCR 100	General Crops	4	
AREC 202 ^P	Agricultural and Resource Economics	3	3C
<i>Select four credits from the following courses:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
OR			
BZ 120	Principles of Plant Biology	4	3A
OR			
LIFE 102 ^P	Attributes of Living Systems	4	3A
CHEM 103	Chemistry in Context	3	3A
CO 150 ^P	College Composition	3	1A
ECON 204 ^P	Principles of Macroeconomics	3	3C

Course	Title	Cr	AUCC
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
	Arts and Humanities ¹	3	3B
	TOTAL	29-30	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
AREC 305 ^P	Agricultural and Resource Enterprise Analysis	3	
MATH 141 ^P	Calculus in Management Sciences	3	1B
SPCM 200	Public Speaking	3	
	Advanced Writing ²	3	2
	Foundations and Perspectives ³	9	3B, 3D, 3E
	Agricultural science electives ⁴	3	
	Elective	3	
	TOTAL	30	
JUNIOR			
AREC 335 ^P / ECON 335 ^P	Introduction to Econometrics	3	
AREC 408 ^P	Agricultural Finance	3	
ECON 306 ^P	Intermediate Microeconomics	3	
MKT 305 ^P	Fundamentals of Marketing	3	
MKT 362 ^P	Professional Selling	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
	Agricultural Science Electives ⁴	6	
	Electives	6	
	TOTAL	30	
SENIOR			
<i>Select two courses from the following:</i>			
AREC 310 ^P	Agricultural Marketing	3	
AREC 311 ^P	Agricultural and Resource Product Marketing	3	
AREC 412 ^P	Agricultural Commodities Marketing	3	
AREC 415 ^P	International Agricultural Trade	3	
AREC 428 ^P	Agricultural Business Management	3	
AREC 375 ^P	Agricultural Law	3	
AREC 405 ^P	Agricultural Production Management	3	4A, 4C
AREC 460 ^P	Economics of World Agriculture	3	4B
OR			
AREC 478 ^P	Agricultural Policy	3	4A, 4B, 4C
	Agricultural Science Electives ⁴	6	
	AREC/ECON Electives ⁵	6	
	Electives ⁶	3-4	
	TOTAL	30-31	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 2 in the AUCC.

³ Select three courses to meet the AUCC requirements in arts/humanities (3B), historical perspectives (3D), and global and cultural awareness (3E).

⁴ Select a total of 15 credits from courses in AGRI, ANEQ, AREC, BSPM, FTEC, HORT, LAND, SOCR, FSHN 150, NR 120A-B, or NR 320. A maximum of three AREC credits may be used as agricultural science electives.

⁵ Select from AREC and/or ECON courses.

⁶ Enough elective credits need to be selected to bring the program total to 120 credits with a minimum of 42 upper-division credits.

Natural Resource Economics Concentration

In the Natural Resource Economics concentration, agricultural and natural resource economics, physical and biological sciences, and social sciences are required the first two years. Juniors and seniors complete advanced classes in natural resource economics, economic theory, statistics, and mathematics. To strengthen their technical training, students concentrating in Natural Resource Economics can

simultaneously complete a second major in natural resource management with few additional credit hours.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 140	Technology in Agriculture	3	
AGRI 192	Orientation to Agricultural Systems	1	
AREC 202 ^P	Agricultural and Resource Economics	3	3C
<i>Select four credits from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
OR			
BZ 120	Principles of Plant Biology	4	3A
OR			
LIFE 102 ^P	Attributes of Living Systems	4	3A
CO 150 ^P	College Composition	3	1A
ECON 204 ^P	Principles of Macroeconomics	3	
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
	Arts and Humanities ¹	3	3B
	Biological and Physical Sciences ²	3	3A
	Agriculture, Forestry, or Natural Science Elective ³	3	
	TOTAL	29	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
MATH 141 ^P	Calculus in Management Sciences	3	1B
SPCM 200	Public Speaking	3	
	Advanced Writing ⁴	3	2
	Foundations and Perspectives ⁵	9	3B, 3D, 3E
	Agriculture, Forestry, or Natural Science Elective ³	3	
	Electives	7	
	TOTAL	31	
JUNIOR			
AREC 240/ ECON 240	Issues in Environmental Economics	3	
AREC 335 ^P / ECON 335 ^P	Introduction to Econometrics	3	
AREC 340 ^P / ECON 340 ^P	Introduction: Economics of Natural Resources	3	
AREC 375 ^P	Agricultural Law	3	
ECON 306 ^P	Intermediate Microeconomics	3	
FIN 305 ^P	Fundamentals of Finance	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
	Agriculture, Forestry, Natural Science Electives ³	3	
	Social Science Electives ³	6	
	TOTAL	30	
SENIOR			
<i>Select two courses from the following:</i>			
AREC 342 ^P	Water Law, Policy, and Institutions	3	
AREC 346 ^P / ECON 346 ^P	Economics of Outdoor Recreation	3	
ECON 344 ^P	Economics of Energy Resources	3	
AREC 460 ^P	Economics of World Agriculture	3	4B
AREC 478 ^P	Agricultural Policy	3	4A, 4B, 4C
ECON 304 ^P	Intermediate Macroeconomics	3	
	Agriculture, Forestry, Natural Science Elective ³	3	
	AREC or ECON Electives ⁶	6	
	Electives ⁷	6	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3A in the AUCC.

³ See departmental list.

⁴ Select from the list of courses in category 2 in the AUCC.

⁵ Select three courses to meet the core requirements in arts/humanities (3B), historical perspectives (3D), and global and cultural awareness (3E).

⁶ Select 6 credits from AREC and/or ECON courses.

⁷ Enough elective credits need to be selected to bring program total to 120 credits with a minimum of 42 upper-division credits.

Major in Agricultural Education

Agricultural Education is an interdepartmental major in both the College of Agricultural Sciences and a teacher preparation program in the School of Teacher Education and Principal Preparation (STEPP). It prepares students for teaching youth and adults in the agricultural industry. Students refine their communication skills and personal qualities necessary to serve as educational leaders and managers.

Learning Outcomes

The successful student will demonstrate:

- Competent knowledge of agricultural subject matter to be taught
- Ability to create instruction opportunities that are adapted to diverse learners in agricultural education
- Employment of innovative instructional methodologies to promote student success in agricultural education
- Effective leadership to the FFA and in supervising agricultural programs/projects for high school students

Potential Occupations

Graduates in Agricultural Education are in demand to fill a fifteen-year shortage of agricultural teachers in Colorado and nationwide. Two-thirds of the Colorado State graduates have become teachers or administrators in public schools. Other graduates take agribusiness positions with seed, fertilizer, feed, machinery, or finance firms. Students are also prepared to teach in community or junior colleges, area vocational schools, and technical institutes. Participation in internships is required to enhance practical training and development. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

Some examples include: high school agriculture teacher, post-secondary vocational agriculture teacher, agribusiness or agriservice representative, cooperative extension agent, education specialist, 4-H association youth specialist, youth development specialist, science teacher.

A Bachelor of Science degree in Agricultural Education leads to teacher licensure by the state of Colorado. Teachers combine classroom, laboratory, and hands-on experiences to teach high school students about the myriad agricultural topics. The curriculum requires students to demonstrate a competent knowledge of educational theory and a broad-

based understanding in agricultural content. Students combine practical experience and technical course work including animal science, plant science, agricultural mechanics, forestry, natural resources, horticulture, agricultural processing and supplies, and services in agriculture. Courses from biological sciences, liberal arts, and social sciences round out a student's education. Students must apply to the Teacher Licensure Program in the School of Teacher Education and Principal Preparation (STEPP) after they have completed at least 30 college credits, usually during their sophomore or junior year. A few of the requirements for acceptance are: having at least a 2.750 cumulative GPA, completion of introductory education courses, and 20 hours of documented work experience with school-age children. This curriculum includes instructional methods and assessment, classroom management and technology, exceptionality, and courses specific to teaching in the agricultural field. All students are required to student teach for one semester.

Students interested in pursuing a teaching license through Colorado State University may refer to the School of Teacher Education and Principal Preparation (STEPP) section in this catalog for general information. Detailed information about the Educator Licensing Program and licensure requirements are available on the program's Web site (www.stepp.caahs.colostate.edu/) or in room 100 of the Education Building. For more detailed information about agricultural education see www.agsci.colostate.edu/index.html.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
OR			
AGRI 292	Transfer Seminar	1	
ANEQ 101	Food Animal Science	3	
OR			
ANEQ 102	Introduction to Equine Science	4	
AREC 202 ^P	Agricultural Resource Economics	3	3C
<i>Select four credits from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
OR			
BZ 120	Principles of Plant Biology	4	3A
OR			
LIFE 102 ^P	Attributes of Living Systems	4	3A
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CO 150 ^P	College Composition	3	1A
<i>Select a minimum of three credits from the following:</i>			
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
MATH 141 ^P	Calculus in Management Sciences	3	1B
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
SOCR 100	General Crops	4	
	Arts/humanities ¹	3	3B
	Food Products and Processing Systems	2-3	
	Elective ²		
		30-32	
SOPHOMORE			
ANEQ 250 ^P	Live Animal and Carcass Evaluation	3	
<i>Select 5 credits from the following Ag Mechanical Technical System Electives:</i>			

Course	Title	Cr	AUCC
AGED 241	Plumbing and Electrical Applications in Ag Ed	2	
AGED 244	Small Gas Engine Repair and Maintenance	2	
CON 151	Construction Materials and Methods Agriculture Mechanical Technical Systems Elective(s) ²	3 1-5	
<i>Select 3 credits from the following Natural Resource/ Environmental System Electives:</i>			
AREC 240	Issues in Environmental Economics	3	3C
AREC 342	Water Law, Policy, and Institutions	3	
F 210 ^P	Forest Ecogeography	3	
FW 104	Wildlife Ecology and Conservation	3	3A
FW 260 ^P	Principles of Wildlife Management	3	
RS 300 ^P	Rangeland Conservation and Stewardship	3	
SOCR 240 ^P	Introductory Soil Science	4	
	Animal Science Elective ²	3	
	Arts/humanities ¹	3	3B
	Food Products and Processing Systems Elective ²	2-3	
	Global and cultural awareness ³	3	3E
	Historical perspectives ⁴	3	3D
	TOTAL	29-30	
JUNIOR			
AGRI 300	Issues in Agriculture	2	
<i>Select 3 credits not previously taken from the following Natural Resource/Environmental System Electives:</i>			
AREC 240	Issues in Environmental Economics	3	3C
AREC 342	Water Law, Policy, and Institutions	3	
F 210 ^P	Forest Ecogeography	3	
FW 104	Wildlife Ecology and Conservation	3	3A
FW 260 ^P	Principles of Wildlife Management	3	
RS 300 ^P	Rangeland Conservation and Stewardship	3	
AREC 305 ^P	Agricultural and Resource Enterprise Analysis	3	
AREC 310 ^P	Agricultural Marketing	3	
OR			
AREC 408 ^P	Agricultural Finance	3	
EDCT 420	Agricultural Experience and Adult Education	3	
EDUC 275 ^P	Schooling in the United States	3	3C
EDUC 331 ^P	Educational Technology and Assessment	2	
EDUC 340 ^P	Literacy and the Learner	3	
EDUC 350 ^P	Instruction I- Individualization/Management	3	
EDUC 386 ^P	Practicum-Instruction I	1	
HORT 100	Horticultural Science	4	3A
	Advanced Writing ⁵	3	2
	TOTAL	33	
SENIOR			
EDCT 425 ^P	Methods/Materials in Agricultural Education	4	
EDCT 485 ^P	Student Teaching	11	4A,4B, 4C
EDCT 492 ^P	Seminar-Professional Relations	2	4C
EDUC 450 ^P	Instruction II-Standards and Assessment	4	
EDUC 486 ^P	Practicum-Instruction II	1	
	Agricultural Business Elective ²	3	
	Plant Systems Elective ²	3	
	TOTAL	28	
PROGRAM TOTAL = 120-123 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from list of courses in category 3B in the All-University Core Curriculum (AUCC).

² Select course(s) in consultation with advisor.

³ Select from list of courses in category 3E in the AUCC.

⁴ Select from list of courses in category 3D in the AUCC.

⁵ Select from list of courses in category 2 in the AUCC.

Minor in Agricultural and Resource Economics

The minor identifies students who have completed an integrated set of courses in Agricultural and Resource Economics. Areas of study in the minor include agricultural production management, financial management, marketing management, international development and trade, natural resources, and environmental economics.

Course	Title	Cr
LOWER DIVISION		
AREC 202 ^P	Agricultural and Resource Economics	3
UPPER DIVISION		
AREC	Agricultural Economics Electives*	15
	Additional course ¹	3
	TOTAL	18

PROGRAM TOTAL = 21 credits without prerequisites

*Additional course work may be required because of prerequisites.

¹ To be determined in consultation with minor program coordinator.

Graduate Programs in Agricultural and Resource Economics

The department offers graduate programs leading to Master of Science and Doctor of Philosophy degrees. A description of these programs may be found in the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, or on the department's website, dare.colostate.edu/.

DEPARTMENT OF ANIMAL SCIENCES

Office in Animal Sciences Building, Room 106

(970) 491-1442

www.ansci.colostate.edu

W. R. Wailes, Head

Major in Animal Science

Students majoring in Animal Science (food animals) are provided with an industry-oriented, science-based education that prepares them for careers in animal agriculture or one of many industries associated with livestock production. The curriculum focuses on the study of food-producing animals and includes foundation courses in the sciences. Students also choose from specialized courses to enhance their technical, practical, and business skills in topics related to various aspects of production, marketing, and processing of livestock and their products.

Learning Outcomes

Successful students will demonstrate:

- Broad-based understanding of biological principles and develop the ability to incorporate the use of these principles into animal management systems
- An understanding of business/economic principles and their application to food animal production systems
- Ability to critically evaluate industry and management issues
- Problem solving and leadership skills that enhance professional success

Potential Occupations

Potential occupations include: managers of production units such as ranches, feedlots, and dairy farms; sales representative for feed companies, pharmaceutical firms, and livestock service organizations; organizational groups/associations such as breed organizations, clientele groups, and branded beef companies; cooperative extension and other educational positions; graduate and professional schools.

A maximum of five credits is allowed for ANEQ 350A-E, ANEQ 352, ANEQ 353, ANEQ 354, ANEQ 355, ANEQ 356, ANEQ 357, ANEQ 361, ANEQ 362, ANEQ 363, and ANEQ 364. A maximum of 12 credits is allowed for any combination of the following: ANEQ 350A-E, ANEQ 352, ANEQ 353, ANEQ 354, ANEQ 355, ANEQ 356, ANEQ 357, ANEQ 361, ANEQ 362, ANEQ 363, ANEQ 364, ANEQ 384, ANEQ 487, ANEQ 495, and ANEQ 496.

A minimum grade of 'C' (2.0) is required for each of the ANEQ courses which are required to complete the major.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
ANEQ 101	Food Animal Science	3	
<i>Select one pair of courses from the following:</i>			
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
OR			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CO 150 ^P	College Composition	3	1A
LIFE 102 ^P	Attributes of Living Systems	4	3A
<i>Select one course from the following:</i>			
L*** 105 ^P	First Year Language I ¹	5	
L*** 107 ^P	First Year Language II ¹	5	
L*** 200 ^P	Second Year Language I ¹	3	
L*** 201 ^P	Second Year Language II ¹	3	
SPCM 200	Public Speaking	3	
<i>Select at least three credits from the following:</i>			
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
MATH 125 ^P	Numerical Trigonometry	1	1B
MATH 126 ^P	Analytic Trigonometry	1	1B
MATH 141 ^P	Calculus in Management Sciences	3	1B
MATH 155 ^P	Calculus for Biological Scientists	4	1B

Course	Title	Cr	AUCC
	Arts/humanities ²	3	3B
	Historical perspectives ³	3	3D
	TOTAL	28-31	

SOPHOMORE

ANEQ 230 ^P	Farm Animal Anatomy and Physiology	3	
OR			
BMS 300 ^P	Human Gross Anatomy	4	
ANEQ 250 ^P	Live Animal and Carcass Evaluation	3	
ANEQ 286 ^P	Livestock Practicum	2	
ANEQ 310 ^P	Animal Reproduction	3	4B
ANEQ 320 ^P	Principles of Animal Nutrition	4	4B
ANEQ 330 ^P	Principles of Animal Breeding	3	4B
ANEQ 360 ^P	Principles of Meat Science	3	4B
AREC 202	Agricultural and Resource Economics	3	3C
OR			
ECON 202 ^P	Principles of Microeconomics	3	3C
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			
STAT 307 ^P	Introduction to Biostatistics	3	
	Applied animal science elective ⁴	2	
	Arts/humanities ³	3	3B
	TOTAL	32-33	

JUNIOR

<i>Select one course from the following:</i>			
ANEQ 346 ^P	Equine Disease Management	4	
MIP 315A	Human and Animal Disease	3	
VS 300	Prevention and Control of Livestock Diseases	3	
RS 300 ^P	Rangeland Conservation and Stewardship	3	
OR			
RS 320/ SOCR 320	Forage and Range Management	3	
SOCR 330 ^P	Principles of Genetics	3	
	Advanced writing ⁵	3	2
	Advanced animal science elective ⁶	3	
	Applied animal science elective ⁵	2-6	
	Business electives ⁷	9	
	Electives ⁸	0-3	
	TOTAL	26-34	

SENIOR

<i>Select two courses from the following:⁹</i>			
ANEQ 470 ^P	Meat Processing Systems	4	4A, 4C
ANEQ 472 ^P	Sheep Systems	3	4A, 4C
ANEQ 473 ^P	Dairy Systems	3	4A, 4C
ANEQ 474 ^P	Swine Systems	3	4A, 4C
ANEQ 476 ^P	Feedlot Systems	3	4A, 4C
ANEQ 478 ^P	Beef Systems	3	4A, 4C
	Advanced animal science elective ⁶	3	
	Experience animal science elective ¹⁰	2	
	Business electives ⁷	6	
	Global and cultural awareness ¹¹	3	3E
	Electives ⁸	5-10	
	TOTAL	26-30	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Effective Fall Semester 2007, foreign language courses have been moved into separate subject codes (LFRE for French, LGER for German, LSPA for Spanish, etc.), depending on the language.

² Select from the list of courses in category 3B in the AUCC.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select two courses from department approved applied course list for animal science majors for a minimum of 4 credits.

⁵ Select from the list of courses in category 2 in the AUCC.

⁶ Select a total of two courses from the department approved advanced course list for animal science majors.

⁷ Select a total of 15 credits from any AREC or ECON course or any business course of which 3 credits may be a computer course. Access granted for the following business courses: ACT 205, BUS 205, FIN 305, MGT 305, MKT 305.

⁸ Students with specific career goals are strongly encouraged to consult with their adviser regarding selection of elective credits. Select enough elective credits to bring the program total to 120 credits with a minimum of 42 upper-division credits.

⁹ Two courses from the list meet departmental requirements; and one of the courses meets AUCC category 4A and 4C requirements.

¹⁰ Select one course from the department approved Experience Course list for animal science majors.

¹¹ Select from the list of courses in category 3E in the AUCC.

Major in Equine Science

The Equine Science major prepares students to serve the many needs of a growing industry and focuses on providing students with an in-depth scientific knowledge of the varied functions of the horse and how to relate those scientific principles to the industry. Equine Science majors have the opportunity to develop a broad understanding of the horse as it relates to business, recreational, and production aspects of the industry. Currently, Colorado State has the most comprehensive equine program in the United States with major efforts in research, teaching, and public service.

Learning Outcomes

Successful students will demonstrate:

- Broad-based understanding of biological principles and develop the ability to incorporate the use of these principles into the horse industry
- An understanding of business/economic principles and their application to equine enterprises
- Ability to critically evaluate equine industry issues

Problem solving and leadership skills that enhance professional success

Potential Occupations

- The opportunity to attend professional and/or graduate school
- Positions that provide services to the horse industry
- Management of equine production systems such as breeding farms
- Positions with horse organizations and horse shows
- Education positions with cooperative extension and colleges and universities

A minimum grade of "C" (2.0) is required for each of the ANEQ courses which are required to complete the major. A maximum of five credits is allowed for ANEQ 350A-E, ANEQ 352, ANEQ 353, ANEQ 354, ANEQ 355, ANEQ 356, ANEQ 357, ANEQ 361, ANEQ 362, ANEQ 363, and ANEQ 364. A maximum of 12 credits is allowed for any combination of the following: ANEQ 350A-E, ANEQ 352, ANEQ 353, ANEQ 354, ANEQ 355, ANEQ 356, ANEQ 357, ANEQ 361, ANEQ 362, ANEQ 363, ANEQ 364, ANEQ 384, ANEQ 487, ANEQ 495, and ANEQ 496.

Course	Title	Cr	AUCC
FRESHMAN			
ANEQ 102	Introduction to Equine Science	4	
ANEQ 292	Equine Industry Seminar	1	

Course	Title	Cr	AUCC
<i>Select one pair of courses from the following:</i>			
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
OR			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CO 150 ^P	College Composition	3	1A
LIFE 102 ^P	Attributes of Living Systems (high school chemistry)	4	3A
SPCM 200	Public Speaking	3	
<i>Select a minimum of 3 credits from the following:</i>			
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
MATH 125 ^P	Numerical Trigonometry	1	1B
MATH 126 ^P	Analytic Trigonometry	1	1B
MATH 141 ^P	Calculus in Management Sciences	3	1B
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
	Arts/humanities ¹	3	3B
	Historical perspectives ²	3	3D
	TOTAL	29-30	
SOPHOMORE			
SOCR 330 ^P	Principles of Genetics	3	
ANEQ 230 ^P	Farm Animal Anatomy and Physiology	3	
OR			
BMS 300 ^P	Principles of Human Physiology	4	
AREC 202	Agricultural and Resource Economics	3	3C
OR			
ECON 202 ^P	Principles of Microeconomics	3	3C
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			
STAT 307 ^P	Introduction to Biostatistics	3	
	Arts/humanities ¹	3	3B
	Business electives ³	6	
	Electives	8-11	
	TOTAL	29-30	
JUNIOR			
ANEQ 334 ^P	Principles of Equine Genetics	2	
ANEQ 344 ^P	Principles of Equine Reproduction	4	4B
ANEQ 345 ^P	Principles of Nutrition: Equine Applications	3	4B
	Advanced writing ⁴	3	2
	Global and cultural awareness ⁵	3	3E
	Applied equine science electives ⁶	4	
	Experience equine science electives ⁷	2-6	
	Business electives ³	6	
	Electives	4	
	TOTAL	31-35	
SENIOR			
ANEQ 346 ^P	Equine Disease Management	3	
ANEQ 440 ^P	Equine Production and Industry	3	4A, 4C
ANEQ 441	Integrated Equine Science	2	
OR			
ANEQ 444	Equine Business Management	2	
	Applied equine science electives ⁶	4	
	Business electives ³	3	
	Electives ⁸	9-18	
	TOTAL	22-31	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the AUCC.

² Select from the list of courses in category 3D in the AUCC.

³ Select a total of 15 credits from any AREC or ECON course or any business course of which 3 credits may be a computer course. Access granted for the following business courses: ACT 205, BUS 205, FIN 305, MGT 305, MKT 305.

⁴ Select from the list of courses in category 2 in the AUCC.

⁵ Select from the list of courses in category 3E in the AUCC.

⁶ Select eight credits from four courses from the department approved applied course list for equine science majors.

⁷ Select one course from the department approved experience course list for equine science majors.

⁸ Enough elective credits must be selected to bring the program total to 120 credits with 42 upper-division credits.

Preprofessional Veterinary Medicine Requirements

Preveterinary medical students with specific interest in animal science or equine science may follow the animal or equine science majors. Maximum flexibility in career direction may be obtained by meeting the requirements for a degree in animal or equine science while simultaneously completing the admission requirements for the professional veterinary medical program. The Food Animal Veterinary Career Incentive Program (FAVCIP) is available for animal science majors.

Graduate Programs in Animal Sciences

The department offers graduate programs leading to the Master of Science and the Doctor of Philosophy degrees. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduate.school.colostate.edu/current-students/bulletin.aspx, and the department's website, www.ansci.colostate.edu.

DEPARTMENT OF BIOAGRICULTURAL SCIENCES AND PEST MANAGEMENT

Office in Plant Sciences Building, Room C129
(970) 491-5261
www.colostate.edu/Depts/bspm/

Professor Thomas O. Holtzer, Head
Janet Dill, Graduate Coordinator

Although there is no undergraduate major in bioagricultural sciences offered within the department, instructional programs in the Department of Bioagricultural Sciences and Pest Management serve a number of undergraduate majors and graduate programs across the University

Minor Programs

Minors are offered in Entomology and Plant Health. Students are provided with maximum breadth and depth with a limited number of required courses. The minors also serve to broaden the academic background of students seeking employment in the interdisciplinary job markets associated with most plant science majors. The minors provide adequate credits to meet most federal and state certification requirements for employment. Please contact Dr. Kondratieff for information on the Entomology minor and Dr. Jacobi for the Plant Health minor.

Minor in Entomology

Course	Title	Cr
LOWER DIVISION		
<i>Select one pair of the following:</i>		
BZ 110	Principles of Animal Biology	3
BZ 120	Principles of Plant Biology	4
OR		
LIFE 102 ^P	Attributes of Living Systems	4
LIFE 103 ^P	Biology of Organisms-Animals and Plants	4
TOTAL		7-8
UPPER DIVISION		
BSPM 302	Applied and General Entomology	2
BSPM 303A- C ^P	Entomology Laboratory	3
<i>Select 12-13 credits from the following:</i>		
BSPM 423	Evolution and Classification of Insects	4
BSPM 445 ^P	Aquatic Insects	4
BSPM 451 ^P	Integrated Pest Management	4
BSPM 462 ^P / MIP 462 ^P / BZ 462 ^P	Parasitology and Vector Biology*	5
BSPM 487	Internship	3
OR		
BSPM 495	Independent Study	3
TOTAL		17-18
PROGRAM TOTAL = 24-26 credits		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.
*Additional course work may be required because of prerequisites.

Minor in Plant Health

Course	Title	Cr
BSPM 302	Applied and General Entomology	2
<i>Select one of the following:</i>		
BSPM 303A ^P	General Entomology Laboratory	2
BSPM 303B ^P	Horticultural Entomology Laboratory	1
BSPM 303C ^P	Agricultural Entomology Laboratory	1
BSPM 308 ^{P*}	Ecology and Management of Weeds	3
BSPM 310 ^{P*}	Understanding Pesticides	3
BSPM 361 ^{P*}	Elements of Plant Pathology	3
<i>Select a minimum of 9-10 credits from the following (including the selections of BSPM 487 or BSPM 495 or BZ/LIFE courses below):</i>		
BSPM 365 ^{P*}	Integrated Tree Health Management	4
BSPM 423	Evolution and Classification of Insects	3
BSPM 445 ^{P*}	Aquatic Insects	4
BSPM 450 ^{P*}	Molecular Plant-Microbe Interactions	3
BSPM 451 ^P	Integrated Pest Management	3
BSPM 462 ^{P*} / MIP 462 ^{P*} / BZ 462 ^{P*}	Parasitology and Vector Biology	5
BSPM 487	Internship	3
OR		
BSPM 495	Independent Study	3
BZ 120	Principles of Plant Biology ¹	4
OR		
LIFE 102 ^P	Attributes of Living Systems ¹	4
AND		
LIFE 103 ^P	Biology of Organisms-Animal and Plants ¹	4
PROGRAM TOTAL = 22 credits without prerequisites		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.
*Additional course work may be required because of prerequisites.

¹ May be taken as electives by students in majors that are not in the biological or agricultural sciences.

Graduate Programs in Bioagricultural Sciences

The department offers graduate programs leading to a non-thesis Master of Science in Pest Management and Master of Science and Doctor of Philosophy degrees in Bioagricultural Sciences with specializations are available in Entomology, Plant Pathology, or Weed Science. Research in the department is focused in four areas of emphasis that cut across disciplinary specializations: 1) genomics and molecular biology; 2) ecology and biodiversity; 3) biology and management of invasive species; and 4) integrated pest management. In addition, a number of faculty in the department are members of Colorado State University's Graduate Degree Program in Ecology or the Cell and Molecular Biology Program and advise M.S. and Ph.D. students through these programs. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, www.colostate.edu/Depts/bspm/.

DEPARTMENT OF HORTICULTURE AND LANDSCAPE ARCHITECTURE

Office in Shepardson Building, Room 111
(970) 491-7019
hla.colostate.edu

Professor Stephen J. Wallner, Head

Major in Horticulture

Horticulture is the application of scientific principles in the growing, marketing, processing, and utilizing of fruits, vegetables, flower and foliage plants, trees, shrubs, and turfgrasses. The major requires a strong grounding in botany, chemistry, and horticulture. There are six concentrations in the Horticulture major: Floriculture, Horticultural Business Management, Horticultural Food Crops, Horticultural Science, Horticultural Therapy, and Viticulture and Enology.

Learning Outcomes

Successful students will demonstrate:

- Technical competence that includes understanding plant growth and development as influenced by the manipulations of horticulture technologies such as

greenhouse management, fertility management, integrated pest management, etc.

- Management and leadership skills that will allow them to become an entry-level supervisor in a specific business or research program
- Problem solving skills such as identifying the significance of a problem, researching realistic solutions using current literature, and organizing the materials to develop appropriate recommendations and actions

Potential Occupations

Horticulture is both a production and service industry. Well-educated horticulturists have the best opportunity for obtaining positions and moving up in the industry. The industry will be looking for professionals who can manage greenhouses, nurseries, and floral outlets, buy and sell supplies, plant material, and equipment, or edit journals and newsletters. Meeting the nutritional needs of the world population is an important challenge. Researchers are needed to develop improved fruit and vegetable varieties. Other professionals are needed to improve production and transportation methods and to develop and market better fertilizers. Within this field, students can exercise their talents and interests in computers, construction, engineering, chemistry, physics, social services, or business management. Participation in internships and cooperative education opportunities is highly recommended to enhance practical training and development. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

Some examples include: biotechnologist; extension specialist; floriculturist; fruit and vegetable grower; grape producer; greenhouse supplies/seed and plant material sales representative; greenhouse production manager; horticultural therapist; interior plant maintenance technician; marketing representative; plant breeder; produce buyer; winemaker.

Floriculture Concentration

Floriculture emphasizes greenhouse-grown flower crops. Students study propagation, production, utilization, and improvement of plants, and are prepared to grow quality greenhouse products. Courses include the production, use, and marketing of cut flowers, bedding, and potted plants, which give this concentration its focus. Students are also required to take a practicum and an internship in their junior and/or senior years. A number of opportunities exist in floriculture-related professions including greenhouse production, all phases of retail and wholesale floral business, greenhouse supply sales, greenhouse construction and

computerized environmental control, plant breeding and plant research.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
OR			
AGRI 292 ^P	Transfer Seminar	1	
BZ 120	Principles of Plant Biology	4	3A
<i>Select one set of course from the following:</i>			
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
OR			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A
HORT 100	Horticultural Science	4	3A
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
	Arts/humanities ¹	3	3B
	Global and cultural awareness ²	3	3E
	Electives	0-4	
	TOTAL	30	
SOPHOMORE			
AREC 202	Agricultural and Resource Economics	3	3C
BZ 223 ^P	Plant Identification	3	
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
HORT 260 ^P	Plant Propagation	4	
SOCR 240 ^P	Introductory Soil Science	4	
SPCM 200	Public Speaking	3	
	Arts/humanities ¹	3	3B
	Historical perspectives ³	3	3D
	Electives	3	
	TOTAL	30	
JUNIOR			
AGRI 320B ^P	Computer Applications in Agriculture-Data Base ⁴	1	
AGRI 320D ^P	Computer Applications in Agriculture-Project Management ⁴	1	
AGRI 320E ^P	Computer Applications in Agriculture-Spreadsheets ⁴	1	
BSPM 302	Applied and General Entomology	2	
BSPM 303B ^P	Horticultural Entomology Laboratory	1	
BSPM 361 ^P	Elements of Plant Pathology	3	
HORT 310	Greenhouse Management	4	4B
<i>Select 3-4 credits from the following:⁵</i>			
HORT 321 ^P	Nursery Production and Management	4	
HORT 331	Landscape Design	2	
HORT 341 ^P	Turfgrass Management	3	
HORT 401 ^P	Medicinal and Value-Added Uses of Plants	3	
HORT 441 ^P	Turfgrass Science	3	
HORT 450A ^P	Horticulture Food Crops-Cool Season Vegetable Production	1	
HORT 450B ^P	Horticulture Food Crops-Warm Season Vegetable Production	1	
HORT 450C ^P	Horticulture Food Crops-Small Fruit Production	1	
HORT 450D ^P	Horticulture Food Crops-Tree Fruit Production	1	
HORT 452 ^P	Viticulture I-Grape Production	1	
HORT 460 ^P	Plant Breeding	3	
SOCR 460 ^P		3	
HORT 464 ^P	Arboriculture	3	
HORT 476 ^P	Environmental Plant Stress Physiology	3	
HORT 322	Herbaceous Plants	3	
HORT 486A	Practicum-Floriculture ⁶	2	
HORT 487	Internship ⁷	3	
	Advanced writing ⁸	3	2
	Electives	2-3	
	TOTAL	30	
SENIOR			
BZ 440 ^P	Plant Physiology	3	

Course	Title	Cr	AUCC
HORT 412	Floriculture Crops	4	
HORT 454 ^P	Horticulture Crop Production and Management	2	4A, 4C
HORT 486A	Practicum-Floriculture ⁹	2	
MGT 305	Fundamentals of Management	3	
SOCR 330 ^P	Principles of Genetics	3	
	Agricultural economics ¹⁰	3	
	Horticulture electives ¹¹	3-4	
	Electives ¹²	6-7	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3E in the AUCC.

³ Select from the list of courses in category 3D in the AUCC.

⁴ AGRI 140 and BUS 150 and CS 110 are considered review courses; credits in these courses may not be used toward a degree in the floriculture concentration in the horticulture major.

⁵ HORT 571 may also be selected in this choice.

⁶ All junior-level floriculture majors are required to register for at least two credits of HORT 486A for one term.

⁷ For internship requirements, refer to departmental policy.

⁸ Select from the list of courses in category 2B in the AUCC

⁹ All senior-level floriculture majors are required to register for at least two credits of HORT 486A for one term.

¹⁰ Select from the list of courses taught in the Department of Agricultural and Resource Economics.

¹¹ Select from the horticulture courses listed in the junior year.

¹² Select the number of credits to bring the program total to 120 credits.

Horticultural Business Management Concentration

Horticultural Business Management provides the broadest horticultural background available. The curriculum consists of a core of business, computer, and economics courses. In horticulture, students choose a special emphasis, or take an array of courses that may lead to greater job opportunities. Graduates have the knowledge to manage a horticulture business or work in market-associated positions. Opportunities exist in the sale of facilities, plant material, equipment, and supplies involved in all aspects of horticulture, or as buyers of horticulture products in the U.S. or in international markets. With careful selection of business courses, Horticulture graduates can complete a minor in business administration with one additional course.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
OR			
AGRI 292 ^P	Transfer Seminar	1	
AREC 202	Agricultural and Resource Economics	3	3C
BZ 120	Principles of Plant Biology	4	3A
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
CO 150 ^P	College Composition	3	1A
ECON 204 ^P	Principles of Macroeconomics	3	3F
HORT 100	Horticultural Science	4	3A
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
	Elective	3	
	TOTAL	29	

Course	Title	Cr	AUCC
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
AGRI 140	Technology in Agriculture	3	
OR			
BUS 150	Business Computing Concepts and Applications	3	
AREC 375 ^P	Agricultural Law	3	
OR			
BUS 205	Legal and Ethical Issues in Business	3	
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
HORT 260 ^P	Plant Propagation	4	
SOCR 240 ^P	Introductory Soil Science	4	
SPCM 200	Public Speaking	3	
	Advanced Writing ¹	3	2
	Electives	3	
	TOTAL	30	

JUNIOR			
AREC 408 ^P	Agricultural Finance	3	
OR			
FIN 305 ^P	Fundamentals of Finance	3	
BSPM 302	Applied and General Entomology	2	
BSPM 361 ^P	Elements of Plant Pathology	3	
BZ 440 ^P	Plant Physiology	3	
MGT 305	Fundamentals of Management	3	
MKT 305 ^P	Fundamentals of Marketing	3	
STAT 204 ^P	Statistics for Business Students	3	
	Horticulture, upper division	6	
	Electives	3	
	TOTAL	29	

SENIOR			
HORT 310	Greenhouse Management	4	4B
OR			
HORT 460 ^P / SOCCR 460 ^P	Plant Breeding	3	4B
HORT 454 ^P	Horticulture Crop Production and Management	2	4A, 4C
HORT 476 ^P	Environmental Plant Stress Physiology	3	
	Arts/humanities ²	6	3B
	Global and cultural awareness ³	3	3E
	Historical perspectives ⁴	3	3D
	Horticulture, upper division	5	
	Upper division agricultural economics, business, or economics	3	
	Electives	3-4	
	TOTAL	32	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 2 of the AUCC.

² Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 3E in the AUCC.

⁴ Select from the list of courses in category 3D in the AUCC.

Horticultural Food Crops Concentration

Horticultural Food Crops focuses on systems related to production of fruits and vegetables. Specific courses include fruit and vegetable production, irrigation practices, soil fertility, propagation, breeding, and related plant pest management courses. Students must choose either the Production or Seed Science option. Those interested in organic food crop production can major in Horticulture in the Horticultural Food Crops concentration and pursue the Organic Agriculture Interdisciplinary Minor as described in University-Wide Instruction Programs. A number of opportunities exist in horticultural food crops-related professions including greenhouse production, all phases of

the retail and wholesale business, greenhouse supply sales, greenhouse construction, seed production and sales, plant breeding and plant research.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
OR			
AGRI 292 ^P	Transfer Seminar	1	
AREC 202	Agricultural and Resource Economics	3	3C
BZ 120	Principles of Plant Biology	4	3A
<i>Select one of the following sets of courses:</i>			
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
OR			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A
HORT 100	Horticultural Science	4	3A
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
	Elective	3-7	
	TOTAL	30	

SOPHOMORE			
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
HORT 260 ^P	Plant Propagation	4	
SOCR 240 ^P	Introductory Soil Science	4	
SPCM 200	Public Speaking	3	
STAT 201 ^P	General Statistics	3	
OR			
STAT 301 ^P	Introduction to Statistical Methods	3	
	Arts/humanities ¹	6	3B
	Historical perspectives ²	3	3D
	Global and cultural awareness ³	3	3E
	TOTAL	30	

JUNIOR			
AGRI 140	Technology in Agriculture	3	
OR			
CS 110	Personal Computing	4	
BSPM 302	Applied and General Entomology	2	
BSPM 303 ^P	Horticultural Entomology Laboratory	1	
BSPM 361 ^P	Elements of Plant Pathology	3	
BZ 440 ^P	Plant Physiology	3	
HORT 486B	Practicum-General	3	
OR			
HORT 487	Internship	3	
SOCR 330 ^P	Principles of Genetics	3	
	TOTAL	18-19	

SENIOR			
BSPM 308 ^P	Ecology and Management of Weeds	3	
HORT 450A ^P	Horticulture Food Crops-Cool Season Vegetable Production	1	
HORT 450B ^P	Horticulture Food Crops-Warm Season Vegetable Production	1	
HORT 454 ^P	Horticulture Crop Production and Management	2	4A, 4C
HORT 476 ^P	Environmental Plant Stress Physiology	3	
	Advanced Writing ⁴	3	2
	Elective	1	
	TOTAL	14	

PROGRAM TOTAL = 92-93 credits⁵

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3D in the AUCC.

³ Select from the list of courses in category 3E in the AUCC.

⁴ Select from the list of courses in category 2 of the AUCC.

⁵ Students must select either the production option or seed science option to complete this concentration.

Production Option

In addition to the Horticultural Food Crop concentration courses, students in the production option must take the following courses:

Course	Title	Cr	AUCC
JUNIOR			
HORT 310	Greenhouse Management	4	4B
SOCR 350 ^P	Soil Fertility Management	3	
	Electives	4-5	
	TOTAL	11-12	
SENIOR			
HORT 450C ^P	Horticulture Food Crops-Small Fruit Production	1	
HORT 450D ^P	Horticulture Food Crops-Tree Fruit Production	1	
HORT 460 ^P	Plant Breeding	3	
SOCR 370 ^P	Irrigation Principles	2	
	Electives ¹	9	
	TOTAL	16	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select enough elective credits to bring total to minimum of 120.

Seed Science Option

In addition to the Horticultural Food Crop concentration courses, the following must be completed:

Course	Title	Cr	AUCC
SOPHOMORE			
BZ 223 ^P	Plant Identification	3	
JUNIOR			
<i>Select 6-7 credits from the following:</i>			
HORT 310	Greenhouse Management	4	4B
HORT 321 ^P	Nursery Production and Management	4	
HORT 341 ^P	Turfgrass Management	3	
HORT 412 ^P	Floriculture Crops	4	
HORT 450C ^P	Horticulture Food Crops-Small Fruit Production	1	
HORT 450D ^P	Horticulture Food Crops-Tree Fruit Production	1	
HORT 452 ^P	Viticulture-Grape Production	1	
	Electives	5	
	TOTAL	11-12	
SENIOR			
HORT 460 ^{P/}	Plant Breeding	3	4B
SOCR 460 ^P			
	Electives ¹	10	
	TOTAL	13	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select enough elective credits to bring total to minimum of 120.

Horticultural Science Concentration

Horticultural Science graduates conduct research to discover new information about plant growth, development, and environmental response. This research can lead to new plant varieties and production methods. The curriculum consists of a solid foundation in the basic natural sciences as well as in agricultural sciences and prepares students for technical and scientific careers in laboratory, greenhouse, or field

research. Exceptional students participate in individual research projects coordinated by professors. Graduates in this area often continue their education.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
OR			
AGRI 292 ^P	Transfer Seminar	1	
BZ 120	Principles of Plant Biology	4	3A
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A
HORT 100	Horticultural Science	4	3A
MATH 126 ^P	Analytic Trigonometry ¹	1	1B
	Arts/humanities ²	6	3B
	Social/behavioral sciences ³	3	3C
	TOTAL	31	

Course	Title	Cr	AUCC
SOPHOMORE			
AGRI 140	Technology in Agriculture	3	
OR			
CS 110	Personal Computing	4	
HORT 260 ^P	Plant Propagation	4	
PH 121 ^P	General Physics I	5	3A
PH 122 ^P	General Physics II	5	3A
SPCM 200	Public Speaking	3	
	Global and cultural awareness ⁴	3	3E
	Historical perspectives ⁵	3	3D
	Advanced writing ⁶	3	2
	TOTAL	29-30	

Course	Title	Cr	AUCC
JUNIOR			
<i>Select one pair of courses from the following:</i>			
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
CHEM 246 ^P	Fundamentals of Organic Chemistry Laboratory	1	
OR			
CHEM 345 ^P	Organic Chemistry I	4	
CHEM 346 ^P	Organic Chemistry II	4	
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
SOCR 240 ^P	Introductory Soil Science	4	
SOCR 330 ^P	Principles of Genetics	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
	Horticulture electives	8	
	Electives	0-3	
	TOTAL	30	

Course	Title	Cr	AUCC
SENIOR			
BC 351 ^P	Principles of Biochemistry	4	
BSPM 302	Applied and General Entomology	2	
BSPM 303B ^P	Horticultural Entomology Laboratory	1	
BSPM 361 ^P	Elements of Plant Pathology	3	
BZ 440 ^P	Plant Physiology	3	
HORT 310	Greenhouse Management	4	4B
OR			
HORT 460 ^{P/}	Plant Breeding	3	4B
SOCR 460 ^P			
HORT 454 ^P	Horticulture Crop Production and Management	2	4A, 4C
HORT 476 ^P	Environmental Plant Stress Physiology	3	
HORT 495	Independent Study	2	
	Horticulture electives	3	
	Electives ⁷	3-4	
	TOTAL	29-30	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ The equivalent to MATH 117, MATH 118, and MATH 125 are considered background courses and should have been taken prior to admission or made up.

² Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 3C in the AUCC.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵Select from the list of courses in category 3D in the AUCC.

⁶Select from the list of courses in category 2 in the AUCC.

⁷Select the number of credits to bring the program total to 120 credits.

Horticultural Therapy Concentration

The Horticultural Therapy concentration combines horticulture courses with the study of therapy/human sciences, leading to careers in health care and human services. Horticultural therapy students gain the skills necessary to establish, manage, and work in a range of program types such as mental health, vocational, correctional, rehabilitative, wellness, educational, community-based and long term care.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
OR			
AGRI 292 ^P	Transfer Seminar	1	
BZ 120	Principles of Plant Biology	4	3A
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CO 150 ^P	College Composition	3	1A
HORT 100 ^P	Horticultural Science	4	3A
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
PSY 100	General Psychology	3	3C
SOC 100	General Sociology	3	3C
OR			
SOC 105	Social Problems	3	3C
	Arts/humanities ¹	3	3B
	Electives	3	
	TOTAL	31	
SOPHOMORE			
HORT 270	Fundamentals of Horticultural Therapy ²	2	
HORT 221	Landscape Plants	4	
HORT 260 ^P	Plant Propagation	4	
SOCR 240 ^P	Introductory Soil Science	4	
SPCM 200	Public Speaking	3	
	Arts/humanities ¹	3	3B
	Global and cultural awareness ³	3	3E
	Therapy/human science courses ⁴	6	
	TOTAL	29	
JUNIOR			
HORT 310	Greenhouse Management	4	4B
HORT 322	Herbaceous Plants	3	
HORT 421 ^P	Horticultural Therapy Techniques ²	2	
HORT 423 ^P	Horticultural Therapy Programming ²	2	
PSY 310 ^P	Basic Counseling Skills	3	
PSY 320 ^P	Abnormal Psychology	3	
	Horticulture/bioagricultural science courses ⁵	3	
	Therapy/human science courses ⁴	6	
	Advanced Writing ⁶	3	2
	Electives	1	
	TOTAL	30	
SENIOR			
AHS 300	Research in Applied Professions	3	
OR			
STAT 311 ^P	Statistics for Behavioral Sciences I	3	
HORT 377 ^P	Horticultural Methods for Therapy Programs ²	1	
HORT 454 ^P	Horticulture Crop Production and Management	2	4A, 4C
HORT 425 ^P	Horticultural Therapy Management ²	3	
HORT 487	Internship	3	
	Historical Perspectives ⁷	3	3D
	Horticulture/bioagricultural science courses ⁵	5	
	Therapy/human science courses ⁴	6	
	Electives	3	
	TOTAL	29	

Course Title Cr AUCC

PROGRAM TOTAL = 120 credits

^PThis course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹Select from list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

²Offered as nontraditional or online course.

³Select from list of courses in category 3E in the AUCC.

⁴Select from departmental list of therapy/human science courses. A total of 12 credits must be upper-division.

⁵Select from departmental list of horticulture/bioagricultural science courses.

⁶Select one course from the list of courses in category 2 of the AUCC.

⁷Select from list of courses in category 3D in the AUCC.

Viticulture and Enology Concentration

The Viticulture and Enology concentration is designed to give students a background in food crop production with a focus on grapes and their processing into wine. Students gain practical experience through required internships in grape production and winemaking. This is accomplished via one or more internships at a winery and/or vineyard. Students take background courses in science and pest identification and management as well as food safety and plant nutrition. Students completing the concentration have the opportunity to enter the industry as an assistant grower or winemaker.

Course Title Cr AUCC

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Sciences	1	
OR			
AGRI 292	Transfer Seminar	1	
AREC 202	Agricultural and Resource Economics	3	3C
BZ 120	Principles of Plant Biology	4	3A
<i>Select one set of courses from the following:</i>			
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
OR			
CHEM 111 ^P	General Chemistry	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A
HORT 100 ^P	Horticultural Science	4	3A
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
	Arts/humanities ¹	3	3B
	Electives	0-3	
	TOTAL	29-30	
SOPHOMORE			
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
HORT 260 ^P	Plant Propagation	4	
HORT 452 ^P	Viticulture I- Grape Production ²	1	
LIFE 205	Survey of Microbial Biology	3	
SOCR 240 ^P	Introductory Soil Science	4	
SPCM 200	Public Speaking	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
	Arts/humanities ¹	3	3B
	Historical perspectives ³	3	3D
	Global and cultural awareness ⁴	3	3E
	TOTAL	31	
JUNIOR			
AGRI 140	Technology in Agriculture	3	
OR			
CS 110	Personal Computing	4	
BSPM 302	Applied and General Entomology	2	

Course	Title	Cr	AUCC
BSPM 303B ^P	Entomology Laboratory-Horticultural	1	
BSPM 361 ^P	Elements of Plant Pathology	3	
BZ 440 ^P	Plant Physiology	3	
FTEC 400 ^P	Food Safety	3	
HORT 277	Introduction to Enology ⁵	1	
HORT 487	Internship	2	
MKT 305 ^P	Fundamentals of Marketing	3	
SOCR 330 ^P	Principles of Genetics	3	
SOCR 350	Soil Fertility Management	3	
	Advanced Writing ⁶	3	2
	TOTAL	30-31	
SENIOR			
BSPM 308 ^P	Ecology and Management of Weeds	3	
HORT 310	Greenhouse Management	4	4B
OR			
HORT 460 ^P / SOCR 460 ^P	Plant Breeding	3	
HORT 450C ^P	Horticulture Food Crops-Small Fruit Production ⁷	1	
HORT 450D ^P	Horticulture Food Crops-Tree Fruit Production ⁷	1	
HORT 454	Horticulture Crop Production and Management	2	4A, 4C
HORT 462	Viticulture Practices in Grape Production ⁸	3	4B
HORT 476 ^P	Environmental Plant Stress Physiology	3	
HORT 477	Enology-History and Winemaking ⁸	3	
HORT 487	Internship	2	
SOCR 370 ^P	Irrigation Principles	2	
	Electives	5-6	
	TOTAL	29	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Offered in the fall of even-numbered years.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Offered in the spring of even-numbered years.

⁶ Select one course from the list in category 2 in the AUCC.

⁷ Offered in the fall of odd-numbered years.

⁸ Offered in the spring of odd-numbered years.

Major in Landscape Architecture

Studying Landscape Architecture at Colorado State is an adventure. Taking part in a challenging course of study, students prepare themselves for careers in a field whose enormous potential has only begun to be recognized. Landscape Architecture students study design as accomplished landscape architects see it: shaping spaces as well as planning and preserving them.

Landscape architects create and design detailed landscape plans to be functional, aesthetic, and compatible with the natural environment. Throughout the program, emphasis is on the relationship between design, nature, and society: the impact of environments on the individual as well as the impact of users on the environment. Registration laws for landscape architects in 49 states encourage graduation from programs such as that offered at Colorado State University, which is accredited by the Landscape Architecture Accreditation Board of the American Society of Landscape Architects.

Landscape architects must analyze the natural elements of a site including the climate, soil, slope of the land, drainage, sunlight, and vegetation. Computer-aided design (CAD) has become an essential tool for landscape architects. Landscape architects often work with building architects, surveyors, engineers, and urban planners and collaborate with environmental scientists, foresters, and other professionals to find the best way to conserve or restore natural resources. Knowledge of appropriate local, state, or federal regulations such as those protecting wetlands or historic resources is essential.

Nature, culture, form, and space are the classic elements of landscape architecture with which students work in a series of design studies and related courses. Coursework focuses on a variety of landscape projects that grow more complex as the curriculum proceeds. The courses include subjects such as site design, landscape design and construction, surveying, landscape ecology, and urban and regional planning. Other courses specific to the major are history of the designed landscape, plant and soil science, geology, and professional practice. Students are also encouraged to take advantage of summer travel courses available to study highly-valued ecological/cultural sites in Colorado and designed landscapes in Europe.

Colorado State University offers the only nationally accredited undergraduate professional Landscape Architecture program in Colorado.

Learning Outcomes

Successful students will demonstrate:

- Basic problem solving skills and knowledge for comprehensive landscape design that include the following characteristics: 1) research of natural systems, cultural systems, users, and precedents; 2) analysis of related site systems and users; and 3) synthesis, the articulation of formal responses to research and analysis findings
- Technical competency in basic landscape architectural methods and communication, including organization of writing, project development, representation, and documentation
- Fundamental knowledge and skills appropriate to public and private entry-level landscape architecture including: 1) application of digital media; 2) technology applications for analysis and design; 3) landscape design; and 4) representation for analysis and design

Potential Occupations

Many types of organizations and individuals hire landscape architects – from real estate development firms starting new

projects, municipalities constructing airports or parks, to home owners desiring garden designs. Many landscape architects are employed by government agencies doing site design for buildings, parks, and other public assets. Others are involved in park and recreation planning in national parks and forests, and restoration of environmentally damaged landscapes. Employment of landscape architects is expected to increase faster than the average for all occupations through the year 2015. Starting in 1998, average salaries for landscape architects exceeded average salaries of architects. Anticipated growth in construction is expected to increase demand for landscape architectural services over the long run. Participation in internships and cooperative education opportunities is highly recommended to enhance practical training and development. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

Some examples include: design consultant, landscape designer and contractor, private practice business, construction supervisor, land or environmental planner, urban designer, historic preservationist, golf course architect, resort planner.

Course	Title	Cr	AUCC
FRESHMAN			
BZ 120	Principles of Plant Biology	4	3A
CO 150 ^P	College Composition	3	1A
LAND 110	Introduction to Landscape Architecture	3	
LAND 120	History of the Designed Landscape	3	
LAND 230	Drawing the Landscape	4	
LAND 240 ^P	Fundamentals of Landscape Design	4	
LAND 241 ^P	Environmental Analysis	3	
MATH 126 ^P	Analytic Trigonometry	1	1B
	Arts and Humanities ¹	3	3B
	Mathematics ²	2	1B
	TOTAL	30	
SOPHOMORE			
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
GEOL 120	Exploring Earth Physical Geology	3	3A
	OR		
GEOL 122	The Blue Planet: Geology of Our Environment	3	3A
GEOL 121 ^P	Introductory Geology Laboratory	1	3A
LAND 220 ^P / LIFE 220 ^P	Fundamentals of Ecology	3	
LAND 360 ^P	Basic Landscape Design and Construction (LAND 240)	3	4A
LAND 361 ^P	Digital Methods	3	
LAND 362 ^P	Form and Expression in Garden Design	3	4B
LAND 363 ^P	Advanced Landscape Site Engineering	4	
	<i>Select one course from the following:</i>		
LAND 454 ^P	Landscape Field Studies	5	
LAND 455 ^P	Travel Abroad-European Landscape Architecture	5	
NR 220 ^P	Natural Resources Ecology and Measurements	5	
PSY 100	General Psychology	3	3C
	Global and Cultural Awareness ³	3	3E
	TOTAL	35	
JUNIOR			
AREC 202	Agricultural and Resource Economics	3	3C
	OR		
ECON 202 ^P	Principles of Microeconomics	3	3C
LAND 364 ^P	Design and Nature	4	

Course	Title	Cr	AUCC
LAND 365 ^P	Landscape Contract Drawing and Specifications	3	
LAND 366 ^P	Landscape Design Expression	4	
LAND 444 ^P	Ecology of Landscapes	3	
NR 319 ^P	Geospatial Applications in Natural Resources	4	
	OR		
NR 323	Remote Sensing of Natural Resources	3	
PHIL 345 ^P	Environmental Ethics	3	
SOCR 240 ^P	Introductory Soil Science	4	
SPCM 200	Public Speaking	3	
	TOTAL	30-31	
SENIOR			
BZ 223 ^P	Plant Identification	3	
	OR		
HORT 221	Landscape Plants	4	
HORT 368 ^P / LAND 368 ^P	Landscape Irrigation and Water Conservation	3	
LAND 392 ^P	Seminar-Designed Landscapes-Theory and Criticism	2	
LAND 446 ^P	Urban Design	4	
LAND 447 ^P	Comprehensive Landscape Design	4	4C
LAND 449 ^P	Professional Practice	1	4C
	Advanced writing ⁴	3	2
	Arts and Humanities	3	3B
	Historical perspectives ⁵	3	3D
	Elective(s)	4	
	TOTAL	30-31	

PROGRAM TOTAL = 125-127 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All –University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 1B in the AUCC.

³ Select from the list of courses in category 3E in the AUCC.

⁴ Select from the list of courses in category 2 in the AUCC.

⁵ Select from the list of courses in category 3D in the AUCC.

⁴ Select from the list of courses in category 2B in the AUCC.

⁵ Select from the list of courses in category 3D in the AUCC.

Graduate Program in Landscape Architecture

The department offers a graduate program leading to the Master of Landscape Architecture (M.L.A.). Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, hla.colostate.edu.

Major in Environmental Horticulture

Environmental horticulturists provide solutions necessary to achieve aesthetically pleasing, functional, and environmentally sound outdoor spaces. They also design and manage private and public landscapes, such as golf courses, botanical gardens, and parks. In addition, they may develop the entrepreneurial skills necessary to successfully operate a nursery, garden center, tree care, landscape design and build or landscape management firm. Four concentrations are offered in the Environmental Horticulture major – Landscape Business, Landscape Design and Contracting,

Nursery and Landscape Management, and Turf Management.

Learning Outcomes

Successful students will demonstrate:

- Management and leadership skills necessary for a successful career in the green industry
- Technical competencies in their understanding of growth and development of horticultural plants and landscapes, including development as influenced by manipulation of horticulture technologies, such as fertility and water management, and integrated pest management for all aspects of landscape horticulture
- Skills to assess site issues, provide creative environmentally sound solutions and manage designed and built landscapes
- Analytical and problem solving skills that allow identification of problems related to the management or production of horticultural crops and landscapes, as well as strategies to solve them

Potential Occupations

Graduates of the Environmental Horticulture major will find career opportunities in a multitude of fields in the green industry. Emerging demand for environmental solutions and green technologies will position our students for careers in a wide variety of areas including: landscape design and construction, sports turf management, retail and wholesale nursery and garden center management; golf course superintendence; arborists, plant propagation, landscape project management, landscape maintenance, landscape estimating; green industry account management; irrigation design and water resource management; arboriculture; botanic gardens or arboreta, or landscape business management and entrepreneurship.

Landscape Business Concentration

The Landscape Business concentration prepares individuals for careers in business management, production, operations, account management, entrepreneurship, landscape management and project management opportunities in the green industry. This concentration focuses on both horticulture and business. Students will develop skills in estimating project costs, plant selection and care, as well as business management techniques. Students completing this concentration will also earn a minor in business through the College of Business. This concentration is fully accredited by the Professional Landscape Network (PLANET). Additionally, students are required to complete an internship program, furthering their learning opportunities.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
OR			
AGRI 292 ^P	Transfer Seminar	1	
AGRI 140	Technology in Agriculture	3	
OR			
BUS 150	Business Computing Concepts and Applications	3	
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CO 150	College Composition	3	1A
HORT 330 ^P	Computers for Landscape Design	2	
HORT 100	Horticultural Science	4	3A
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 125 ^P	Numerical Trigonometry	1	1B
SPCM 200	Public Speaking	3	
	Arts/humanities ¹	3	3B
	Electives	2	
	TOTAL	31	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
AREC 202	Agricultural and Resource Economics	3	3C
OR			
ECON 202 ^P	Principles of Microeconomics	3	3C
HORT 221	Landscape Plants	4	
HORT 331	Landscape Design	2	
HORT 487	Internship	3	
LSPA 105 ^P	First Year Spanish I	5	
OR			
LSPA 106 ^P	First Year Spanish Review	3	
LSPA 107 ^P	First Year Spanish II	5	
SOCR 240 ^P	Introductory Soil Science	4	
	Historical perspectives ²	3	3D
	TOTAL	30-32	
JUNIOR			
BUS 205	Legal and Ethical Issues in Business	3	
ECON 204 ^P	Principles of Macroeconomics	3	
FIN 305 ^P	Fundamentals of Finance	3	
HORT 310	Greenhouse Management	4	4B
HORT 321 ^P	Nursery Production and Management	4	4A
HORT 322	Herbaceous Plants	3	
HORT 370 ^P	Landscape Irrigation	1	
JTC 300 ^P	Professional and Technical Communication	3	2
LSPA 200 ^P	Second Year Spanish I	3	3B
MGT 305	Fundamentals of Management	3	
SOCR 370 ^P	Irrigation Principles	2	
	TOTAL	32	
SENIOR			
AREC 328 ^P	Small Agribusiness Management	3	
BSPM 308 ^P	Ecology and Management of Weeds	3	
OR			
BSPM 302	Applied and General Entomology	2	
AND			
BSPM 303B ^P	Horticultural Entomology Laboratory	1	
BUS 405A ^P	Contemporary Business Topics	3	
HORT 341 ^P	Turfgrass Management	3	
HORT 464 ^P	Arboriculture	3	4C
HORT 465 ^P	Landscape Estimating	3	
HORT 479 ^P	Landscape Professional Practices	2	
MKT 305	Fundamentals of Marketing	3	
	Global and cultural awareness ³	3	3E
	Electives	2-4	
	TOTAL	28-30	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3D in the AUCC.

³ Select from the list of courses in category 3E in the AUCC.

Landscape Design and Contracting Concentration

The Landscape Design and Contracting concentration prepares students for careers in the design-build profession for residential, commercial and public properties. Landscape designers and contractors create, build, and manage landscape projects and work in close collaboration with other design and contracting professionals. Students will develop skills to provide environmental solutions, creating projects that minimize the impact on the environment.

They also acquire skills to manage multifaceted projects of all scales, including site design, estimating of job and labor costs, construction methods and techniques, plant selection and care, as well as business management skills. Experiential learning opportunities lead to projects allowing our students to work with clients and realize built works prior to graduating. Additionally, students are required to complete an internship program, furthering their learning opportunities. This concentration is fully accredited by the Professional Landscape Network (PLANET). Graduates of this concentration are recognized by the Colorado State Board of Landscape Architects, allowing our students to become eligible for landscape architecture licensure.

Course	Title	Cr	AUCC
HORT 370 ^P	Landscape Irrigation	1	
HORT 465 ^P	Landscape Estimating	3	
SOCR 370 ^P	Irrigation Principles	2	
	Advanced Writing ²	3	2
	Spanish ⁴	5	
	Electives	1	
	TOTAL	29	
SENIOR			
BSPM 302	Applied and General Entomology	2	
BSPM 303 ^B	Horticultural Entomology Laboratory	1	
HORT 341 ^P	Turfgrass Management	3	
HORT 431 ^P	Planting Design Studio	4	4A
HORT 432 ^P	Intensive Landscape Design Studio	5	4B, 4C
HORT 464 ^P	Arboriculture	3	
HORT 479 ^P	Professional Landscape Practices	2	
	Global and cultural awareness ⁵	3	3E
	Business electives	3	
	Electives	4	
	TOTAL	30	

PROGRAM TOTAL = 125-130 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3D in the AUCC.

³ Select from the list of courses in category 2 in the AUCC

⁴ One semester.

⁵ Select from the list of courses in category 3E in the AUCC.

Nursery and Landscape Management Concentration

Nursery and Landscape Management provides extensive training in landscape plant culture and use; and also develops skills needed to start and manage a nursery, garden center, arboriculture or landscape management firm. Nursery specialists produce trees, shrubs, groundcovers, and herbaceous perennials for the landscape industry. Graduates become nursery and landscape managers who oversee and manage general landscape operations, choose the type and quantity of horticultural plants to be grown; select and purchase seed, fertilizers, and pest control chemicals; hire employees, direct and coordinate work activities; manage record-keeping, and implement marketing plans. Supporting courses are taught in plant and soil science, pest management, business management, horticulture and plant materials. An internship is required to ensure graduates have practical experience.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
OR			
AGRI 292 ^P	Transfer Seminar	1	
AREC 202	Agricultural and Resource Economics	3	3C
BZ 120	Principles of Plant Biology	4	3A
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
CO 150 ^P	College Composition	3	1A
HORT 100 ^P	Horticultural Science	4	3A
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
	Electives	5	
	TOTAL	28	

Course	Title	Cr	AUCC
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FRESHMAN

AGRI 140	Technology in Agriculture	3	
OR			
BUS 150	Business Computing Concepts and Applications	3	
AGRI 192	Orientation to Agricultural Systems	1	
OR			
AGRI 292 ^P	Transfer Seminar	1	
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CO 150 ^P	College Composition	3	1A
HORT 100 ^P	Horticultural Science	4	3A
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 125 ^P	Numerical Trigonometry	1	1B
SPCM 200	Public Speaking	3	
	Arts/humanities ¹	6	3B
	Historical perspectives ²	3	3D
	Electives	3	
	TOTAL	33	

SOPHOMORE

ACT 205	Fundamentals of Accounting	3	
CON 131	Graphic Communications/CAD	2	
CON 261 ^P	Construction Surveying	3	
HORT 221	Landscape Plants	4	
HORT 231	Landscape Graphics Studio	4	
HORT 232 ^P	Principles of Landscape Design	4	
HORT 487	Internship	3-6	
LAND 120	History of the Designed Landscape	3	
SOCR 240 ^P	Introductory Soil Science	4	
	Electives	3	
	TOTAL	33-36	

JUNIOR

AREC 202	Agricultural and Resource Economics	3	3C
OR			
ECON 202 ^P	Principles of Microeconomics	3	3C
HORT 322 ^P	Herbaceous Plants	3	
HORT 335 ^P	Landscape Structures	4	
HORT 336 ^P	Landscape Grading and Drainage Studio	4	

Course	Title	Cr	AUCC
SOPHOMORE			
BZ 223 ^P	Plant Identification	3	
HORT 221	Landscape Plants	4	
HORT 260 ^P	Plant Propagation	4	
SOCR 240 ^P	Introductory Soil Science	4	
SPCM 200	Public Speaking	3	
	Arts/humanities ¹	6	3B
	Global and cultural awareness ²	3	3E
	Historical perspectives ³	3	3D
	TOTAL	30	

JUNIOR

<i>Select three credits from the following:</i>			
AGRI 140	Technology in Agriculture	3	
AGRI 320A ^P	Computer Applications in Agriculture-Optimization	1	
AGRI 320B ^P	Computer Applications in Agriculture-Data Base	1	
AGRI 320C ^P	Computer Applications in Agriculture-Communications	1	
AGRI 320D ^P	Computer Applications in Agriculture-Project Management	1	
AGRI 320E ^P	Computer Applications in Agriculture-Spreadsheets	1	
AGRI 320F ^P	Computer Applications in Agriculture-Presentation Technology	1	

BSPM 302	Applied and General Entomology	2	
BSPM 303B ^P	Horticultural Entomology Laboratory	1	
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
HORT 310	Greenhouse Management	4	4B
HORT 321 ^P	Nursery Production and Management	4	4A
HORT 322 ^P	Herbaceous Plants	3	
HORT 331	Landscape Design	2	
HORT 341 ^P	Turfgrass Management	3	
HORT 487	Internship ⁴	3	
	TOTAL	29	

SENIOR

AREC 328 ^P	Small Agribusiness Management	3	
BSPM 308 ^P	Ecology and Management of Weeds	3	
BSPM 361 ^P	Elements of Plant Pathology	3	
BZ 440 ^P	Plant Physiology	3	
HORT 370 ^P	Landscape Irrigation	1	
HORT 464 ^P	Arbiculture	3	4C
HORT 465 ^P	Landscape Estimating	3	
SOCR 370 ^P	Irrigation Principles	2	
	Advanced Writing ²	3	2
	Electives	9	
	TOTAL	33	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3E in the AUCC.

³ Select from the list of courses in category 3D in the AUCC.

⁴ For internship requirement, refer to departmental policy.

⁵ Select from the list of courses in category 2 in the AUCC.

Turf Management Concentration

Turf Management trains students for management opportunities ranging from sod production to the establishment and maintenance of private and public grounds. Turfgrass managers are supervisors for golf courses, ski resorts, sports fields, and parks departments. Turfgrass professionals manage and train personnel, draw up work contracts, and allocate labor and financial resources efficiently. Graduates develop expertise in production and

maintenance of ornamental and functional turfgrass areas with supplemental courses in nursery and landscape management, plant and soil science, business management, and irrigation design. An internship is required to ensure graduates have practical experience, furthering their learning opportunities.

Course	Title	Cr	AUCC
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FRESHMAN

AGRI 192	Orientation to Agricultural Systems	1	
OR			
AGRI 292	Transfer Seminar	1	
AREC 202	Agricultural and Resource Economics	3	3C
BZ 120	Principles of Plant Biology	4	3A
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
CO 150 ^P	College Composition	3	1A
HORT 100	Horticultural Science	4	3A
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
	Global and cultural awareness ¹	3	3E
	Elective	3	
	TOTAL	29	

SOPHOMORE

<i>Select one course from the following:</i>			
AGRI 140	Technology in Agriculture	3	
BUS 150	Business Computing Concepts and Applications	3	
CS 110	Personal Computing	4	
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
HORT 221	Landscape Plants	4	
HORT 487	Internship	3	
SOCR 240 ^P	Introductory Soil Sciences	4	
SPCM 200	Public Speaking	3	
	Arts/humanities ²	6	3B
	TOTAL	27-28	

JUNIOR

BSPM 361 ^P	Elements of Plant Pathology	3	
BZ 440 ^P	Plant Physiology	3	
HORT 321 ^P	Nursery Production and Management	4	4A
HORT 341 ^P	Turfgrass Management	3	
HORT 464 ^P	Arbiculture	3	
SOCR 350 ^P	Soil Fertility Management	3	
	Advanced Writing ²	3	2
	Historical perspectives ⁴	3	3D
	Electives ⁵	8	
	TOTAL	33	

SENIOR

BSPM 302	Applied and General Entomology	2	
BSPM 303B ^P	Horticultural Entomology Laboratory	1	
BSPM 308 ^P	Ecology and Management of Weeds	3	4B
HORT 370 ^P	Landscape Irrigation	1	
HORT 441 ^P	Turfgrass Science	3	4C
HORT 465 ^P	Landscape Estimating	3	
MGT 305	Fundamentals of Management	3	
SOCR 370 ^P	Irrigation Principles	2	
	Electives ⁵	12-13	
	TOTAL	30-31	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from list of courses in category 3E in the All-University Core Curriculum (AUCC).

² Select from list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of course in category 2 of the AUCC.

⁴ Select from list of courses in category 3D in the AUCC.

⁵ Select enough elective credits to bring the total to 120.

Minor Programs

A Horticulture or Environmental Horticulture minor will serve to broaden the academic background of students seeking employment in interdisciplinary job markets associated with plant sciences or the art and science of environmental horticulture. A minor will allow students a maximum breadth and depth in the field while utilizing a limited number of requirements.

Minor in Horticulture

Course	Title	Cr
LOWER DIVISION		
HORT 100	Horticultural Science	4
HORT 260 ^P	Plant Propagation	4
	TOTAL	8
UPPER DIVISION		
HORT 310	Greenhouse Management	4
HORT 454 ^P	Horticulture Crop Production and Management	2
	TOTAL	6
	<i>Select two courses (for a minimum of 7 credits) from the following:</i>	4
HORT 322	Herbaceous Plants	3
HORT 401 ^P	Medicinal and Value-Added Uses of Plants	3
HORT 412	Floriculture Crops	4
HORT 450A-D ^P	Horticulture Food Crops	1-4
HORT 452 ^P	Viticulture I-Grape Production	1
HORT 460 ^P /	Plant Breeding*	3
SOCR 460 ^P		
HORT 462	Viticulture Practices in Grape Production	3
HORT 475 ^P	Environmental Requirements of Horticultural Plants	3
PROGRAM TOTAL = 21 credits without prerequisites		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required because of prerequisites.

Minor in Environmental Horticulture

Course	Title	Cr
LOWER DIVISION		
HORT 100	Horticultural Science	4
HORT 221	Landscape Plants	4
	TOTAL	8
UPPER DIVISION		
HORT 341 ^P	Turfgrass Management	3
HORT 464 ^P	Arboriculture*	3
	<i>Select a minimum of seven credits (six must be upper division) from the following:</i>	
HORT 260 ^P	Plant Propagation	4
HORT 321 ^P	Nursery Production and Management	4
HORT 322	Herbaceous Plants	3
HORT 331	Landscape Design	2
HORT 441 ^P	Turfgrass Science	3
LAND 120	History of the Designed Landscape	3
	TOTAL	13
PROGRAM TOTAL = 21 credits without prerequisites		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required because of prerequisites.

Graduate Programs in Horticulture

The department offers graduate programs leading to Master of Science and Doctor of Philosophy degrees. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduate.school.colostate.edu/current-students/bulletin.aspx, and the department's web site, hla.colostate.edu.

DEPARTMENT OF SOIL AND CROP SCIENCES

Office in Plant Science Building, C127
(970) 491-6517

www.soilcrop.colostate.edu

Professor Eugene F. Kelly, Head

Major in Soil and Crop Sciences

Soil and Crop Sciences, the studies of field crops and soils, are the foundation sciences underlying the production and management of food, feed, fiber, and energy crops to meet human needs and to protect the environment. Students are taught the importance of learning soil and crop science principles in alleviating concerns of rapidly increasing world populations, the demand on land for food supplies, and the demand for environmental quality to enhance human comfort and well being. Special emphasis is placed on improved production efficiency and the conservation of soil, chemicals, energy, plants, and water. The curriculum offers broad-based coverage of the basic natural and social sciences, communication skills, and opportunity to explore interests and leadership potential. Eight concentrations allow for specialization in the major: Agronomic Production Management; Applied Information Technology; Biomass for Biofuels; Environmental Soil Science; International Soil and Crops; Plant Biotechnology, Genetics, and Breeding; Soil Ecology; and Soil Resources and Conservation. However, students do not have to choose a concentration but are given the flexibility to tailor the curriculum to their individual interests. This provides opportunities for students to have a second major in a related discipline.

Learning Outcomes

Successful students will demonstrate:

- Technical competencies, including knowledge and understanding of soil and crop science principles,

ability to apply these principles to specific issues, and ability to synthesize information, both technical and non-technical, to meet identified needs;

- Problem solving skills, such as identifying a problem, collecting data, summarizing information, and drawing conclusions to the identified problem;
- Professional skills, including interpersonal skills and communication skills, such as presenting a topic with logical development, technical understanding, mechanical and technique correctness, and accurate documentation of sources.

Potential Occupations

Participation in internships and cooperative education opportunities is highly recommended to enhance practical training and development. Paid summer internship positions exist for all students in this major, and often lead to a job after graduation. The job outlook for graduates is very optimistic, with more job openings than can be filled in some areas of study. Graduates work for a variety of federal, state, or local government agricultural agencies, state agricultural colleges or research stations, agricultural service companies, commercial research and development labs, and seed companies. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

Some examples include: agronomic production manager; cooperative manager; genetic engineering scientists; land reclamation specialist; international agronomist; land-use planner; plant geneticist; plant breeder, seed, chemical, and fertilizer consultant; soil conservation specialist; soil surveyor; waste management specialist; water quality specialist; crop production; chemical fertilizer sales; crop consultant; county agricultural extension agents; agricultural products inspector; farm manager.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
OR			
AGRI 292 ^P	Transfer Seminar	1	
AREC 202	Agricultural and Resource Economics	3	3C
OR			
	AREC or ECON elective ¹	3	3C
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
CO 150	College Composition	3	1A
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
PH 110	Descriptive Physics	3	3A
PHIL 110	Logic and Critical Thinking	3	3B
SOCR 100	General Crops Biology electives ²	4	
	TOTAL	29	
SOPHOMORE			
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	

Course	Title	Cr	AUCC
CHEM 246 ^P	Fundamentals of Organic Chemistry Laboratory	1	
FSHN 125	Food and Nutrition in Health	2	
OR			
FSHN 150	Survey of Human Nutrition	3	
LAND 220 ^P / LIFE 220 ^P	Fundamentals of Ecology	3	3A
SOCR 240 ^P	Introductory Soil Science	4	
SPCM 200	Public Speaking	3	
	Arts/humanities ³	3	3B
	Global and cultural awareness ⁴	3	3E
	Technical Electives ⁵	7-8	
	TOTAL	30-32	
JUNIOR			
<i>Select one pair of courses from the following:</i>			
BZ 440 ^P	Plant Physiology	3	
BZ 441 ^P	Plant Physiology Laboratory	2	
OR			
GEOL 120	Exploring Earth—Physical Geology	3	3A
GEOL 121 ^P	Introductory Geology Laboratory	1	3A
JTC 300 ^P	Professional and Technical Communication	3	2
SOCR 330 ^P	Principles of Genetics	3	
	Soil and crop science electives ⁶	6	
	Statistics ⁷	3	
	Technical electives ⁵	10	
	TOTAL	29-30	
SENIOR			
SOCR 421 ^P	Crop and Soil Management Systems II	4	4A, 4B, 4C
SOCR 486 ^P	Practicum	1	
OR			
SOCR 487	Internship	1	
SOCR 492	Seminar	1	4A
	Soil and crop science electives ⁶	4	
	Historical Perspectives ⁸	3	3D
	Technical electives ⁵	8	
	Electives ⁹	8-11	
	TOTAL	29-32	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3C in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3A after consultation with adviser.

³ Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select from the Colleges of Agricultural Sciences, Business, Engineering, Natural Resources, Natural Sciences, and/or Veterinary Medicine and Biomedical Sciences in consultation with adviser.

⁶ Select course(s) with the SOCR subject code.

⁷ Select a course with the STAT subject code.

⁸ Select from the list of courses in category 3D in the AUCC.

⁹ Select enough elective credits to bring program total to 120 credits, of which at least 42 must be upper division.

Agronomic Production Management Concentration

Agronomic Production Management focuses on methods to improve the nutritional value of crops and the quality of seed, as well as increase productivity. This concentration is best suited for students planning careers in production agriculture and agribusiness. The concentration combines courses in basic sciences, economics, and business management with principles and practices of using soil, plant, and water resources for crop production and

agriculture-related organizations and companies. This concentration offers a seed science option for those who wish to focus on the dynamic science of seeds.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
OR			
AGRI 292 ^P	Transfer Seminar	1	
AREC 202 ^P	Agricultural and Resource Economics	3	3C
BZ 120	Principles of Plant Biology	4	3A
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
CO 150 ^P	College Composition	3	1A
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
SOCR 100	General Crops	4	
	Historical perspectives ¹	3	3D
	Electives	4	
	TOTAL	30	
SOPHOMORE			
BZ 223 ^P	Plant Identification	3	
LAND 220/ LIFE 220 ^P	Fundamentals of Ecology	3	
PH 110	Descriptive Physics	3	3A
PHIL 110	Logic and Critical Thinking	3	3B
SOCR 240 ^P	Introductory Soil Science	4	
SPCM 200	Public Speaking	3	
	Global and cultural awareness ²	3	3E
	Electives	8	
	TOTAL	30	
JUNIOR			
BZ 440 ^P	Plant Physiology	3	
BZ 441 ^P	Plant Physiology Laboratory	2	
<i>Select one of the following:</i>			
CO 300 ^P	College Composition	3	2
CO 301B ^P	Writing in the Disciplines	3	2
JTC 300 ^P	Professional and Technical Communication	3	2
BUS 300 ^P	Business Writing and Communication	3	2
SOCR 330 ^P	Principles of Genetics	3	
SOCR 350 ^P	Soil Fertility Management	3	
SOCR 351 ^P	Soil Fertility Laboratory	1	
SOCR 370 ^P	Irrigation Principles	2	
SOCR 371 ^P	Irrigation of Field Crops	1	
<i>Select one course from the following:</i>			
STAT 201 ^P	General Statistics	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
STAT 307 ^P	Introduction to Biostatistics	3	
	Agricultural and Resource Economics Elective ³	3	
	Arts and Humanities ⁴	3	
	Department Electives ⁵	3	
	TOTAL	30	
SENIOR			
BSPM 302	Applied and General Entomology	2	
BSPM 303C ^P	Agricultural Entomology Laboratory	1	
BSPM 308 ^P	Ecology and Management of Weeds	3	
BSPM 361 ^P	Elements of Plant Pathology	3	
<i>Select two courses from the following:</i>			
SOCR 320	Forage and Range Management	3	
SOCR 322 ^P	Principles of Microclimatology	3	
SOCR 430 ^P	Applications of Plant Biotechnology	3	
SOCR 440	Pedology	4	
SOCR 455 ^P	Soil Microbiology	3	
SOCR 460 ^P	Plant Breeding	3	
HORT 460 ^P			
SOCR 377 ^P	Geographic Information Systems in Agriculture	3	
SOCR 421 ^P	Crop and Soil Management Systems II	4	4A,4B,4C
SOCR 486	Practicum	1	
OR			
SOCR 487	Internship	1	
SOCR 492	Seminar	1	4A

Course	Title	Cr	AUCC
	Agricultural and Resource Economics Elective ³	3	
	Department Electives ⁵	3-8	
	TOTAL	30-34	

PROGRAM TOTAL = 120-124 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3D in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3E in the AUCC.

³ Select from department list of Agricultural and Resource Economics Electives.

⁴ Select from the list of courses in category 3B in the AUCC in consultation with advisor.

⁵ Select from department list of Department Elective courses.

Applied Information Technology Concentration

Applied Information Technology educates students in utilizing advanced information technology to make better decisions in crop, soil, and environmental management systems as well as meet the expanding needs and technological opportunities in industry (consulting/GIS/GPS/remote sensing). Students will take course work in computer science, data management, business, and various electives in their discipline choice (crop science, soil science, animal science, horticulture, pest management, and related disciplines) to utilize application of advanced information technologies. This understanding will lead to improved environmental stewardship and profitability. Career opportunities exist with equipment companies, consulting firms, state and federal agencies, and agricultural data management firms.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
OR			
AGRI 292 ^P	Transfer Seminar	1	
BZ 120	Principles of Plant Biology	4	
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
CIS 210 ^P	Information Technology in Business	3	
CO 150 ^P	College Composition	3	1A
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
PH 110	Descriptive Physics	3	3A
PHIL 110	Logic and Critical Thinking	3	3B
SOCR 100	General Crops	4	
SOCR 177	Applied Information Technology in Agriculture	1	
	TOTAL	30	
SOPHOMORE			
AREC 202	Agricultural and Resource Economics	3	3C
CIS 240 ^P	Application Design and Development	3	
MATH 141 ^P	Calculus in Management Sciences	3	
SOCR 240 ^P	Introductory Soil Science	4	
SPCM 200	Public Speaking	3	
	Arts/humanities ¹	3	3B
	Global and cultural awareness ²	3	3E
	Historical perspectives ³	3	3D
	Electives ⁴	4	
	TOTAL	29	
JUNIOR			
CO 300 ^P	Writing Arguments	3	2
OR			

Course	Title	Cr	AUCC
JTC 300 ^P	Professional and Technical Communication	3	2
LIFE 220 ^P	Fundamentals of Ecology	3	
OR			
LIFE 320 ^P	Ecology	3	
CIS 320 ^P	Project Management for Information Systems	3	
CIS 355 ^P	Business Database Systems	3	
OR			
STAT 372 ^P	Data Analysis Tools	3	
FSHN 125	Food and Nutrition in Health	2	
OR			
FSHN 150	Survey of Human Nutrition	3	
NR 322	Introduction to Geographic Information Systems	4	
NR 323/GR 323	Remote Sensing and Image Interpretation	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			
STAT 307 ^P	Introduction to Biostatistics	3	
	SOCR electives ^{4,5}	3	
	Electives ⁴	2-3	
	TOTAL	30	
SENIOR			
AREC 478 ^P	Agricultural Policy	3	
NR 423 ^P	Applications of Global Positioning Systems	1	
SOCR 377 ^P /CIVE 377 ^P	Geographic Information Systems in Agriculture	3	4A, 4B, 4C
SOCR 487	Internship	6	4A
SOCR 492	Seminar	1	4A, 4C
	SOCR electives ^{4,5}	6	
	Electives ⁴	11	
	TOTAL	31	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B of the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3E in the AUCC.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Of the 9 SOCR elective credits and 17-18 general elective credits, 12 must be upper division (300- and 400-level). Select enough elective credits to bring program total to 120, of which 42 must be upper division.

⁵ Select from courses with the SOCR subject code, in consultation with advisor.

Biomass for Biofuels Concentration

The Biomass for Biofuels concentration prepares students for jobs in the rapidly expanding field of biofuels--an area where substantial job growth is expected in the next decade. Interdisciplinary coursework specifically focuses on agronomy, plant breeding, bio-refining, policy, and economics of biomass production for biofuels. Through internship and independent study opportunities, students experience cutting edge research and industry practices being incorporated in the field of biomass for biofuels. This undergraduate concentration also provides good preparation for students interested in seeking a graduate degree in an energy field, or who are interested in the interface between energy and agriculture.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
OR			

Course	Title	Cr	AUCC
AGRI 292 ^P	Transfer Seminar	1	
BZ 120	Principles of Plant Biology	4	3A
OR			
LIFE 102 ^P	Attributes of Living Systems	4	3A
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CO 150 ^P	College Composition	3	1A
FSHN 125	Food and Nutrition in Health	2	
OR			
FSHN 150	Survey of Human Nutrition	3	
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Functions	1	1B
MATH 141 ^P	Calculus in Management Sciences	3	1B
OR			
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
PHIL 110	Logic and Critical Thinking	3	3B
SOCR 100	General Crops	4	
SPCM 200	Public Speaking	3	
	TOTAL	31-33	
SOPHOMORE			
AREC 202 ^P	Agricultural and Resource Economics	3	3C
AREC 240/	Issues in Environmental Economics	3	3C
ECON 240			
HORT 171/	Environmental Issues in Agriculture	3	3E
SOCR 171			
JTC 300 ^P	Professional and Technical Communication	3	2
POLS 232	International Relations	3	3E
OR			
POLS 241	Comparative Government and Politics	3	3E
SOC 100	General Sociology	3	3C
OR			
SOC 105	Social Problems	3	3C
SOCR 240 ^P	Introductory Soil Science	4	
<i>Select one course from the following:</i>			
STAT 201 ^P	General Statistics	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
STAT 307 ^P	Introduction to Biostatistics	3	
	Arts and Humanities ¹	3	3B
	Historical Perspectives ²	3	3D
	TOTAL	31	
JUNIOR			
<i>Select one course from the following:</i>			
NR 319 ^P	Geospatial Applications in Natural Resources	4	
NR 322	Introduction to Geographic Information Systems	4	
SOCR 377 ^P	Geographic Information Systems in Agriculture	3	
POLS 362 ^P	Global Environmental Politics	3	
SOC 220	Global Environmental Issues	3	
OR			
SOC 364 ^P	Agriculture and Global Society	3	
SOCR 320	Forage and Pasture Management	3	
SOCR 322 ^P	Principles of Microclimatology	3	
SOCR 350 ^P	Soil Fertility Management	3	
SOCR 351 ^P	Soil Fertility Laboratory	1	
SOCR 370 ^P	Irrigation Principles	2	
SOCR 371 ^P	Irrigation of Field Crops	1	
	Technical Electives ³	6	
	TOTAL	28-29	
SENIOR			
BZ 440 ^P	Plant Physiology	3	
BZ 441 ^P	Plant Physiology Laboratory	1	
SOCR 421 ^P	Crop and Soil Management Systems II	4	4A, 4B, 4C
SOCR 455 ^P	Soil Microbiology	3	
SOCR 470 ^P	Soil Physics	3	
SOCR 471 ^P	Soil Physics Laboratory	1	
SOCR 475 ^P	Global Challenges in Plant and Soil Science	3	
SOCR 487	Internship	3	
SOCR 492	Seminar	1	4A
	Technical Electives ³	4-7	
	TOTAL	28-29	

Course	Title	Cr	AUCC
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PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3D in the AUCC.

³ Select from department list of technical electives.

Environmental Soil Science Concentration

Environmental Soil Science provides extensive training in the prevention of soil and ground water pollution, as well as remediation of existing problems. Graduates are well prepared to work for organizations concerned with environmental and ecological issues such as waste disposal, clean-up of hazardous waste, land management, and reclamation of disturbed lands. The concentration requires an extensive understanding of science and math

Course	Title	Cr	AUCC
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FRESHMAN

AGRI 192	Orientation to Agricultural Systems	1	
AREC 240/	Issues in Environmental Economics	3	
ECON 240			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A

FSHN 125	Food and Nutrition in Health	2	
OR			
FSHN 150	Survey of Human Nutrition	3	
LIFE 102 ^P	Attributes of Living Systems	4	3A
MATH 141 ^P	Calculus in Management Sciences	3	1B
SOCR 240 ^P	Introductory Soil Science	4	
	Arts/humanities ¹	3	3B
TOTAL		32-33	

SOPHOMORE

GEOL 120	Exploring Earth-Physical Geology	3	3A
GEOL 121 ^P	Introductory Geology Laboratory	1	3A
LAND 220 ^P	Fundamentals of Ecology	3	3A
LIFE 220 ^P			
MATH 125 ^P	Numerical Trigonometry	1	1B
PH 121 ^P	General Physics I	5	3A
PH 122 ^P	General Physics II	5	3A
SOCR 350 ^P	Soil Fertility Management	3	
SOCR 351 ^P	Soil Fertility Laboratory	1	
SPCM 200	Public Speaking	3	

<i>Select one course from the following:</i>			
STAT 201 ^P	General Statistics	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
STAT 307 ^P	Introduction to Biostatistics	3	
	Global and cultural awareness ²	3	3E
TOTAL		31	

JUNIOR

<i>Select one set of courses from the following:</i>			
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
CHEM 246 ^P	Fundamentals of Organic Chemistry Laboratory	1	
OR			
CHEM 345 ^P	Organic Chemistry I	4	
CHEM 346 ^P	Organic Chemistry II	4	
CHEM 334 ^P	Quantitative Analysis Laboratory	1	
CHEM 335 ^P	Introduction to Analytical Chemistry	3	
JTC 300 ^P	Professional and Technical Communication	3	2
MIP 300 ^P	General Microbiology	3	
SOCR 440	Pedology	4	
SOCR 467 ^P	Soil and Environmental Chemistry	3	

Course	Title	Cr	AUCC
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	Historical perspectives ³	3	3D
	Social/behavioral sciences ⁴	3	3C
	Technical electives ⁵	4	
TOTAL		32-35	

SENIOR

BC 351 ^P	Principles of Biochemistry	4	
OR			
BZ 440 ^P	Plant Physiology	3	
<i>Select four credits from the following:</i>			
SOCR 421 ^P	Crop and Soil Management Systems II	4	4A, 4B, 4C
OR			
SOCR 478 ^P	Environmental Soil Sciences	3	4A, 4B, 4C
SOCR 479 ^P	Environmental Soil Science Laboratory	1	4A, 4B, 4C
SOCR 455 ^P	Soil Microbiology	3	
SOCR 456 ^P	Soil Microbiology Laboratory	1	
SOCR 470 ^P	Soil Physics	3	
SOCR 471 ^P	Soil Physics Laboratory	1	
SOCR 492	Seminar	1	4A
	Arts/humanities ¹	3	3B
	Technical electives ⁵	3	
	Electives	0-3	
TOTAL		23-25	

PROGRAM TOTAL = 120-122 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3E in the UCC.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select from the list of courses in category 3C in the AUCC.

⁵ Select from departmental list.

International Soil and Crop Sciences Concentration

International Soil and Crop sciences prepares students to work in developing nations by giving them technical soil and crop science skills along with education in the political, social, and cultural aspects of countries they may work in. Scientists design appropriate practices that can succeed under a variety of climatic and socioeconomic constraints. Many research opportunities are available. Students may work with the Peace Corps or other agencies in demonstration and extension positions in developing countries.

Course	Title	Cr	AUCC
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FRESHMAN

AGRI 192	Orientation to Agricultural Systems	1	
OR			
AGRI 292 ^P	Transfer Seminar	1	
AREC 202	Agricultural and Resource Economics	3	3C
BZ 120	Principles of Plant Biology	4	3A
<i>Select one set of courses from the following:</i>			
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
OR			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A
FSHN 125	Food and Nutrition in Health	2	

Course	Title	Cr	AUCC
OR			
FSHN 150	Survey of Human Nutrition	3	
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
PHIL 110	Logic and Critical Thinking	3	3B
SOCR 100	General Crops	4	
TOTAL		28-33	
SOPHOMORE			
<i>Select one course from the following:</i>			
ANTH 100	Introductory Cultural Anthropology	3	3C
SOC 100	General Sociology	3	3C
SOC 105	Social Problems	3	3C
AGRI 270/IE 270	World Interdependence-Population and Food	3	3E
ANEQ 101	Food Animal Science	3	
LAND 220 ^P /LIFE 220 ^P	Fundamentals of Ecology	3	
PH 110	Descriptive Physics	3	3A
POLS 131	Current World Problems	3	3E
POLS 232	International Relations	3	3E
SOCR 240 ^P	Introductory Soil Science	4	
SPCM 200	Public Speaking	3	
	Historical perspectives ¹	3	3D
TOTAL		31	
JUNIOR			
BZ 440 ^P	Plant Physiology	3	
JTC 300 ^P	Professional and Technical Communication	3	2
OR			
CO 301B ^P	Writing in the Disciplines—Sciences	3	2
POLS 332 ^P / ECON 332 ^P	International Political Economy	3	
<i>Select two courses from the following:</i>			
ANTH 310 ^P	Peoples and Cultures of Africa	3	
ANTH 312 ^P	Modern Indian Culture and Society	3	
ANTH 314 ^P	Southeast Asian Cultures and Societies	3	
ANTH 446 ^P	New Orleans and the Caribbean	3	
SOC 320 ^P	Population-Natural Resources and Environment	3	
SOC 341 ^P	Sociology of Rural Life	3	
SOC 364	Agriculture and Global Society	3	
SOC 366 ^P	Peoples and Institutions of Latin America	3	
SOCR 330 ^P	Principles of Genetics	3	
SOCR 350 ^P	Soil Fertility Management	3	
SOCR 351 ^P	Soil Fertility Laboratory	1	
<i>Select one course from the following:</i>			
STAT 201 ^P	General Statistics	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
STAT 307 ^P	Introduction to Biostatistics	3	
	Arts and Humanities ²	3	3B
	Electives	1-2	
TOTAL		29-30	
SENIOR			
AREC 460 ^P	Economics of World Agriculture	3	
BSPM 302	Applied and General Entomology	2	
BSPM 303C ^P	Agricultural Entomology Laboratory	1	
OR			
BSPM 308 ^P	Ecology and Management of Weeds	3	
OR			
BSPM 361 ^P	Elements of Plant Pathology	3	
SOCR 370 ^P	Irrigation Principles	2	
SOCR 371 ^P	Irrigation of Field Crops	1	
SOCR 421 ^P	Crop and Soil Management Systems II	4	4A, 4B, 4C
SOCR 475	Global Challenges in Plant and Soil Science	3	
SOCR 486 ^P	Practicum	1-3	
OR			
SOCR 487	Internship	1-3	
SOCR 492	Seminar	1	4A
	Electives ³	1-17	
TOTAL		21-35	
PROGRAM TOTAL = 120-122 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3D in the AUCC.

² Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select enough elective credits to bring the program total to 120-122 credits, of which 42 must be upper division.

Plant Biotechnology, Genetics, and Breeding Concentration

Plant Biotechnology, Genetics, and Breeding provides expertise in the fundamentals of plant molecular biology and their application to crop improvement. The focus is in the integration of new DNA-based methods with the principles of plant breeding and genetics to enhance production. Graduates work in plant breeding and biotechnology companies and public research institutions, or continue with graduate work.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
OR			
AGRI 292 ^P	Transfer Seminar	1	
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150	College Composition	3	1A
LIFE 102 ^P	Attributes of Living Systems	4	3A
LIFE 103 ^P	Biology of Organisms-Animals and Plants	4	
MATH 124	Logarithmic and Exponential Function	1	1B
MATH 125 ^P	Numerical Trigonometry	1	1B
MATH 126 ^P	Analytic Trigonometry	1	1B
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
SOCR 100	General Crops	4	
TOTAL		32	
SOPHOMORE			
AGRI 116/IE 116	Plants and Civilization	3	3E
OR			
AGRI 270/IE 270	World Interdependence-Population and Food	3	3E
AREC 202	Agricultural and Resource Economics	3	3C
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
CHEM 246 ^P	Fundamentals of Organic Chemistry Laboratory	1	
FSHN 125	Food and Nutrition in Health	2	
OR			
FSHN 150	Survey of Human Nutrition	3	
PH 110	Descriptive Physics	3	3A
PHIL 110	Logic and Critical Thinking	3	3B
SOCR 240 ^P	Introductory Soil Science	4	
SOCR 330 ^P	Principles of Genetics	3	
SPCM 200	Public Speaking	3	
	Historical perspectives ¹	3	3D
TOTAL		32-	
		33	
JUNIOR			
BC 351 ^P	Principles of Biochemistry	4	
<i>Select eight credits from the following:</i>			
BC 463 ^P	Molecular Genetics	3	
BSPM 450 ^P	Molecular Plant-Microbe Interactions	3	
BSPM 451 ^P	Integrated Pest Management	3	
BZ 346 ^P	Population and Evolutionary Genetics	3	
BZ 402 ^P	Molecular Cytogenetics	4	
BZ 476 ^P	Topics in Advanced Genetics	3	
HORT 401 ^P	Medicinal and Value-Added Uses of Plants	3	

Course	Title	Cr	AUCC
HORT 424 ^P / SOCR 424 ^P	Topics in Organic Agriculture	3	
HORT 450A ^P	Horticulture Food Crops-Cool Season Vegetable Production	1	
HORT 450B ^P	Horticulture Food Crops-Warm Season Vegetable Production	1	
HORT 450C ^P	Horticulture Food Crops-Small Fruit Production	1	
HORT 450D ^P	Horticulture Food Crops-Tree Fruit Production	1	
MIP 300 ^P	General Microbiology	3	
MIP 450 ^P	Microbial Genetics	3	
<i>Select two of the following three groups:</i>			
BSPM 302	Applied and General Entomology	2	
BSPM 303C ^P	Agricultural Entomology Laboratory	1	
OR			
BSPM 308 ^P	Ecology and Management of Weeds	3	
OR			
BSPM 361 ^P	Elements of Plant Pathology	3	
BZ 310 ^P	Cell Biology	4	
JTC 300 ^P	Professional and Technical Communication	3	2
SOCR 460 ^P / HORT 460 ^P	Plant Breeding	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			
STAT 307 ^P	Introduction to Biostatistics	3	
TOTAL		31	
SENIOR			
BZ 440 ^P	Plant Physiology	3	
SOCR 430 ^P	Applications of Plant Biotechnology	3	4A, 4B, 4C
SOCR 486 ^P	Practicum	1	4C
SOCR 492	Seminar	1	4A
	Arts/humanities ²	3	3B
	Soil and crop electives	8	
	Electives ³	5-6	
TOTAL		24-	
PROGRAM TOTAL = 120 credits		25	

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3D in the AUCC.

² Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select enough elective credits to bring the program total to 120, with a minimum of 42 upper division credits.

Soil Ecology Concentration

The Soil Ecology concentration emphasizes the interdisciplinary nature of soils through the study of soil organisms and their interactions with each other and the soil physical and chemical environment. These interactions affect the cycling of elements including carbon and nitrogen, the release (or consumption) of greenhouse gases, water quality, soil formation and structure, and plant productivity. The curriculum is rigorous and includes a solid core of mathematics, biology, physics and chemistry courses, as well as specialized electives and ecology courses that allow students to tailor the concentration to their interests. Career opportunities exist in academia, state and federal health and environmental agencies, natural resource agencies (water and soil), state and national parks services, private industry as environmental assessors, and in the rapidly growing environmental consulting profession.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
OR			
AGRI 292 ^P	Transfer Seminar	1	
BZ 120	Principles of Plant Biology	4	3A
OR			
LIFE 102 ^P	Attributes of Living Systems	4	3A
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CO 150 ^P	College Composition	3	1A
FSHN 125	Food and Nutrition in Health	2	
OR			
FSHN 150	Survey of Human Nutrition	3	
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Functions	1	1B
MATH 141 ^P	Calculus in Management Sciences	3	1B
OR			
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
PHIL 110	Logic and Critical Thinking	3	3B
SOCR 100	General Crops	4	
SPCM 200	Public Speaking	3	
TOTAL		31-33	
SOPHOMORE			
AREC 202 ^P	Agricultural and Resource Economics	3	3C
AREC 240/	Issues in Environmental Economics	3	3C
ECON 240/			
HORT 171/	Environmental Issues in Agriculture	3	3E
SOCR 171/			
JTC 300 ^P	Professional and Technical Communication	3	2
POLS 232	International Relations	3	3E
OR			
POLS 241	Comparative Government and Politics	3	3E
SOC 100	General Sociology	3	3C
OR			
SOC 105	Social Problems	3	3C
SOCR 240 ^P	Introductory Soil Science	4	
<i>Select one course from the following:</i>			
STAT 201 ^P	General Statistics	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
STAT 307 ^P	Introduction to Biostatistics	3	
	Arts and Humanities ¹	3	3B
	Historical Perspectives ²	3	3D
TOTAL		31	
JUNIOR			
<i>Select one course from the following:</i>			
NR 319 ^P	Geospatial Applications in Natural Resources	4	
NR 322	Introduction to Geographic Information Systems	4	
SOCR 377 ^P	Geographic Information Systems in Agriculture	3	
POLS 362 ^P	Global Environmental Politics	3	
SOC 220	Global Environmental Issues	3	
OR			
SOC 364 ^P	Agriculture and Global Society	3	
SOCR 320	Forage and Pasture Management	3	
SOCR 322 ^P	Principles of Microclimatology	3	
SOCR 350 ^P	Soil Fertility Management	3	
SOCR 351 ^P	Soil Fertility Laboratory	1	
SOCR 370 ^P	Irrigation Principles	2	
SOCR 371 ^P	Irrigation of Field Crops	1	
	Technical Electives ³	6	
TOTAL		28-29	
SENIOR			
BZ 440 ^P	Plant Physiology	3	
BZ 441 ^P	Plant Physiology Laboratory	1	
SOCR 421 ^P	Crop and Soil Management Systems II	4	4A, 4B, 4C
SOCR 455 ^P	Soil Microbiology	3	
SOCR 470 ^P	Soil Physics	3	
SOCR 471 ^P	Soil Physics Laboratory	1	
SOCR 475 ^P	Global Challenges in Plant and Soil Science	3	
SOCR 487	Internship	3	

Course	Title	Cr	AUCC
SOCR 492	Seminar	1	4A
	Technical Electives ³	4-7	
	TOTAL	26-29	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3D in the AUCC.

³ Select from department list of technical electives.

Soil Restoration and Conservation Concentration

Soil Restoration and Conservation graduates provide technical assistance to farmers, ranchers, state and local governments, and others concerned with the conservation of soil, water, and related natural resources. Emphasis is on interpretations of land sustainability for agricultural, urban, industrial, and recreational land uses, waste disposal, water management systems, and ecological purposes. Specialists develop programs designed to obtain the most productive use of land while minimizing or mitigating damages. Others help landowners and managers develop management practices to combat erosion. Students are prepared for careers in environmental consulting, government conservation and resource management agencies, farm management, and municipal soil and water resource management agencies.

Course	Title	Cr	AUCC
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FRESHMAN

AGRI 192	Orientation to Agricultural Systems	1	
	OR		
AGRI 292 ^P	Transfer Seminar	1	
AREC 202	Agricultural and Resource Economics	3	3C
BZ 120	Principles of Plant Biology	4	3A
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A
LAND 220 ^P	Fundamentals of Ecology	3	3A
LIFE 220 ^P			
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
SOCR 100	General Crops	4	
	TOTAL	30	

SOPHOMORE

BSPM 308 ^P	Ecology and Management of Weeds	3	
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
PH 110	Descriptive Physics	3	3A
PHIL 110	Logic and Critical Thinking	3	3B
SOCR 240 ^P	Introductory Soil Science	4	
SPCM 200	Public Speaking	3	
	Arts/humanities ¹	3	3B
	Global and cultural awareness ²	3	3E
	Historical perspectives ³	3	3D
	TOTAL	29	

JUNIOR

JTC 300 ^P	Professional and Technical Communication	3	2
SOCR 320	Forage and Pasture Management	3	
SOCR 350 ^P	Soil Fertility Management	3	
SOCR 351 ^P	Soil Fertility Laboratory	1	
SOCR 370 ^P	Irrigation Principles	2	

Course	Title	Cr	AUCC
SOCR 371 ^P	Irrigation of Field Crops	1	
SOCR 377 ^P	Geographic Information Systems in Agriculture	3	
SOCR 440	Pedology	4	
SOCR 486 ^P	Practicum	1-3	
	OR		
SOCR 487	Internship	1-3	
	<i>Select one course from the following:</i>		
STAT 201 ^P	General Statistics	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
STAT 307 ^P	Introduction to Biostatistics	3	
WR 304	Principles of Watershed Management Electives ⁴	3	3A
	TOTAL	30-32	

SENIOR

BZ 440 ^P	Plant Physiology	3	
RS 478 ^P	Restoration Ecology	3	
SOCR 421 ^P	Crop and Soil Management Systems II	4	4A, 4B, 4C
SOCR 455 ^P	Soil Microbiology	3	
SOCR 467 ^P	Soil and Environmental Chemistry	3	
SOCR 470 ^P	Soil Physics	3	
SOCR 471 ^P	Soil Physics Laboratory	1	
SOCR 492	Seminar	1	4A
	Electives ⁴	8-9	
	TOTAL	29-30	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3E in the AUCC.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select from list of department electives.

Minor in Soil Resources and Conservation

The purpose of the minor in Soil Resources and Conservation is to give students with appropriate biological sciences background the opportunity to formalize their interests in an organized course of study.

Course	Title	Cr
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LOWER DIVISION

SOCR 240 ^P	Introductory Soil Science	4
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UPPER DIVISION

BZ 440 ^P	Plant Physiology*	3
GEOL 454 ^P	Geomorphology*	4

Select three credits from the following:

SOCR 320	Forage and Pasture Management	3
SOCR 370 ^P	Irrigation Principles*	2
SOCR 371 ^P	Irrigation of Field Crops	1
SOCR 420 ^P	Crop and Soil Management Systems I*	3
SOCR 455 ^P	Soil Microbiology	3
SOCR 350 ^P	Soil Fertility Management	3
SOCR 351 ^P	Soil Fertility Laboratory	1
SOCR 421 ^P	Crop and Soil Management Systems II*	4
SOCR 440	Pedology	4
SOCR 442 ^P	Forest and Range Soils	3

SOCR 467 ^P	Soil Chemistry*	3
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	OR	
SOCR 470 ^P	Soil Physics	3
SOCR 471 ^P	Soil Physics Laboratory	1

TOTAL 28-29

PROGRAM TOTAL = 32-33 credits without prerequisites

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required because of prerequisites.

Graduate Programs in Soil and Crop Sciences

Graduate and Professional Bulletin, graduate.school.colostate.edu/current-students/bulletin.aspx and the department's website, www.soilcrop.colostate.edu.

Programs in crop science, soil science, or plant genetics lead to Master of Science and Doctor of Philosophy degrees. Students interested in graduate work should refer to the

Colorado State University reserves the right at any time, without notice, to change, modify, or cancel any course, program, procedure, policy, financial requirement, or disciplinary arrangement set forth in this catalog whenever, in its sole discretion, it determines such action to be appropriate. Furthermore, Colorado State will not be responsible for any failure to present or complete any course or program or to perform any other activity, function, or obligation mentioned in this catalog. Since changes may occur at any time, students must check the relevant website (as noted throughout various chapters in this catalog).

College of Applied Human Sciences

*Office in L.L. Gibbons Building, Room 217
(970) 491-6331
www.cahs.colostate.edu*

*Professor Jeff McCubbin, Dean
Professor Dale DeVoe, Associate Dean
Professor Pat Kendall, Associate Dean*

UNDERGRADUATE MAJORS

*Apparel and Merchandising
Construction Management
Family and Consumer Sciences
Fire and Emergency Services Administration
Health and Exercise Science
Human Development and Family Studies
Interior Design
Nutrition and Food Science
Hospitality Management
Social Work*

UNDERGRADUATE MINORS

*Merchandising
Nutrition*

COLLEGE PROGRAMS

The College of Applied Human Sciences comprises six academic departments and two schools. It is a human-centered place, with a focus on educating students for people-oriented professions and on applying creative, interdisciplinary research to solve social problems. Each of its units offers professional education for careers and for lifelong learning, through a solid grounding in the natural sciences, social sciences, and humanities as well as courses specific to each field of study. The College currently includes the Departments of Construction Management; Design and Merchandising; Food Science and Human Nutrition; Health and Exercise Science; Human Development and Family Studies; and Occupational Therapy; and the Schools of Education and Social Work. The Department of Occupational Therapy has no undergraduate degree and offers a master's

program and an interdisciplinary Ph.D. program through the School of Education. Requirements for undergraduate majors are outlined in the departmental sections of this chapter.

Learning within the College takes place in a variety of settings on and off campus, forging strong links between the classroom and the workplace. All of the College's programs combine classroom instruction with hands-on experience in state-of-the-art computer laboratories, research laboratories, or specialized centers and institutes that emphasize the practical application of new knowledge.

Faculty in the College of Applied Human Sciences maintain valued and useful relationships with a broad range of constituents, enhancing College visibility within the larger community, fulfilling Colorado State's land-grant mission. These vital connections also provide students with excellent opportunities for working internships in their fields. For all its students, the College places a strong emphasis on experiential learning and leadership opportunities that allow students to test new skills in real-world settings. Numerous scholarships are available through the College of Applied Human Sciences each spring semester. For more information, visit the College web site at www.cahs.colostate.edu.

Study Abroad

Because knowledge of at least one other culture is valuable in understanding our own, the College of Applied Human Sciences is strongly committed to the value of international study and encourages students to participate in study abroad programs. The College sponsors one of the University's study abroad programs, i.e., a program offered each spring semester at the University of Canberra (Australia). This and other formal Colorado State study abroad programs make it easy for students to transfer credits between universities and to have access to the richness of engaging knowledge from the perspectives of other countries. Students should plan for study abroad with their academic advisers far in advance (the junior year is usually the best time to study elsewhere), consult with the Office of International Programs in Laurel Hall and visit their web site at www.international.colostate.edu.

School for Teacher Education and Principal Preparation (STEPP)

Office in Education Building, Room 111
(970) 491-5292
stepp.cahs.colostate.edu

Associate Professor Donna Cooner, Director
Associate Professor Rod Lucero, Associate Director

One of the most important ways to help people and to impact our society is through involvement in public and private schools. Teachers make lasting contributions to our nation and its many generations of learners. Teacher education programs at Colorado State University serve the needs of individuals preparing to teach in most secondary areas, K-12 art, foreign languages, instructional technology, and music, or early childhood education. The University is presently the only public institution in Colorado designated to offer programs leading towards a career and technical (vocational) credential. Candidates for teacher licensure are skilled in a teaching concentration and proficient in educational methodology. These students take their professional education course work concurrently while completing their subject matter courses. Candidates may complete licensure while enrolled in an undergraduate program or after completing a bachelor's degree at an accredited university.

Endorsements available through the program include:

Endorsement	Levels	U	P	G
Agricultural Education	Secondary	X	X	X
Art	K-12	X	X	
Business Education	Secondary		X	X
Early Childhood Education	Ages 0-8	X	X	
English/Language Arts	Secondary	X	X	X
Family and Consumer Sciences	Secondary	X	X	X
Foreign Language (French, German, Spanish)	K-12	X	X	X
Instructional Technology	K-12	X	X	X
Marketing Education	Secondary		X	X
Mathematics	Secondary	X	X	X
Music	K-12	X	X	
Science	Secondary	X	X	X
Social Studies	Secondary	X	X	X
Speech	Secondary	X	X	X
Technology Education	Secondary	X	X	X
Special Services/Administrative Endorsements				
Occupational Therapist	Ages 0-21			X
School Counselor	Ages 0-21			X
School Principal	K-12			X
School Social Worker	Ages 0-21			X

(Pursued at indicated level(s). G = graduate; P = post-baccalaureate; U = undergraduate)

The Colorado State University Educator Licensing Program is nationally accredited by the Teacher Education Accreditation Council and state accredited by the Colorado Department of Education and the Colorado Department of Higher Education.

Section 207 of Title II of the Higher Education Act mandates that the Department of Education collect data on state requirements for teacher certification and licensure, as well as data on the performance of teacher preparation programs. The Title II Institutional Report for Colorado State University is available through the Licensure Web site stepp.cahs.colostate.edu/Accreditation.

Learning Outcomes

Students will demonstrate:

- Employment of innovative instructional methods to promote student success and to meet state and national standards
- Understanding of how students differ in their approaches to learning and create instructional opportunities that are adapted to diverse learners
- Mastery of the content knowledge students will use for teaching a subject.
- Ability to impact learning of P-12 students through course work and field experiences.
- Knowledge of education governance and about careers in teaching

Potential Occupations

Examples include: public or private school teacher, principal, staff developer, educational sales, school counselor, school social worker, school occupational therapist, curriculum specialist, human resources trainer, post-secondary teacher, early childhood center director.

Approved Majors for the Teacher Endorsements

At Colorado State University, the following are the approved majors for each endorsement area. Undergraduate teacher education candidates must be majoring in one of the approved majors that align with their endorsement area for admission to the licensure program.

For detailed four-year curriculum on the degrees listed below, refer to the specific program in this catalog.¹

Endorsement	Approved Major for Licensure	College
Agricultural Education	Agricultural Education (B.S.)	Agricultural Sciences
Art	Art (B.A.)	Liberal Arts
Early Childhood Education	Human Development and Family Studies (B.S.)	Applied Human Sciences
English/Language Arts	English (B.A.)	Liberal Arts
Family and Consumer Sciences	Family and Consumer Sciences (B.S.)	Applied Human Sciences

Endorsement	Approved Major for Licensure	College
Foreign Language (French, German, Spanish)	Languages, Literatures, and Cultures (B.A.)	Liberal Arts
Instructional Technology Mathematics	Applied Computing Technology (B.S.) Mathematics (B.S.)	Natural Sciences Natural Sciences
Music Science	Music (B.M.) Natural Sciences (B.S.)	Liberal Arts Natural Sciences
Social Studies Speech	History (B.A.) Communication Studies (B.A.)	Liberal Arts Liberal Arts
Technology Education	Engineering Science (B.S.)	Engineering

Admission to Teacher Licensure

Students who wish to pursue an endorsement program should apply for admission to the Teacher Licensure Program in the School of Teacher Education and Principal Preparation.. Formal admission to the Teacher Licensure Program is based upon completion of a minimum of 30 semester credits and successful completion of the following:

- Submission of written application
- Submission of reference forms
- Field experience documentation (20 hour form)
- 2.75 cumulative GPA; 3.00 GPA for admission to the social studies endorsement
- Evidence of oral English proficiency
- Background check (fingerprinting using CDE forms/process)
- Successful completion of Phase I courses
- Verification of lawful presence

(Note: Admission requirements are subject to change based on program and state licensing requirements and laws.)

Detailed information about the admission process and specific deadline dates for admission are available in the STEPP Advising Center, Education Building, Room 111, and through the program’s web site, [stepp.cahs.colostate.edu](http://cahs.colostate.edu)

Student Teaching

Teacher licensure candidates apply for student teaching placement one semester before student teaching. Candidates must pass the state teacher’s exam in their respective teaching area to begin the student teaching experience. Additionally, candidates must demonstrate acceptable personal and academic fitness. Student teaching must be completed at an approved school. Placement is contingent upon acceptance of the student by a school system. All assignments are made by the

University. The experience is full time for the specific time period.

Requirements for Licensure

Colorado licensure requires completion of an approved program and the recommendation of the institution at which the program was completed. The Director for Educator Licensing in the School of Teacher Education and Principal Preparation serves as the licensure officer for the University. Additional requirements of the Colorado Department of Education and the Colorado Department of Higher Education include the successful completion of the state teacher’s exam. Successful completion of the approved teacher licensure program at Colorado State University does not guarantee successful completion of the teacher’s exam. The School of Teacher Education and Principal Preparation does not assume responsibility for the successful completion of the teacher’s exam.

Colorado State University’s approved program requirements include completion of a baccalaureate degree, completion of course work in general education, content area, and professional education, and fulfillment meeting the Colorado Performance Based Standards for teachers at the proficient or advanced proficient level. Additionally, all grades in professional education and content courses must be a C or better for licensing. The minimum scholastic average acceptable for completion of the Teacher Licensure Program and recommendation for licensing is 2.75 computed for all course work, except for social studies where a 3.00 GPA is required.

The University reserves the right to not recommend a student for licensure on the basis of unacceptable personal and fitness/performance.

Professional Education Coursework for Licensure

The professional education requirements listed below apply to all teaching endorsement areas except early childhood education where EDUC 400, EDUC 425, and EDUC 426 are required in place of EDUC 350, EDUC 386, EDUC 450, and EDUC 486E. Additional courses may be required by specific endorsement areas. For clarification, refer to individual coursework check sheets which can be obtained in Room 111, Education Building.

Candidates in all endorsement areas must complete appropriate methods courses the semester prior to enrolling in student teaching.

Career and Technical Education

Individuals desiring to teach in or administer career and technical programs in the state of Colorado must qualify

for a credential in addition to a teaching license. Those who plan to qualify as career and technical education (CTE) teachers or directors must meet the requirements for a CTE credential established by the Community Colleges of Colorado. Credentialing questions may be directed to the Department of Education (303) 866-6856.

Professional Education Course Requirements

The professional education course requirements listed under Professional Education Coursework for Licensure apply to all teaching endorsement areas in career and technical education.

Agricultural Education

Kellie Enns, Ph.D., Program Chair

Candidates studying agricultural education are prepared to teach youth and adults in high schools, community colleges, junior colleges, area career and technical schools, and technical institutes. Two thousand hours in the agriculture industry are required in addition to completion of the agriculture curriculum and professional education courses.

For the detailed four-year curriculum, refer to the College of Agricultural Sciences, Department of Agricultural and Resource Economics, interdepartmental major in agricultural education, or contact the STEPP Advising Center in room 111 Education Building.

Family and Consumer Sciences

Dawn Mallette, Ph.D., Program Chair

Candidates majoring in family and consumer sciences with a concentration in family and consumer sciences education are prepared to be employed as teachers in middle schools, junior or senior high schools, community and junior colleges, area career and technical schools, and technical institutes.

For the detailed four-year curriculum, refer to the interdepartmental major in family and consumer sciences, family and consumer sciences education concentration, in this section of the catalog.

Technology Education

Michael A. De Miranda, Ph.D., Program Chair

Technology Education requires students to learn about how people design, make, use, maintain, and manage technology and engineered systems through hands-on problem solving and design activities. Teaching engineering is done in hands-on environments where students learn about Science, Technology, Engineering, and Mathematics (STEM). Candidates majoring in engineering science with a concentration in engineering education are prepared as professional teachers for middle schools, junior or senior high schools. Engineering and Technology in Engineering science is an interdisciplinary major that allows students to acquire a strong base in mathematics, the physical sciences, and engineering fundamentals while pursuing a broad background to teach engineering design in exciting hands-on technology education laboratories in secondary schools.

For the detailed degree and licensure curriculum, refer to the department major in Engineering Science, Teacher Education concentration, in the College of Engineering section of the catalog.

DEPARTMENT OF CONSTRUCTION MANAGEMENT

*Office in Guggenheim Hall, Room 102
(970) 491-7353
www.cm.cahs.colostate.edu/*

Professor Mostafa Khattab, Department Head

Major in Construction Management

The Construction Management (CM) program at Colorado State University is one of the top-ranked programs in the nation. Since its inception in 1946, more than 4,500 students have graduated, many of them going on to become leaders in their field as presidents and CEOs of major construction companies. The program is accredited by the American Council for Construction Education.

The Construction Management major is controlled and all students admitted to C.S.U. or seeking to change their major to CM must first be designated as pre-construction management. To be considered for admission to CM students must:

- Complete a minimum of 15 credits at C.S.U.
- Earn a minimum 2.750 cumulative C.S.U. GPA
- Complete CON 101, Introduction to Construction Management, with a “B” grade or better

- Complete CO 150, College Composition, with a “B” grade or better
- Complete MATH 125, Numerical Trigonometry, with a “C” grade or better

Once a student has met the minimum requirements listed above they are eligible to apply to the CM program. Applications will be available online at www.cm.caahs.colostate.edu the week before finals in December and in May. Students must print off, complete, and return the application to the CM advising office in 222 Guggenheim Hall. Up to 100 students will be admitted at the end of fall and spring semesters from the eligible pool of students. Meeting requirements does not guarantee admission to the program.

The CM academic program is interdisciplinary, with course requirements in business, engineering, and the humanities as well as applied courses in construction science and construction management. The focus of the program is on the integration of innovative management systems and other technologies into the construction process. These requirements provide a wide scope of educational experiences and create a broad range of career options for graduates.

During their academic career, CM students are required to obtain an internship (full-time structured work experience) position with any one of a variety of construction companies and organizations. Our Phelps Placement Office assists current and graduating students as well as alumni with in-house interviews, bi-annual career fairs, and the publication of a graduate resume book.

Learning Outcomes

Students will develop and demonstrate:

- Professional, analytical, and problem solving skills related to the career requirements in construction management
- Strong professional communication skills with an emphasis on written, graphic, and verbal skills related to the career requirements in construction management
- Technical proficiency in the following construction management areas: design/engineering, management, materials and methods, estimating, scheduling, safety, surveying, and project administration

Potential Occupations

The construction industry has become a \$750 billion per year industry marked by continuous and dramatic change. The demand for capable and highly-trained construction management professionals, who can adapt and become

effective leaders in the field, remains strong. There continues to be a growing demand for graduates of the construction management program. Placement of CM graduates in the industry has been near 100 percent, with average starting annual salaries ranging from \$40,000 to \$60,000.

Entry-level occupations include, but are not limited to: field engineer, assistant estimator, project scheduler, cost control engineer, safety engineer, project supervisor, project coordinator, quality assurance specialist, project engineer, assistant project manager, and assistant superintendent.

Students may consider simultaneously completing the requirements for a minor in Business Administration. Several of the courses required for the minor in Business Administration are also required for the major in Construction Management curriculum.

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
CO 150 ^P	College Composition	3	1A
CON 101	Introduction to Construction Management	3	
CON 131	Graphic Communications/CAD	2	
CON 151	Construction Materials and Methods	3	
CON 251 ^P	Materials Testing and Processing	2	
<i>Select one course from the following:</i>			
GEOL 120	Exploring Earth: Physical Geology	3	3A
GEOL 122	The Blue Planet: Geology of Our Environment	3	3A
GEOL 124	Geology of Natural Resources	3	3A
GEOL 121 ^P	Introductory Geology Laboratory	1	3A
MATH 125 ^P	Numerical Trigonometry	1	1B
	Arts and Humanities ¹	6	3B
	Global and Cultural Awareness ²	3	3E
	Historical Perspectives ³	3	3D
	TOTAL	<u>30</u>	
SOPHOMORE			
CON 261 ^P	Construction Surveying	3	
CON 265 ^P	Construction Estimating I	3	
CON 317	Safety Management	2	
CON 351 ^P	Construction Field Management	2	
CON 360 ^P	Electrical and Control Systems	3	
ECON 202 ^P	Principles of Microeconomics	3	3C
MATH 141 ^P	Calculus in Management Sciences	3	1B
PH 121 ^P	General Physics I	5	3A
SPCM 200	Public Speaking	3	
	Advanced writing ⁴	3	2
	TOTAL	<u>30</u>	
JUNIOR			
ACT 205	Fundamentals of Accounting	3	
CON 267	Construction Management Pre-Internship	1	
CON 359 ^P	Structures I (MATH 125; junior or senior standing)	4	
CON 365 ^P	Construction Estimating II	3	4A
CON 366 ^P	Construction Equipment and Methods	3	
CON 367 ^P	Construction Contracts/Project Administration	3	4B
CON 371 ^P	Mechanical and Plumbing Systems	3	
MGT 305	Fundamentals of Management	3	
STAT 201 ^P	General Statistics	3	
OR			
STAT 204 ^P	Statistics for Business Students	3	
	CON Elective ²	3	
	TOTAL	<u>29</u>	
SENIOR			
BUS 205	Legal and Ethical Issues in Business	3	
CON 469 ^P	Soils Engineering for Construction Managers	3	

Course	Title	Cr	AUCC
CON 459 ^P	Structures II	4	
CON 461 ^P	Construction Project Scheduling and Cost Control ⁵	3	4A
CON 462 ^P	Financial Management for Construction	3	
CON 465 ^P	Construction Management Professional Practice	3	4C
<i>Select 6 credits from the following:</i>			
CON 487A ^P	Internship-Construction Management I	6	
OR			
CON 487B ^P	Internship-Construction Management II	3	
AND			
	Technical elective ⁵	3	
MGT 473	Employment Relations: Labor and Management	3	
	CON elective ²	3	
	TOTAL	31	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3E in the AUCC.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select one course from the list of courses in category 2 of the AUCC.

⁵ Select from department list of approved courses.

Graduate Programs in Construction Management

The Department of Construction Management offers a graduate program leading to a Master of Science. The program is designed for students with specialized studies in construction management and information systems and sustainable construction. The master's program is an advanced curriculum designed to allow students to tailor a portion of the specialization requirements to meet individual interests and goals. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, www.cm.caahs.colostate.edu/.

DEPARTMENT OF DESIGN AND MERCHANDISING

Office in Aylesworth Hall SE, Room 150
(970) 491-1629
www.dm.caahs.colostate.edu

Professor Nancy Miller, Department Head

Major in Apparel and Merchandising

The Apparel and Merchandising program emphasizes the study of product design and development; promotion, distribution, and retailing; and consumer behavior in the global environment, while fostering cultural awareness

and a commitment to social responsibility. There are two concentrations in the major: Apparel Design and Production, and Merchandising.

Learning Outcomes

Students will demonstrate:

- An ability to integrate and apply experience, knowledge, critical thinking skills, and technology to market research; product forecasting, product design and development (i.e., sketching, draping, pattern drafting, marker making, constructing, and utilizing computer-aided design software), sourcing, production, evaluation, marketing, buying, and retailing of apparel and textile products in a global environment, while demonstrating responsiveness to diverse consumer needs and preferences
- An ability to apply understanding of cultural, historic, and socio-psychological aspects of dress to the design and merchandising of apparel and an ability to apply knowledge of textile science (i.e., fiber and textile properties, processes, and performance) to the evaluation of apparel and textile products
- Comprehensive knowledge of global industry practices and policies as well as the ability to analyze and discuss economic, legal, political, social, and technological developments or situations that may impact the industry
- Preparedness for participation in an internship experience that requires integration and application of discipline knowledge and emphasizes professionalism, including the refinement of communication, critical thinking, problem-solving, organization, time management, and teamwork skills

Students majoring in Apparel and Merchandising are strongly encouraged to complete an internship. Placement with businesses and organizations in national and international settings are intended to facilitate depth and integration of knowledge in the study of apparel and merchandising and to enhance students' professional development and career opportunities. Students with a 2.500 GPA are eligible to participate in department-facilitated internships.

Potential Occupations

Some examples of careers for Apparel Design and Production concentration graduates include, but are not limited to: manufacturer's representative, sales representative, production manager, manufacturer's agent, inventory controller, apparel designer, textile designer, pattern maker, product developer, customer service representative, advertiser, fashion illustrator, costing engineer, technical services, testing and development,

government or private researcher, and computer-aided design (CAD) manager.

Some examples of careers for Merchandising concentration graduates include, but are not limited to: product developer, product or brand merchandise manager, merchandise buyer, retail analyst, retail manager, retail technology specialist, resident buying office administrator, sales representative, inventory or quality control agent, sourcing agent, import/export specialist, consumer or market researcher, trend analyst, advertiser, public relations specialist, fashion journalist, and visual merchandiser.

Apparel Design and Production Concentration

The Apparel Design and Production concentration offers study in the design and development of apparel goods, including fiber/textile science, aesthetics, forecasting, textile design, apparel design and construction techniques, product evaluation, and quality assessment, as well as the sourcing, mass production, and marketing of apparel goods for an identified target market.

Students applying to the apparel design and production concentration are accepted first into the apparel and merchandising major. Full acceptance into the apparel design and production concentration requires passing the Portfolio Review held in the fall semester. Industry professionals in the field of apparel design and manufacturing will evaluate portfolios. The 20 to 25 highest scoring students will be accepted into the apparel design and production concentration and become eligible to take the apparel design and production courses in the concentration.

Course	Title	Cr	AUCC
FRESHMAN			
AM 101	Fashion Industries	3	
AM 110 ^P	Apparel and Merchandising Digital Technology	3	
AM 130	Design Appreciation-Apparel and Merchandising	3	
AM 143	Introduction to Apparel Design	4	
CHEM 103	Chemistry in Context	3	3A
CHEM 104 ^P	Chemistry in Context Laboratory	1	3A
CO 150 ^P	College Composition	3	1A
DM 120	Textiles	3	
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
PSY 100	General Psychology	3	3C
OR			
SOC 100	General Sociology	3	3C
	Elective	1	
	TOTAL	30	
SOPHOMORE			
AM 240 ^P	Computer-Aided Apparel Design	3	
AM 241 ^P	Apparel Production	3	
AM 250	Clothing, Adornment and Human Behavior	3	3E
AM 270 ^P	Merchandising Processes	3	
DM 272	Consumers in the Marketplace	3	
PHIL 110	Logic and Critical Thinking	3	
OR			

Course	Title	Cr	AUCC
STAT 201 ^P	General Statistics	3	
SPCM 200	Public Speaking	3	
	Arts and Humanities ¹	3	3B
	Electives	7	
	TOTAL	31	
JUNIOR			
AM 244 ^P	Illustration for Fashion Design	3	
AM 341 ^P	Computer-Aided Apparel Production	3	
AM 342 ^P	Computer-Aided Textile Design	3	4B
AM 345 ^P	Draping Design	3	
AM 363	Historic Costume	3	4A
AM 375 ^P	Production Design and Development	3	
DM 492 ^P	Preinternship Seminar	2	
	Advanced Writing ¹	3	2
	Arts and Humanities ²	3	3B
	Biological and Physical Sciences ³	3	3A
	Historical Perspectives ⁴	3	3D
	TOTAL	32	
SENIOR			
AM 421 ^P	Textile Analysis	3	
AM 446 ^P	Apparel Design and Production	3	4C
AM 460	Historic Textiles	3	
DM 487B ^P	Internship-Apparel Design and Production ⁷	12	
	Upper division electives	6	
	TOTAL	27	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select one course from the list of courses in category 2 of the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3B in the (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select one three-credit course from the list of courses in category 3A in the AUCC.

⁴ Select from the list of courses in category 3D in the AUCC.

⁷ Acceptance for DM 487B depends on the student's GPA and acceptance by a cooperating company. Students not enrolled in an internship will select 12 credits from departmental list.

Merchandising Concentration

The merchandising concentration offers study in research and development, product development, procurement, marketing, and retailing of consumer goods that emphasizes meeting consumers' needs and preferences by delivering the right product, at the right price, at the right place, and at the right time.

Course	Title	Cr	AUCC
FRESHMAN			
AM 101	Fashion Industries	3	
AM 110 ^P	Apparel and Merchandising Digital Technology	3	
AM 130	Design Appreciation-Apparel and Merchandising	3	
CHEM 103	Chemistry in Context	3	3A
CHEM 104 ^P	Chemistry in Context Laboratory	1	3A
CO 150 ^P	College Composition	3	1A
DM 120	Textiles	3	
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
PSY 100	General Psychology	3	3C
OR			
SOC 100	General Sociology	3	3C
	Arts and Humanities ¹	3	3B
	Elective	3	
	TOTAL	30	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
AM 250	Clothing, Adornment and Human Behavior	3	3E
AM 270 ^P	Merchandising Processes	3	
DM 272	Consumers in the Marketplace	3	
ECON 202 ^P	Principles of Microeconomics	3	3C
SPCM 200	Public Speaking	3	
STAT 201 ^P	General Statistics	3	
OR			
STAT 204 ^P	Statistics for Business Students	3	
	Arts and Humanities ¹	3	3B
	Biological and Physical Sciences ²	3	3A
	Historical Perspectives ³	3	3D
	TOTAL	30	
JUNIOR			
AM 321 ^P	Advanced Textiles (DM 120)	3	
AM 330 ^P	Textile and Apparel Economics	3	4B
AM 366 ^P	Merchandising Promotion	3	
AM 371 ^P	Merchandising Systems	4	
AM 375 ^P	Product Design and Development	3	
DM 360 ^P	Retailing	3	
MKT 360 ^P			
DM 492 ^P	Preinternship Seminar	2	
FIN 305 ^P	Fundamentals of Finance	3	
OR			
	Upper division elective	3	
MGT 305	Fundamentals of Management	3	
MKT 305 ^P	Fundamentals of Marketing	3	
	Advanced Writing ⁴	3	2
	TOTAL	33	
SENIOR			
AM 479 ^P	Merchandising Policies and Strategies	3	4A, 4C
DM 487A ^P	Internship-Merchandising ⁵	12	
	AM, DM, INTD elective ⁶	3	
	Upper division AM elective ⁷	3	
	Electives	6	
	TOTAL	27	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select one three credit course from the list of courses in category 3A in the AUCC.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select one course from the list of courses in category 2 in the AUCC.

⁵ Registration for DM 487A depends on acceptance by a cooperating company.

Students not enrolled in an internship will select 12 credits from departmental list.

⁶ Choose any course with an AM, DM, or INTD prefix.

⁷ Choose upper-division AM courses which end in 00-81.

Minor in Merchandising

A minor in Merchandising provides students in other majors an opportunity to expand their knowledge of merchandising. The minor may be of special interest to students majoring in areas such as art and business. The perspectives gleaned by selecting a Merchandising minor both enhance understanding of the student's major program and expand career opportunities available to the student.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
LOWER DIVISION		
AM 101	Fashion Industries	3
AM 270 ^P	Merchandising*	3
DM 120	Textiles	3
	TOTAL	9
UPPER DIVISION		
AM 330 ^P	Textile and Apparel Economics*	3
OR		

<u>Course</u>	<u>Title</u>	<u>Cr</u>
AM 366 ^P	Merchandising Promotion	3
AM 371 ^P	Merchandising Systems*	4
AM	Elective ¹ *	3
DM 360 ^P	Retailing*	3
MKT 360 ^P		
	TOTAL	13
PROGRAM TOTAL = 22 credits without prerequisites		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select in consultation with adviser.

*Additional course work may be required because of prerequisites.

Major in Interior Design

The Interior Design program exemplifies the definition of the professional interior designer as qualified by education, experience, and examination to enhance the function and quality of life, increase productivity, and protect the health, safety, and welfare of the public. The program is accredited by the Council for Interior Design Accreditation (CIDA).

Students seeking to apply to the Interior Design major at Colorado State University (C.S.U.) first are admitted to Colorado State University as Pre-Interior Design. All students who wish to be considered for admission to Interior Design will be required to complete the Interior Design Scenario. Selective advancement into the major is based on the score received at the Interior Design Scenario determined by external reviewers who assess student competencies in writing, drawing, problem solving and conceptual frameworks. A cohort of approximately 40 students is selected upon completion of the Interior Design Scenario. The Design Scenario occurs annually in spring semester. See the Department of Design and Merchandising website for more information regarding the Interior Design Scenario.

In order to participate in the Interior Design Scenario students must have the following:

- GPA of 2.5 or higher.
- Completion or current enrollment in INTD 129 (Introduction to Interior Design) and INTD 166 (Visual Communication/Sketching) or equivalent. Equivalent courses from other institutions must be approved at least two weeks prior to the Interior Design Scenario by the Interior Design transfer advisor.

Interior Design department advisors will work with Pre-Interior Design students and advise them on their current performance in relation to the possibility of their admission to Interior Design.

Faculty in the interior design program value learning as a collaborative effort inviting diversity, design research as a

basis for excellence in design practice, and new models for learning to respond to new ways of working. The program guides students toward becoming dedicated interior designers who have strong communication skills, are active as team players and creative problem solvers, and who make a positive impact in the practice of interior design. Students engage in research-based problem solving, providing a solid transition from education to practice in a global community. An internship in interior design practice is required for graduation.

The Interior Design graduate will learn the entirety of the design process, beginning with assessment of client needs through design programming, development of alternative design solutions, development of conceptual and theoretical frameworks, selection of furniture and finish materials, construction documentation, core compliance, and contract administration including project management and post-occupancy evaluation methodologies. In addition, students take course work in construction/building systems and codes, business principles in interior design, computer-aided design and drafting, animation, multimedia, graphic visualization, interior design history, and sustainable practices.

The teaching facilities include design studios; display, resource, and critique spaces; and computer labs.

Learning Outcomes

Interior design majors will:

- Produce a research-based solution demonstrating depth of exploration in planning for a large-scale, complex facility with complexity and depth of exploration defined in terms of scale, detail, and design elements inclusive in space, lighting requirements, and project definition as exemplified through presentation materials
- Demonstrate overall mastery of skills and knowledge identified by the Council for Interior Design Accreditation standards ranging from understanding human behavior and design history to concept development, technology, and green design
- Demonstrate oral, written, and graphic communication skills at the entry-level of the profession

Potential Occupations

Students are prepared as entry-level interior designers with competency in design fundamentals, space planning and programming, code compliance, lighting, materials research, project management, and professional practices in the design of diverse interior spaces.

Graduates seek employment in interior design and architecture firms as residential, corporate, retail, health care, institutional, education, and hospitality designers. Graduates also work in lighting design, product development, marketing, research, design-related journalism, illustration, facility management, showroom management, and as manufacturers' representatives.

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
ART 100	Introduction to the Visual Arts	3	3B
CO 150 ^P	College Composition	3	1A
CON 151	Construction Materials and Methods	3	
INTD 129	Introduction to Interior Design	3	
INTD 166	Visual Communication/Sketching	3	
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
PSY 100	General Psychology	3	3C
	Arts and Humanities ¹	3	3B
	Biological and Physical Sciences ²	4	3A
	Historical perspectives ³	3	3D
	TOTAL	31	
SOPHOMORE			
CON 235 ^P	Construction Graphics	3	
DM 120	Textiles	3	
INTD 210 ^P	Interior Design Anatomy	3	
INTD 236 ^P	Three-Dimensional Thinking	3	
INTD 256 ^P	Computer-Aided Design for Interior Designers	3	
INTD 266 ^P	Visual Communication-Multi-Media	3	
INTD 276 ^P	Interior Design I	3	
INTD 350 ^P	Codes-Health and Safety	3	
	Electives	6	
	TOTAL	30	
JUNIOR			
ART 110	Art History I	3	
	OR	3	
HIST 354 ^P	American Architectural History	3	
CON 371 ^P	Mechanical and Plumbing Systems	3	
INTD 330 ^P	Lighting Design	3	
INTD 340 ^P	Interior Materials and Finishes	3	
INTD 356 ^P	Professional Communications-Interior Design	3	4A
INTD 359 ^P	History of Interior Design	3	
INTD 376 ^P	Interior Design II	3	
PSY 316 ^P	Environmental Psychology	3	
	Advanced Writing ⁴	3	2
	Electives	3	
	TOTAL	30	
SENIOR			
INTD 400 ^P	Interior Design Research Proposal	4	4B
INTD 476 ^P	Interior Design Project	4	4C
INTD 487 ^P	Internship-Interior Design ⁵	3	
	Biological and Physical Sciences ²	3	3A
	Global and Cultural Awareness ⁶	3	3E
	Upper division electives ⁷	12	
	TOTAL	29	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select from the list of courses in category 2 in the AUCC.

⁵ Substitute experiences could include study abroad or independent study (service learning) with prior adviser approval.

⁶ Select from the list of courses in category 3E in the AUCC.

⁷ Select from the list of courses in category 3E in the AUCC.

Graduate Programs in Design and Merchandising

The department offers graduate programs leading to a Master of Science degree in Design and Merchandising. Students may specialize in Apparel and Merchandising or Interior Design. For more information about program emphases and requirements, contact the department. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, www.dm.caahs.colostate.edu.

SCHOOL OF EDUCATION

*Office in Education Building, Room 203 or Room 227
(970) 491-6317
soe.caahs.colostate.edu*

*Kevin Oltjenbruns, Interim Director
Brian Cobb, Interim Associate Director*

Major in Family and Consumer Sciences

Family and consumer sciences is an exciting field with many career opportunities. The mission of this interdepartmental major prepares professionals dedicated to enhancing the well-being of individuals and families and the communities and environments in which they function.

Students graduate with an interdisciplinary perspective about the challenges encountered by consumers and families. Family and consumer sciences students attain skills to assist families and consumers with quality of life decisions and challenges related to interpersonal/human relationships, consumer and financial resource management, personal development, nutrition and wellness, and balancing family and work. This program emphasizes management and problem solving skills needed to be a responsible and productive individual, family member, and worker. Students take course work primarily in family and consumer sciences and in the Departments of Human Development and Family Studies, Food Science and Human Nutrition, and Design and Merchandising.

Students have the option of the family and consumer sciences concentration or the family and consumer sciences education concentration. Graduates qualify to sit for the examination to be Certified in Family and

Consumer Sciences (CFCS) with the American Association of Family and Consumer Sciences.

Learning Outcomes

Students will:

- Demonstrate mastery of knowledge related to interdisciplinary areas of family and consumer sciences
- Value professional involvement
- Demonstrate problem solving and communication skills
- Demonstrate learning and competence in experiential settings

Potential Occupations

Graduates' career opportunities include cooperative extension/agent, consumer program development, consultant, product representative, consumer information specialist, customer assurance specialist, writer/developer of informational or educational materials, governmental, community, and non-profit agency worker, and Peace Corps volunteer. Teaching opportunities at the middle school, junior high, high school, or post-secondary level are available upon completion of the education concentration.

The major provides a strong foundation for graduate work. Graduate degree opportunities are available in the School of Education or specific departments related to family and consumer sciences (Design and Merchandising, Food Science and Human Nutrition, and Human Development and Family Studies).

Family and Consumer Sciences Concentration

The family and consumer sciences concentration provides student with a focus on consumer and family well being, growth and development of family members, and the relationship of households to their environment. The concentration is interdisciplinary, bringing together courses in human development, family studies, nutrition and foods, consumer sciences, apparel and textiles, and design and merchandising.

It is highly recommended that students participate in internships, volunteer activities, or cooperative extension opportunities to enhance their experiences and development. Graduates who seek advanced degrees attain higher level professional positions.

The concentration includes general education courses, subject matter courses, and elective courses to enhance personal and professional development.

Course	Title	Cr	AUCC
FRESHMAN			
AM 130	Design Foundation-Apparel and Merchandising	3	
OR			
ART 100	Introduction to the Visual Arts	3	3B
<i>Select one pair from the following:</i>			
CHEM 103	Chemistry in Context	3	3A
CHEM 104 ^P	Chemistry in Context Laboratory	1	3A
OR			
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
CO 150 ^P	College Composition	3	1A
DM 120	Textiles	3	
FACS 179	Introduction to Family and Consumer Sciences	2	
FSHN 150	Survey of Human Nutrition	3	
HDFS 101	Individual and Family Development	3	3C
PSY 100	General Psychology	3	3C
	Mathematics ¹	3	1B
	Elective	2	
	TOTAL	29-30	
SOPHOMORE			
BZ 101	Humans and Other Animals	3	3A
OR			
LIFE 102 ^P	Attributes of Living Systems	4	3A
BUS 150	Business Computing Concepts and Applications	3	
OR			
CS 110	Personal Computing	4	
DM 272	Consumers in the Marketplace	3	
HES 145	Health and Wellness	3	
SOC 100	General Sociology	3	3C
SPCM 200	Public Speaking	3	
	Arts and Humanities ²	6	3B
	Economics ³	3	
	Elective	3	
	TOTAL	30-32	
JUNIOR			
AHS 300	Research in Applied Professions	3	
FACS 320	Finance-Personal and Family	3	
FSHN 300 ^P	Food Principles and Applications	3	
FSHN 301 ^P	Food Principles and Applications Laboratory	2	
<i>Select one course from the following:</i>			
HDFS 310 ^P	Infant and Child Development in Context	3	
HDFS 311 ^P	Adolescent/Early Adult Development in Context	3	
HDFS 312 ^P	Adult Development-Middle Age and Aging	3	
INTD 200	Housing Values in America	3	
	Advanced Writing ⁴	3	2
	FSHN, FTEC, RRM elective	3	
	Family and Consumer Sciences electives ⁵	3	
	Historical Perspectives ⁶	3	3D
	TOTAL	29	
SENIOR			
FACS 479 ^P	Colloquium-Family and Consumer Sciences	2	4A, 4C
HDFS 302 ^P	Marriage and Family Relationships	3	
HDFS 334 ^P	Parenting Across the Lifespan	3	4B
HDFS 402 ^P	Family Studies	3	
HDFS 403	Families in the Legal Environment	3	
	Global and Cultural Awareness ⁷	3	3E
	Family and Consumer Sciences electives ⁵	12	
	Support career objective-electives ⁸	2-3	
	TOTAL	31-32	
PROGRAM TOTAL = 120-122 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select at least three credits from the list of courses in category 1B in the All-University Core Curriculum (AUCC).

² Select two courses from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select one course from the ECON subject code.

⁴ Select one course from the list in category 2 of the AUCC.

⁵ Select courses with subject codes AHS, AM, DM, FACS, FSHN, FTEC, HDFS, INTD, or RRM. Keep in mind the requirement of 42 upper-division credits when choosing these courses.

⁶ Select from the list of courses in category 3D in the AUCC.

⁷ Select from the list of courses in category 3E in the AUCC. AM 250 is suggested but not required.

⁸ Select courses to enhance knowledge and skill in chosen career area.

Family and Consumer Sciences Education Concentration

Family and consumer sciences education directly addresses the needs of youth, families, and consumers. Helping to shape the future, teachers of family and consumer sciences impact the lives of individuals, the health of families, and the welfare of society.

The education concentration has as its mission *to teach and model best educational practices to prepare emerging teachers as learners, collaborators, and leaders*. The family and consumer sciences licensure program includes general education courses, subject matter courses, and teacher preparation courses.

Students apply for the licensure program in their junior year and participate in practicum experiences working closely with classroom teachers in area schools. Throughout the phases of the licensure program, students are placed in a middle or junior high school and a senior high school where they apply professional knowledge and refine their instructional skills. While student teaching, they work closely with a family and consumer sciences mentor teacher(s) and a university professor(s).

Students completing the program meet the requirements for the Bachelor of Science degree in family and consumer sciences, a Colorado Teaching License in Family and Consumer Sciences, and a Family and Consumer Sciences Career and Technical Credential.

Course	Title	Cr	AUCC
FRESHMAN			
<i>Select one pair from the following:</i>			
CHEM 103	Chemistry in Context	3	3A
CHEM 104 ^P	Chemistry in Context Laboratory	1	3A
OR			
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
CO 150 ^P	College Composition	3	1A
FACS 179	Introduction to Family and Consumer Sciences	2	
FSHN 150	Survey of Human Nutrition	3	
HDFS 101	Individual and Family Development	3	
HES 145	Health and Wellness	3	
PSY 100	General Psychology	3	3C
	Arts/humanities ¹	6	3B
	Mathematics ²	3	1B
	TOTAL	30-31	
SOPHOMORE			
AM 101	Fashion Industries	3	
AM 250	Clothing, Adornment and Human Behavior	3	3E
DM 272	Consumers in the Marketplace	3	
ECON	Economics	3	
HDFS 310 ^P	Infant and Child Development in Context	3	
INTD 129	Introduction to Interior Design	3	
SPCM 200	Public Speaking	3	

Course	Title	Cr	AUCC
	Advanced writing ³	3	2
	Biological/physical sciences ⁴	3	3A
	Historical perspectives ⁵	3	3D
	TOTAL	30	
JUNIOR			
AHS 300	Research in Applied Professions	3	
FACS 320	Finance-Personal and Family	3	
EDUC 275 ^P	Schooling in the United States	3	3C
EDUC 331 ^P	Educational Technology and Assessment	2	
EDUC 340 ^P	Literacy and the Learner	3	
EDUC 350 ^P	Instruction I- Individualization/Management	3	
EDUC 386 ^P	Practicum-Instruction I	1	
FSHN 300 ^P	Food Principles and Applications	3	
FSHN 301 ^P	Food Principles and Applications Laboratory	2	
HDFS 302 ^P	Marriage and Family Relationships	3	
HDFS 311 ^P	Adolescent/Early Adult Development in Context	3	
	Family and consumer sciences electives ⁶	2-3	
	TOTAL	31-32	
SENIOR			
EDCT 451 ^P	Methods-Family and Consumer Sciences Education	4	
EDCT 485 ^P	Student Teaching	11	4C
EDCT 492 ^P	Seminar-Professional Relations	1	4C
EDUC 450 ^P	Instruction II-Standards and Assessment	4	
EDUC 486 ^E ^P	Practicum-Instruction II	1	
FACS 479 ^P	Colloquium-Family and Consumer Sciences	2	4A
HDFS 334 ^P	Parenting Across the Lifespan	3	4B
HDFS 403	Families in the Legal Environment	3	
	TOTAL	29	
PROGRAM TOTAL = 120-121 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from list in category 3B in the All-University Core Curriculum (AUCC).

² Select at least three credits from list of courses in category 1B in the AUCC. Select from the list of courses in category 2 of the AUCC.

³ Select from list of courses in category 3A in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁵ Select from family and consumer sciences' list of recommended courses in category 3D in the AUCC.

⁶ Select courses with subject codes AHS, AM, DM, FACS, FSHN, FTEC, HDFS, INTD, or RRM.

This concentration is accredited and approved by the Colorado Department of Higher Education (CDHE) and the Colorado Department of Education (CDE). Nationally, it is approved by the Teacher Education Accreditation Council.

Students interested in pursuing a teaching license through Colorado State University may refer to the School of Education section in this chapter for general information. Detailed information about the School of Teacher and Principal Preparation program and licensure requirements are available on the program's web site www.stepp.cahs.colostate.edu/ or in room 111 of the Education Building.

Major in Fire and Emergency Services Administration

The fire and emergency services have a long and proud history of serving their communities with a wide variety of fire protection, prevention, emergency medical, and public education services. The fire and emergency service administrators of the future need advanced administration, management, and leadership skills to address the ever-evolving nature of emergency services. The major prepares students for managerial and officer positions in emergency and fire service organizations.

The major is a degree completion program for students to gain advanced knowledge of emergency service related subjects. The coursework builds upon technical skills and experiences earned in fire science associate degree programs and on-the-job training. Students will explore key administrative areas such as emergency operations, public service budgeting, human resources, and incident command. The major is both administrative and fire service oriented.

All fire and emergency services administration courses are upper-division and offered online via distance education only through the Division of Continuing Education.

Learning Outcomes

Students will demonstrate their ability to:

- Effectively integrate academic knowledge into fire and emergency service administrative and managerial roles within current and future employment situations
- Collaborate with peers to solve fire and emergency service organizational problems. Effective collaboration includes the ability to organize and synthesize ideas, develop a persuasive argument, interact with individuals and groups, and use applicable presentation aids
- Demonstrate knowledge, skills, and competencies in the fire and emergency services field and apply this knowledge to fire and emergency service organizations. Examples include knowledge of proposal and report writing, trends in emergency management and incident command systems, and comprehension of public service administration practices.

Potential Occupations

Students in the fire and emergency services administration major should have work experience in the

fire and emergency services field. Typical students currently are employed as career or volunteer firefighters, paramedics, emergency medical technicians, inspectors, or trainers. Graduates can expect positions as fire chiefs, company officers, public administrators, fire marshals, or educators.

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN & SOPHOMORE			
The bachelor of science in fire and emergency services administration is designed as a 2+2 degree program for students in the fire and emergency services. Students should complete 60 semester hours of transferable college credit at the freshman and sophomore levels. A total of 120 credits are required for graduation, with the remaining 60 credits shown below. Prior transcripts are evaluated to determine academic status in relation to meeting degree requirements, including general education courses equivalent to the All-University Core Curriculum (AUCC). All courses below are presented in an online format through the Division of Continuing Education.			
	TOTAL	60	
JUNIOR			
FESA 331	Structure Influence on Tactics and Strategy	3	
FESA 333	Proposals/Reports in Fire Service Management	3	
FESA 334	Orientation to Experiential Learning	1	
FESA 336	Fire and Emergency Services Management	3	4A
FESA 337 ^P	Policy and Public Administration	3	
FESA 338	Essentials of Emergency Management	3	
	Fire and emergency services administration electives	9	
	Technical electives ¹	6	
	TOTAL	31	
SENIOR			
FESA 432 ^P	Fire and Emergency Services Budgeting	3	
FESA 433 ^P	Human Resource Development	3	4B
FESA 467 ^P	Integrated Management Simulation	3	4C
	Fire and emergency services administration electives	14-15	
	Technical electives ¹	6	
	TOTAL	29-30	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ See current approved list of related technical electives offered through the Division of Continuing Education or seek approval of junior- and senior-level transfer courses in accordance with departmental policy.

Graduate Programs

Office in Education Building, Room 209
(970) 491-1963
soe.caahs.colostate.edu

The School of Education offers graduate programs leading to a Master of Education in education and human resource studies, a Master of Science in student affairs in higher education, and a Doctor of Philosophy degree in education and human resource studies.

Master of Education emphases are available in adult education and training, counseling and career development which is approved by the Council for Accreditation of Counseling and Related Educational Programs, educational leadership, and organization performance and change.

The Master of Science degree in student affairs in higher education follows the Council on the Advancement standards.

Doctoral degree emphases are available in community college leadership, college and university leadership, educational leadership in K-12 or in higher education, organizational performance and change, research methodology, and interdisciplinary studies.

Regional Graduate Program status has been given to the doctoral degree by the Western Interstate Commission on Higher Education (WICHE). This arrangement, approved by the State of Colorado, permits citizens of other states to pay resident tuition rates under certain conditions. Contact the School of Education for further details.

Nondegree programs are also available that lead to licensure/credential/endorsement as a school principal.

Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduate.school.colostate.edu/current-students/bulletin.aspx, and the School's website, soe.caahs.colostate.edu.

The School for Teacher Education and Principal Preparation (STEPP) is the program at Colorado State University responsible for licensure of K-12 teachers in 16 content areas, and of public school principals, K-12. Program information may be found under the College of Applied Human Sciences, section on the School for Teacher Education and Principal Preparation at: www.stepp.caahs.colostate.edu/.

DEPARTMENT OF FOOD SCIENCE AND HUMAN NUTRITION

Office in Gifford Building, Room 234
(970) 491-FOOD (3663)
www.fshn.caahs.colostate.edu

Professor Chris Melby, Dr.P.H., Department Head
Dietetic Program Director Mary Harris, Ph.D., R.D., BC-ADM
Hospitality Management Director Jeff Miller, Ph.D.

Major in Nutrition and Food Science

Public interest regarding the importance of nutrition to health and fitness is at a high level and increasing. The nutrition and food science major involves integration of the biological, medical, and social sciences and their application to the improvement of human nutrition and fitness, prevention of chronic disease, and improved

quality of life. The major is both science and human service oriented.

Nutrition and food science graduates gain a scientific understanding of the principles of human nutrition, the role of nutrition in the prevention and management of disease, delivery of nutritional care, and the principles of nutrition assessment and food preparation. Additionally, graduates know the techniques of interviewing, counseling, information management, and effective communications.

Four options are currently available in this major – dietetics; nutrition and fitness; nutritional sciences (pre-med), and food safety and nutrition.

Learning Outcomes

Students will demonstrate:

- Ability to identify nutrition-related public health problems, integrates information from basic nutrition sciences, critically analyze data, and develop appropriate conclusions
- Discipline-specific knowledge, skills, and competencies needed in the field of dietetics and nutrition. Examples include knowledge of evolving methods of assessing health status, medical nutrition therapy, nutrition and metabolism, program planning, monitoring, and evaluation, facility management, organizational change theory, financial management, food safety, and the role of food in promotion of a healthy lifestyle
- Competent application of nutrition knowledge and skills in a work environment, including an ability to calculate and/or define diets for various health/disease conditions, screen individuals for nutritional risk, determine nutrient requirements across the lifespan, and calculate enteral and parental nutrition formulations; determine costs of services/operations, interpret financial data, and prepare a budget

(See Dietetics option on website for specific learning outcomes for the ADA accredited dietetics program at: www.fshn.caahs.colostate.edu/academic_programs/undergraduate/Default.aspx.)

Potential Occupations

Participation in community outreach, internships, volunteer activities, or cooperative education opportunities is highly recommended to enhance career planning, skills, and development. Graduates who go on for advanced studies can attain more responsible leadership positions with the possibility of rising to top professional levels.

Some examples of career opportunities include, but are not limited to: dietitian or nutritionist in health care, hospitals, nursing homes, schools, state or county health agencies, health clubs, corporate wellness programs, or private practice; community nutritionist; biomedical scientist; restaurant manager; caterer; quality assurance specialist; food scientist; food inspector; food technologist, food plant manager; food service manager. The median salary for Registered Dietitians is \$49,500 – the range is \$30,000-\$59,000.

Students interested in *teaching* nutrition and/or food science content at the secondary education level should explore the interdepartmental concentration in family and consumer sciences education at the beginning of this college section. The family and consumer sciences education concentration allows students to combine their interests in nutrition, wellness/health, food science, culinary arts, and/or catering with teaching. Family and consumer sciences students take course work in the Department of Food Science and Human Nutrition, Design and Merchandising, and Human Development and Family Studies as well as complete an education sequence which qualifies them for a secondary teaching license. The demand for secondary family and consumer sciences teachers exceeds the supply in Colorado as well as nationally. Therefore, job placement is extremely high with starting salaries in the \$30,000-\$34,000 range for a nine-month teaching position.

Students may choose from among four options under the Nutrition and Food Science major.

Dietetics Option

The dietetics option provides a broad background in clinical nutrition, health promotion, and food service management. The science-based curriculum includes nutritional assessment, application of food theory, and course work focusing on nutritional counseling and medical nutrition therapy. The option is designed to prepare students for a dietetic internship and a professional career in medical nutrition therapy or nutrition counseling. The dietetics option is accredited by the Commission on Dietetic Education of the American Dietetic Association (ADA). This option is open to all students interested in becoming registered dietitians. However, students must qualify to continue in the dietetics option by meeting the prerequisites for the Dietetic Practice Seminar (FSHN 392) in their junior year. These prerequisites are an overall GPA of 2.8 and grades of “C” or better in FSHN 150, FSHN 300/301, and basic sciences (CHEM 107/108, or CHEM 111, 112, 113; LIFE 102 or BZ 110, 111; BMS 300, 302; FSHN 150; FSHN 300, 301). Students who do not meet these requirements are encouraged to exercise their repeat/delete options in those courses which are lower

than a “C” grade if they wish to be considered for the dietetics option.

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
<i>Select four credits from the following courses:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
OR			
LIFE 102 ^P	Attributes of Living Systems	4	3A
<i>Select one set from following:</i>			
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
OR			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CO 150 ^P	College Composition	3	1A
BUS 150	Business Computing Concepts and Applications	3	
OR			
CS 110	Personal Computing	4	
FSHN 150	Survey of Human Nutrition	3	
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
PSY 100	General Psychology	3	3C
SOC 100	General Sociology	3	3C
	Foundations and Perspectives ¹	3	3B, 3D, 3E
TOTAL			
TOTAL		32	
SOPHOMORE			
BMS 300 ^P	Principles of Human Anatomy and Physiology	4	
BMS 302 ^P	Laboratory in Principles of Physiology	2	
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
CHEM 246 ^P	Fundamentals of Organic Chemistry Laboratory	1	
FSHN 300 ^P	Food Principles and Applications	3	
FSHN 301 ^P	Food Principles and Applications Laboratory	2	
OT 215	Medical Terminology	1	
SPCM 200	Public Speaking	3	
	Foundations and Perspectives ¹		3B, 3D, 3E
Electives		3	
TOTAL		32	
JUNIOR			
BC 351 ^P	Principles of Biochemistry	4	
<i>Select one course from the following:</i>			
CO 300 ^P	Writing Arguments	3	2
CO 301B ^P	Writing in the Disciplines-Sciences	3	2
CO 301C ^P	Writing in the Disciplines-Social Sciences	3	2
JTC 300 ^P	Professional and Technical Communication	3	2
FSHN 350 ^P	Human Nutrition	3	4C
FSHN 360 ^P	Nutrition Assessment	2	
FSHN 386	Practicum in Food Service Management	2	
FSHN 392 ^P	Dietetic Practice Seminar	1	
LIFE 205	Survey of Microbial Biology	3	
LIFE 206 ^P	Microbial Biology laboratory	2	
MGT 305	Fundamentals of Management	3	
RRM 310	Food Service Systems Operations	3	
RRM 311 ^P	Food Service Systems-Production and Purchasing	3	
STAT 201 ^P	General Statistics	3	
OR			
STAT 204 ^P	Statistics for Business Students	3	
TOTAL		32	
SENIOR			
FSHN 428 ^P	Nutrition Teaching and Counseling Techniques	3	
FSHN 450 ^P	Medical Nutrition Therapy	5	4B
FSHN 451 ^P	Community Nutrition	3	4A
FSHN 459 ^P	Nutrition in the Life Cycle	3	

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
FSHN 470 ^P	Integrative Nutrition and Metabolism	3	
FSHN 492 ^P	Seminar in Dietetics and Nutrition	2	4C
FSHN 496A-1 ^P	Group Study in Dietetics and Nutrition	2	
Electives ²		1-5	
TOTAL		22-	
TOTAL		26	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select one course each from the lists in categories 3D and 3E, and two courses from category 3B of the All-University Core Curriculum (AUCC), for a total of 12 credits. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Enough elective credits need to be selected to bring program total to 120 credits with 42 upper-division credits.

Food Safety and Nutrition Option

The food safety and nutrition option blends a strong science base with courses in food science, food safety, food microbiology and nutrition. The curriculum prepares students for employment in the food industry or in government in such areas as quality assurance, product development, research, food inspection, food processing plant management, and consumer education. The option also provides an excellent background for a graduate program. Students in the option are encouraged to participate in the interdisciplinary studies program in food science/safety to further their understanding of the continuum of responsibility shared through the food system in ensuring that food is safe and healthful. By addition of several elective courses, students can also meet ADA course requirements.

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
<i>Select four credits from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
OR			
LIFE 102 ^P	Attributes of Living Systems	4	3A
<i>Select one set from the following:</i>			
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
OR			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CO 150 ^P	College Composition	3	1A
FSHN 125	Food and Nutrition in Health	2	
OR			
FSHN 150	Survey of Human Nutrition	3	
FTEC 110	Food-From Farm to Table	3	
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
SOC 100	General Sociology	3	3C
	Foundations and perspectives ¹	6	3B, 3D, 3E
TOTAL		29-33	
SOPHOMORE			
BMS 300 ^P	Principles of Human Anatomy and Physiology	4	
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
CHEM 246 ^P	Fundamentals of Organic Chemistry Laboratory	1	
BUS 150	Business Computing Concepts and	3	

Course	Title	Cr	AUCC
Applications			
OR			
CS 110	Personal Computing	4	
FSHN 300 ^P	Food Principles and Applications	3	
FSHN 301 ^P	Food Principles and Applications Laboratory	2	
	Foundations and perspectives ²	6	3B, 3D, 3E
	Electives	4	
	TOTAL	27-28	
JUNIOR			
<i>Select one course from the following:</i>			
CO 300 ^P	Writing Arguments	3	2
CO 301B ^P	Writing in the Disciplines-Sciences	3	2
CO 301C ^P	Writing in the Disciplines-Social Sciences	3	2
JTC 300 ^P	Professional and Technical Communication	3	2
FSHN 350 ^P	Human Nutrition	3	
FTEC 447 ^P	Food Chemistry	2	4B
LIFE 205	Survey of Microbial Biology	3	
LIFE 206 ^P	Microbial Biology Laboratory	2	
SPCM 200	Public Speaking	3	
	Upper division FSHN/RRM courses	6	
	Advanced courses ²	8	
	TOTAL	30	
SENIOR			
FSHN 492 ^P	Seminar in Dietetics and Nutrition	2	4C
FTEC 400 ^P	Food Safety	3	
FTEC 420 ^P	Quality Assessment of Food Products	3	4A
FTEC 460	Brewing Science and Technology	3	
MIP 334 ^P	Food Microbiology	3	
MIP 335 ^P	Food Microbiology Laboratory	2	
STAT 201 ^P	General Statistics	3	
OR			
STAT 204 ^P	Statistics for Business Students	3	
	Upper division FSHN/RRM courses	6	
	Advanced courses ²	4	
	Electives ³	0-5	
	TOTAL	29-34	

OPTION TOTAL = 120credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select one course each from the list in category 3D, and 3E and two courses from category 3B of the All-University Core Curriculum (AUCC). A total of 12 credits must be selected between the core program and the option chosen. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select a minimum of 12 credits from the following: ACT 205, ANEQ 360, ANEQ 460, BC 351, BTEC 306/BIOM 306, ERHS 220, ERHS 332, MATH 125, MATH 126, MATH 141 or MATH 155, MGT 305, PH 121, RRM 330, RRM 400, SOCR 330, SOCR 430.

³ Enough elective credits need to be selected to bring program total to 120 credits with 42 upper-division credits.

Nutrition and Fitness Option

The nutrition and fitness option prepares students for employment as nutrition and fitness counselors and personal lifestyle coaches in health care settings, commercial establishments, public health settings, or private practice. The curriculum blends a strong science base with course work in exercise science, nutrition, teaching, and counseling. The option also provides an excellent background for a graduate program. By the addition of several elective courses, students can meet ADA didactic course requirements.

Course	Title	Cr	AUCC
FRESHMAN			
<i>Select four credits from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
OR			
LIFE 102 ^P	Attributes of Living Systems	4	3A
<i>Select one set from the following:</i>			
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
OR			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CO 150 ^P	College Composition	3	1A
BUS 150	Business Computing Concepts and Applications	3	
OR			
CS 110	Personal Computing	4	
FSHN 150	Survey of Human Nutrition	3	
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
PSY 100	General Psychology	3	3C
SOC 100	General Sociology	3	3C
	Foundations and Perspectives	3	3B, 3D, 3E
	TOTAL	30-34	
SOPHOMORE			
BMS 300 ^P	Principles of Human Anatomy and Physiology	4	
BMS 302 ^P	Laboratory in Principles of Physiology	2	
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
CHEM 246 ^P	Fundamentals of Organic Chemistry Laboratory	1	
FSHN 300 ^P	Food Principles and Applications	3	
FSHN 301 ^P	Food Principles and Applications Laboratory	2	
OT 215	Medical Terminology	1	
SPCM 200	Public Speaking	3	
	Foundations and perspectives ¹	9	3B, 3D, 3E
	Electives	3	
	TOTAL	32	
JUNIOR			
BC 351 ^P	Principles of Biochemistry	4	
<i>Select one course from the following:</i>			
CO 300 ^P	Writing Arguments	3	2
CO 301B ^P	Writing in the Disciplines-Sciences	3	2
CO 301C ^P	Writing in the Disciplines-Social Sciences	3	2
JTC 300 ^P	Professional and Technical Communication	2	
FSHN 350 ^P	Human Nutrition	3	
FSHN 496A-I ^P	Group Study in Dietetics and Nutrition	1	
HES 240	First Aid and Emergency Care	2	
HES 332F ^P	Techniques of Teaching Weight Training	1	
HES 332H ^P	Techniques of Teaching Aerobics	1	
HES 403 ^P	Physiology of Exercise	4	
LIFE 205	Survey of Microbial Biology	3	
LIFE 206 ^P	Microbial Biology Laboratory	2	
STAT 201 ^P	General Statistics	3	
OR			
STAT 204 ^P	Statistics for Business Students	3	
	TOTAL	27	
SENIOR			
FSHN 360 ^P	Nutrition Assessment	2	
FSHN 428 ^P	Nutrition Teaching and Counseling Techniques	3	
FSHN 450 ^P	Medical Nutrition Therapy	5	4B
FSHN 451 ^P	Community Nutrition	3	4A
FSHN 459 ^P	Nutrition in the Life Cycle	3	
FSHN 470 ^P	Integrative Nutrition and Metabolism	3	
FSHN 492 ^P	Seminar in Dietetics and Nutrition	2	4C
FSHN 496A-I ^P	Group Study in Dietetics and Nutrition	1	
HES 405 ^P	Exercise Testing Instrumentation	2	
	Electives ²	3-7	

Course	Title	Cr	AUCC
TOTAL		27-31	
OPTION TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select one course each from the list in category 3D and 3E and two courses from category 3B of the All-University Core Curriculum (AUCC). A total of 12 credits must be selected between the core program and the option chosen. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Enough elective credits need to be selected to bring program total to 120 credits with 42 upper-division credits.

Nutritional Sciences Option

The nutritional sciences option provides a strong background in natural and biomedical sciences and nutrition, making it an appropriate presentation for graduate study, medical school, and a career in nutritional research, biomedical research, or college teaching. This option forms the basis for a pre-medical professional program. By addition of several elective courses, students can meet ADA course requirements.

Course	Title	Cr	AUCC
FRESHMAN			

<i>Select four credits from the following:</i>			
BZ	110	Principles of Animal Biology	3 3A
BZ	111 ^P	Animal Biology Laboratory	1 3A
OR			
LIFE	102 ^P	Attributes of Living Systems	4 3A
<i>Select one set from the following:</i>			
CHEM	107 ^P	Fundamentals of Chemistry	4 3A
CHEM	108 ^P	Fundamentals of Chemistry Laboratory	1 3A
OR			
CHEM	111 ^P	General Chemistry I	4 3A
CHEM	112 ^P	General Chemistry Laboratory I	1 3A
CHEM	113 ^P	General Chemistry II	3 3A
CO	150 ^P	College Composition	3 1A
BUS	150	Business Computing Concepts and Applications	3
OR			
CS	110	Personal Computing	4
FSHN	150	Survey of Human Nutrition	3
MATH	117 ^P	College Algebra in Context I	1 1B
MATH	118 ^P	College Algebra in Context II	1 1B
MATH	124 ^P	Logarithmic and Exponential Function	1 1B
PSY	100	General Psychology	3 3C
SOC	100	General Sociology	3 3C
		Foundations and Perspectives	3 3B, 3D, 3E
TOTAL			30-34
SOPHOMORE			
BMS	300 ^P	Principles of Human Anatomy and Physiology	4
BMS	302 ^P	Laboratory in Principles of Physiology	2
CHEM	245 ^P	Fundamentals of Organic Chemistry	4
CHEM	246 ^P	Fundamentals of Organic Chemistry Laboratory	1
FSHN	300 ^P	Food Principles and Applications	3
FSHN	301 ^P	Food Principles and Applications Laboratory	2
OT	215	Medical Terminology	1
SPCM	200	Public Speaking	3
		Foundations and perspectives ¹	9 3B, 3D, 3E
Electives			3
TOTAL			32
JUNIOR			
BC	351 ^P	Principles of Biochemistry	4
<i>Select one course from the following:</i>			

Course	Title	Cr	AUCC
CO	300 ^P	Writing Arguments	3 2
CO	301B ^P	Writing in the Disciplines-Sciences	3 2
CO	301C ^P	Writing in the Disciplines-Social Sciences	3 2
JTC	300 ^P	Professional and Technical Communication	2
FSHN	350 ^P	Human Nutrition	3
FSHN	496A-I ^P	Group Study in Dietetics and Nutrition	1
HES	240	First Aid and Emergency Care	2
HES	332F ^P	Techniques of Teaching Weight Training	1
HES	332H ^P	Techniques of Teaching Aerobics	1
HES	403 ^P	Physiology of Exercise	4
LIFE	205	Survey of Microbial Biology	3
LIFE	206 ^P	Microbial Biology Laboratory	2
STAT	201 ^P	General Statistics	3
OR			
STAT	204 ^P	Statistics for Business Students	3
TOTAL			27
SENIOR			
FSHN	360 ^P	Nutrition Assessment	2
FSHN	428 ^P	Nutrition Teaching and Counseling Techniques	3
FSHN	450 ^P	Medical Nutrition Therapy	5 4B
FSHN	451 ^P	Community Nutrition	3 4A
FSHN	459 ^P	Nutrition in the Life Cycle	3
FSHN	470 ^P	Integrative Nutrition and Metabolism	3
FSHN	492 ^P	Seminar in Dietetics and Nutrition	2 4C
FSHN	496A-I ^P	Group Study in Dietetics and Nutrition	1
HES	405 ^P	Exercise Testing Instrumentation	2
Electives ²			3-7
TOTAL			27-31
OPTION TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select one course each from the list in category 3D and 3E and two courses from category 3B of the All-University Core Curriculum (AUCC). A total of 12 credits must be selected between the core program and the option chosen. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Enough elective credits need to be selected to bring program total to 120 credits with 42 upper-division credits.

Minor in Nutrition

This minor provides an opportunity for a non-major to gain a significant orientation to a food, nutrition, and health-related field. The courses in the minor in nutrition have a significant number of prerequisites that should be examined carefully before selecting the minor. Although open to any interested student, the nutrition minor would be most easily taken by students majoring in a life science discipline such as biology or health and exercise science.

Course	Title	Cr
UPPER DIVISION		
BC	351 ^P	Principles of Biochemistry*
BMS	300 ^P	Principles of Human Physiology*
FSHN	350 ^P	Human Nutrition*
FSHN	360 ^P	Nutrition Assessment*
FSHN	451 ^P	Community Nutrition
FSHN	459 ^P	Nutrition in the Life Cycle
FSHN	470 ^P	Integrative Nutrition and Metabolism
PROGRAM TOTAL = 22 credits without prerequisites		3

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

* Additional course work may be required because of prerequisites.

Major in Hospitality Management

Hospitality management combines food service, lodging, business, and elective course work, plus a work experience requirement to provide students with an excellent restaurant and resort management background. There is a strong business emphasis that is combined with course work in nutrition, food service, and tourism. Elective credits allow students to tailor their programs to specific career interests.

The Department of Food Science and Human Nutrition maintains strong ties with the food service and lodging industries locally, state-wide, and nationally to connect graduates with a wide variety of employment opportunities in the expanding commercial and non-commercial hospitality industry. The department also provides job placement assistance.

Learning Outcomes

Students will demonstrate:

- Skills necessary to prepare, cost, and serve a meal using manual or computerized ingredient, recipe, and menu databases
- The requisite skills to manage a front desk at a hotel or resort or the service or kitchen areas of a foodservice operation
- An understanding of the fundamental skills of delivering customer service in hotel or restaurant settings

Potential Occupations

Participation in internships and cooperative education opportunities is highly recommended to enhance practical training and development. The hospitality industry includes restaurants, resorts and hotels, clubs, catering, health care and nursing facilities, schools, correctional, and military facilities. Jobs are most plentiful in large cities and resort areas. The resort industry includes careers in large and small hotel properties, bed and breakfast facilities, country inns, and all types of seasonal resorts.

Some examples of careers include, but are not limited to: food service director, restaurant manager, banquet manager, caterer, flight attendant, food technologist, merchandising supervisor, hotel manager, resort manager, chef; club manager, hotel manager, caterer; purchasing agent, conference planner.

Course	Title	Cr	AUCC
FRESHMAN			
Select four credits from the following:			
BZ 110	Principles of Animal Biology	3	3A

Course	Title	Cr	AUCC
BZ 111 ^P	Animal Biology Laboratory	1	3A
OR			
BZ 120	Principles of Plant Biology	4	3A
CO 150 ^P	College Composition	3	1A
CS 110	Personal Computing	4	
ECON 202 ^P	Principles of Microeconomics	3	3C
FSHN 150	Survey of Human Nutrition	3	
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
NRRT 270	Principles of Natural Resource Tourism	3	
PSY 100	General Psychology	3	3C
OR			
SOC 100	General Sociology	3	3C
RRM 101	Hospitality Industry	3	
TOTAL		29	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
BUS 205	Legal and Ethical Issues in Business	3	
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
ECON 204 ^P	Principles of Macroeconomics	3	
RRM 200 ^P	Resort Operations	3	
RRM 310	Food Service Systems-Operations	3	
SPCM 200	Public Speaking	3	
STAT 204 ^P	Statistics for Business Students	3	
Foundations and Perspectives ¹		6	3B, 3D, 3E
Electives		3	
TOTAL		34	
JUNIOR			
FSHN 300 ^P	Food Principles and Applications	3	
FSHN 301 ^P	Food Principles and Applications Laboratory	2	4A
JTC 300 ^P	Professional and Technical Communication	3	2
MIP 149	The Microbial World	3	
MGT 305	Fundamentals of Management	3	
MGT 310	Human Resource Management	3	
MKT 305 ^P	Fundamentals of Marketing	3	
RRM 311 ^P	Food Service Systems-Production and Purchasing	3	
RRM 330 ^P	Alcoholic Beverage Control and Management	2	
Foundations and perspectives ¹		6	3B, 3D, 3E
TOTAL		31	
SENIOR			
FIN 305 ^P	Fundamentals of Finance	3	
FTEC 400 ^P	Food Safety	3	
RRM 400 ^P	Food and Society	3	4B
RRM 415 ^P	Catering Techniques and Culinary Arts	3	
OR			
RRM 440 ^P	Restaurant Operations	4	
RRM 492 ^P	Seminar on Restaurant and Resort Management	3	4C
Electives ²		10-11	
TOTAL		26	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select one course each from the list in category 3D and 3E and two courses from category 3B of the All-University Core Curriculum (AUCC). A total of 12 credits must be selected. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select enough elective credits to bring program total to 120. At least 3 elective credits must be upper division. Forty-two credits total must be upper division.

Graduate Programs in Food Science and Human Nutrition

At the graduate level, both M.S. and Ph.D. degrees are offered in food science and nutrition. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/

current-students/bulletin.aspx and the department's website, www.fshn.cahs.colostate.edu

DEPARTMENT OF HEALTH AND EXERCISE SCIENCE

Office in Health and Exercise Science Complex, B220
 Moby
 (970) 491-5081
hes.cahs.colostate.edu/

Professor Richard G. Israel, Head

Major in Health and Exercise Science

Students may choose from two concentrations offered in the health and exercise science major – health promotion or sports medicine.

Learning Outcomes

Students will demonstrate:

- Practical knowledge and skills [stress/fitness testing, leadership, administrative, teaching/communication, customer service, and professional attitude] in exercise science and health promotion through laboratory and/or practicum and internship experiences
- Ability to synthesize, integrate, apply, and communicate health and exercise science disciplinary knowledge through structured written assignments and oral presentations
- Skills and knowledge required to successfully compete for employment within the discipline or compete for graduate or professional school placement

Potential Occupations

The marketplace for health and exercise science graduates has expanded dramatically in the last ten years due to society's increasing interest in health and fitness issues. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

Some examples of career opportunities include, but are not limited to: health promotion or wellness specialist, wellness program manager, corporate fitness/wellness programming, exercise consultant or personal trainer, health behavior specialist, exercise technician, recreation director, cardiac rehabilitation program, fitness evaluator, training program consultant, exercise technician. With

additional education, graduates may become: physical therapist, physical therapy assistant, physician assistant, medical technician, respiratory therapist, sport psychologist, medical doctor, occupational therapist.

Health and Exercise Science core courses:

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
HES 120	Introduction to Health and Exercise Science	1	
HES 145	Health and Wellness	3	
HES 207	Anatomical Kinesiology	3	
HES 332F ^P	Techniques of Teaching Weight Training	1	
LIFE 102 ^P	Attributes of Living Systems	4	3A
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
PSY 100	General Psychology	3	3C
	Chemistry ¹	4-5	3A
	TOTAL	25-	
		26	
SOPHOMORE			
BMS 300 ^P	Principles of Human Physiology	4	
HES 240	First Aid and Emergency Care	2	
SPCM 200	Public Speaking	3	
	Historical Perspectives ²	3	3D
	Global and cultural awareness ³	3	3E
	TOTAL	15	
JUNIOR			
HES 403 ^P	Physiology of Exercise	4	4B
	Arts/humanities ⁴	6	3B
	TOTAL	10	
SENIOR			
	<i>Select one of the following:</i>		
STAT 201 ^P	General Statistics	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
STAT 307 ^P	Introduction to Biostatistics	3	
	TOTAL	3	
CORE TOTAL = 53-54 credits⁶			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ See concentration check sheet for pair of courses required by health promotion or sports medicine concentration.

² Select from the list of courses in category 3D in the All-University Core Curriculum (AUCC).

³ Select from the list of courses in category 3E in the AUCC.

⁴ Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁵ Each student must also complete one of the following concentrations: health promotion or sports medicine.

Health Promotion Concentration

A concentration in health promotion provides content and experience in promoting positive health behaviors, such as physical activity, stress management, weight management, and ergonomics, to name a few. Students are prepared for numerous careers in a variety of allied health fields. Specifically, graduates have found employment in corporations as wellness/fitness specialists, hospital and community health promotion, in insurance-based health promotion programs, medical settings, hotel wellness facilities, university health promotion centers, and health and fitness clubs. The curriculum focuses on health promotion program

development, implementation, and evaluation. Other course work includes chemistry, anatomy, physiology of exercise, marketing, advertising, accounting, and more. Students also have opportunities for several practical field experiences before graduating. In fact, the Colorado State health promotion program was ranked #1 in the country by the Association for Worksite Health Promotion for the business course work and quality of clinical field experience a student receives.

In addition to the health and exercise science core courses, the following must be completed:

The minimum GPA for students in the health promotion concentration must be 2.500 with no grade below C in the following courses: BMS 300, FSHN 150, HES 145, and HES 207 before departmental approval will be given to register for HES 386B, Practicum-Wellness Program Management; HES 486B, Practicum-Wellness Program Management; and HES 487, Internship.

Course	Title	Cr	AUCC
FRESHMAN			
FSHN 150	Survey of Human Nutrition	3	
HES 332H	Techniques of Teaching Aerobics	1	
TOTAL		4	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
BUS 150	Business Computing Concepts and Applications	3	
OR			
CS 110	Personal Computing	4	
ECON 202 ^P	Principles of Microeconomics	3	3C
HES 345 ^P	Population Health and Disease Prevention Electives	3	
TOTAL		5-6	
		17-19	
JUNIOR			
HES 340 ^P	Exercise Prescription	1	
HES 356 ^P	Wellness Programming	3	
HES 386A ^P	Practicum in Adult Fitness	2	
HES 386B ^P	Practicum in Wellness Program Management	3	
MKT 305 ^P	Fundamentals of Marketing	3	
MKT 320 ^P	Integrated Marketing Communications	3	
CO 300 ^P	Writing Arguments ¹	3	2
OR			
JTC 300 ^P	Professional and Technical Communication ¹	3	2
Electives		3-4	
TOTAL		21	
SENIOR			
HES 456 ^P	Advanced Wellness Programming	3	4A, 4C
HES 486B ^P	Practicum in Wellness Program Management	3	
HES 487 ^P	Internship Electives	15	
TOTAL		5	
TOTAL		26	
PROGRAM TOTAL = 120-121 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu> to see the course prerequisites.

¹ Select any HES 100 or 101 courses.
² Select from science electives listed on SM checksheet.
³ Select any upper division HES course.

Sports Medicine Concentration

The sports medicine concentration is a preprofessional program that offers a strong science-based education dealing specifically with the application of the natural

sciences to the study of health and exercise. This concentration provides a strong foundation for various professional health-related graduate programs such as physical therapy and exercise physiology. This concentration was structured for two types of students: 1) those seeking preprofessional preparation in medical fields, allied health fields, or physical therapy, and 2) students planning to pursue a master's degree in exercise science.

Some of the courses required for this concentration include chemistry, biology, physics, anatomy, kinesiology, biomechanical principles of human movement, exercise testing, biochemistry, organic chemistry, human nutrition, and rehabilitation exercise.

In addition to the health and exercise core courses, the following must be completed:

Course	Title	Cr	AUCC
FRESHMAN			
HES 100 or HES 101 ¹		1	
MATH 125 ^P	Numerical Trigonometry	1	1B
TOTAL		2	
SOPHOMORE			
BMS 302 ^P	Laboratory in Principles of Physiology	2	
PH 121 ^P	General Physics I	5	
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry II Lab	1	
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
CHEM 246 ^P	Fundamentals of Organic Chemistry Lab	1	
TOTAL		16	
JUNIOR			
BMS 301 ^P	Human Gross Anatomy	5	
<i>Select one of the following:</i>			
CO 300	Writing Arguments	3	2
CO 301B	Writing in the Disciplines—Science	3	2
JTC 300	Professional and Technical Communication	3	2
FSHN 350 ^P	Human Nutrition	3	
HES 307 ^P	Biomechanical Principles of Human Movement	3	
Two Science Electives ²		6-10	
TOTAL		20-24	
SENIOR			
BC 351 ^P	Principles of Biochemistry	4	
HES 319 ^P	Neuromuscular Aspect of Human Movement	3	
HES 405 ^P	Exercise Testing Instrumentation	2	
HES 476 ^P	Exercise and Chronic Disease	3	4A, 4C
HES 379 ^P	Psychology and Sport	3	
HES, upper division ³		2-3	
Electives		6-11	
TOTAL		24-28	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu> to see the course prerequisites.

¹ Select any HES 100 or 101 courses.

² Select from science electives listed on SM checksheet.

³ Select any upper division HES course.

Graduate Programs in Health and Exercise Science

The department offers two graduate degrees, the Master of Science and the Doctor of Philosophy (in Human Bioenergetics.) Students interested in a Master's degree in

Public Health with a focus in Health and Exercise Science can refer to the School of Public Health website <http://www.publichealth.colostate.edu/GPPH/index.asp>. Students interested in graduate work should refer to the *Graduate and Professional Bulletin* graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, hes.caahs.colostate.edu/

DEPARTMENT OF HUMAN DEVELOPMENT AND FAMILY STUDIES

*Office in Behavioral Sciences Building, Room 303
(970) 491-5558
www.hdfs.caahs.colostate.edu*

*Professor Lise Youngblade, Department Head
Professor Karen Barrett, Assistant Department Head*

Major in Human Development and Family Studies

Human development and family studies is a major focusing on the interdisciplinary study of development across the lifespan, within the context of family and culture. Students complete foundational coursework in human development (infancy and childhood, adolescence and young adulthood, middle and later adulthood/aging) and in the area of family studies. This familiarizes them with theory and research in the field, and helps them identify factors influencing cognitive, emotional, social, and physical development across the lifespan. Students also complete an internship designed to provide opportunities to apply knowledge acquired in foundational course work. Additionally, students have the opportunity to take elective courses that support future aspirations related to careers and/or post-baccalaureate programs. With regard to careers, the HDFS curriculum prepares students to work with individuals and families in a broad range of contexts. Students have the opportunity to work toward licensure, a minor or certification in three programs: the Early Childhood Education Licensure program, the Gerontology Interdisciplinary Minor, and the Child Life program.

Learning Outcomes

Students will demonstrate:

- Ability to complete courses and experiences that support their career goals
- Ability to develop effective intervention, prevention, and educational programs based on their knowledge

of theory, normative behavior, family functioning, and ecological factors

- Ability to critically evaluate research and to use research skills to design simple program evaluations and research studies, and ability to use the computer skills required to support this objective;
- Ability to conduct literature searches, find information related to needs assessment, find evaluation measures, and do research-based presentations using PowerPoint

Potential Occupations

Human development and family studies graduates are prepared to work in a variety of human service settings including youth services organizations; early childhood; elementary, and parent education programs; allied health care; juvenile and adult corrections; family and community services; and programs serving older adults, including long-term care facilities. Students interested in teaching human development and family studies content at the secondary level should explore the interdepartmental major in family and consumer sciences, education concentration, at the beginning of this college section. Graduates are also well prepared to pursue advanced degrees in the behavioral and social sciences or other professional programs.

Some examples of career opportunities include, but are not limited to: caseworker, parent educator, children-family educator, child protection worker, family assistance programs, child life specialist, program developer and evaluator, public relations specialist, youth services worker, case manager, non-profit agency administrator, residential center manager, early childhood teacher, adult recreation programmer, career development specialist, family services specialist, human development specialist, adult education teacher, human resources coordinator, youth agency administrator, community outreach worker, women's program administrator, youth intervention and prevention program administrator, youth employment, training, and development specialist.

Completion of the major in human development and family studies requires a minimum grade of C in each HDFS prefix course and a minimum grade of C in each of the four career interest courses used to satisfy human development and family studies requirements. The minimum scholastic average acceptable for graduation is 2.000 computed only for courses attempted at Colorado State.

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
<i>Select one of the following:</i>			
BZ 101	Humans and Other Animals	3	3A
LIFE 102	Attributes of Living Systems	4	3A
CO 150 ^P	College Composition	3	1A
HDFS 101	Individual and Family Development	3	3C
PSY 100	General Psychology	3	3C
SOC 100	General Sociology	3	3C
	Arts and Humanities ¹	3	3B
	Biological and Physical Sciences ²	4	3A

Course	Title	Cr	AUCC
	Historical Perspectives ³	3	3D
	Mathematics ⁴	3	1B
	Elective	2	
	TOTAL	30-31	

SOPHOMORE

<i>Select one course from the following:</i>			
CO	300 ^P	Writing Arguments	3 2
CO	301C ^P	Writing in the Disciplines-Social Sciences	3 2
JTC	300 ^P	Professional and Technical Communication	3 2

HDFS	277	Professional Skills Development I	1
HDFS	310 ^P	Infant and Child Development in Context	3

<i>Select one course from the following:</i>			
SOC	210 ^P	Quantitative Sociological Analysis	3
STAT	201 ^P	General Statistics	3
STAT	301 ^P	Introduction to Statistical Methods	3

		Arts/humanities ¹	3 3B
		Global and cultural awareness ⁵	3 3E
		Career interest elective ⁶	3
		Electives	11
		TOTAL	30

JUNIOR

HDFS	311 ^P	Adolescent/Early Adult Development in Context	3
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HDFS	312 ^P	Adult Development-Middle Age and Aging	3
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HDFS	334 ^P	Parenting Across the Lifespan	3 4A, 4B
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HDFS	350 ^P	Applied Research Methods	3
		Career interest electives ⁶	8-10
		Electives	8-10
		TOTAL	30

SENIOR

<i>Select two courses from the following:</i>			
HDFS	302 ^P	Marriage and Family Relationships	3
HDFS	402 ^P	Family Studies	3
HDFS	403	Families in the Legal Environment	3

HDFS	492 ^P	Seminar-Program Proposal Development	3 4C
		Career interest electives ⁶	3-6
		Experiential learning ⁷	9
		Electives	6-9
		TOTAL	30

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3A in the AUCC.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select at least three credits from the list of courses in category 1B in the AUCC.

⁵ Select from the list of courses in category 3E in the AUCC.

⁶ Choose from department list.

⁷ HDFS 477 (1 credit), and HDFS 488A-D, (5-8 credits), or a three course upper-division cognate defined with and approved by the adviser.

Preparation for Teacher Licensure in Early Childhood and Elementary Education

A major in human development and family studies provides a strong foundation for students desiring a license to teach young children between the ages of 0 and 8. Knowledge of lifespan developmental processes and family systems prepares future teachers to work in partnership with parents and grandparents in educating children.

Human development and family studies students aspiring to work with children between the ages of 0 and 8 can apply during their sophomore year to become part of the Early Childhood Teacher Licensure Program. If accepted, students take course work in the School of Education requiring a 4 semester (2 year) commitment in addition to completing their human development and family studies degree requirements. The Early Childhood Teacher Licensure Program uses a cohort model, and admits a limited number of students, typically between 30-40, each year. The admission process takes place once a year in the spring with the admitted candidates starting in the fall.

Course	Title	Cr	AUCC
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FRESHMAN

<i>Select one course from among the following:¹</i>			
BZ	101	Humans and Other Animals	3 3A
BZ	110	Principles of Animal Biology	3 3A
LIFE	102 ^P	Attributes of Living Systems ¹	4 3A

CO	150 ^P	College Composition	3 1A
HDFS	101	Individual and Family Development	3 3C
PSY	100	General Psychology	3 3C
SOC	100	General Sociology	3 3C
		Arts and Humanities ¹	3 3B
		Biological and Physical Sciences ²	3-4 3A
		Historical Perspectives ³	3 3D
		Mathematics ⁴	3 1B
		Elective	0-2
		TOTAL	29

SOPHOMORE

HDFS	217 ^P	Creative Experiences for Children	3
HDFS	277	Professional Skills Development	1
HDFS	310 ^P	Infant and Child Development in Context	3
HDFS	311 ^P	Adolescent/Early Adult Development in Context	3
HDFS	312 ^P	Adult Development-Middle Age and Aging	3
HDFS	350 ^P	Applied Research Methods	3
HDFS	375 ^P	Programming for Children and Families	3

STAT	201 ^P	General Statistics	3
OR			
STAT	301 ^P	Introduction to Statistical Methods	3
		Arts and Humanities ¹	3 3B
		Global and Cultural Awareness ⁵	3 3E
		Electives	3
		TOTAL	31

JUNIOR

<i>Select one course from the following:⁶</i>			
BMS	300 ^P	Principles of Human Anatomy and Physiology	4
FSHN	150	Survey of Human Nutrition	3
HES	145	Health and Wellness	3
LIFE	201A-B ^P	Introductory Genetics ²	3
LIFE	210 ^P	Introductory Eukaryotic Cell Biology	3

<i>Select one course from the following:</i>			
CO	300 ^P	Writing Arguments	3 2
CO	301C ^P	Writing in the Disciplines-Social Sciences	3 2
JTC	300 ^P	Professional and Technical Communication	3 2

EDUC	275 ^P	Schooling in the United States	3 3C
EDUC	331 ^P	Educational Technology and Assessment	2
EDUC	340 ^P	Literacy and the Learner	3
EDUC	400 ^P	Diagnostic Teaching of Reading	3
EDUC	425 ^P	Early Childhood Education I	4
HDFS	320 ^P	Cognitive and Language Development	3
HDFS	334 ^P	Parenting Across the Lifespan	3 4A, 4B

Course	Title	Cr	AUCC
PSY 460 ^P	Childhood Exceptionality and Psychopathology Elective ⁶	3	
	TOTAL	0-1	
		31	
SENIOR			
EDUC 426 ^P	Early Childhood Education II	4	
EDUC 485C ^P	Student Teaching-Early Childhood	12	
EDUC 493A ^P	Seminar-Professional Relations	1	
<i>Select two of the following courses:</i>			
HDFS 302 ^P	Marriage and Family Relationships	3	
HDFS 402 ^P	Family Studies	3	
HDFS 403	Families in the Legal Environment	3	
HDFS 401 ^P	Childhood Socialization	3	
HDFS 492 ^P	Seminar-Program Proposal Development	3	4C
	TOTAL	29	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from departmental list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² AUCC 3A, Biological/Physical Sciences requirement must include 7 credits and at least one course with a lab component.

³ Select from HIST courses in category 3D in the AUCC.

⁴ Select from departmental list of courses in category 1B in the AUCC.

⁵ Select from departmental list of courses in category 3E in the AUCC.

⁶ Students taking a 3-credit course (FSHN 150, HES 145, LIFE 201A-B, or LIFE 210) must add 1-credit of elective.

Gerontology Interdisciplinary Minor

The Gerontology Interdisciplinary Minor is a 21-23 credit interdisciplinary minor, housed in HDFS, that provides students with the opportunity to earn an undergraduate minor in gerontology. The Gerontology minor helps students to develop an understanding of the aging process, including the biological, psychological and social aspects of adult development and aging. Admission is ongoing throughout the year. The full program may be found in chapter 2.4, University-Wide Instructional Programs in this catalog.

Child Life Program

Child Life is a therapeutic approach to helping children and their families prior to, during, and following a child's hospitalization experience. To sit for the national exam to become a certified child life specialist, students need a Bachelor's degree from an accredited school, 10 courses in child life or related subjects, and 480 hours of internship under a Certified Child Life Specialist. Internship applications are competitive. It is important to have experience working with children in group settings and complete volunteer work in a pediatric hospital or unit. Students typically spend six months volunteering at Children's Hospital of Denver or at National Jewish Hospital. Given that there is only one (highly competitive) internship site in Colorado, at The Children's Hospital of Denver, students usually complete their 12- to 14-week internship out of state.

Online Degree Completion Program

To better serve the needs of distance and working students, HDFS now offers a Bachelor of Science degree completion program online through the Division of Continuing Education. The HDFS online courses are designed to be comparable to their parallel resident instruction courses in HDFS, providing a high quality university education. The online Bachelor of Science degree in HDFS carries the full accreditation of Colorado State University, and is indistinguishable on student transcripts from the on-campus version of the degree. Students interested in this option should visit www.learn.colostate.edu/degrees/hdfs/.

Graduate Programs in Human Development and Family Studies

The Department of Human Development and Family Studies offers two specializations leading to the Master of Science degree: (1) family and developmental studies, and (2) marriage and family therapy.

For students interested in pursuing a Ph.D., the department offers a doctoral program in Applied Developmental Science. This program provides training in research and its application to issues that affect the quality of life of individuals, families, and communities.

Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduate.school.colostate.edu/current-students/bulletin.aspx, and the graduate program's website, www.hdfs.cahs.colostate.edu/Grad.

DEPARTMENT OF OCCUPATIONAL THERAPY

Office in Occupational Therapy Building, Room 219
(970) 491-6253
www.ot.cahs.colostate.edu

Professor Wendy H. Wood, Department Head

Known nationally and internationally for its excellence, the Department of Occupational Therapy is ranked among the top 10 programs in the nation by *U.S. News and World Report*. It is recognized by Colorado State as a Program of Research and Scholarly Excellence and it has been designated as a Program of Excellence by the state of Colorado. The department offers graduate-level education to prepare students as leaders in the field of occupational therapy.

Students interested in earning a master's degree in occupational therapy must first earn an undergraduate degree. Contact the Center for Advising and Student Achievement, (970) 491-7095 about undergraduate majors and prerequisite course requirements.

The occupational therapy program is accredited by the Accreditation Council for Occupational Therapy Education (ACOTE), 4720 Montgomery Lane, PO Box 31220, Bethesda, MD 20824-1220; (301) 652-2682.

The National Board for Certification in Occupational Therapy (NBCOT) is the credentialing agency responsible for the development and implementation of the certification process for OT practitioners.

Graduate Programs in Occupational Therapy

The Occupational Therapy Department offers the following degree programs:

- Master of Science in Occupational Therapy (M.S.)
- Master of Occupational Therapy (M.O.T.)
- Post-Professional Master of Science (M.S.)
- Ph.D. in Occupation and Rehabilitation Science

Students with a bachelor's degree in a discipline outside of occupational therapy pursue the Master of Science or the Master of Occupational Therapy degree. Students with a bachelor's degree in occupational therapy pursue the Post-Professional Master of Science degree. Please contact the Occupational Therapy Department for further details (Linda McDowell, (970) 491-6243; otinfo@cahs.colostate.edu).

Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduate.school.colostate.edu/current-students/bulletin.aspx, and the department's website, www.ot.cahs.colostate.edu/.

SCHOOL OF SOCIAL WORK

Office in Education Building, Room 12
(970) 491-6612
www.ssw.cahs.colostate.edu/

Professor Deborah Valentine, Director and Graduate Coordinator
Assistant Professor Brenda Miles, BSW Program Director

Major in Social Work

Social work is distinguished by a tradition of concern for people and their interactions with society. Social work professionals are community problem solvers who intervene in organizational settings, communities, social service agencies, groups, individuals, and families with goals of enhancing well-being and promoting social and economic justice. Most social workers are employed in fields such as child welfare and family services, mental health, medical social work, school social work, corrections, community organization, or advocacy.

The social work curriculum focuses on the practical application of social work principles, policies, and practices within human rights and social justice perspectives. Students acquire a professional social work foundation transferable to different settings, population groups, and problem areas. Attention is devoted to understanding the social welfare system in the U.S., and working with individuals, families, and communities to affect desired change. Several practical experiences are required. Students work with an agency participant throughout their sophomore year, and then as seniors, participate in a social work agency internship. The curriculum also includes a strong liberal arts base in social science research and statistics, arts, humanities, social science, and natural sciences.

Learning Outcomes

Graduating seniors will have demonstrated:

- Skills in conceptualizing and applying knowledge of social welfare policy and services, a systems perspective, theory, community resources, and community policy-making processes and practices.
- Knowledge and mastery of skills necessary to perform the following six social work roles: advocate, mediator, researcher, broker, educator, and counselor.
- An understanding of the social work code of ethics and mastery of skills in maintaining client confidentiality, establishing professional boundaries, and resolving ethical dilemmas that are presented in case situations.

Potential Occupations

Social work graduates are employed in a variety of settings including welfare agencies, schools, hospitals, clinics, institutions, community centers, public health, corrections, and group homes. Entry-level job opportunities are plentiful. Graduates should be willing to work with people of all ages and in a multitude of circumstances and settings. Opportunities to work with

older adults are especially prevalent. Internships are required. Graduates who achieve a Master of Social Work (MSW) degree attain the ability to intervene in a variety of situations, coordinate services, and supervise other workers. Advancement generally requires an MSW.

Some examples of career opportunities include, but are not limited to: child welfare worker, adolescent group home counselor, crisis counselor, child protection, adult protection, clinical social worker, psychiatric social worker, geriatric social worker, case manager, nursing home administrator, medical social service counselor, community outreach coordinator, youth program counselor, home health worker, occupational social services worker, foster parent consultant, probation officer, client advocate, victim-witness program counselor, program manager, school social services, substance abuse counselor, domestic violence counselor, or adoption worker.

Practicum, Internship, and Progression Requirements

Students directly apply classroom knowledge, skills, and social work values through a six-credit supervised practicum, SOWK 286A and B, in the sophomore year. During this practicum, students must formally apply for Progression to the Major. To comply with accreditation standards that require systematic evaluation of programs and students, faculty review student progress towards completion of this professional degree at the end of the first semester for juniors or at the end of the second semester for sophomores in the SOWK 286 practicum. Students must have an overall 2.000 GPA, and a 2.500 GPA with no grade less than C- in any required social work course before being allowed to continue in the program. In addition, students will prepare a professional statement concerning their informed choice of social work as a profession. The professional statement will be evaluated by the student’s adviser on the basis of content (i.e., fit with the social work profession) and the quality of written communication skills. Students will also be asked to review the Social Work Code of Ethics and indicate their intention to subscribe to its provisions.

If progression requirements are not met, or if the Bachelor’s Program Director has any questions, student materials will be reviewed by the School’s Administrative Team. A full faculty review may be recommended as a next step. The adviser will inform the student, in writing, of the recommended actions. These actions may include: 1) additional course work; 2) a probationary period; 3) consideration of a change of major; 4) dismissal from the social work program. Students may appeal these decisions using the established School and University grievance procedures.

After progression into the major, students must continue to maintain a 2.000 overall GPA and a 2.500 GPA with no grade less than C- in any social work course. Students will be required to retake any social work course (SOWK prefix) in which a grade of C- or better is not achieved.

In the senior year, students fulfill a 10-credit field placement in a social work agency or program in a community setting. Examples of available field placements include child and public welfare programs; hospitals, homeless and women’s shelters, rehabilitation and mental health agencies, schools, adolescent residential care, geriatric centers, and correction programs. Under supervision, students have the opportunity to evaluate their practice interventions.

The social work program is accredited by the Council on Social Work Education. Application for student membership in the professional organization, the National Association of Social Workers, is available through the School office.

All SOWK prefix courses required for the major in social work must have a minimum grade of C-.

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
<i>Select one course from the following:</i>			
ANTH 120	Human Origins and Variation	3	3A
BZ 101	Humans and Other Animals	3	3A
BZ 110	Principles of Animal Biology	3	3A
LIFE 102 ^P	Attributes of Living Systems	4	3A
CO 150 ^P	College Composition	3	1A
HDFS 101	Individual and Family Development	3	3C
PSY 100	General Psychology	3	3C
SOC 100	General Sociology	3	
OR			
SOC 105	Social Problems	3	
SOWK 150 ^P	Introduction to Social Work	3	
	Mathematics ¹	3	1B
	ECON or POLS course	3	
	Elective	5-6	
	TOTAL	30	
SOPHOMORE			
SOWK 233 ^P	Human Behavior in the Social Environment	3	
SOWK 286A ^P	Practicum I	3	
SOWK 286B ^P	Practicum II	3	
	Arts and Humanities ²	3	3B
	Biological and Physical Sciences ³	3-4	3A
	Global and Cultural Awareness ⁴	3	3E
	Health and wellness ⁵	2	
	Historical Perspectives ⁶	3	3D
	Statistics ⁷	3	
	Electives	3-4	
	TOTAL	30	
JUNIOR			
AHS 300	Research in Applied Professions	3	
SOWK 330 ^P	Human Diversity Practice Issues	3	
SOWK 340 ^P	Generalist Practice-Individuals and Families	3	
SOWK 341 ^P	Generalist Practice-Small Groups	3	
	Advanced Writing ⁸	3	2
	Arts and Humanities ⁹	6	3B
	Electives	9	
	TOTAL	30	
SENIOR			
SOWK 342 ^P	Generalist Practice-Organizations/Communities	3	4B

Course	Title	Cr	AUCC
SOWK 410 ^P	Social Welfare Policy	3	4A
SOWK 488 ^P	Field Placement	10	
SOWK 492 ^P	Seminar	3	4C
	Social and Behavioral Sciences ¹⁰	6	
	Electives	5	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 1B in the AUCC. MATH 130 or MATH 133 are recommended.

² Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 3A in the AUCC. At least one of the courses used here or selected in the freshman year to meet this requirement must have a laboratory component.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select from departmental list.

⁶ Select from the list of courses in category 3D in the AUCC.

⁷ Select any three credit statistics course.

⁸ Select from the list of courses in category 2 in the AUCC.

⁹ Select three credits from the list of courses in category 3B in the AUCC, and with approval of adviser, an additional three credits from category 3B or from the following prefixes: ART, D, E, ETST (see department list), L**, MU, PHIL, SPCM, and TH. [NOTE: Effective Fall 2007, foreign language courses are in separate prefixes (all starting with L and followed by three letters designating the language, e.g., LFRE is French, LGER is German, etc.)].

¹⁰ Select six upper-division credits, with approval of adviser, from the following prefixes: ANTH, ECON, ETST (see department list), HIST, HDFS, POLS, PSY, and SOC.

Graduate Programs in Social Work

The School of Social Work offers an M.S.W. degree, accredited by the Council on Social Work Education, with a specialization in advanced generalist practice. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx and the department's website, www.cahs.colostate.edu/sw/.

Colorado State University reserves the right at any time, without notice, to change, modify, or cancel any course, program, procedure, policy, financial requirement, or disciplinary arrangement set forth in this catalog whenever, in its sole discretion, it determines such action to be appropriate. Furthermore, Colorado State will not be responsible for any failure to present or complete any course or program or to perform any other activity, function, or obligation mentioned in this catalog. Since changes may occur at any time, students must check the relevant website (as noted throughout various chapters in this catalog).

College of Business

Office in Rockwell Hall, Room 125
(970) 491-6471
www.biz.colostate.edu

Professor Ajay Menon, Dean
Professor John Olienyk, Senior Associate Dean
Professor Susan Athey, Associate Dean, Undergraduate Programs
Professor John Hoxmeier, Associate Dean, Graduate Programs

MAJOR IN BUSINESS ADMINISTRATION WITH CONCENTRATIONS IN

Accounting
Accounting—Business Education
Finance
Information Systems
Marketing
Marketing Education
Organization and Innovation Management
Organization and Innovation Management—Business Education
Real Estate

UNDERGRADUATE MINOR

Business Administration

UNDERGRADUATE PROGRAMS

The College of Business is accredited by the AACSB, the Association to Advance Collegiate Schools of Business. Undergraduate and graduate programs offered include Bachelor of Science and Master of Science degrees in business administration as well as the Master of Business Administration degree (MBA), Master of Accountancy (M.Acc.), and Master of Management Practice (M.M.P.).

The programs of study offered provide functional business education in accounting, finance, information systems, finance, marketing, organization and innovation management, and real estate to undergraduates. The skills acquired help prepare students for entry-level positions in a wide range of both private and public enterprises and

provide a solid foundation for further academic study. The program follows a philosophy of linking theory with practical application.

Study Abroad

Study abroad programs are available to students in the College of Business. Because the knowledge of at least one other culture is valuable in understanding our own, students are strongly encouraged to take a summer or semester to study outside the United States as part of their overall program at Colorado State University. Students interested in study abroad should plan far in advance by discussing opportunities with their academic adviser and by visiting the Office of International Programs in Laurel Hall or the Web site, www.international.colostate.edu/.

Major in Business Administration

The College of Business prepares students with the knowledge and skills needed to become effective leaders and decision makers in today's dynamic business environment.

The four-year curriculum leads to a Bachelor of Science degree with a major in business administration. The program focuses on global orientation, technology, business processes, and corporate social responsibility.

Lower-division work provides a cultural and analytical foundation. Upper-division work provides specialized work in business disciplines to prepare students to enter their chosen fields in the business world. At the same time, the program develops the attitudes and analytical abilities required for future professional advancement.

The College of Business has a strong reputation among regional, national, and international employers. As a whole, graduates from the College of Business are better prepared to enter challenging positions. The program centers on an approach which emphasizes: knowledge of concepts, processes, and institutions; understanding of the financial, economic, legal, ethical, social, and organizational influences; information systems; and interpersonal communications. The senior capstone course offers an opportunity for students to apply these skills in a learning environment.

All undergraduate business majors must complete the All-University Core Curriculum as part of their graduation requirement. Coordinated with this general education, all business students take business core subjects plus a concentration with its specified course sequence. Fifty percent of the total credits required for the business core and concentration must be completed at Colorado State University.

Each student selects an area of concentration in one of the following fields: accounting, finance, information systems, marketing, organization and innovation management, or real estate.

Admission

Direct entry as a new freshman or transfer to the College of Business is highly selective and only those students meeting academic requirements will be accepted. For details contact the Office of Admissions. Other students may be admitted to the College of Business provided conditions for admission have been met.

Colorado State and the College of Business use holistic review when determining eligibility for admission to the College of Business as a new freshman. An example of a strong candidate for admission to the College of Business is one who is actively involved in their high school and community, has at least a 3.5 GPA with a 1200 or higher on the SAT or a 27 or higher on the ACT. For current admission criteria, contact the CSU Office of Admissions. New freshmen not admitted directly to the College of Business will be admitted as “Undeclared” and must meet the requirements below. To be eligible for admission to the College, CSU students (including Undeclared) must have a 3.000 cumulative GPA on a minimum of 15 graded credits at Colorado State and grades of B- or higher in ECON 202 and MATH 141.

External transfer students who have completed a minimum of 15 graded credits with MATH 141 and ECON 202 with grades of B- or higher and a 3.000 cumulative GPA will be admitted directly to the College.

External transfer students who do not meet the above criteria will be admitted to Undeclared and must complete the requirements stated above.

Learning Outcomes

Students will:

- Be proficient in the use of office productivity tools and have a broad understanding of the role of information technologies in organizations.

- Recognize the near-term and long-term legal and ethical issues related to customers, employees, shareholders, and larger communities in the development of sustainable business practices.
- Communicate effectively to a targeted audience, employing the correct channel of communication, and are able to professional present in appropriate written and oral presentation formats.
- Develop and demonstrate an understanding for the unique opportunities and challenges associated with global business practices.
- Have fundamental knowledge within business disciplines necessary to identify and solve business problems.

Course Requirements

The first two years of study include completion of the All-University Core Curriculum and the lower-division business core courses as outlined in the core curriculum below. Some lower-division specialized course work is required in the computer information systems concentration. Students must have junior or senior status and be admitted into the College of Business in order to take specialized course work in the business concentrations.

Core Curriculum

The following core curriculum sets the minimum course requirements for all business majors. With recommendations of the student’s adviser, supplementary courses are selected to meet the total minimum of 120 credits required for the Bachelor of Science degree.

The College of Business requires a minimum grade point average of 2.000 in business and economics courses as a graduation requirement. A student who has less than this average at the end of any term is subject to referral by the department head or college dean to the Faculty Council Committee on Scholastic Standards of the University for consideration of academic dismissal from the College of Business.

Course	Title	Cr	AUCC
FRESHMAN			
BUS 100	Introduction to Business	1	
BUS 150	Business Computing Concepts and Applications	3	
CIS 200 ^P	Business Information Systems	3	
CO 150 ^P	College Composition	3	1A
ECON 202 ^P	Principles of Microeconomics	3	3C
ECON 204 ^P	Principles of Macroeconomics	3	
MATH 117 ^P	College Algebra in Context I ¹	1	1B
MATH 118 ^P	College Algebra in Context II ¹	1	1B
MATH 141 ^P	Calculus in Management Sciences	3	1B
	Biological/physical sciences ²	4	3A
	Global and cultural awareness ³	3	3E
	TOTAL	28	
SOPHOMORE			
ACT 210 ^P	Introduction to Financial Accounting	3	
ACT 220 ^P	Introduction to Managerial Accounting	3	
BUS 260 ^P	Social-Ethical-Regulatory Issues in Business	3	

Course	Title	Cr	AUCC
BUS 300 ^P	Business Writing and Communication	3	2
STAT 204 ^P	Statistics for Business Students	3	
	Arts/humanities ⁴	6	3B
	Biological/physical sciences ²	3	3A
	Historical perspectives ⁵	3	3D
	TOTAL	27	
JUNIOR⁷			
FIN 300 ^P	Principles of Finance ⁷	3	4A,4B
MGT 301 ^P	Supply Chain Management	3	
MGT 320 ^P	Contemporary Management	3	
	Principles/Practices		
MKT 300 ^P	Marketing ⁷	3	4B
	TOTAL	12	
SENIOR			
BUS 479 ^P	Strategic Management	3	4A, 4C
	TOTAL	3	

CORE TOTAL = 73 credits⁸

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu> to see the course prerequisites.

¹ Students who test out of MATH 117 and/or MATH 118 are not required to show credit for these courses.

² Select from the list of courses in category 3A in the All-University Core Curriculum (AUCC). One course must have a laboratory component.

³ Select from list of courses in category 3E in the AUCC.

⁴ Select two courses from list in category 3B in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁵ Select from list of courses in category 3D in the AUCC.

⁶ All freshman and sophomore required courses must be completed prior to or concurrent with first enrollment in required junior and senior courses. By the beginning of the junior year, students must select one of the concentrations described on the following pages.

⁷ Students who have taken FIN 305 and/or MKT 305 prior to admission to the College of Business may substitute those courses to satisfy the category 4A and 4B requirements. All other students are required to take FIN 300 and MKT 300 to satisfy categories 4A and 4B.

⁸ Additional requirements which all business majors must complete are: 1) one of the concentrations described on the following pages; 2) a minimum of 54 credits outside the field of business; 3) business majors must not utilize the pass-fail grading option in business or non-business core courses.

Minor in Business Administration

The College of Business offers a minor in business administration to students in other colleges. A minor in business administration will give students a basic understanding of the functional areas of business to add to their specific major area. Students can expect to develop competencies to understand the language of business and use these skills in businesses in a wide variety of majors.

Course	Title	Cr
FRESHMAN		
AREC 202	Agricultural and Resource Economics	3
OR		
ECON 202 ^P	Principles of Microeconomics*	3
SOPHOMORE		
ACT 205	Fundamentals of Accounting	3
BUS 205	Legal and Ethical Issues in Business	3
ECON 204 ^P	Principles of Macroeconomics*	3
	TOTAL	9
JUNIOR		
FIN 305 ^P	Fundamentals of Finance	3
MGT 305	Fundamentals of Management	3
MKT 305 ^P	Fundamentals of Marketing	3
	TOTAL	9
SENIOR		
<i>Select one course from the following:</i>		
BUS 405A ^P	Contemporary Business Topics-Entrepreneurship	3
BUS 405B ^P	Contemporary Business Topics-International	3

Course	Title	Cr
BUS 405C ^P	Business Contemporary Business Topics-Business Information Management	3

PROGRAM TOTAL = 24 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu> to see the course prerequisites.

*Additional credits may be required because of prerequisites.

Graduate Programs in Business

The College of Business offers graduate programs leading to the degrees of Master of Science (M.S.), and Master of Business Administration (M.B.A.), Master of Accountancy (M.Acc.), and Master of Management Practice (M.M.P.). Graduate students may also pursue teacher licensure at the secondary level for Business Education or Marketing Education. Contact the School for Teacher Education and Principal Preparation (STEPP) in the Education Building, room 111, or at (970) 491-5292, or see the website at stepp.cahs.colostate.edu.

DEPARTMENT OF ACCOUNTING

Office in Rockwell Hall, Room 205
(970) 491-5102; (970) 491-2676 (fax)
www.biz.colostate.edu/accounting

Professor Frederick W. Rankin, Chair

Accounting Concentration

This program is designed to give students an understanding of the theory and practice of the major fields of accounting: financial reporting, managerial accounting, taxation, and auditing. Accountants provide financial information and documentation about businesses to managers, investors, creditors, and other interested parties. Accounting can be categorized into management accounting, which provides information for internal decision makers (e.g., managers); and financial accounting, which provides information for external decision makers (e.g., investors, analysts, and creditors).

Accounting is an ever-evolving field with growing importance in most businesses and not-for-profit organizations. Today, accountants are business leaders and participate in business decisions and strategy formulation. Accountants must be able to explain and analyze business data, excel in communications, teamwork, leadership, and possess technical and computer-based skills. The accountant in an increasingly global society is rapidly becoming both an information specialist as well as a business advisor.

Accountants also act as the moral and ethical compass for business practices.

The accounting curriculum at Colorado State University satisfies current educational requirements to become a Certified Public Accountant (CPA) in the State of Colorado. (Requirements to become a CPA are unique to each state and students should be aware of requirements of the state in which they intend to practice.)

The accounting curriculum is designed to meet the needs of those who seek professional education and training to practice as public, private, or governmental accountants, or expect to work in business managerial positions requiring an understanding of fundamental accounting concepts and principles. The curriculum offers considerable flexibility in designing a program of study that will meet a variety of career interests. In addition to the All-University Core Curriculum and the College of Business Core Curriculum, students are particularly encouraged to take additional course work in both finance and computer information systems.

Learning Outcomes

Students will demonstrate:

- Knowledge of the principles of auditing and attestation
- Knowledge of the fundamental concepts of financial accounting and reporting
- Knowledge of the fundamental concepts of managerial accounting and decision making
- Knowledge of taxation (federal, state) and its application to business decisions
- Knowledge of business ethics and principles of social responsibility
- Knowledge of business organization, processes, and understanding of accounting-based systems integration issues

Potential Occupations

Some examples include, but are not limited to: accountant or auditor of publicly or privately held companies, government agencies, or not-for-profit institutions; consultant in firms providing professional management services; public, private, or personal tax specialist; financial analyst; finance and real estate planning; bank administration.

In addition to the business administration core courses, the following must be completed:

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
SOPHOMORE	Electives	6	

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
ACT 311 ^P	Intermediate Accounting I	3	
ACT 312 ^P	Intermediate Accounting II	3	
ACT 321 ^P	Cost Management	3	
ACT 350 ^P	Accounting Information Systems	3	
	Accounting elective ¹	3	
	Electives	3	
	TOTAL	18	
SENIOR			
ACT 330 ^P	Introduction to Taxation	3	
ACT 411 ^P	Advanced Accounting	3	
ACT 441 ^P	Auditing Practices	3	
	Electives ²	17	
	TOTAL	26	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Choose an additional three upper-division credits in accounting courses (ACT prefix).

² Students must take 23 credits of electives to make up 120 credits. Three of these credits must be at the 300- or 400- level.

DEPARTMENT OF COMPUTER INFORMATION SYSTEMS

Office in Rockwell Hall, Room 150

(970) 491-7929

www.biz.colostate.edu/cis

Professor Jon D. Clark, Chair

Information Systems Concentration

This program is designed to provide students with a comprehensive knowledge of computer information systems along with the skills necessary for effective decision making in a business environment that is diverse, global, and highly competitive. The information systems curriculum provides students with a broad understanding of business and a sound foundation in computer fundamentals and programming, systems analysis and design, networking, database design and implementation, project management, Web applications, and systems integration. Graduates acquire an ability to apply computer technologies to solve business problems, providing a wide variety of career opportunities.

Learning Outcomes

Learning outcomes in the CIS program use a tiered model based on year in school. Learning outcomes build on the previous year's learning outcomes. Upon graduation all of the learning outcomes will be achieved.

Students will demonstrate:

- Ability to design, write, and test computer programs written in various computer languages by the end of

their sophomore year.

- Ability to design, implement, and test a database; construct a project plan for technology implementation; understand, implement, and administer various network protocols and implementations by the end of their junior year.
- Ability to integrate and implement previously learned technologies in a Web-based environment by the time they graduate.

Potential Occupations

Computing-related careers are characterized by a rapid rate of change driven by technological developments. Participating in paid or voluntary work, internships, and cooperative education opportunities is highly recommended, to keep students abreast of new developments and to help them benefit from networking to enhance employment opportunities.

Examples of career opportunities include, but are not limited to: applications programmer, programmer/analyst, systems analyst, systems consultant, PC specialist, systems or network manager/administrator, database administrator, IT project manager, webmaster.

In addition to the business administration core courses, the following must be completed:

Course	Title	Cr	AUCC
SOPHOMORE			
CIS 210	Information Technology in Business	3	
	TOTAL	3	
JUNIOR			
CIS 240 ^P	Application Design and Development	3	
CIS 320 ^P	Project Management for Information Systems	3	
CIS 350 ^P	Operating Systems and Networks	3	
CIS 355 ^P	Business Database Systems	3	
	Electives	6	
	TOTAL	18	
SENIOR			
CIS 360 ^P	Systems Analysis and Design	3	
	<i>Select two courses from the following:¹</i>		
CIS 340 ^P	Advanced Application Design and Development	3	
CIS 410 ^P	Web Application Development	3	
CIS 411 ^P	Enterprise Resource Planning Systems	3	
CIS 413 ^P	Advanced Networking and Security	3	
	Electives ²	17	
	TOTAL	26	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ One of the courses selected must be either CIS 340 or CIS 410.

² Students must take 20 credits of electives to make up 120 credits. Six of these credits must be at the 300- or 400- level.

DEPARTMENT OF FINANCE AND REAL ESTATE

Office in Rockwell Hall, Room 305
(970) 491-5062

www.biz.colostate.edu/financeRealEstate/

Professor Sanjay Ramchander, Chair

Finance Concentration

This program is designed to prepare undergraduate students to enter the finance profession with comprehensive knowledge and real world skills in their area of emphasis. The field of finance is complex, quantitative, and constantly evolving. The program focuses on providing state-of-the-art tools, techniques, and computer applications.

Learning Outcomes

At the end of the program, all students will have demonstrated the following core knowledge and skills:

- Solve time value of money problems.
- Value securities, measure and manage risk
- Analyze the financial health of companies.
- Incorporate global risk in financial decision-making

In addition to the core areas of asset valuation, investments, and global finance, the concentration allows students to select from three options for more in-depth study.

The Corporate Finance Option prepares students for positions in both financial and non-financial business enterprises in which they will need to make and defend strategic financial decisions in capital budgeting, planning, control, and policy.

The Financial Planning option is a CFP® Board Registered Program. The curriculum fulfills the education requirements for students intending to sit for the CFP® certification examination after graduation. This program covers all the major areas of financial planning, including retirement, employee benefits, estate, tax, and insurance planning. The option is most appropriate for those who intend to enter the financial planning profession as financial advisors, financial planners, wealth managers, or financial product representatives.

The Investment Analysis option focuses on the theoretical and practical aspects of investment valuation, selection, and portfolio management, for both individual and institutional investors.

Potential Occupations

Finance students are prepared for a number of different careers in business. Internships and volunteer experiences enhance skills and marketability.

Examples of fields in which graduates can find finance-related occupations include, but are not limited to: commercial and investment banking; corporate finance; investments; portfolio management; financial analysis; securities analysis; loan analysis; insurance; stock brokerage; government banking and securities regulation; government finance; teaching and research.

In addition to the business administration core courses, the following must be completed:

Course	Title	Cr	AUCC
FRESHMAN			
	Elective	3	
SOPHOMORE			
	Elective	6	
JUNIOR			
FIN 310 ^P	Financial Markets and Institutions	3	
FIN 355 ^P	Principles of Investments	3	
	Option courses ¹	6-9	
	Electives	6	
	TOTAL	18-21	
SENIOR			
FIN 475 ^P	International Business Finance	3	
	Option courses ¹	6-9	
	Electives ²	11	
	TOTAL	20-23	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ In order to complete the finance concentration, the business administration core courses and the finance concentration core courses must be completed. Students must also select one of the following options as well: corporate finance, financial planning, or investment analysis.

² Students must take 23 credits of electives to make up 120 credits. Three of these credits must be at the 300-400 level.

Corporate Finance Option

Course	Title	Cr	AUCC
JUNIOR			
FIN 370 ^P	Financial Management-Theory and Application	3	
	FIN, REL, or ACT elective	3	
	TOTAL	6	
SENIOR			
FIN 470 ^P	Financial Risk Management	3	
FIN 471 ^P	Enterprise Valuation	3	
	FIN, REL, or ACT elective	3	
	TOTAL	9	
OPTION TOTAL = 15 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

Financial Planning Option

Course	Title	Cr	AUCC
JUNIOR			
ACT 330 ^P	Introduction to Taxation	3	
FIN 320 ^P	Introduction to Financial Planning	3	
FIN 342 ^P	Risk Management and Insurance	3	
	TOTAL	9	
SENIOR			
FIN 440 ^P	Estate Planning	3	
FIN 445 ^P	Financial Plan Development	3	
	TOTAL	6	
OPTION TOTAL = 15 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

Investment Analysis Option

Course	Title	Cr	AUCC
JUNIOR			
	FIN, REL, or ACT elective	3	
FIN 311 ^P	Debt Securities Analysis	3	
	TOTAL	6	
SENIOR			
FIN 455 ^P	Advanced Portfolio Management	3	
FIN 470 ^P	Financial Risk Management	3	
	FIN, REL, or ACT elective	3	
	TOTAL	9	
OPTION TOTAL = 15 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

Real Estate Concentration

Real estate is the largest industry in the world representing nearly 50% of the world's wealth. The real estate profession offers one of the most diverse career selections in the business world today. It is a multi-disciplinary profession that coordinates architecture, construction, law, finance, marketing, property management, and urban dynamics. Real estate professionals help find, provide, and manage space for people to work sleep, shop, eat, and play. Those who choose careers in real estate are typically goal-oriented, persevering, self-motivated, and possess an entrepreneurial spirit. Furthermore, they must be creative and able to research, analyze, negotiate, and pay attention to details. No two projects or investments are ever the same. Rewards of a real estate career include potential for high earnings, status in the community, independence, flexibility, and an opportunity to help people.

Learning Outcomes

- Students will have gained skills and demonstrated understanding
- Physical real estate evaluation (land and building analysis)

- Financial real estate analysis (including time value of money)
- Assessment and management of risk
- Market analysis and opportunity identification
- Management of properties and portfolios

Potential Occupations

Real estate graduates find professional employment in many fields. Students interested in commercial real estate may find employment in property and land development, property acquisition, property management, commercial mortgage lending, commercial real estate brokerage, asset management, government housing, commercial construction, or Real Estate Investment Trust (REIT) analysis, investment, or management. Students interested in real estate finance may find employment in commercial real estate investment banking, residential real estate lending for both development and loan underwriting, financial analysis, real estate securities analysis, insurance underwriting, commercial real estate brokerage, government housing finance and investment, or construction lending and research. Students interested in residential real estate may find employment in residential brokerage, residential marketing, residential appraisal, residential finance, residential home inspection services, home construction consulting, or residential development.

In addition to the business administration core courses, the following must be completed:

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
	Elective	3	
SOPHOMORE			
	Elective	6	
JUNIOR			
FIN 310 ^P	Financial Markets and Institutions	3	
REL 360 ^P	Real Estate Principles	3	
REL 367 ^P	Real Estate Law	3	
REL 430 ^P	Real Estate Market Analysis and Valuation	3	
	Electives	6	
	TOTAL	18	
SENIOR			
<i>Select 6 credits from the following:</i>			
FIN 311 ^P	Debt Securities Analysis	3	
FIN 355 ^P	Principles of Investments	3	
FIN 370 ^P	Financial Management—Theory and Application	3	
MGT 476 ^P	Negotiation and Conflict Management	3	
MKT 362 ^P	Professional Selling	3	
	Any REL course(s) ¹		
FIN 475 ^P	International Business Finance	3	
REL 460 ^P	Real Estate Finance and Investment	3	
	Electives ²	11	
	TOTAL	23	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Any REL course(s) not already required within the business administration core or real estate concentration.

² Students must take 23 credits of electives to make up 120 credits. Three of these credits must be at the 300-400 level.

DEPARTMENT OF MANAGEMENT

Office in Rockwell Hall, Room 213
(970) 491-5323

www.biz.colostate.edu/management

Professor Dan Ganster, Chair

Organization and Innovation Management Concentration

This program is designed to provide its students with a comprehensive knowledge of organization and innovation management along with the skills necessary for effective decision making in a business environment that is diverse, global, and highly competitive. Managers are dynamic individuals who are responsible for projects, teams, and processes. They coordinate, motivate, strategize, plan, budget, initiate action, evaluate performance, and control process and activities. They are commonly responsible for overseeing a budget and the activities of others to ensure that the organization's goals and objectives are met. Managers are employed in every industry. It is essential that a manager learn and master key knowledge, skills, and abilities including how to handle conflict, communicate effectively, negotiate, create positive and productive work environments, and effectively manage the numerous issues associated with the human resources of an organization.

Certificates of completion are available to provide concentrated course work in entrepreneurship, supply chain management, leadership communication, and human resource management. These are designed to help students acquire skill sets so that, upon graduation, they will be able to "hit the ground running." In addition to the All-University Core Curriculum, course work for a concentration in organization and innovation management includes the College of Business Core and various management electives that allow the student to structure a program around his or her educational and/or career interests.

Learning Outcomes

Students will demonstrate:

- Knowledge and skills adequate to assume entry-level management positions in the broad spectrum of organizations so they can pursue careers in a wide variety of organizations and industries.
- Ethical decision making skills.
- Change management and innovation skills.
- Application of business principles and practices in an international context.

Potential Occupations

Some examples include, but are not limited to the following: account management, analyst, client services, consultant, logistics management, supply management, management trainee, warehouse manager, corporate recruiter, business owner, events planner, executive assistant, human resource specialist, project management, recruiter, relationship

management, retail management, team leader, trainer/facilitator.

In addition to the core courses in business administration, the following courses must be completed:

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
SOPHOMORE			
	Electives	6	
JUNIOR			
<i>Select three courses from the following:</i>			
MGT 310	Human Resource Management	3	
MGT 340	Entrepreneurship in the Contemporary World	3	
MGT 375 ^P	Advanced Supply Management	3	
MGT 411 ^P	Leading High Performance Teams	3	
	Electives	12	
	TOTAL	21	
SENIOR			
<i>Select four courses from the following:¹</i>			
MGT 325 ^P	Leadership Communication	3	
MGT 330 ^P	Corporate Innovation and Entrepreneurship	3	
MGT 350	Employment Relations: The Legal Environment	3	
MGT 360	Social and Sustainable Venturing	3	
MGT 410 ^P	Leadership and Organizational Behavior	3	
MGT 420 ^P	New Venture Creation	3	
MGT 425 ^P	Organizational Communication Strategies	3	
MGT 430	Leadership and Social Responsibility	3	
MGT 440 ^P	New Venture Management	3	
MGT 470 ^P	Managerial Decisions-Issues and Analysis	3	
MGT 471 ^P	Micro Issues in Supply Chain Management	3	
MGT 472 ^P	Macro Issues in Supply Chain Management	3	
MGT 473	Employment Relations: Labor and Management	3	
MGT 474 ^P	Human Resource Planning and Development	3	
MGT 475 ^P	International Business Management	3	
MGT 476 ^P	Negotiation and Conflict Management	3	
MGT 477 ^P	Advanced Logistics	3	
MGT 486 ^P	Practicum in Supply Chain Management	3	
	Electives ²	11	
	TOTAL	23	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Course not selected in the junior year may be taken as one of the four courses.

² Students must take 26 credits of electives to make up 120 credits. Six of these credits must be at the 300- 400- level.

DEPARTMENT OF MARKETING

Office in Rockwell Hall, Room 111

(970) 491-5063

www.biz.colostate.edu/marketing

Professor Kenneth C. Manning, Chair

Marketing Concentration

This program will provide its students with a comprehensive knowledge of marketing along with the skills necessary for effective decision making in a business environment that is diverse, global, and highly competitive. As defined by the American Marketing Association, marketing is the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customer, clients, partners, and society at large. Both profit and nonprofit organizations engage in marketing activities such as conducting market research, planning and developing new products and services, advertising, selling, and retaining satisfied customers. Marketing is people-oriented and ever changing. A person's analytical abilities, imagination, and creative potential are brought to bear on continuously evolving tasks and goals. In addition to the All-University Core Curriculum, course work for a major in business administration-marketing includes calculus, economics, statistics, and business principles along with courses that specifically examine marketing and management issues and practices.

Learning Outcomes

By the completion of their degree, marketing students will have demonstrated:

- Ability to identify a marketing problem and key influences on that problem, to use appropriate qualitative and quantitative analysis to evaluate the marketing problem, and to evaluate alternative solutions by assessing their strengths and weaknesses
- Ability to make a final recommendation that thoroughly addresses the problem/opportunity based on: making reasonable assumptions; considering appropriate customer, competitor, and company constraints; clearly addressing the marketing issues; and demonstrating an understanding of the interrelationships of marketing concepts
- Ability to use marketing terminology correctly
- Ability to develop persuasive and convincing arguments that support recommendations
- Ability to design a marketing plan

Potential Occupations

Between one-fourth and one-third of the civilian labor force is employed in marketing-related positions. These positions are excellent training for higher level jobs because of the knowledge gained about products, customers, and decision making.

Examples of possible careers include, but are not limited to: advertising, brand and product management, international marketing, market research, distribution, retailing management, sales and sales management, service marketing, and promotion management.

In addition to the business administration core courses, the following must be completed:

Course	Title	Cr	AUCC
SOPHOMORE			
	Electives	6	
JUNIOR			
MKT 310 ^P	Marketing Decision Making	3	
MKT 361 ^P	Buyer Behavior	3	
MKT 410 ^P	Marketing Research	3	
	Electives	12	
	TOTAL	21	
SENIOR			
	<i>Select three courses from the following:</i>		
MKT 320 ^P	Integrated Marketing Communications	3	
MKT 330 ^P	Business Customer Relationships	3	
MKT 360 ^P / DM 360 ^P	Retailing	3	
MKT 362 ^P	Professional Selling	3	
MKT 363 ^P	Sales Management	3	
MKT 364 ^P	Product Development and Management	3	
MKT 365 ^P	International Marketing	3	
MKT 366 ^P	Services Marketing	3	
MKT 440 ^P	Pricing and Financial Analysis in Marketing	3	
MKT 487 ^P	Internship	3	
MKT 492 ^P	Seminar	3	
MKT 479 ^P	Marketing Strategy and Management	3	
	Electives ¹	11	
	TOTAL	23	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Students must take 27 credits of electives to make up 120 credits. Six of these credits must be at the 300- or 400- level.

Graduate Programs in Business

The College of Business offers graduate programs leading to the degrees of Master of Science (M.S.), and Master of Business Administration (M.B.A.), Master of Accountancy (M.Acc.), and Master of Management Practice (M.M.P.). Master of Science degrees are offered in accounting and computer information systems. The college also offers three platforms for the M.B.A.: on-campus/evening, distance education, and an executive M.B.A. program in Denver. Graduate students may also pursue teacher licensure at the secondary level for Business Education or Marketing Education. Contact the School for Teacher Education and Principal Preparation (STEPP) in the Education Building, room 111, or at (970) 491-5292, or see the website at stepp.caahs.colostate.edu.

Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the College's website, www.biz.colostate.edu.

Colorado State University reserves the right at any time, without notice, to change, modify, or cancel any course, program, procedure, policy, financial requirement, or disciplinary arrangement set forth in this catalog whenever, in its sole discretion, it determines such action to be appropriate. Furthermore, Colorado State will not be responsible for any failure to present or complete any course or program or to perform any other activity, function, or obligation mentioned in this catalog. Since changes may occur at any time, students must check the relevant website (as noted throughout various chapters in this catalog).

College of Engineering

Office in Engineering Building, Room 202
(970) 491-8657 or (970) 491-6220
www.engr.colostate.edu

Professor Sandra Woods, Dean
Professor Thomas Siller, Associate Dean

UNDERGRADUATE MAJORS

Biomedical Engineering
Chemical and Biological Engineering
Civil Engineering
Computer Engineering
Electrical Engineering
Engineering Science
Environmental Engineering
Mechanical Engineering

UNDERGRADUATE MINOR

Environmental Engineering

The mission of the College of Engineering is to provide high quality teaching, advising, research, outreach, and service in a land grant, Carnegie Class I environment and to serve the people and industries of the state, nation, and world.

Engineers are critically involved in every facet of modern technological society, processing information, designing systems and equipment, maintaining society's infrastructure, solving environmental and energy problems, and helping attain desired levels of efficiency and comfort. The College of Engineering continues its tradition – a tradition as old as Colorado State – of providing world-class training in the basic fields of engineering through both undergraduate instruction and graduate programs strongly supported by modern research facilities and distinguished faculty.

COLLEGE PROGRAMS

All engineering undergraduate programs except the dual-degree program in Biomedical Engineering are accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite, 1050, Baltimore, MD 21202-4012 – telephone (410) 347-7700. The School of Biomedical Engineering and the College of Engineering will apply for

accreditation for the dual-degree in Biomedical Engineering according to ABET rules, which require a graduate from the program prior to accreditation.

Undergraduate programs are administered by the Departments of Chemical and Biological Engineering, Civil and Environmental Engineering, Electrical and Computer Engineering, and Mechanical Engineering. These departments offer four-year programs leading to a Bachelor of Science degree. Although emphasis is on broad training in basic engineering, students may specialize to some extent by proper choice of technical electives.

A program leading to a Bachelor of Science degree with a major in engineering science is coordinated by the Associate Dean for Academic Affairs in the College of Engineering. This program offers five concentrations: engineering physics, space engineering, teacher education, international engineering and international studies with a minor in a second language, and a dual degree resulting in degrees in both liberal arts and engineering.

Students may consider simultaneously completing the requirements for a second major. See Second Major Requirements in the Degree Program chapter for a complete description of the program. A student may pursue a minor program of study inside or outside the College of Engineering in conjunction with the desired engineering major.

College of Engineering General Objectives and Outcomes

Outcomes

Graduates of the undergraduate engineering programs will be able to:

- Apply knowledge of mathematics, science, and engineering
- Identify, formulate, and solve engineering problems,
- Design and conduct experiments and analyze and interpret data
- Design a system, component, or process to meet demand needs within realistic constraints
- Communicate effectively

- Function in multi-disciplinary teams
- Use the techniques, skills and modern engineering tools necessary for engineering practice

They also shall have:

- The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context,
- A knowledge of contemporary issues,
- An understanding of professional and ethical responsibility, and
- A recognition of the need for, and an ability to engage in, life-long learning.

Objectives

Engineering B.S. graduates will be able to do the following within the first few years after graduation:

- Identify, analyze, formulate, and solve engineering problems associated with their professional position, both independently and in a team environment
- Manage multi-faceted and multi-disciplinary projects with significant legal, ethical, regulatory, social, environmental, and economic considerations using a broad systems perspective
- Communicate effectively with colleagues, professional clients, and the public
- Demonstrate commitment and progress in lifelong learning, professional development, and leadership

Individual program outcomes and objectives are given at the departments' websites.

International Opportunities

Study abroad programs are available to students in the College of Engineering. Because knowledge of other cultures is valuable in understanding our own, students are strongly encouraged to take a summer or semester to study outside the United States as part of their overall program at Colorado State University. Students interested in study abroad should plan far in advance by discussing opportunities with their academic adviser and by visiting the Office of International Programs in Laurel Hall or the web site www.international.colostate.edu/.

Registration as a Professional Engineer

Registration and licensing are required under certain legally defined circumstances in order to practice as an engineer. The College of Engineering actively encourages all of its students to fulfill the necessary requirements as soon as they are

eligible. The Fundamentals of Engineering Examination (FE) administered by the State Board of Registration for

Professional Engineers and Professional Land Surveyors may be taken by seniors from ABET accredited programs during the two semesters prior to graduation. After the required practical experience is completed, the Principles and Practice of Engineering Examination (PE) for licensing may be taken for licensure in the engineering profession.

Professional Development

Each department maintains its own standards and program requirements for student professional development.

ADMISSION INFORMATION

Students may be admitted to a specific undergraduate major in this college or as undecided engineering freshmen (Engineering Open Option). Undecided engineering students must specify their choice of major prior to registration for the sophomore year. Should the demand for any engineering major exceed the capacity to maintain a high-quality education, the college may find it necessary to limit enrollment in some majors. The undecided engineering student who wishes to transfer to one of these majors may be at a disadvantage when demand exceeds capacity. In general, students are better served by selecting one of the college's majors at admission and then changing majors, if necessary, rather than entering as undecided freshmen.

High School Graduates

See Undergraduate Admission Policies and Procedures section in this catalog for specific College of Engineering requirements. The required units listed are minimums. Students desiring to enter the engineering majors are urged to take available advanced math, English, computer skills, and natural sciences classes.

Course Placement and Advising for Freshmen

All entering freshmen are required to take the mathematics placement examination prior to registration. The examination results, together with other information about students, are used by faculty advisers to counsel students. Those with weaknesses in mathematics may be advised to take up to five math review courses (MATH 117, MATH 118, MATH 124, MATH 125, MATH 126) before enrolling in calculus (MATH 160).

Transfer Students

Advisers in each department are available to assist students who wish to transfer. Should the demand for any engineering major exceed the capacity to maintain a high-quality education, individual departments may find it necessary to enforce more stringent requirements.

Transfer of credits earned at other colleges and universities within Colorado is facilitated by the articulation agreements from one university to another on course equivalencies.

Change of Major to Engineering

Students who wish to change from another C.S.U. major are selected for admission once each term; the number of students admitted is based on space availability as well as academic criteria. Some majors may specify more stringent requirements in math and science courses. Engineering courses are normally open to engineering majors only. The change of major must be initiated at the Center for Advising and Student Achievement (CASA).

CURRICULAR REQUIREMENTS

The curricula of the College of Engineering include courses in engineering, mathematics, science, humanities, and social sciences. During the first two years, all engineering students take coursework emphasizing mathematics, physics, chemistry, and basic engineering; because all branches of engineering rely on this foundation. The junior and senior years are devoted primarily to a balanced selection of specialized engineering courses. The minimum number of credits for graduation with a Bachelor of Science degree varies with the engineering major.

Good engineers are not only competent to render professional service in their fields of specialization, but are able to assume leadership roles as citizens. To broaden the students' perspectives in non-technical areas, the programs in engineering require a minimum of 12 to 15 credits in arts and humanities and behavioral and social sciences to be selected from anthropology, economics, foreign languages, history, literature, philosophy, political science, psychology, and sociology. Courses in art, geography, music, speech, and theatre may also be selected with the prior approval of the adviser. These courses must be selected in such a way that they also meet All-University Core Curriculum requirements.

The ability to express oneself clearly and concisely in both written and oral forms is a great asset to the engineer who is often called upon to prepare reports in which clarity, organization, and precision are essential. For this reason, engineering students must do more than meet the minimum

English course requirements. In fact, the development of communication skills is emphasized throughout the engineering curricula. This emphasis is especially evident in laboratory and design-oriented courses, in which the presentation of both oral and written reports is a major component.

The College of Engineering requires a minimum grade point average of 2.000 in required engineering, mathematics, chemistry, and physics courses as a graduation requirement. Additional minimum grade requirements apply in some engineering majors.

An engineer applies physical understanding and analytical techniques to the *design* of devices and systems needed by modern society. The preparation of an engineer, therefore, must include engineering design experience. To meet this objective, all undergraduate engineering students must participate in a well-structured sequence of design-related courses culminating in a capstone design experience in order to graduate.

Graduate Programs in Bioengineering

Programs leading to a Master of Engineering, Master of Science, and Doctor of Philosophy degrees are offered at Colorado State. The graduate programs in bioengineering integrate physical, chemical, and mathematical sciences with engineering principles and clinical studies. There are boundless opportunities for research, ranging from new therapies and imaging modalities for fighting cancer, to improving the design of vital medical equipment used in open heart surgery, or developing the next generation of gene therapies and engineered tissues. At Colorado State we are uniquely positioned to offer this advanced degree program. The highly-ranked Veterinary Medical Center and the Professional Veterinary Medicine Program are co-located with engineering and sciences on the C.S.U. campus, providing a rich environment for interdisciplinary research and day-to-day collaborations.

INTERDEPARTMENTAL MAJOR

Major in Engineering Science

*Office in Engineering Building, Room 102
(970) 491-6220*

*Associate Professor, Patrick Fitzhorn, Department Head
Laurie Craig, Undergraduate Adviser*

Engineering science is an interdisciplinary major that allows students to acquire a strong base in mathematics, the physical sciences, and engineering fundamentals while pursuing a broad background in the liberal arts or other

areas of interest in preparation for specialized careers or graduate studies. The major provides comprehensive undergraduate engineering education in selected fields which are not served by traditional engineering programs available at Colorado State University. Five concentrations are available – engineering physics, international engineering and international studies, space engineering, teacher education, and the dual degree program in engineering and the liberal arts. Regardless of the concentration, graduates are well prepared for a professional career.

Educational outcomes and objectives of the engineering science major, along with additional information on this major, are given at www.engr.colostate.edu/students/future-students/undergraduate/engineering-science.html.

Potential Occupations

Engineering science graduates are well rounded in mathematics, sciences, humanities, and social and behavioral sciences. They are well prepared to enter a career in engineering, or to proceed to graduate school in one of the traditional engineering disciplines. Graduates of the liberal arts/engineering science dual major often move on to professional programs in medicine, law, veterinary medicine, or business. Moreover, these graduates are suited for a broad range of occupations in addition to engineering. Participation in internships or volunteer activities is highly recommended to enhance practical training and development. Graduates who continue on with advanced studies can attain more responsible positions with the possibility of rising to top professional levels. Some examples include: space engineer, solid-state electronics engineer, and aerospace engineer.

Engineering Physics Concentration

The engineering physics concentration prepares students to work in high technology areas in which solid engineering training, combined with a broader background in physics is valuable. Through the appropriate choice of technical electives, students can specialize in modern laser physics, solid-state electronics, or energy conversion. The technical electives are chosen predominantly from the Departments of Electrical and Computer Engineering and Mechanical Engineering in the College of Engineering and the Departments of Computer Science, Mathematics, and Physics in the College of Natural Sciences.

To qualify for graduation, engineering science majors must achieve a minimum 2.000 grade point average at Colorado State in all courses in engineering, mathematics, computer science, statistics, physics, and chemistry as well as courses taken as technical electives.

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CO 150 ^P	College Composition	3	1A
ECE 102	Digital Circuit Logic	4	
ECE 103 ^P	DC Circuit Analysis	3	
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	Global and cultural awareness ¹	3	3E
	Additional Requirements for Graduation ⁸	0	
	TOTAL	31	
SOPHOMORE			
CIVE 260 ^P	Engineering Mechanics-Statics	3	
CIVE 261 ^P	Engineering Mechanics-Dynamics	3	
ECE 202 ^P	Circuit Theory Applications	4	
ECE 251 ^P	Introduction to Microprocessors	4	
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	4A, 4B
MECH 237 ^P	Introduction to Thermal Sciences	3	
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Social/behavioral sciences ²	3	3C
	Additional Requirements for Graduation ⁸	0	
	TOTAL	33	
JUNIOR			
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CIVE 300 ^P	Fluid Mechanics	4	
OR			
MECH 342 ^P	Mechanics and Thermodynamics of Flow Processes	3	
ECE 341 ^P	Electromagnetic Fields and Devices I	3	
ECE 342 ^P	Electromagnetic Fields and Devices II	3	
PH 314 ^P	Introduction to Modern Physics	4	
PH 315 ^P	Modern Physics Laboratory	2	
	Additional communication ³	3	2A or 2B
	Arts/humanities ⁴	6	3B
	Historical perspectives ⁵	3	3D
	Additional Requirements for Graduation ⁸	0	
	TOTAL	31-32	
SENIOR			
ECE 401 ^P	Senior Design Project I	3	4A
ECE 402 ^P	Senior Design Project II	3	4C
PH 353 ^P	Optics and Waves	4	
STAT 315 ^P	Statistics for Engineers and Scientists	3	
	Mathematics ⁶	3	
	Technical electives ⁷	17-18	
	Electives	5	
	Additional Requirements for Graduation ⁸	0	
	TOTAL	38-39	
PROGRAM TOTAL = 134 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3E in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3C in the AUCC.

³ Select from the list of courses in category 2A or 2B in the AUCC. First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (category 2B).

⁴ Select two courses from the list in category 3B in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁵ Select from the list of courses in category 3D in the AUCC.

⁶ Mathematics elective (300 level or higher). Select course with adviser's approval.

⁷ Select courses with adviser's approval.

⁸ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's four-year program.

International Engineering and International Studies Concentration

The international engineering and international students concentration is a five-year joint program with dual degrees in liberal arts (B.A.) and engineering science (B.S.). Students in this concentration must take on an emphasis in one of the following areas: chemical and biological engineering, civil engineering, computer engineering, electrical engineering, environmental engineering, or mechanical engineering. The program prepares students to work in an international environment. Key components include:

- An engineering education which favors breadth over specialization;
- A foreign language background which helps the student to develop sufficient competency to speak and write with some accuracy and fluency.
- An opportunity to study abroad in a region of the selected language;
- A strong background in the liberal arts as it relates to the region of the selected foreign language, including an understanding of history, culture, political science, and economics.

To qualify for graduation, engineering science majors must achieve a minimum 2.000 grade point average at Colorado State in all courses in engineering, mathematics, computer science, statistics, physics, and chemistry as well as courses taken as technical electives.

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 111 ^P	General Chemistry I	4	
CHEM 112 ^P	General Chemistry Laboratory I	1	
CHEM 113 ^P	General Chemistry II	3	
CIVE 102	Introduction: Civil/Environmental Engineering	3	
CIVE 103 ^P	Engineering Graphics and Computing	3	
CO 150 ^P	College Composition	3	1A
ECON 202 ^P	Principles of Microeconomics	3	3C
L* 200 ^P	Second Year Language I ¹	3	
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	
	Additional Requirements for Graduation ⁸	0	
	TOTAL	31	
SOPHOMORE			
ECON 204 ^P	Principles of Macroeconomics	3	
L* 201 ^P	Second Year Language II ¹	3	
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	4A, 4B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
POLS 131	Current World Problems	3	3E
CO 300 ^P	Writing Arguments	3	2B
	OR		
JTC 300 ^P	Professional and Technical Communication	3	2B
	Technical electives ⁷	3	
	Additional Requirements for Graduation ⁸	0	
	TOTAL	33	
JUNIOR			
CIVE 260 ^P	Engineering Mechanics-Statics	3	
CIVE 261 ^P	Engineering Mechanics-Dynamics	3	
MECH 237 ^P	Introduction to Thermal Sciences	3	

Course	Title	Cr	AUCC
POLS 232	International Relations	3	
	OR		
POLS 241	Comparative Government and Politics	3	
STAT 315 ^P	Statistics for Engineers and Scientists	3	
	Foreign language minor ³	6	
	Historical perspectives ⁴	3	3D
	Electives from approved list ⁵	3	
	Technical electives ²	3	
	Additional Requirements for Graduation ⁸	0	
	TOTAL	30	
SENIOR			
CIVE 300 ^P	Fluid Mechanics	4	
ECE 204 ^P	Introduction to Electrical Engineering	3	
ECON 370 ^P	Comparative Economic Systems	3	
	Foreign language minor ³	6	
	Technical electives ²	13-15	
	Additional Requirements for Graduation ⁸	0	
	TOTAL	29-31	
FIFTH YEAR			
	<i>Select one of the following pairs of courses:</i>		
CBE 451 ^P	Chemical and Biological Engineering Design I ⁶	3	4C
CBE 452 ^P	Chemical and Biological Engineering Design II	3	4C
	OR		
CIVE 402 ^P	Senior Design Principles ⁶	3	
CIVE 403 ^P	Senior Project Design	3	4C
	OR		
ECE 401 ^P	Senior Design Project I ⁶	3	
ECE 402 ^P	Senior Design Project II	3	4C
	OR		
MECH 486A ^P	Engineering Design Practicum I ⁶	4	4C
MECH 486B ^P	Engineering Design Practicum II	4	4C
	Arts and humanities ⁷	6	3B
	Foreign language minor ³	3	
	Electives from approved list ⁵	9	
	Technical electives ²	6	
	Free electives	2	
	Additional Requirements for Graduation ⁸	0	
	TOTAL	32-34	
PROGRAM TOTAL = 157 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Effective Fall 2007, foreign language courses are in separate prefixes (all starting with L and followed by three letters designating the language, e.g., LFRE is French, LGER is German, etc.).

² Courses are to be selected with the approval of the engineering adviser. A minimum of 7 credits must be upper division.

³ Each student is required to complete a minor in a foreign language.

⁴ Select courses from approved list that fall into category 3D in the All-University Core Curriculum (AUCC).

⁵ The list of approved courses is available in the office of the Associate Dean for Academic Affairs, College of Engineering or in the Dean's Office, College of Liberal Arts.

⁶ Students in this concentration may need to obtain a prerequisite override from the appropriate department to enroll in this course.

⁷ Select two courses from list of courses in category 3B in the AUCC.

⁸ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's four-year program.

Space Engineering Concentration

The space engineering concentration provides students with a broad background in aerospace and space engineering. The curriculum is based on a solid foundation of engineering disciplines and applied mathematics.

To qualify for graduation, engineering science majors must achieve a minimum 2.000 grade point average at Colorado State in all courses in engineering, mathematics, computer science, statistics, physics, and chemistry as well as courses taken as technical electives.

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
<i>Select one pair of courses from the following:</i>			
CIVE 102	Introduction: Civil/Environmental Engineering	3	
CIVE 103 ^P	Engineering Graphics and Computing	3	
OR			
MECH 102 ^P	Mechanical Engineering Problem Solving	3	
MECH 200 ^P	Introduction to Manufacturing Processes	3	
CO 150 ^P	College Composition	3	1A
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	Global and cultural awareness ¹	3	3E
	Additional Requirements for Graduation ⁸	0	
	TOTAL	30	
SOPHOMORE			
CIVE 260 ^P	Engineering Mechanics-Statics	3	
CIVE 261 ^P	Engineering Mechanics-Dynamics	3	
ECE 204 ^P	Introduction to Electrical Engineering	3	
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	4A, 4B
MECH 201 ^P	Engineering Design I	3	
MECH 337 ^P	Thermodynamics	4	
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Historical perspectives ²	3	3D
	Additional Requirements for Graduation ⁸	0	
	TOTAL	32	
JUNIOR			
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CIVE 300 ^P	Fluid Mechanics	4	
OR			
MECH 342 ^P	Mechanics and Thermodynamics of Flow Processes	3	
CIVE 360 ^P	Mechanics of Solids	3	
CIVE 367 ^P	Structural Analysis	3	
MECH 302 ^P	Engineering Design III ³	3	
MECH 307 ^P	Mechatronics and Measurement Systems	4	
	Additional communication ⁴	3	2A or 2B
	Arts/humanities ⁵	6	3B
	Social/behavioral sciences ⁶	3	3C
	Additional Requirements for Graduation ⁸	0	
	TOTAL	32-33	
SENIOR			
<i>Select one pair of courses from the following:</i>			
CIVE 402 ^P	Senior Design Principles ³	3	
CIVE 403 ^P	Senior Project Design	3	4C
OR			
MECH 486A ^P	Engineering Design Practicum I ³	4	4C
MECH 486B ^P	Engineering Design Practicum II	4	4C
MECH 344 ^P	Heat and Mass Transfer	3	
MECH 417 ^P	Control Systems	3	
MECH 460 ^P	Aeronautics	3	
MECH 468 ^P	Space Propulsion and Power Engineering	3	
STAT 315 ^P	Statistics for Engineers and Scientists	3	
	Mathematics, upper division	6	
	Technical electives ⁷	11-12	
	Electives	3	
	Additional Requirements for Graduation ⁸	0	
	TOTAL	42-43	
PROGRAM TOTAL = 137 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3E in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3D in the AUCC.

³ Space engineering students will need to obtain a registration override from the appropriate department to take this course.

⁴ Select from the list of courses in category 2A or 2B in the AUCC. First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (category 2B).

⁵ Select two courses from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁶ Select from the list of courses in category 3C in the AUCC.

⁷ Select courses with adviser's approval.

⁸ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's four-year program.

Teacher Education Concentration

The engineering science teacher education concentration provides students with the engineering and teaching experience to enter junior and senior high classrooms and laboratories to teach engineering design principles and concepts in an exciting technology education classroom.

Detailed information about the School for Teacher Education and Principal Preparation (STEPP) and licensure requirements are available on the program's web site (www.stepp.caahs.colostate.edu/) or in room 111 of the Education Building

To qualify for graduation, engineering science majors must achieve a minimum 2.000 grade point average at Colorado State in all courses in engineering, mathematics, computer science, statistics, physics, and chemistry as well as courses taken as technical electives.

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
<i>Select one pair of courses from the following:</i>			
CBE 101	Chemical and Biological Engineering I	3	
CBE 102 ^P	Chemical and Biological Engineering II	3	
OR			
CIVE 102	Introduction: Civil/Environmental Engineering	3	
CIVE 103 ^P	Engineering Graphics and Computing	3	
OR			
ECE 102	Digital Circuit Logic	4	
ECE 103 ^P	DC Circuit Analysis	3	
OR			
MECH 102 ^P	Mechanical Engineering Problem Solving	3	
MECH 200	Introduction to Manufacturing Processes	3	
CO 150 ^P	College Composition	3	1A
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	Arts and humanities ²	6	3B
	Additional Requirements for Graduation ⁸	0	
	TOTAL	33-34	
SOPHOMORE			
CIVE 260 ^P	Engineering Mechanics—Statics	3	
CIVE 261 ^P	Engineering Mechanics—Dynamics	3	
ECE 204 ^P	Introduction to Electrical Engineering	3	

Course	Title	Cr	AUCC
EDUC 275 ^P	Schooling in the United States	3	3C
EDUC 340 ^P	Literacy and the Learner	3	
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	4A, 4B
MECH 201 ^P	Engineering Design I ³	3	
MECH 237 ^P	Introduction to Thermal Sciences	3	
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Additional Requirements for Graduation ⁸	0	
	TOTAL	34	
JUNIOR			
CIVE 300 ^P	Fluid Mechanics	4	
CIVE 360 ^P	Mechanics of Solids	3	
CIVE 367 ^P	Structural Analysis	3	
EDUC 331 ^P	Educational Technology and Assessment	2	
EDUC 350 ^P	Instruction I- Individualization/Management	3	
EDUC 386 ^P	Practicum-Instruction I	1	
MECH 307 ^P	Mechatronics and Measurement Systems ¹	4	
STAT 315 ^P	Statistics for Engineers and Scientists	3	
	Technical electives ⁴	7	
	Additional Requirements for Graduation ⁸	0	
	TOTAL	30	
SENIOR			
Select one pair of courses from the following:			
CIVE 402 ^P	Senior Design Principles ¹	3	
CIVE 403 ^P	Senior Project Design	3	4C
OR			
MECH 486A ^P	Engineering Design Practicum I ¹	4	4C
MECH 486B ^P	Engineering Design Practicum II	4	4C
EDCT 465 ^P	Methods and Materials in Technology Education	3	
EDUC 450 ^P	Instruction II-Standards and Assessment	4	
EDUC 486E ^P	Practicum-Instruction II	1	
MECH 325 ^P	Machine Design	3	
CO 300 ^P	Writing Arguments	3	2B
OR			
JTC 300 ^P	Professional and Technical Communication	3	2B
	Global and cultural awareness ⁵	3	3E
	Historical perspectives ⁶	3	3D
	Social/behavioral science ⁷	3	3C
	Additional Requirements for Graduation ⁸	0	
	TOTAL	29-31	
FIFTH YEAR			
EDCT 492 ^P	Seminar-Professional Relations	1	
EDUC 485B ^P	Student Teaching-Secondary	11	
OR			
EDCT 485 ^P	Student Teaching	11	
	Additional Requirements for Graduation ⁸	0	
	TOTAL	12	
PROGRAM TOTAL = 139-141 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Students will need to obtain a registration override from the appropriate department to take this course.

² Select two courses from list of courses in category 3B of the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.³ Students who do not take the MECH sequence in the freshman year may need to get a registration override from the Department of Mechanical Engineering to register for this course.

⁴ If planning to take MECH 486A and MECH 486B in the senior year, take MECH 302 and MECH 331; otherwise select courses with adviser's approval.

⁵ Select one course from list of courses in category 3E of the AUCC.

⁶ Select one course from list of courses in category 3D of the AUCC.

⁷ Select one course from list of courses in category 3C of the AUCC.

⁸ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's four-year program.

Liberal Arts Concentrations

The liberal arts concentration is a five-year joint program with dual degrees in liberal arts (B.A.) and engineering science (B.S.). Students in this concentration must take on an emphasis in one of the following areas: chemical engineering, computer engineering, civil engineering, electrical engineering, environmental engineering, or mechanical engineering. The program prepares students for a vast array of career options. (See the chapter for College of Liberal Arts, Liberal Arts major, for information on the liberal arts concentrations in engineering science.)

School of Biomedical Engineering

Office in Engineering Building, Room AR204

www.engr.colostate.edu/sbme/

(970) 491-7157

Professor Stuart Tobet, Director

Professor Kevin Lear, Associate Director and Director, Undergraduate Programs

The School of Biomedical Engineering (SBME) is supported by four C.S.U. colleges and more than 50 faculty members in 14 departments providing students with broad expertise, active researchers, and excellent instructors. Programs leading to dual degree Bachelor's degrees, a minor, Master of Engineering (online and on campus), Master of Science, and Doctor of Philosophy degrees are offered by SBME.

Biomedical Engineering lies at the interface of engineering, biology and medicine and the SBME provides extensive opportunities for research, ranging from investigating new therapies and imaging modalities for fighting cancer, to improving vital medical equipment used in open heart surgery, creating devices to diagnose devastating diseases, or developing the next generation of gene therapies and engineered tissues. Colorado State University is positioned to offer unique bioengineering degree programs due to our faculty expertise, the interdisciplinary nature of the SBME, and the highly-ranked Veterinary Medical Center and the Professional Veterinary Medicine Program, which are co-located with engineering and sciences on the C.S.U. campus, providing a rich environment for interdisciplinary research and day-to-day collaborations. Our biomedical engineering programs integrate biological, chemical, physical, and mathematical sciences with engineering principles and clinical studies and our graduates are well prepared for careers in research, education, veterinary or human medicine and industry.

Biomedical engineers are involved in a wide variety of activities on a daily basis. Practical applications of

biomedical engineering include doing research along with scientists, chemists, and medical professionals in areas such as:

- Designing biomedical materials and/or medical device equipment (e.g., pacemakers, bio-compatible wheelchairs, exercise equipment for astronauts, or creating/improving materials to help joint replacements last longer)
- Developing or improving therapies for fighting cancer, tuberculosis, or other illnesses and diseases (e.g., nanoscaffolding for localized chemotherapy delivery, telemetric sensors to determine healing rates in bone fractures, etc.)
- Finding better ways to image and/or diagnose illnesses (e.g., using lasers to detect viruses, developing ways to increase electrical signals to detect threats to food safety and security, designing a biosensor to diagnose cancer cells, or developing software to determine toxicity levels in people exposed to pesticides)

Potential Occupations

Biomedical Engineering applies engineering principles to medicine and improving quality of life for humans and animals. Biomedical engineers work in a variety of settings. Some biomedical engineers spend their days in the lab, researching new devices and systems that solve medical and health care-related problems. Others might work in clinical settings, run biomedical-focused enterprises, or research patent law. All graduates will be well prepared for careers in research, education, or industry.

Undergraduate Dual Degree Bachelor's Program in Biomedical Engineering

The dual degree approach to the undergraduate program provides both the breadth of interdisciplinary biomedical engineering studies and the depth of a traditional engineering education. In this five-year program, students earn two Bachelor of Science degrees — one in Biomedical Engineering and one in either of the following majors:

- Chemical and Biological Engineering
- Electrical Engineering
- Electrical Engineering, Lasers and Optics concentration
- Mechanical Engineering

The total number of credit hours required to obtain the dual degrees ranges from 156 to 161 credits, based on the particular course of study. AP/IB credits may reduce time to graduate.

In the first year, students will take Introduction to Biomedical Engineering and begin fulfilling their general

education requirements. Through the second and third years, they will gain a foundation in the traditional engineering major as well as life and physical sciences courses needed for biomedical engineering. In the fourth and fifth years, students will build a more thorough understanding of biomedical engineering. Their studies will culminate in a Senior Design project their fifth year that will provide hands-on experience with a team of peers. This combination of practical application and traditional academic rigor is an excellent way to conclude this unique dual degree program.

Combining two degrees in a five-year period is a challenging and rewarding way to gain the breadth and depth needed to be a successful biomedical engineer.

Dual Degree Program: Biomedical Engineering and Chemical and Biological Engineering

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
BIOM 101	Introduction to Biomedical Engineering	3	
CBE 101	Chemical and Biological Engineering I	3	
CBE 102 ^P	Chemical and Biological Engineering II	3	
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	Additional Requirements for Graduation ¹	0	
	TOTAL	31	
SOPHOMORE			
CBE 201 ^P	Material and Energy Balances	3	
CBE 210 ^P	Thermodynamic Process Analysis	3	
CHEM 341 ^P	Modern Organic Chemistry I	3	
CHEM 343 ^P	Modern Organic Chemistry II	3	
CHEM 344 ^P	Modern Organic Chemistry Laboratory	2	
CO 150 ^P	College Composition	3	1A
LIFE 102 ^P	Attributes of Living Systems	4	3A
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Additional Requirements for Graduation ¹	0	
	TOTAL	34	
JUNIOR			
BC 351 ^P	Principles of Biochemistry	4	
BIOM 300 ^P	Problem-Based Learning Biomedical Engr Lab	4	
BIOM 330 ^P	Transport Phenomena in Biomedical Engineering	3	
BMS 300 ^P	Principles of Human Physiology	4	
CBE 310 ^P	Molecular Concepts and Applications	3	
CBE 320 ^P	Chemical and Biological Reactor Design	3	
CBE 330 ^P	Process Simulation	3	
CBE 331 ^P	Momentum Transfer and Mechanical Separations	3	
CBE 332 ^P	Heat and Mass Transfer Fundamentals	3	
CBE 333 ^P	Chemical and Biological Engineering Lab I	2	
LIFE 210 ^P	Introductory Eukaryotic Cell Biology	3	
	Additional Requirements for Graduation ¹	0	
	TOTAL	35	
SENIOR			
BIOM 400 ^P	Kinetics of Biomolecular and Cellular	3	

Course	Title	Cr	AUCC	Course	Title	Cr	AUCC
	Systems			SOPHOMORE			
CBE 430 ^P	Process Control and Instrumentation	3		CHEM 113 ^P	General Chemistry II	3	3A
CBE 442 ^P	Separation Processes	4		ECE 202 ^P	Circuit Theory Applications	4	
CBE 443 ^P	Chemical and Biological Engineering Lab II	2		ECE 251 ^P	Introduction to Microprocessors	4	
CIVE 262 ^P	Engineering Mechanics	4		LIFE 102 ^P	Attributes of Living Systems	4	3A
STAT 315 ^P	Statistics for Engineers and Scientists	3		MATH 261 ^P	Calculus for Physical Scientists III	4	
	Arts and Humanities ²	3	3B	MATH 340 ^P	Introduction to Ordinary Differential Equations	4	
	Historical Perspectives ³	3	3D		OR		
	Social and Behavioral Sciences ⁴	3	3C	MATH 345 ^P	Differential Equations	4	
	Technical Elective ⁵	3		MECH 337 ^P	Thermodynamics	4	
	Additional Requirements for Graduation ¹	0		PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	TOTAL	31			Additional Requirements for Graduation ¹	0	
					TOTAL	32	
FIFTH YEAR				JUNIOR			
BIOM 486A ^P	Practicum—Capstone Design I	4	4A, 4B, 4C	BMS 300 ^P	Principles of Human Physiology	4	
BIOM 486B ^P	Practicum—Capstone Design II	4	4A, 4B, 4C	CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
CBE 451 ^P	Chemical and Biological Engineering Design I	3		CIVE 262 ^P	Engineering Mechanics	4	
CBE 493	Professional Development Seminar	1		ECE 303 ^P	Introduction to Communications	3	
	Advanced Writing ⁶	3	2B	STAT 303 ^P	Principles		
	Arts and Humanities ²	3	3B	ECE 311 ^P	Linear System Analysis I	3	
	Global and Cultural Awareness ⁷	3	3E	ECE 312 ^P	Linear System Analysis II	3	
	BIOM Technical Elective ⁸	3		ECE 341 ^P	Electromagnetic Fields and Devices I	3	
	Technical Elective ⁵	3		ECE 342 ^P	Electromagnetic Fields and Devices II	3	
	Additional Requirements for Graduation ¹	0		LIFE 210 ^P	Introductory Eukaryotic Cell Biology	3	
	TOTAL	27			Global and Cultural Awareness ²	3	3E
					Additional Requirements for Graduation ¹	0	
					TOTAL	33	

PROGRAM TOTAL = 158 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's five-year program.

² Select from list of courses in category 3B of the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select from the list of courses in category 3C in the AUCC.

⁵ Select a total of 6 credits from courses with the BIOM or ECE subject code.

⁶ Select from the list of courses in category 2B in the AUCC.

⁷ Select from the list of courses in category 3E in the AUCC.

⁸ Select 3 credits from courses with the BIOM subject code.

Dual Degree Program: Biomedical Engineering and Electrical Engineering

Course	Title	Cr	AUCC
FRESHMAN			
BIOM 101	Introduction to Biomedical Engineering	3	
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CO 150 ^P	College Composition	3	1A
<i>Select 3 or 4 credits from the following:</i>			
CS 155	Introduction to Unix	1	
CS 156 ^P	Introduction to C Programming I	1	
CS 157 ^P	Introduction to C Programming II	1	
OR			
CS 160 ^P	Foundations in Programming	4	
ECE 102	Digital Circuit Logic	4	
ECE 103 ^P	DC Circuit Analysis	3	
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	Additional Requirements for Graduation ¹	0	
	TOTAL	34-35	

SENIOR			
BIOM 300 ^P	Problem-Based Learning Biomedical Engr Lab	4	
ECE 331 ^P	Electronics Principles I	4	
ECE 332 ^P	Electronics Principles II	4	
ECE 404 ^P	Experiments in Optical Electronics	2	
ECE 441 ^P	Optical Electronics	3	
ECON 202 ^P	Principles of Microeconomics	3	3C
	Arts and Humanities ³	3	3B
	Technical Elective ⁴	6	
	Additional Requirements for Graduation ¹	0	
	TOTAL	29	
FIFTH YEAR			
BIOM 486A	Practicum—Capstone Design I	4	4A, 4B, 4C
BIOM 486B	Practicum—Capstone Design II	4	4A, 4B, 4C
CO 301B ^P	Writing in the Disciplines—Sciences	3	2B
OR			
JTC 300	Professional and Technical Communication	3	2B
	Arts and Humanities ³	3	3B
	Historical Perspectives ⁵	3	3D
	Technical Electives ⁴	12	
	Additional Requirements for Graduation ¹	0	
	TOTAL	29	

PROGRAM TOTAL = 157-158 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's five-year program.

² Select from the list of courses in category 3E in the AUCC.

³ Select from list of courses in category 3B of the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁴ Select a total of 15 credits from courses with the BIOM or ECE subject code.

⁵ Select from the list of courses in category 3D in the AUCC.

Dual Degree Program: Biomedical Engineering and Electrical Engineering, Lasers and Optical Engineering Concentration

Course	Title	Cr	AUCC
FRESHMAN			
BIOM 101	Introduction to Biomedical Engineering	3	
CO 150 ^P	College Composition	3	1A
<i>Select 3 or 4 credits from the following:</i>			
CS 155	Introduction to Unix	1	
CS 156 ^P	Introduction to C Programming I	1	
CS 157 ^P	Introduction to C Programming II	1	
OR			
CS 160 ^P	Foundations in Programming	4	
ECE 102	Digital Circuit Logic	4	
ECE 103 ^P	DC Circuit Analysis	3	
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	Additional Requirements for Graduation ¹	0	
	TOTAL	29-30	
SOPHOMORE			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	3A
ECE 202 ^P	Circuit Theory Applications	4	
LIFE 102 ^P	Attributes of Living Systems	4	3A
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	
OR			
MATH 345 ^P	Differential Equations	4	
MECH 337 ^P	Thermodynamics	4	
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Additional Requirements for Graduation ¹	0	
	TOTAL	33	
JUNIOR			
BMS 300 ^P	Principles of Human Physiology	4	
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
CIVE 262 ^P	Engineering Mechanics	4	
ECE 303 ^{P/}	Introduction to Communications	3	
STAT 303 ^P	Principles	3	
ECE 311 ^P	Linear System Analysis I	3	
ECE 341 ^P	Electromagnetic Fields and Devices I	3	
ECE 342 ^P	Electromagnetic Fields and Devices II	3	
LIFE 210 ^P	Introductory Eukaryotic Cell Biology	3	
PH 314 ^P	Introduction to Modern Physics	4	
PH 353 ^P	Optics and Waves	4	
	Additional Requirements for Graduation ¹	0	
	TOTAL	35	
SENIOR			
BIOM 300 ^P	Problem-Based Learning Biomedical Engr Lab	4	
ECE 331 ^P	Electronics Principles I	4	
ECE 332 ^P	Electronics Principles II	4	
ECE 404 ^P	Experiments in Optical Electronics	2	
ECE 441 ^P	Optical Electronics	3	
ECE 457 ^P	Fourier Optics	3	
ECON 202 ^P	Principles of Microeconomics	3	3C
	Arts and Humanities ²	3	3B
	Global and Cultural Awareness ³	3	3E
	Technical Electives ⁶	3	
	Additional Requirements for Graduation ¹	0	
	TOTAL	32	
FIFTH YEAR			
BIOM 486A	Practicum—Capstone Design I	4	4A, 4B, 4C
BIOM 486B	Practicum—Capstone Design II	4	4A, 4B, 4C
CO 301B ^P	Writing in the Disciplines—Sciences	3	2B
OR			
JTC 300	Professional and Technical Communication	3	2B

Course	Title	Cr	AUCC
PH 451 ^P	Introductory Quantum Mechanics I	3	
	Arts and Humanities ²	3	3B
	Historical Perspectives ⁴	3	3D
	Technical Electives ⁵	9	
	Additional Requirements for Graduation ¹	0	
	TOTAL	29	

PROGRAM TOTAL = 158-159 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's five-year program.

² Select from list of courses in category 3B of the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 3E in the AUCC.

⁴ Select from the list of courses in category 3D in the AUCC.

⁵ Select 9 credits from courses with the BIOM or ECE subject code.

⁶ Select from departmental list of approved courses in the laser and optical engineering area.

Dual Degree Program: Biomedical Engineering and Mechanical Engineering

Course	Title	Cr	AUCC
FRESHMAN			
BIOM 101	Introduction to Biomedical Engineering	3	
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CO 150 ^P	College Composition	3	1A
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
MECH 100 ^P	Introduction to Mechanical Engineering	1	
MECH 102 ^P	Mechanical Engineering Problem Solving	3	
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	Additional Requirements for Graduation ¹	0	
	TOTAL	31	
SOPHOMORE			
CIVE 260 ^P	Engineering Mechanics—Statics	3	
CIVE 261 ^P	Engineering Mechanics—Dynamics	3	
ECE 204 ^P	Introduction to Electrical Engineering	3	
LIFE 102 ^P	Attributes of Living Systems	4	3A
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	
MECH 200 ^P	Introduction to Manufacturing Processes	3	
MECH 201 ^P	Engineering Design I	2	
MECH 202 ^P	Engineering Design II	3	
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Additional Requirements for Graduation ¹	0	
	TOTAL	34	
JUNIOR			
BMS 300 ^P	Principles of Human Physiology	4	
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
CIVE 360 ^P	Mechanics of Solids	3	
LIFE 210 ^P	Introductory Eukaryotic Cell Biology	3	
MECH 307 ^P	Mechatronics and Measurement Systems	4	
MECH 325 ^P	Machine Design	3	
MECH 337 ^P	Thermodynamics	4	
	Global and Cultural Awareness ²	3	3E
	Social and Behavioral Sciences ³	3	3C
	Additional Requirements for Graduation ¹	0	
	TOTAL	31	

Course	Title	Cr	AUCC
SENIOR			
BIOM 300 ^P	Problem-Based Learning Biomedical Engr Lab	4	
BIOM 441 ^P	Biomechanics and Biomaterials	3	
CIVE 363 ^P	Material Properties	1	
MECH 302 ^P	Engineering Design III	3	
MECH 324 ^P	Dynamics of Machines	4	
MECH 331 ^P	Introduction to Engineering Materials	4	
MECH 338 ^P	Thermosciences Laboratory	1	
MECH 342 ^P	Mechanics and Thermodynamics of Flow Processes	3	
MECH 344 ^P	Heat and Mass Transfer	3	
STAT 315 ^P	Statistics for Engineers and Scientists	3	
	Arts and Humanities ⁴	3	3B
	Additional Requirements for Graduation ¹	0	
	TOTAL	32	
FIFTH YEAR			
BIOM 486A ^P	Practicum—Capstone Design I	4	4A, 4B, 4C
BIOM 486B ^P	Practicum—Capstone Design II	4	4A, 4B, 4C
	Advanced Writing ⁵	3	2B
	Arts and Humanities ⁴	3	3B
	Historical Perspectives ⁶	3	3D
	Technical Electives ⁷	12	
	Additional Requirements for Graduation ¹	0	
	TOTAL	29	
PROGRAM TOTAL = 157 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's five-year program.

² Select from the list of courses in category 3E in the AUCC.

³ Select from the list of courses in category 3C in the AUCC.

⁴ Select from the list of courses in category 3B of the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁵ Select from the list of courses in category 2B in the AUCC.

⁶ Select from the list of courses in category 3D in the AUCC.

⁷ Select 12 credits from courses with the BIOM or ECE subject code.

DEPARTMENT OF ATMOSPHERIC SCIENCE

Office in Atmospheric Science Building, Foothills Campus,
Room 117

(970) 491-8360

www.atmos.colostate.edu

Professor Jeffrey L. Collett, Jr., Department Head

No undergraduate major is offered. Undergraduates interested in atmospheric science at the graduate level are encouraged to major in engineering, physics, chemistry, mathematics, or atmospheric science.

Graduate Programs in Atmospheric Science

The department offers graduate programs leading to the Master of Science and Doctor of Philosophy degrees in atmospheric science. Since the graduate degrees are primarily research degrees, the specialization opportunities for students generally reflect the research interests and expertise of the academic faculty. A description of these areas of interest may be found at the Atmospheric Science website www.atmos.colostate.edu/dept/research.php. The academic curriculum and research training for atmospheric science graduate students are closely integrated. Graduates of the program typically find employment in government research laboratories, academic institutions, military services, and private industry. Students with a baccalaureate degree in mathematics, the natural sciences, or engineering are encouraged to apply for admission.

For additional information on graduate programs, interested students should write to the Department of Atmospheric Science and request *The Department of Atmospheric Science Graduate Student Guide* (info@atmos.colostate.edu).

DEPARTMENT OF CHEMICAL AND BIOLOGICAL ENGINEERING

Office in Glover Building, Room 100

(970) 491-5252

cbe.colostate.edu/

Professor David S. Dandy, Department Head

Major in Chemical and Biological Engineering

Chemical and biological engineering is a powerful blend of basic sciences and the skills to quantitatively describe, predict, and control all changes of matter. This provides the foundation to create cutting-edge materials and products, to design new devices to improve health or the environment, and to design processes for the safe production of chemicals and biochemicals, the production of alternative energy sources, and prevention of hazardous waste.

The chemical and biological engineering curriculum is based on the sciences of physics, chemistry, biology, and mathematics. It includes engineering science and design methods, as well as humanities and social sciences. Students can pursue interdisciplinary studies programs or minors.

Popular options include minors in chemistry, mathematics, environmental engineering, and biomedical engineering. The curriculum is well-aligned to meet pre-health profession requirements. The chemical and biological engineering program provides an environment that promotes a sense of professionalism, the development of project management skills, and an appreciation for the value of life-long learning. Graduates of our program are well prepared to enter a variety of professions, or to pursue further education. The broad, strong scientific basis of chemical and biological engineering has kept our graduates consistently near or at the top in salary and demand among B.S. graduates.

Educational outcomes and objectives of the chemical and biological engineering major, along with additional information on this major are given at cbe.colostate.edu/.

Potential Occupations

Chemical and biological engineering graduates find employment with the biotechnology, biomedical, microelectronics, environmental, consulting, alternative energy, petroleum, chemical, food, pharmaceutical, and other private sector industries and with government agencies. Participation in internships, volunteer activities, or cooperative education opportunities is highly recommended to enhance practical training and development. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels. In addition to pursuing M.S. and Ph.D. degrees in chemical and biological engineering and related fields, some of our graduates have obtained M.D., D.V.M., law, and M.B.A. degrees.

Course	Title	Cr	AUCC
FRESHMAN			
CBE 101	Chemical and Biological Engineering I	3	
CBE 102 ^P	Chemical and Biological Engineering II	3	
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
LIFE 102 ^P	Attributes of Living Systems	4	3A
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	Additional Requirements for Graduation ¹	0	
	TOTAL	32	
SOPHOMORE			
CBE 201 ^P	Material and Energy Balances	3	
CBE 210 ^P	Thermodynamic Process Analysis	3	
CHEM 345 ^P	Organic Chemistry I	4	
CHEM 346 ^P	Organic Chemistry II	4	
CO 150 ^P	College Composition	3	1A
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	4A, 4B
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Arts/humanities ²	3	3B
	Additional Requirements for Graduation ¹	0	
	TOTAL	33	
JUNIOR			
BC 351 ^P	Principles of Biochemistry	4	
CBE 310	Molecular Concepts and Applications	3	

Course	Title	Cr	AUCC
CBE 320 ^P	Chemical and Biological Reactor Design	3	
CBE 330 ^P	Process Simulation	3	
CBE 331 ^P	Momentum Transfer and Mechanical Separations	3	4B
CBE 332 ^P	Heat Transfer and Mass Transfer Fundamentals	3	
CBE 333 ^P	Chemical and Biological Engineering Lab I	2	
	Additional communication ³	3	2A or 2B
	Global and cultural awareness ⁴	3	3E
	Bioscience elective ⁵	3	
	Technical elective ⁵	3	
	Additional Requirements for Graduation ¹	0	
	TOTAL	33	
SENIOR			
CBE 430 ^P	Process Control and Instrumentation	3	
CBE 442 ^P	Separation Processes	4	
CBE 443 ^P	Chemical and Biological Engineering Lab II	2	
CBE 451 ^P	Chemical Engineering Design I	3	4C
CBE 452 ^P	Chemical Engineering Design II	3	4A, 4C
CBE 493	Seminar	1	
	Arts/humanities ²	3	3B
	Historical perspectives ⁶	3	3D
	Social/behavioral sciences ⁷	3	3C
	Engineering elective ⁵	3	
	Technical electives ⁵	4	
	Additional Requirements for Graduation ¹	0	
	TOTAL	32	
PROGRAM TOTAL = 130 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's four-year program.

² Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 2A or 2B in the AUCC. First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (category 2B).

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select from departmental list of approved courses.

⁶ Select from the list of courses in category 3D in the AUCC.

⁷ Select from the list of courses in category 3C in the AUCC.

Graduate Programs in Chemical and Biological Engineering

The department offers graduate programs leading to Master of Engineering, Master of Science, and Doctor of Philosophy degrees. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, for general information on graduate studies. The department publishes a descriptive brochure, which may be obtained from our web site or by writing to the department head.

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

Office in Engineering Building, Room 203
(970) 491-5048
www.engr.colostate.edu/ce

Professor Luis Garcia, Department Head
Professor Marvin E. Criswell, Associate Department Head
Professor Darrell G. Fontane, Associate Department Head
Laurie Alburn, Graduate and Undergraduate Adviser

The Department of Civil and Environmental Engineering administers undergraduate and graduate degrees in civil engineering and an undergraduate degree in environmental engineering.

Major in Civil Engineering

The undergraduate civil engineering program provides a solid base in the physical sciences, mathematics, engineering fundamentals, and design and management concepts, as well as the social sciences and humanities. In addition to courses in civil engineering sub-disciplines, the civil engineering curriculum covers design practices, information technology, technical communications, project management, and engineering ethics. Preparation for high level professional practice is emphasized. Graduates from this major and the environmental engineering major consistently have a passing rate significantly above the national average on the Fundamentals of Engineering exam, the first step towards registration as a Professional Engineer.

The series of civil engineering core classes – CIVE 102, CIVE 103, CIVE 202, CIVE 203, CIVE 302, CIVE 303, CIVE 402, and CIVE 403 – include an integrated coverage of design practices, information technology, technical communications, project management, and engineering ethics preparing students for the civil engineering profession. This series culminates in a year-long term-based senior capstone design experience.

Participation in internships, volunteer activities, professional organizations, or cooperative education opportunities is highly recommended to enhance practical training and development. Graduates who go on for advanced studies are prepared for higher level technical responsibilities and can attain more responsible positions with the possibility of rising to top professional levels.

The educational outcomes and objectives for the civil engineering major, along with additional information on this major, are given at www.engr.colostate.edu/ce/.

Potential Occupations

Civil engineers are employed in many different organizations including small and large consulting firms, governmental agencies at all levels, and industrial companies such as construction, petroleum, and aerospace firms. Civil engineers may also find opportunities in specialized design, research, and teaching.

Some example job titles for civil engineering graduates include, but are not limited to: civil engineer, environmental engineer, transportation engineer, hydraulic engineer, water resources engineer, structural engineer, fluid mechanics, geotechnical engineer, geoenvironmental engineer, groundwater engineer, hydrologist, wind engineer, urban/regional planner, infrastructure engineer or manager, architect, contract administrator, construction engineer or manager, building construction inspector, facilities engineer or manager, industrial transportation specialist, industrial designer/engineer, construction materials engineer, irrigation engineer, mining engineer, cartographer, mining and petroleum research engineer, technical sales engineer, and educator.

Civil Engineering Concentration

Course	Title	Cr	AUCC
FRESHMAN			
CIVE 102	Introduction: Civil/Environmental Engineering	3	
CIVE 103 ^P	Engineering Graphics and Computing	3	
CO 150 ^P	College Composition	3	1A
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Arts/humanities ¹	3	3B
	Social/behavioral sciences ²	3	3C
	Additional Requirements for Graduation ³	0	
	TOTAL	33	
SOPHOMORE			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CIVE 202 ^P	Numerical Modeling and Risk Analysis	3	
CIVE 203 ^P	Engineering Systems and Decision Analysis	3	
CIVE 260 ^P	Engineering Mechanics-Statics	3	
CIVE 261 ^P	Engineering Mechanics-Dynamics	3	
CIVE 360 ^P	Mechanics of Solids	3	
MATH 261 ^P	Calculus for Physical Scientists III	4	
MECH 237 ^P	Introduction to Thermal Sciences	3	
	Arts/humanities ¹	3	3B
	Additional Requirements for Graduation ³	0	
	TOTAL	33	
JUNIOR			
CIVE 300 ^P	Fluid Mechanics	4	
CIVE 302 ^P	Evaluation of Civil Engineering Materials	3	
CIVE 303 ^P	Infrastructure and Transportation Systems	3	
CIVE 322 ^{P/}	Basic Hydrology	3	
ENVE 322 ^P			
CIVE 367 ^P	Structural Analysis	3	
CIVE 355 ^P	Introduction to Geotechnical Engineering	4	
CIVE 466 ^P	Design and Behavior of Steel Structures	3	
ECE 204 ^P	Introduction to Electrical Engineering	3	

Course	Title	Cr	AUCC
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	4A, 4B
	Additional communications ⁴	3	2A or 2B
	Additional Requirements for Graduation ³	0	
	TOTAL	33	
SENIOR			
CIVE 401 ^P	Hydraulic Engineering	3	
CIVE 402 ^P	Senior Design Principles	3	
CIVE 403 ^P	Senior Project Design	3	4C
CIVE 438 ^P / ENVE 438 ^P	Environmental Engineering Concepts	3	
CIVE 467 ^P	Design of Reinforced Concrete Structures	3	
	Global and cultural awareness ⁵	3	3E
	Historical perspectives ⁶	3	3D
	Technical electives ⁷	10	
	Additional Requirements for Graduation ³	0	
	TOTAL	31	

PROGRAM TOTAL = 130 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from department list of those in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from departmental list of courses from those in category 3C in the AUCC.

³ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's four-year program.

⁴ Select from departmental list of courses from those in category 2A or 2B in the AUCC. First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (category 2B).

⁵ Select from departmental list of courses from those in category 3E in the AUCC.

⁶ Select from departmental list of courses from those in category 3D in the AUCC.

⁷ Select from departmental list of permissible technical elective courses. At least 3 credits must be in engineering. At least 3 credits must be from the list of permissible additional science technical electives.

Soil and Water Resource Engineering Concentration

Course	Title	Cr	AUCC
FRESHMAN			
CIVE 102	Introduction: Civil/Environmental Engineering	3	
CIVE 103 ^P	Civil Engineering Graphics and Computing	3	
CO 150 ^P	College Composition	3	1A
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Arts/humanities ¹	3	3B
	Social/behavioral sciences ²	3	3C
	Additional Requirements for Graduation ⁷	0	
	TOTAL	33	
SOPHOMORE			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory II	1	3A
CHEM 113 ^P	General Chemistry II	3	
CIVE 202 ^P	Numerical Modeling and Risk Analysis	3	
CIVE 203 ^P	Engineering Systems and Decision Analysis	3	
CIVE 260 ^P	Engineering Mechanics-Statics	3	
CIVE 261 ^P	Engineering Mechanics-Dynamics	3	
CIVE 360 ^P	Mechanics of Solids	3	
MATH 261 ^P	Calculus for Physical Scientists III	4	
MECH 237 ^P	Introduction to Thermal Sciences	3	

Course	Title	Cr	AUCC
	Arts and humanities ¹	3	3B
	Additional Requirements for Graduation ⁷	0	
	TOTAL	33	
JUNIOR			
CIVE 300 ^P	Fluid Mechanics	4	
CIVE 302 ^P	Evaluation of Civil Engineering Materials	3	
CIVE 303 ^P	Infrastructure and Transportation Systems	3	
CIVE 322 ^P / ENVE 322 ^P	Basic Hydrology	3	
CIVE 367 ^P	Structural Analysis	3	
CIVE 355 ^P	Introduction to Geotechnical Engineering	4	
ECE 204 ^P	Introduction to Electrical Engineering	3	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	4A, 4B
SOCR 240 ^P	Introductory Soil Science	4	
	Additional Requirements for Graduation ⁷	0	
	TOTAL	31	
SENIOR			
CIVE 401 ^P	Hydraulic Engineering	3	
CIVE 402 ^P	Senior Design Principles	3	
CIVE 403 ^P	Senior Project Design	3	4C
CIVE 425 ^P	Soil and Water Engineering	3	
CIVE 440 ^P	Nonpoint Source Pollution	3	
SOCR 420 ^P	Crop and Soil Management Systems I	3	
	Additional communications ³	3	2A or 2B
	Global and cultural awareness ⁴	3	3E
	Historical perspectives ⁵	3	3D
	Technical electives ⁶	6	
	Additional Requirements for Graduation ⁷	0	
	TOTAL	33	

PROGRAM TOTAL = 130 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from departmental list of those in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from departmental list of courses from those in category 3C in the AUCC.

³ Select from departmental list of courses from those in category 2A or 2B in the AUCC. First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (category 2B).

⁴ Select from departmental list of courses from those in category 3E in the AUCC.

⁵ Select from departmental list of courses from those in category 3D in the AUCC.

⁶ Select from departmental list of permissible technical elective courses.

⁷ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's four-year program.

Major in Environmental Engineering

Environmental engineers design solutions to prevent future pollution as well as correct existing pollution problems. The B.S. curriculum in environmental engineering is based on a strong foundation in physical and biological sciences, mathematics, and engineering fundamentals. A broad background in communication, liberal arts, humanities, and social sciences is provided by the All-University Core Curriculum. Upper-level courses address engineering applications for prevention and control of air, water, and land pollution. Required courses that are specific to the environmental engineering major come from several engineering and science disciplines and include organic and

environmental chemistry, microbiology, hydrology, statistics, environmental toxicology, and water treatment. Technical electives permit some specialization in a particular field of interest. Seniors complete the same year-long design experience as do civil engineering majors, working in teams on real-world engineering problems.

Participation in student professional societies, other campus organizations, internships, and volunteer activities is highly recommended to foster personal growth and professional development. The Fundamentals of Engineering exam is strongly encouraged and is the first step toward registration as a Professional Engineer, an important credential for environmental engineers.

The education outcomes and objectives for the environmental engineering major, along with additional information on this major, are given at www.engr.colostate.edu/ce.

Potential Occupations

The expansion of our population and economy, along with increased public concern and regulation of environmental quality, will contribute to increasing demand for the services of environmental engineers, both in the U.S. and abroad. Today environmental engineers are at work designing pollution prevention equipment and systems, designing environmental monitoring systems, helping both government and industry implement environmental regulations, designing water and wastewater treatment systems, and restoring ecosystem health.

B.S. graduates in environmental engineering from Colorado State University are well prepared for entry-level positions with regulatory agencies, engineering consulting firms, and environmental divisions of large corporations, particularly in the energy and manufacturing industries. Graduate study in a particular area of interest is highly recommended to enhance the probability of rising to top professional levels.

Environmental Engineering Concentration

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CIVE 102	Introduction: Civil/Environmental Engineering	3	
CIVE 103	Engineering Graphics and Computing	3	
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Additional Requirements for Graduation ¹	0	
	TOTAL	33	

SOPHOMORE

AREC 202	Agricultural and Resource Economics	3	3C
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OR

Course	Title	Cr	AUCC
ECON 202 ^P	Principles of Microeconomics	3	3C
<i>Select four credits from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
AND			
BZ 111 ^P	Animal Biology Laboratory	1	3A
BZ 120	Principles of Plant Biology	4	3A
LIFE 102 ^P	Attributes of Living Systems	4	3A
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
CIVE 260 ^P	Engineering Mechanics-Statics	3	
CIVE 261 ^P	Engineering Mechanics-Dynamics	3	
CO 150 ^P	College Composition	3	1A
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	4A, 4B
	Additional communication ²	3	2A or 2B
	Additional Requirements for Graduation ¹	0	
	TOTAL	31	
JUNIOR			
CBE 201 ^P	Material and Energy Balances	3	
OR			
MECH 237 ^P	Introduction to Thermal Sciences	3	
CIVE 202 ^P	Numerical Modeling and Risk Analysis	3	
CIVE 203 ^P	Engineering Systems and Decision Analysis	3	
CIVE 300 ^P	Fluid Mechanics	4	
CIVE 322 ^{P/}	Basic Hydrology	3	
ENVE 322 ^P			
CIVE 360 ^P	Mechanics of Solids	3	
CIVE 438 ^{P/}	Environmental Engineering Concepts	3	
ENVE 438 ^P			
ERHS 446 ^P	Environmental Toxicology	3	
MIP 300 ^P	General Microbiology	3	
	Arts/humanities ³	3	3B
	Additional Requirements for Graduation ¹	0	
	TOTAL	31	
SENIOR			
CIVE 401 ^P	Hydraulic Engineering	3	
CIVE 402 ^P	Senior Design Principles	3	
CIVE 403 ^P	Senior Project Design	3	4C
CIVE 425 ^P	Soil and Water Engineering ⁴	3	
CIVE 439 ^{P/}	Environmental Engineering Chemical Concepts	3	
CBE 439 ^P			
ENVE 441 ^P	Water Quality Analysis and Treatment	3	
	Arts/humanities ³	3	3B
	Global and cultural awareness ⁵	3	3E
	Historical perspectives ⁶	3	3D
	Technical electives ⁷	8	
	Additional Requirements for Graduation ¹	0	
	TOTAL	35	
PROGRAM TOTAL = 130 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's four-year program.

² Select from the list of courses in category 2A or 2B in the All-University Core Curriculum (AUCC). First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (category 2B).

³ Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁴ ATS 555 and ATS 560 (both courses) may substitute for CIVE 425. If this pair of courses is chosen, one credit may be counted toward technical electives.

⁵ Select from the list of courses in category 3E in the AUCC.

⁶ Select from the list of courses in category 3D in the AUCC.

⁷ Select courses with adviser's approval.

Ecological Engineering Concentration

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CIVE 102	Introduction: Civil/Environmental Engineering	3	
CIVE 103 ^P	Engineering Graphics and Computing	3	
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
SOCR 240 ^P	Soil Science	4	
	Additional Requirements for Graduation ¹	0	
	TOTAL	32	

SOPHOMORE

AREC 202	Agricultural and Resource Economics	3	3C
OR			
ECON 202 ^P	Principles of Microeconomics	3	3C
<i>Select four credits from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
BZ 120	Principles of Plant Biology	4	3A
LIFE 102 ^P	Attributes of Living Systems	4	3A
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
CIVE 260 ^P	Engineering Mechanics-Statics	3	
CIVE 261 ^P	Engineering Mechanics-Dynamics	3	
CO 150 ^P	College Composition	3	1A
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	4A, 4B
	Additional communication ²	3	2A or 2B
	Additional Requirements for Graduation ¹	0	
	TOTAL	31	

JUNIOR

CBE 201 ^P	Material and Energy Balances	3	
OR			
MECH 237 ^P	Introduction to Thermal Sciences	3	
STAT 315 ^P	Statistics for Engineers and Scientists	3	
LIFE 320 ^P	Ecology	3	
CIVE 300 ^P	Fluid Mechanics	4	
CIVE 322 ^{P/}	Basic Hydrology	3	
ENVE 322 ^P			
CIVE 330	Ecological Engineering	2	
CIVE 360 ^P	Mechanics of Solids	3	
CIVE 438 ^{P/}	Environmental Engineering Concepts	3	
ENVE 438 ^P			
ERHS 446 ^P	Environmental Toxicology	3	
	Arts/humanities ³	3	3B
	Science Electives ⁴	3	
	Additional Requirements for Graduation ¹	0	
	TOTAL	33	

SENIOR

CIVE 401 ^P	Hydraulic Engineering	3	
CIVE 402 ^P	Senior Design Principles	3	
CIVE 403 ^P	Senior Project Design	3	4C
CIVE 439 ^{P/}	Environmental Engineering Chemical Concepts	3	
CBE 439 ^P			
CIVE 440 ^P	Nonpoint Source Pollution	3	
ENVE 441 ^P	Water Quality Analysis and Treatment	3	
	Arts/humanities ³	3	3B
	Global and cultural awareness ⁵	3	3E
	Historical perspectives ⁶	3	3D
	Science electives ⁴	2	
	Technical electives ⁷	5	
	Additional Requirements for Graduation ¹	0	
	TOTAL	34	

PROGRAM TOTAL = 131 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section ofthe catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's four-year program.

² Select from the list of courses in category 2A or 2B in the All-University Core Curriculum (AUCC). First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (category 2B).

³ Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁴ Select courses with adviser's approval.

⁵ Select from the list of courses in category 3E in the AUCC.

⁶ Select from the list of courses in category 3D in the AUCC.

⁷ Select courses with adviser's approval.

Minor in Environmental Engineering

In order to permit undergraduate students in any engineering major to take advantage of Colorado State's environmental expertise, the Department of Civil and Environmental Engineering offers a minor in environmental engineering. The minor is designed to broaden the academic background of undergraduate engineering students seeking a career in environmental fields, and to provide fundamentals required to pursue a master's degree in environmental engineering or related fields.

Course	Title	Cr
LOWER DIVISION		
CHEM 245 ^{P*}	Fundamentals of Organic Chemistry ^{1,2}	4
CHEM 246 ^{P*}	Fundamentals of Organic Chemistry Laboratory ^{1,2}	1
	TOTAL	5

UPPER DIVISION

<i>Select four to five credits from the following:</i> ⁴		
BC 351 ^{P*}	Principles of Biochemistry	4
CBE 439 ^{P/}	Environmental Engineering Chemical Concepts	3
CIVE 439 ^{P*}		
CBE 443 ^{P*}	Chemical and Biological Engineering Lab II	2
CIVE 440 ^{P*}	Nonpoint Source Pollution	3
ERHS 446 ^P	Environmental Toxicology	3
MECH 463 ^{P*}	Building Energy Systems	3
MIP 432 ^P	Microbial Ecology	3
PHIL 345 ^P	Environmental Ethics	3

CIVE 438 ^{P/}	Environmental Engineering Concepts ^{3,4}	3
ENVE 438 ^{P*}		
OR		
MECH 448 ^{P/}	Pollution Prevention ⁴	3
ENVE 448 ^{P*}		
MIP 300 ^{P*}	General Microbiology	3
MIP 301 ^P	Fundamental Microbiology Laboratory Techniques	1
	TOTAL	16

PROGRAM TOTAL = 21 credits without prerequisites

*Additional course work may be required because of prerequisites.

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Minor based on freshman chemistry sequence of CHEM 111, CHEM 112, CHEM 113, CHEM 114.

² CHEM 345 may be substituted for CHEM 245, CHEM 246, but additional elective credit may be needed to bring program total to 21.

³ Civil Engineering majors cannot take CIVE 438/ENVE 438 for credit in the minor, and therefore must take nine credits from the elective list.

⁴ If CIVE 438/ENVE 438 is selected, select four credits from the previous list; if MECH 448/ENVE 448 is selected, select five credits. Students cannot select

courses offered by their department that are required by their major.

Graduate Programs in Civil and Environmental Engineering

In civil engineering, programs leading to the Master of Science and Doctor of Philosophy degrees are offered in environmental engineering, fluid mechanics and wind engineering, geotechnical engineering, groundwater/environmental hydrogeology, hydraulics, structural engineering and solid mechanics, and water resources planning and management.

A practice-oriented, course-work only, Master of Engineering program is available to students with a baccalaureate degree in engineering. Graduates of some science programs are also eligible, but are typically required to also complete some background courses at the undergraduate level. Master of Engineering tracks are offered in environmental engineering, geotechnical engineering, infrastructure engineering, structural engineering, and water resources engineering.

Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx. The civil engineering departmental Graduate Studies web page and research in civil engineering may be found at www.engr.colostate.edu/ce/degreeinfo.cfm?Source=Future.

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

Office in Engineering Building, Room 104
(970) 491-6600
www.engr.colostate.edu/ece

Professor Anthony Maciejewski, Department Head
Elisabeth Wadman, Academic Adviser

Major in Electrical or Computer Engineering

Have you ever wondered how cell phones, iPods, high definition TV, virtual reality systems, the Internet, and high performance computers came about? These, and many other high tech developments, largely come from the efforts and ingenuity of electrical and computer engineers.

The Department of Electrical and Computer Engineering at Colorado State University can connect you with world-class teaching, research, and proven people in an unbeatable setting. Here you can study alongside professors who share

their rich experience and expertise to expand your knowledge and teach you to think creatively for our high tech world.

Striving to create for students an atmosphere that is friendly, open, and conducive to teaching and learning, our faculty will work closely with you to prepare you for success. ECE courses and research span a range of disciplines that include:

- Communications and signal processing
- Computer engineering
- Controls and robotics
- Lasers, optics, and applications
- Electromagnetics and remote sensing
- Biomedical Engineering
- Systems Engineering
- Energy (especially smart-grid/renewable)

The ECE undergraduate and graduate curricula are designed to provide a wide coverage of mathematics and science, considerable depth in electrical and computer engineering, exposure to other engineering disciplines, and a general knowledge of the humanities and social sciences. We offer two undergraduate degree programs: a bachelor of science in electrical engineering (with a concentration in electrical engineering or lasers and optical engineering) and a bachelor of science in computer engineering. You can also incorporate a certificate in biomedical engineering into either degree program.

During the senior year, all ECE students are required to participate in a capstone design project. Combining classroom learning with engineering practice, you will work on a real-world project, overseeing all phases from design and manufacture to documentation and marketing.

Potential Occupations

Electrical engineers design, develop, test, and oversee the development of electronic systems and the manufacture of electrical and electronic equipment and devices.. They're behind much of the technology in computers, cell phones, satellites, and TVs. Computer engineers deal with all aspects of the design, construction, and operation of computer systems. They might specialize in operating systems, computer networks, software, or hardware. Manufacturers put microchips in nearly everything – cars, toasters, telephones, etc..The fields of electrical and computer engineering encompass a broad range of knowledge, therefore virtually all industries employ electrical and computer engineers at some level.

According to the 2010 Job Outlook Report from the National Association of Colleges and Employers, electrical engineering and computer engineering are among the top ten majors in demand for bachelor's, master's, and doctoral

degrees. The number of U.S.-based high-tech workers is higher today than it was at the peak of the Internet boom, and ECE graduates consistently earn higher starting salaries than most other disciplines.

Major in Computer Engineering

Computer engineering emphasizes computer electronics, digital system design, digital computing and networking, and computer programming.

Computer engineering students are required to take five computer science courses and choose senior elective courses in computer-related areas.

In order to maintain professional standards required of practicing engineers, the Department of Electrical and Computer Engineering requires a cumulative grade point average of at least 2.000 in electrical engineering courses as a graduation requirement. It is the responsibility of any student who fails to maintain a 2.000 average to work with his or her adviser to correct grade point deficiencies. In addition, it is required that students retake any electrical engineering course at the 300 level or below in which they receive a grade below C.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
CS 160 ^P	Foundations in Programming	4	
ECE 102	Digital Circuit Logic	4	
ECE 103 ^P	DC Circuit Analysis	3	
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	Historical perspectives ¹	3	3D
	Additional Requirements for Graduation ⁷	0	
	TOTAL	30	
SOPHOMORE			
CS 161 ^P	Object-Oriented Problem Solving	4	
CS 200 ^P	Algorithms and Data Structures	4	
ECE 202 ^P	Circuit Theory Applications	4	
ECE 251 ^P	Introduction to Microprocessors	4	
MATH 261 ^P	Calculus for Physical Scientists III	4	
<i>Select 4-6 credits from the following:</i>			
MATH 229 ^P	Matrices and Linear Equations	2	
AND			
MATH 345 ^P	Differential Equations	4	
OR			
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Arts/humanities ²	3	3B
	Additional Requirements for Graduation ⁷	0	
	TOTAL	32-34	
JUNIOR			
CS 253 ^P	Problem Solving with C++	4	
CS 320 ^P	Algorithms—Theory and Practice ³	3	
OR			
ECE 332 ^P	Electronics Principles II ⁴	4	
CS 370 ^P	System Architecture and Software	3	
ECE 311 ^P	Linear System Analysis I	3	
ECE 312 ^P	Linear System Analysis II	3	
ECE 331 ^P	Electronics Principles I	4	
ECE 450 ^P	Digital System Design Laboratory	1	
ECE 451 ^P	Digital System Design	3	
ECE 452 ^P	Computer Organization and Architecture	3	
ECON 202 ^P	Principles of Microeconomics	3	3C
	Additional Requirements for Graduation ⁷	0	
	TOTAL	30-31	
SENIOR			

Course	Title	Cr	AUCC
CO 301B ^P	Writing in the Disciplines-Science	3	2B
OR			
JTC 300 ^P	Professional and Technical Communication	3	2B
ECE 303 ^P	Introduction to Communications	3	
STAT 303 ^P	Principles		
ECE 401 ^P	Senior Design Project I	3	4A, 4B
ECE 402 ^P	Senior Design Project II	3	4C
ECE 456 ^P	Computer Networks	4	
	Arts/humanities ²	3	3B
	Global and cultural awareness ⁵	3	3E
	Technical electives ⁶	12	
	Additional Requirements for Graduation ⁷	0	
	TOTAL	34	

PROGRAM TOTAL = 126-129 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3D in the All-University Core Curriculum (AUCC).

² Select from list of courses in category 3B of the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ CS 301 (followed by CS 453 in the senior year) is recommended for students interested in specializing in computer system design.

⁴ ECE 332 is recommended for students interested in specializing in VLSI.

⁵ Select from the list of courses in category 3E in the AUCC.

⁶ Select from departmental list. CS 453 is recommended as one of the electives for students interested in specializing in computer system design.

⁷ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's four-year program.

Major in Electrical Engineering

Students choose between the electrical engineering and lasers and optical engineering concentrations, each one of which leads to the Bachelor of Science degree. The number of credits within each concentration ranges between 125 and 127 credits. Since the first year of both programs is common, the student need not make his or her choice until the sophomore year. In the senior year, electrical engineering students select courses relating to their particular career interests. These courses may be in the following fields: analog and digital electronics, digital systems and signal processing, microelectronics, computers, robotics and controls, lasers, power generation and distribution, optical electronics, semiconductors, antennas, and radar.

Electrical Engineering Concentration

Electrical engineering focuses on traditional subjects such as circuits, electronics, electromagnetic fields, and electromechanical devices.

In order to maintain professional standards required of practicing engineers, the Department of Electrical and Computer Engineering requires a cumulative grade point average of at least 2.000 in electrical engineering courses as a graduation requirement. It is the responsibility of any student who fails to maintain a 2.000 average to work with his or her adviser to correct grade point deficiencies. In addition, it is required that students retake any electrical engineering course at the 300 level or below in which they receive a grade below a C-.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
<i>Select 3-4 credits from the following:</i>			
CS 155	Introduction to Unix	1	
CS 156 ^P	Introduction to C Programming I	1	
CS 157 ^P	Introduction to C Programming II	1	
CS 160 ^P	Foundations in Programming	4	
ECE 102	Digital Circuit Logic	4	
ECE 103 ^P	DC Circuit Analysis	3	
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	Historical perspectives ¹	3	3D
	Additional Requirements for Graduation ⁶	0	
	TOTAL	29-30	
SOPHOMORE			
CHEM 111 ^P	General Chemistry I	4	3A
ECE 202 ^P	Circuit Theory Applications	4	
ECE 251 ^P	Introduction to Microprocessors	4	
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	
OR			
MATH 345 ^P	Differential Equations	4	
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Science/engineering elective ²	6	
	Additional Requirements for Graduation ⁶	0	
	TOTAL	31	
JUNIOR			
CO 301B ^P	Writing in the Disciplines-Science	3	2B
OR			
JTC 300 ^P	Professional and Technical Communication	3	2B
ECE 303 ^P	Introduction to Communication	3	
STAT 303 ^P	Principles	3	
ECE 311 ^P	Linear System Analysis I	3	
ECE 312 ^P	Linear System Analysis II	3	
ECE 331 ^P	Electronic Principles I	4	
ECE 332 ^P	Electronics Principles II	4	4A
ECE 341 ^P	Electromagnetic Fields and Devices I	3	
ECE 342 ^P	Electromagnetic Fields and Devices II	3	
	Global and cultural awareness ³	3	3E
	Science/engineering elective ²	3	
	Additional Requirements for Graduation ⁶	0	
	TOTAL	32	
SENIOR			
ECE 401 ^P	Senior Design Project I	3	4A, 4B
ECE 402 ^P	Senior Design Project II	3	4C
ECON 202 ^P	Principles of Microeconomics	3	3C
	Arts/humanities ⁴	6	3B
	Technical electives ⁵	18	
	Additional Requirements for Graduation ⁶	0	
	TOTAL	33	
PROGRAM TOTAL = 125-126 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3D in the All-University Core Curriculum (AUCC).

² One or more courses to be chosen from CHEM 112, CIVE 260, CIVE 262, CS 200, MATH 229, MATH 366, MATH 419, MATH 470, MECH 237, PH 314, PH 341, or PH 353. If selected course(s) is/are less than six credits, the credit deficiency must be replaced by additional senior elective credits.

³ Select two courses from the list of courses in category 3E in the AUCC.

⁴ Select from the list of courses in category 3B in the AUCC Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁵ Select from departmental list of approved courses.

⁶ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's four-year program.

Lasers and Optical Engineering Concentration

Lasers and optical engineering focuses on optics and waves, optical electronics, optical information processing, and communications.

Lasers and optical engineering students take an additional physics course, senior-level courses in optical electronics and optical processing, and technical electives in the optical area

In order to maintain professional standards required of practicing engineers, the Department of Electrical and Computer Engineering requires a cumulative grade point average of at least 2.000 in electrical engineering courses as a graduation requirement. It is the responsibility of any student who fails to maintain a 2.000 average to work with his or her adviser to correct grade point deficiencies. In addition, it is required that students retake any electrical engineering course at the 300 level or below in which they receive a grade below a C-.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
<i>Select 3-4 credits from the following:</i>			
CS 155	Introduction to Unix	1	
CS 156 ^P	Introduction to C Programming I	1	
CS 157 ^P	Introduction to C Programming II	1	
CS 160 ^P	Foundations in Programming	4	
ECE 102	Digital Circuit Logic	4	
ECE 103 ^P	DC Circuit Analysis	3	
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	Historical perspectives ¹	3	3D
	Additional Requirements for Graduation ⁷	0	
	TOTAL	29-30	
SOPHOMORE			
CHEM 111 ^P	General Chemistry I	4	3A
ECE 202 ^P	Circuit Theory Applications	4	
ECON 202 ^P	Principles of Microeconomics	3	3C
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	
OR			
MATH 345 ^P	Differential Equations	4	
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
PH 314 ^P	Introduction to Modern Physics	4	
	Arts/humanities ²	3	3B
	Additional Requirements for Graduation ⁷	0	
	TOTAL	31	
JUNIOR			
CO 301B ^P	Writing in the Disciplines-Science	3	2B
OR			
JTC 300 ^P	Professional and Technical Communication	3	2B
ECE 311 ^P	Linear System Analysis I	3	
ECE 331 ^P	Electronics Principles I	4	

Course	Title	Cr	AUCC
ECE 332 ^P	Electronics Principles II	4	4A
ECE 341 ^P	Electromagnetic Fields and Devices I	3	
ECE 342 ^P	Electromagnetic Fields and Devices II	3	
PH 353 ^P	Optics and Waves	4	
	Arts/humanities ²	3	3B
	Global and cultural awareness ³	3	3E
	Science/engineering elective ⁴	3	
	Additional Requirements for Graduation ⁷	0	
	TOTAL	33	
SENIOR			
ECE 303 ^{P/}	Introduction to Communications	3	
STAT 303 ^P	Principles		
ECE 401 ^P	Senior Design Project I ⁵	3	4A, 4B
ECE 402 ^P	Senior Design Project II	3	4C
ECE 404 ^P	Experiments in Optical Electronics	2	
ECE 441 ^P	Optical Electronics	3	
ECE 457 ^P	Fourier Optics	3	
PH 451 ^P	Introductory Quantum Mechanics I	3	
	Technical electives ⁶	12	
	Additional Requirements for Graduation ⁷	0	
	TOTAL	32	
PROGRAM TOTAL = 125-126 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3D in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 3E in the AUCC.

⁴ One or more courses to be chosen from CHEM 112, CIVE 260, CIVE 262, CS 200, MATH 229, MATH 366, MATH 419, MATH 470, MECH 237, PH 341, or PH 353.

If selected course(s) is/are less than three credits, the credit deficiency must be replaced by additional senior technical elective credits.

⁵ Project must be a laser and optical engineering topic.

⁶ Select from departmental list of approved courses in the laser and optical engineering area.

⁷ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's four-year program.

Graduate Programs in Electrical and Computer Engineering

Graduate programs leading to the Master of Science, Master of Engineering (electrical and computer engineering specialization), and Doctor of Philosophy degrees are offered in several areas. Students interested in graduate work should refer to the *Graduate and Professional Bulletin* graduateschool.colostate.edu/current-students/bulletin.aspx and the department's website, www.engr.colostate.edu/ece/.

DEPARTMENT OF MECHANICAL ENGINEERING

Office in Engineering Building, Room A101

(970) 491-6558

www.engr.colostate.edu/me/

Professor Susan P. James, Head
Chriselda Engel, Undergraduate Adviser
Karen Mueller, Graduate Adviser

Major in Mechanical Engineering

Is making a difference important to you? Would you enjoy the challenge of inventing sustainable energy devices, doing computer-aided product design, or biomedical research? Does creating new designs for the hybrid electric vehicle industry, or new airplanes in the fields of aeronautics and aerospace sound interesting? Would designing or doing research and development in a wide range of industrial and governmental enterprises be of interest to you? Does studying thermal sciences and the integration of electronic and mechanical devices interest you? Do you like putting ideas and designs to work? Are interested in collaborating and working in teams with others? If your answer to any of these questions is "yes," then a major in mechanical engineering may be for you.

Mechanical engineers are creative problem solvers who design, develop, and manufacture the machines and instrumentation that run energy, building, environmental and transportation systems. Examples include biomedical devices, ground/air/space vehicles, robots, environmental control equipment, and power plants.

In Mechanical Engineering, students take basic science and mathematics courses while beginning their engineering studies in design and computing. A broad spectrum of classes is designed to sharpen problem-solving skills. The senior year focuses on a year-long capstone design course to help students in the transition from college to an engineering career. Students also choose technical electives from the energy, biomedical engineering, materials, mechanics and controls, and thermal sciences areas. Participation in labs further develops design, modeling, and analysis skills.

Educational outcomes and objectives of the mechanical engineering major, along with additional information on this major are given at www.engr.colostate.edu/me/.

Potential Occupations

Graduates from the Department of Mechanical Engineering are expected to have the fundamental knowledge required for the successful practice of mechanical engineering. Colorado State University engineering graduates are generally well prepared for a professional career with a greater than 90% pass rate on the Fundamentals of Engineering professional examination. Participating in internships, volunteer activities, or cooperative education opportunities is highly recommended to enhance practical training and development. Students who go on for graduate

studies can attain more responsible positions with the possibility of rising to top professional levels.

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CO 150 ^P	College Composition	3	1A
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
MECH 100 ^P	Introduction to Mechanical Engineering	1	
MECH 102 ^P	Mechanical Engineering Problem Solving	3	
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	Arts/humanities ¹	6	3B
	Additional Requirements for Graduation ⁷	0	
	TOTAL	31	
SOPHOMORE			
CIVE 260 ^P	Engineering Mechanics-Statics	3	
CIVE 261 ^P	Engineering Mechanics-Dynamics	3	
ECE 204 ^P	Introduction to Electrical Engineering	3	
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	
MECH 200 ^P	Introduction to Manufacturing Processes	3	
MECH 201 ^P	Engineering Design I	2	
MECH 202 ^P	Engineering Design II	3	
MECH 337 ^P	Thermodynamics	4	
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Additional Requirements for Graduation ⁷	0	
	TOTAL	34	
JUNIOR			
CIVE 360 ^P	Mechanics of Solids	3	
CIVE 363 ^P	Material Properties	1	
MECH 302 ^P	Engineering Design III	3	4A
MECH 307 ^P	Mechatronics and Measurement Systems	4	
MECH 324 ^P	Dynamics of Machines	4	
MECH 325 ^P	Machine Design	3	
MECH 331 ^P	Introduction to Engineering Materials	4	
MECH 338 ^P	Thermosciences Laboratory	1	
MECH 342 ^P	Mechanics and Thermodynamics of Flow Processes	3	
MECH 344 ^P	Heat and Mass Transfer	3	4B
	Additional Communication ²	3	2A or 2B
	Additional Requirements for Graduation ⁷	0	
	TOTAL	32	
SENIOR			
MECH 486A ^P	Engineering Design Practicum I	4	4C

Course	Title	Cr	AUCC
MECH 486B ^P	Engineering Design Practicum II	4	4C
STAT 315 ^P	Statistics for Engineers and Scientists	3	
	Global and cultural awareness ³	3	3E
	Historical perspectives ⁴	3	3D
	Science technical elective	3	
	Social/behavioral sciences ⁵	3	3C
	Technical electives ⁶	9	
	Additional Requirements for Graduation ⁷	0	
	TOTAL	32	

PROGRAM TOTAL = 129 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 2A or 2B in the AUCC. First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (category 2B).

³ Select from the list of courses in category 3E in the AUCC.

⁴ Select from the list of courses in category 3D in the AUCC.

⁵ Select from the list of courses in category 3C in the AUCC.

⁶ Select from department list of approved courses.

⁷ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's four-year program.

Graduate Programs in Mechanical Engineering

Programs are offered leading to the Master of Science, Master of Engineering (mechanical engineering specialization), and Doctor of Philosophy. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx and the department's website, www.engr.colostate.edu/me/.

Colorado State University reserves the right at any time, without notice, to change, modify, or cancel any course, program, procedure, policy, financial requirement, or disciplinary arrangement set forth in this catalog whenever, in its sole discretion, it determines such action to be appropriate. Furthermore, Colorado State will not be responsible for any failure to present or complete any course or program or to perform any other activity, function, or obligation mentioned in this catalog. Since changes may occur at any time, students must check the relevant website (as noted throughout various chapters in this catalog).

College of Liberal Arts

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Professor Ann Gill, Dean
Professor Pattie Cowell, Associate Dean
Associate Professor John Didier, Associate Dean
Professor Stephan Weiler, Associate Dean

UNDERGRADUATE MAJORS

Anthropology
Art
Communication Studies
Economics
English
Ethnic Studies
History
International Studies
Journalism and Technical Communication
Languages, Literatures, and Cultures
Liberal Arts
Music
Philosophy
Political Science
Performing Arts
Sociology

UNDERGRADUATE MINORS

Anthropology
Art History
Chinese
Criminology and Criminal Justice
Economics
English
Ethnic Studies
French
General Philosophy
General Sociology
Geography
German
History
Japanese
Media Studies
Music
Political Science

Religious Studies
Spanish
Studio Art
Theatre-Acting/Directing
Theatre-Design/Technical Theatre

The College of Liberal Arts aims to educate committed and active citizens and to develop in them an understanding of humans, including their history, literature, and art; their social, political, and economic systems; and their relationship to the environment. The College offers courses in the arts, humanities, and social sciences, which constitute the foundation of a liberal arts education.

COLLEGE PROGRAMS

Undergraduate majors lead to one of three degrees: Bachelor of Arts, Bachelor of Fine Arts, or Bachelor of Music. Descriptions of the specific departmental and interdepartmental majors and concentrations in the College of Liberal Arts are located in the following pages.

Students should consider simultaneously completing the requirements of a second major or a departmental or interdisciplinary minor, either in the College of Liberal Arts or in another college. With careful planning, numerous combinations are possible within four years of study.

The minimum scholastic average acceptable for graduation in any college program is a 2.000 average in all major courses in addition to the university's overall grade point average requirement of 2.000 for Colorado State courses.

Undergraduate Career Opportunities and Career Counseling

A liberal arts education prepares students for many careers in areas such as education, business, and government. It is important for undergraduates to discuss their interests and abilities with their academic adviser and the College of Liberal Arts career counselor. To maximize opportunities for a good job, students are encouraged to sharpen interviewing skills, prepare a good resume, and through internships gain practical experience and an understanding of how their skills will benefit potential employers.

Prelaw

Offices in Clark Building, Rooms C207

Students preparing for law school can choose any major. Law schools seek above-average students with broad educational backgrounds and excellent communication and analytical skills. Prelaw students, regardless of major, should design a course of study that develops their skills in speaking, writing and analytical capabilities. Law schools require an undergraduate degree for admission. Visit this web site for more information: advising.libarts.colostate.edu/current/pre_law.

International Studies

The College of Liberal Arts encourages students to consider study abroad, international travel, and international careers.

Students interested in careers in other countries may consider a major in International Studies. The program focuses on the diverse civilizations of cultural areas outside North America. International Studies is a coherent formal program of study that includes both disciplinary and multidisciplinary perspectives and gives students powerful tools for understanding the world. We recommend studying abroad as it compliments this program, providing the student an extraordinary experience he or she will never forget but also in most cases valuable immersion in a foreign language.

For more information visit the College of Liberal Arts Advising Center, Clark C207, or the International Studies website: www.colostate.edu/programs/in/.

Study Abroad

Because the knowledge of at least one other culture is valuable in understanding our own, students are encouraged to take a semester or longer to study outside of the United States as part of their overall program at Colorado State University. Students interested in study abroad should plan, far in advance, by discussing opportunities with their advisor and by visiting the Office of International Programs in Laurel Hall or the web site www.studyabroad.colostate.edu.

Foreign Service Officer Career

Students interested in a career as a foreign service officer may prepare for both the general Foreign Service Officer Examination and the associated language examination within the following majors: economics; history; journalism and technical communication; languages, literatures, and cultures; liberal arts; political science; or sociology.

Graduate Programs

A variety of liberal arts advanced degrees are available in the College. Academic degrees offered are Doctor of Philosophy, Master of Arts, Master of Science, Master of Fine Arts, and Master of Music. The last two are generally considered professional degrees.

The College offers three interdisciplinary master's degrees. The Departments of Communication Studies, English, and Journalism and Technical Communication cooperate to offer a master's degree program in communication development for teachers of communication skills in high schools, junior colleges, and some four year colleges, as well as for communication positions in businesses. The Department of Anthropology offers a master's degree in international development studies with courses from across the University. The Departments of English and Foreign Languages and Literatures offer a joint master's program in foreign languages and the teaching of English as a second/foreign language. Information on all three programs may be obtained from any participating department.

For detailed information about graduate programs, contact individual departments. See also the *Graduate and Professional Bulletin* at: graduateschool.colostate.edu/current-students/bulletin.aspx.

INTERDEPARTMENTAL MAJORS

Advising Center
Office in Clark Building, Room C207
(970) 491-3117
www.advising.libarts.colostate.edu

John Didier, Associate Dean, Director
Blane Harding, Director for Advising, Recruitment, and Retention

Major in International Studies

Advising Center
Office in Clark Building, Room C127
(970) 491-3117
www.colostate.edu/programs/in/

John Didier, Associate Dean, Director
Blane Harding, Director for Advising, Recruitment, and Retention

The International Studies major is a multidisciplinary program designed to help students understand the nature of

diverse cultures and peoples. There are four concentrations: *Asian Studies, European Studies, Latin American Studies,*

and *Middle East and North African Studies*. Courses are required in foreign language, history, and international studies, with other courses chosen from literature and cultural studies, the arts, history, philosophy, political science, sociology, ethnic studies, anthropology, geography, economics, and many more disciplines across the college and university.

Learning Outcomes

Graduates of the International Studies major will demonstrate that they are competent and capable in:

- Writing effectively about the knowledge and perspectives of their field of study, including 1) organization in a manner that aids reader comprehension and the expression of the writer’s intent; 2) use of accepted grammatical forms, spelling, and punctuation; 3) use of language in a style that is appropriate to the writer’s purpose; 4) effective support of claims; and 5) clear citation of sources.
- Speaking effectively, including 1) creation of a logically constructed message; 2) adaptation of that message to a particular audience; 3) use of appropriate and engaging language; and 4) use of effective delivery skills.
- Thinking critically about international issues, including the abilities to 1) articulate the histories and aspirations of other peoples; 2) empathize with others, resulting in the ability to identify and appreciate multiple perspectives pertaining to an issue; 3) articulate and analyze through a critical framework texts, artifacts, positions, policies, or cultural practices; 4) appreciate the role and responsibilities of humane involvement at the local, national, and international levels and realize the interconnectedness of those levels.

Potential Occupations

Graduates in International Studies apply their education in a wide variety of careers, including those in international business, non-profit organizations, public policy, artistic production, mass media, engineering, law, city planning, environmental sustainability and clean energy, information systems, international business, journalism, publishing, education, sales and marketing, management and administration, government, communications, museums, entertainment, foreign service, and many other areas in need of intelligent, well-rounded, and broadly world-educated people. Some International Studies graduates enter graduate or professional schools for more specialized study in either international studies or one of many other disciplines. To enhance their career opportunities, majors are encouraged to consider participating in paid or volunteer work or internship opportunities.

International Studies Core

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
GR 100	Introduction to Geography	3	3C
<i>Select a minimum of 3 credits from the following:</i>			
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
MATH 141 ^P	Calculus in Management Sciences	3	1B
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
POLS 241	Comparative Government and Politics	3	3E
	Arts and Humanities ¹	6	3B
	Historical Perspectives ²	3	3D
	Concentration courses ³	10	
	TOTAL	31-32	
SOPHOMORE			
ECON 202 ^P	Principles of Microeconomics	3	3C
L*** 200 ^P	Second Year Language ^{1,4}	3-5	
	Biological and Physical Sciences ⁵	7	3A
	Concentration courses ³	12	
	TOTAL	25-27	
JUNIOR			
INST 300 ^P	Approaches to International Studies	3	4B
	Advanced Writing ⁶	3	2
	Concentration courses ³	27	
	TOTAL	33	
SENIOR			
INST 492 ^P	Seminar	3	4A, 4C
	Concentration courses ³	27-28	
	TOTAL	30-31	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/>.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC), except L*** 200 and L*** 201 (see footnote 4).

² Select from the list of courses in category 3D in the AUCC.

³ Students must declare one of the concentrations under this major.

⁴ Effective Fall 2007, foreign language courses are in separate prefixes (all starting with L and followed by three letters designating the language, e.g. LFRE is French, LGER is German, etc.).

⁵ Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

⁶ Select from the list of courses in category 2of the AUCC.

Asian Studies Concentration

In addition to the International Studies major core courses, the following must be completed:

Course	Title	Cr	AUCC
FRESHMAN			
LCHI 105 ^P	First Year Chinese I	5	
OR			
LJPN 105 ^P	First Year Japanese I	5	
LCHI 107 ^P	First Year Chinese II	5	
OR			
LJPN 107 ^P	First Year Japanese II	5	
	TOTAL	10	
SOPHOMORE			
HIST 120	Asian Civilizations I ¹	3	
OR			
HIST 121	Asian Civilizations II ¹	3	
<i>Select one course from the following:¹</i>			
HIST 120	Asian Civilizations I ²	3	
HIST 121	Asian Civilizations II ²	3	
HIST 430 ^P	Ancient Near East	3	
HIST 438 ^P	The Modern Middle East	3	
HIST 440 ^P	Modern South Asia	3	
HIST 451 ^P	Medieval China and Central Asia	3	
HIST 469 ^P	The Crusades	3	

Course	Title	Cr	AUCC
LCHI 201 ^P	Second Year Chinese I	5	
	OR		
LJPN 201 ^P	Second Year Japanese I	5	
	TOTAL	11	
JUNIOR			
	Track courses ³	18	
LCHI 304 ^P	Third-Year Chinese I	3	
LCHI 305 ^P	Third-Year Chinese II	3	
	OR		
LJPN 304 ^P	Third-Year Japanese I	3	
LJPN 305 ^P	Third-Year Japanese II	3	
	Electives ⁴	3	
	TOTAL	27	
SENIOR			
	Track courses ³	6	
	Electives ⁴	20-21	
	TOTAL	26-27	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Course(s) selected may not be used here and for AUCC 3D or 3E or in track courses (see note 3).

² Course not selected in the previous choice may be chosen here.

³ Three different subject codes, (6 credits minimum from Track 1 and Track 2, respectively, and 3 credits minimum from Track 3) for a total of 24 credits, 18 of which must be upper division. *Track 1—History and Politics of Asia*: HIST 115, HIST 303, HIST 430, HIST 431, HIST 432, HIST 433, HIST 435, HIST 438, HIST 440, HIST 441, HIST 450, HIST 451, HIST 452, HIST 455, HIST 456, HIST 464, HIST 465, HIST 466, HIST 468, HIST 469, IE 271, POLS 445, POLS 449; *Track 2—The Thought and Culture of Asia*: ANTH 312, ANTH 314, ART 112, ART 316, E 356, LCHI 250 or LJPN 250, LCHI 309, LGEN 465B, LJPN 496, PHIL 106, PHIL 172, PHIL 309, PHIL 349, PHIL 360, PHIL 371, PHIL 379, PHIL 455; *Track 3—International Studies*: AM 430, AM 460, ANTH 200, ANTH 352, ANTH 415, ANTH 422, ANTH 441, AREC 240, AREC 415, AREC 460, BUS 350, CON 450, ECON 204, ECON 240, ECON 332, ECON 370, ECON 440, ECON 442, ECON 460, FIN 475, GR 320, HIST 462, HIST 463, HIST 470, HIST 471, IE 270, IE 370, IE 450, IE 470, IE 471, INTD 357, INTD 450, JTC 412, MGT 475, MKT 365, NRRT 320, POLS 332, POLS 362, POLS 431, POLS 433, POLS 435, POLS 436, SOC 364, SOC 422, SOC 429, SOC 482A-B, SOWK 450, SPCM 434.

⁴ Minimum number of elective credits to complete the program. To fulfill the 42 upper-division credit minimum and depending on the selections made in the sophomore year and for the track courses, at least 9 elective credits must be upper division.

European Studies Concentration

In addition to the International Studies major core courses, the following must be completed:

Course	Title	Cr	AUCC
FRESHMAN			
L* 105 ^{P1}	First-Year Language I	5	
L* 107 ^{P1}	First-Year Language II	5	
	TOTAL	10	
SOPHOMORE			
L* 201 ^{P1}	Second-Year Language II	3	
	Electives ²	9	
	TOTAL	12	
JUNIOR			
<i>Select 6 credits from the following courses:</i>			
HIST 100	Western Civilization, Pre-Modern	3	
	AND		
HIST 101	Western Civilization, Modern ³	3	
	OR		
	Two HIST courses at the 200 and/or 300 level related to Europe ⁴	6	
	Upper division language ¹	6	
	Track courses ⁵	15	
	TOTAL	27	
SENIOR			
	Track courses ⁵	9	

Course	Title	Cr	AUCC
	Electives ²	18-19	
	TOTAL	27-28	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ French, German, Italian, Russian, or Spanish. Effective Fall 2007, foreign language courses are in separate prefixes (all starting with L and followed by three letters designating the language, e.g., LFRE is French, LGER is German, etc.).

² Minimum number of elective credits to complete the program. To fulfill the 42 upper-division credit minimum, at least 6 elective credits must be upper division, depending on other choices made during the program.

³ If HIST 100 and HIST 101 are used to fulfill the history sequence within the option, a course other than HIST 101 must be used to fulfill AUCC category 3D.

⁴ With approval of adviser.

⁵ Three different subject codes, (6 credits minimum from Track 1 and Track 2, respectively, and 3 credits minimum from Track 3) for a total of 24 credits, 18 of which must be upper division. *Track 1—History and Politics of Europe*: ECON 376, HIST 300, HIST 301, HIST 302, HIST 303, HIST 304, HIST 308, HIST 309, HIST 311, HIST 312, HIST 317, HIST 319, HIST 320, HIST 321, HIST 323, HIST 324, HIST 327, HIST 329, HIST 330, HIST 331, HIST 332, HIST 335, HIST 337, HIST 339, HIST 461, HIST 469, POLS 341, POLS 345, POLS 420, POLS 421; *Track 2—The Thought and Cultures of Europe*: ANTH 324, ART 110, ART 111, ART 212, ART 410, ART 411, ART 412, ART 414, ART 415, ART 416, ART 417, ART 420, E 276, E 277, E 337, E 342, E 343, E 353, E 424, E 426, E 427, E 430, E 431, E 432, E 443, E 444, E 445, E 452, E 455, E 460, E 463, E 475, LAND 120, L* 250, L* 310, L* 313, L* 335 L* 345, L* 355, L* 413, L* 450, LFRE 433A-B, LGER 434, LSPA 437, L* 441, LSPA 443, LSPA 450, L* 452, L* 453, L* 454, LFRE 460, LGEN 465C, MU 334, MU 335, PHIL 170, PHIL 173, PHIL 300, PHIL 301, PHIL 302, PHIL 409; *Track 3—International Studies*: AM 430, AM 460, ANTH 200, ANTH 415, ANTH 422, ANTH 441, AREC 240, AREC 415, AREC 460, BUS 350, CON 450, ECON 204, ECON 240, ECON 332, ECON 370, ECON 440, ECON 442, ECON 460, FIN 475, GR 320, HIST 462, HIST 463, HIST 470, HIST 471, IE 270, IE 370, IE 450, IE 470, IE 471, INTD 357, INTD 450, JTC 412, MGT 475, MKT 365, NRRT 320, POLS 332, POLS 362, POLS 431, POLS 433, POLS 435, POLS 436, SOC 364, SOC 422, SOC 429, SOC 482A-B, SOWK 450, SPCM 434.

Latin American Studies Concentration

In addition to the International Studies major core courses, the following must be completed:

Course	Title	Cr	AUCC
FRESHMAN			
LSPA 105 ^P	First-Year Spanish I	5	
LSPA 107 ^P	First-Year Spanish II	5	
	TOTAL	10	
SOPHOMORE			
LSPA 201 ^P	Second-Year Spanish II	3	
	Latin American history ¹	3	
	Electives	6	
	TOTAL	12	
JUNIOR			
<i>Select one course from following:</i>			
HIST 410 ^P	Colonial Latin America	3	
HIST 412 ^P	Mexico	3	
HIST 413 ^P	Caribbean Civilization	3	
HIST 414 ^P	Revolutions in Latin America	3	
	Latin American history ¹	3	
	Upper division Spanish	6	
	Track courses ²	18	
	TOTAL	30	
SENIOR			
	Track courses ²	6	
	Electives ³	18-19	
	TOTAL	24-25	
PROGRAM TOTAL = 120 credits²			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ Choose two courses from the following: HIST 410, HIST 411, HIST 412, HIST 413, HIST 414. Courses selected may NOT be used both here and as track courses.

²Three different subject codes, (6 credits minimum from Track 1 and Track 2, respectively, and 3 credits minimum from Track 3), for a total of 24 credits, 18 of which must be upper division. *Track 1-Social Sciences*: ANTH 319, ANTH 451, AREC 460, DM 470A-B, ETST 319, HIST 410, HIST 411, HIST 412, HIST 413, HIST 414, HIST 460, POLS 331, POLS 446, POLS 447, SOC 366; *Track 2-Civilization, History, and Literature of Latin America*: ANTH 319, ANTH 332, ANTH 451, ANTH 452, ART 312, DM 470A-B, ETST 319, HIST 410, HIST 411, HIST 412, HIST 413, HIST 414, LGEN 465A, LSPA 310, LSPA 313, LSPA 335, LSPA 345, LSPA 365, LSPA 435, LSPA 436, LSPA 437, LSPA 441, LSPA 445, LSPA 449, LSPA 452, LSPA 453, LSPA 454, SOC 366; *Track 3-International Studies*: AM 430, AM 460, ANTH 200, ANTH 352, ANTH 415, ANTH 422, ANTH 441, AREC 240, AREC 415, AREC 460, BUS 350, CON 450, ECON 204, ECON 240, ECON 332, ECON 370, ECON 440, ECON 442, ECON 460, FIN 475, GR 320, HIST 462, HIST 463, HIST 470, HIST 471, IE 270, IE 370, IE 450, IE 470, IE 471, INTD 357, INTD 450, JTC 412, MGT 475, MKT 365, NRRT 320, POLS 332, POLS 362, POLS 431, POLS 433, POLS 435, POLS 436, SOC 364, SOC 422, SOC 429, SOC 482A-B, SOWK 450, SPCM 434. If HIST 410, HIST 412, HIST 413, or HIST 414 is used for the history sequence, that course cannot also count as a Track course.

³ Minimum number of elective credits needed to complete the program. To fulfill the 42 upper-division credit minimum, at least 6 elective credits must be upper-division.

Middle East and North African Studies Concentration

In addition to the International Studies major core courses, the following must be completed:

Course	Title	Cr	AUCC
FRESHMAN			
LARA 105 ^P	First-Year Arabic I	5	
LARA 107 ^P	First-Year Arabic II	5	
	TOTAL	10	
SOPHOMORE			
HIST 115	Islamic World to 1800	3	
HIST 438 ^P	The Modern Middle East	3	
LARA 201 ^P	Second Year Arabic II	4	
	TOTAL	10	
JUNIOR			
LARA 300 ^P	Third Year Arabic	3	
LARA 301 ^P	Oral Communication—Arabic	3	
	Track courses ¹	18	
	Electives ²	3	
	TOTAL	27	
SENIOR			
	Track courses ¹	3	
	Electives ²	25-26	
	TOTAL	28-29	
PROGRAM TOTAL = 120 credits²			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ Three different subject codes (6 credits minimum from Track 1 and Track 2, respectively, and 3 credits minimum from Track 3), for a total of 24 credits, 18 of which must be upper division. *Track 1 – History and Politics of the Middle East/North Africa*: HIST 303, HIST 308, HIST 421, HIST 422, HIST 430, HIST 431, HIST 432, HIST 433, HIST 435, HIST 438, HIST 468, HIST 469, POLS 449; *Track 2 – Religion and Culture of the Middle East/North Africa*: LARA 250, PHIL 171, PHIL 173, PHIL 335, PHIL 379, PHIL 455; *Track 3—International Studies*: AM 430, AM 460, ANTH 200, ANTH 352, ANTH 415, ANTH 422, ANTH 441, AREC 240, AREC 415, AREC 460, BUS 350, CON 450, ECON 204, ECON 240, ECON 332, ECON 370, ECON 440, ECON 442, ECON 460, FIN 475, GR 320, HIST 462, HIST 463, HIST 470, HIST 471, IE 270, IE 370, IE 450, IE 470, IE 471, INTD 450, JTC 412, MGT 475, MKT 365, NRRT 320, POLS 332, POLS 362, POLS 431, POLS 433, POLS 435, POLS 436, SOC 364, SOC 422, SOC 429, SOC 482A-B, SOWK 450, SPCM 434.

² Select enough elective credits to bring program total to a minimum of 120 credits, of which at least 42 must be upper division.

Major in Liberal Arts

Liberal Arts majors can select between the interdisciplinary Liberal Arts major and a five-year joint program with dual degrees in Liberal Arts (B.A.) and Engineering Science (B.S.)

To further increase depth and focus, and to enhance expertise and career opportunities, liberal arts students are required to complete a minor or an interdisciplinary studies program from within the College of Liberal Arts.

Learning Outcomes

Students will demonstrate the following skills:

- Writing effectively about the knowledge and perspectives of their field of study, including 1) organization in a manner that aids the readers' comprehension as well as the writer's purpose; 2) use of accepted grammatical form, spelling, and punctuation; 3) use of language in a style that is appropriate to the writer's purpose; 4) effective support of claims; and 5) clear citation of information sources.
- Speaking effectively, including 1) creation of a logically constructed message; 2) adaptation of that message to a particular audience; 3) use of accepted grammatical forms of standard American English dialect; 4) use of appropriate and engaging language; and 5) use of effective delivery skills.
- Thinking critically about contemporary issues, particularly within their field of study, including 1) description of a policy, position, or artifact; 2) analysis of the policy, position, or artifact by identifying issues or articulating and then applying a critical framework or perspective; and 3) clear articulation and support of conclusions based on that analysis/identification of issues.

Potential Occupations

Graduates in Liberal Arts apply their education in a wide variety of careers, including public policy, artistic production, mass media, engineering, law, city planning, business, information systems, international business, journalism, publishing, education, sales and marketing, management and administration, government, communications, museum work, entertainment, foreign service, and many others. Some enter graduate and professional schools for more specialized study. To enhance their career opportunities, majors are encouraged to participate in paid or volunteer work or internship opportunities.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
SPCM 200	Public Speaking	3	
	Arts and humanities ¹	6	3B

Course	Title	Cr	AUCC
	Biological and Physical Sciences ²	3	3A
	Historical Perspectives ³	3	3D
	Mathematics ⁴	3	1B
	Social and Behavioral Sciences ⁵	3	3C
	Electives	6	
	TOTAL	30	
SOPHOMORE			
LB 200	Liberal Arts Research Methods	1	
	Biological and Physical Sciences ²	4	3A
	Global and Cultural Awareness ⁶	3	3E
	Arts and Humanities or Social Sciences	6	
	Electives ⁷		
	Minor courses ⁸	7	
	Electives	9	
	TOTAL	30	
JUNIOR			
	Advanced writing ⁹	3	2
	Minor courses ⁸	9	
	Upper division Arts and Humanities or social sciences ¹⁰	12	
	Arts and Humanities or Social Sciences	6	
	Electives ⁷		
	TOTAL	30	
SENIOR			

<i>Select one course from the following:</i> ¹²			
LB 455 ^P / SPCM 455 ^P	Narrative Fiction Film as a Liberal Art	3	4B
LB 456 ^P / JTC 456 ^P	Documentary Film as a Liberal Art	3	4B
	Other CLA 4B course	3	4B
LB 492	Liberal Arts Capstone Seminar	3	4A, 4C
	Minor courses ⁸	6	
	Upper division Arts and Humanities or social sciences ¹⁰	6	
	Electives ¹¹	12	
	TOTAL	30	

PROGRAM TOTAL = 120 credits¹³

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from the list in category 3B of the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3A of the AUCC. One course must have a laboratory component.

³ Select 3 credits from the list in category 3D of the AUCC.

⁴ Select at least three credits from the list of courses in category 1B of the AUCC.

⁵ Select from the list of courses in category 3C of the AUCC.

⁶ Select from the list of courses in category 3E of the AUCC.

⁷ Choose courses from the following subject codes: ANTH, ART, CO, D, E, ECON, ETST, GR, HIST, JTC, L*, LB, MU, PHIL, POLS, PSY, SOC, SPCM, TH. [NOTE: Effective Fall 2007, foreign language courses are in separate subject codes, all starting with L and followed by three letters designating the language, e.g., LFRE is French, LGER is German, etc.] Courses used to fulfill AUCC distribution requirements may not be double-counted toward this major requirement.

⁸ Students must complete a minor in arts and humanities or social sciences discipline or one of the following interdisciplinary studies programs: Asian Studies, Environmental Affairs, Latin American and Caribbean Studies, Religious Studies, Russian, Eastern, and Central European Studies, Women's Studies, or, with prior approval, any other minor or interdisciplinary studies program.

⁹ Select from the list of courses in category 2 of the AUCC.

¹⁰ Eighteen upper-division credits in at least two subject codes in the arts and humanities or social sciences disciplines: ART, ANTH, CO, D, E, ECON, ETST, L*, GR, LB, HIST, JTC, MU, PHIL, POLS, PSY, SOC, SPCM, TH. [NOTE: You cannot double count upper-division credits between your minor/interdisciplinary studies program and upper-division Arts and Humanities and social sciences.]

¹¹ The number of free electives can vary. Students should take elective credits to get to a minimum of 120 total credits and 42 upper-division credits.

¹² Either take LB 455/SPCM 455 or LB 456/JTC 456, PSY 315, PSY 320, PSY 325, or any category 4B course in the College of Liberal Arts: ANTH 400, AMST 300/E 300, ART 311, ART 312, ART 314, ART 315, ART 316, ART 318, ART 319, ART 410, ART 411, ART 412, ART 414, ART 415, ART 416, ART 417, D 428, E 341, ECON 306, ECON 492, HIST 492, JTC 415, MU 334, MU 335, PHIL 462, any upper division political science course, SOC 311, SPCM 311, SPCM 341, SPCM 342, SPCM 355, SPCM 411, SPCM 412, TH 341, TH 342.

¹³ Students must complete 120 credits, and a minimum total of 42 upper-division credits (at least 30 upper-division credits must be taken at or through CSU).

Arts and Humanities and Engineering Science Concentration

Students interested in a broad education and training for the engineering profession may take a five-year program awarding a B.A. with a major in Liberal Arts, Arts and Humanities concentration, and a B.S. in Engineering Science. The program, which requires 152 credits, is administered jointly by the Colleges of Liberal Arts and Engineering. Inquire at the Dean's Office of one of these colleges for further information. Students in this concentration must fulfill the requirements for both degrees in order to graduate.

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CIVE 102	Introduction: Civil/Environmental Engineering	3	
CIVE 103 ^P	Engineering Graphics and Computing	3	
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	Arts and Humanities ¹	6	3B
	Global and Cultural Awareness ²	3	3E
	Additional Requirements for Graduation ³	0	
	TOTAL	29	
SOPHOMORE			
CHEM 113 ^P	General Chemistry II	3	
CO 150 ^P	College Composition	3	1A
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
MATH 261 ^P	Calculus for Physical Scientists III	4	
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Advanced Writing ⁴	3	2
	Historical Perspectives ⁵	6	3D
	Social and Behavioral Sciences ⁶	3	3C
	Additional Requirements for Graduation ³	0	
	TOTAL	31	
JUNIOR			
CIVE 260 ^P	Engineering Mechanics-Statics	3	
CIVE 261 ^P	Engineering Mechanics-Dynamics	3	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	4A, 4B
MECH 237 ^P	Introduction to Thermal Sciences	3	
STAT 315 ^P	Statistics for Engineers and Scientists	3	
	Minor or Interdisciplinary Minor ⁷	9	
	Arts and humanities electives ⁸	6	
	Additional Requirements for Graduation ³	0	
	TOTAL	31	
SENIOR			
CIVE 300 ^P	Fluid Mechanics	4	
ECE 204 ^P	Introduction to Electrical Engineering	3	
	Minor or Interdisciplinary Minor ⁷	12	
	Arts and humanities electives ⁸	6	
	Technical electives in engineering ⁹	3-5	
	Additional Requirements for Graduation ³	0	
	TOTAL	28-30	
FIFTH YEAR			
<i>Select one pair of courses from the following:</i>			
CBE 451 ^P	Chemical and Biological Engineering Design I ¹⁰	3	4C
CBE 452 ^P	Chemical and Biological Engineering Design II	3	4C
OR			
CIVE 402 ^P	Senior Design Principles ¹⁰	3	
CIVE 403 ^P	Senior Project Design	3	4C
OR			
ECE 401 ^P	Senior Design Project I ¹⁰	3	

Course	Title	Cr	AUCC
ECE 402 ^P	Senior Design Project II	3	4C
OR			
MECH 486A ^P	Engineering Design Practicum I ¹⁰	4	4C
MECH 486B ^P	Engineering Design Practicum II	4	4C
Technical electives in engineering ⁹		25	
Additional Requirements for Graduation ³		0	
TOTAL		31-33	

PROGRAM TOTAL = 152 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ From All-University Core Curriculum (AUCC) category 3B select two courses.

One must have a prefix of ART, D, MU, or TH and another prefix of E, ETST, PHIL, or SPCM. These two courses double count in either the arts and humanities electives required by the major or the minor/interdisciplinary minor program.

² Select from the following subset of courses in category 3E in the AUCC: ANTH 200, E 238, E 245, ECON 211, ETST 253, ETST 256, LB 170, LB 171, PHIL 170, POLS 131, POLS 241, SOC 205, SA 482.

³ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's four-year program.

⁴ Select one course from among CO 300, CO 301A-D, CO 302, or JTC 300.

⁵ Select one pair of courses from the following subset of courses in category 3D in the AUCC: AMST 100/AMST 101, HIST 100/HIST 101, HIST 150/HIST 151, HIST 170/HIST 171. Students may also select a pair of courses designed to achieve programmatic objectives, if approved by the adviser, but at least one course must be on the category 3D list.

⁶ Select from the list of courses in category 3C in the All-University Core Curriculum (AUCC) with the following prefixes: ANTH, ECON, JTC, POLS, PSY, or SOC.

⁷ Students must complete a minor in the arts and humanities or one of the following interdisciplinary minors: Asian Studies; Environmental Affairs; Latin American and Caribbean Studies; Religious Studies; Women's Studies; or, with the approval of the student's adviser and the College of Liberal Arts, any other minor or interdisciplinary minor consistent with the student's program in the arts and humanities. The minor or interdisciplinary minor must include a minimum of 21 credits, of which 12 must be upper-division. Because courses taken in fulfillment of the AUCC may, where appropriate, be double counted in fulfilling this requirement, the actual number of new credits generated by this requirement of a minor or interdisciplinary minor can vary.

⁸ Students must complete 12 upper-division credits in at least two arts and humanities prefixes, not including the minor. Arts and humanities prefixes are: ART, D, E, L*, MU, PHIL, SPCM, TH, ETST (if the course has an arts and humanities focus), LB 455. *Effective Fall 2007, foreign language courses are in separate prefixes (all starting with L and followed by three letters designating the language, e.g., LFRE is French, LGER is German, etc.).

⁹ Select courses from departmental list.

¹⁰ Students in this concentration may need to obtain a prerequisite override from the appropriate department to enroll in this course.

Social Sciences and Engineering Science Concentration

Students interested in a broad education and training for the engineering profession may take a five-year program awarding a B.A. with a major in Liberal Arts, Social Science concentration, and a B.S. in Engineering Science. The program, which requires 155 credits, is administered jointly by the Colleges of Liberal Arts and Engineering. Direct inquiries to the Dean's Office of one of these colleges. Students in this concentration must fulfill the requirements for both degrees in order to graduate.

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A

Course	Title	Cr	AUCC
CIVE 102	Introduction: Civil/Environmental Engineering	3	
CIVE 103 ^P	Engineering Graphics and Computing	3	
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	Historical Perspectives ¹	6	3D
	Social and Behavioral Sciences ²	3	3C
Additional Requirements for Graduation ³		0	
TOTAL		29	

SOPHOMORE

CHEM 113 ^P	General Chemistry II	3	
CO 150 ^P	College Composition	3	1A
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
MATH 261 ^P	Calculus for Physical Scientists III	4	
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Advanced Writing ⁴	3	2
	Arts and humanities ⁵	6	3B
	Global and Cultural Awareness ⁶	3	3E
Additional Requirements for Graduation ³		0	
TOTAL		31	

JUNIOR

CIVE 260 ^P	Engineering Mechanics-Statics	3	
CIVE 261 ^P	Engineering Mechanics-Dynamics	3	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	4A, 4B
MECH 237 ^P	Introduction to Thermal Sciences	3	
STAT 315 ^P	Statistics for Engineers and Scientists	3	
	Minor or Interdisciplinary Minor ⁷	12	
	Social science electives ⁸	6	
Additional Requirements for Graduation ³		0	
TOTAL		34	

SENIOR

CIVE 300 ^P	Fluid Mechanics	4	
ECE 204 ^P	Introduction to Electrical Engineering	3	
	Minor or Interdisciplinary Minor ⁷	9	
	Social science electives ⁸	6	
	Technical electives in engineering ⁹	6	
Additional Requirements for Graduation ³		0	
TOTAL		28	

FIFTH YEAR

<i>Select one of the following pairs of courses:</i>			
CBE 451 ^P	Chemical and Biological Engineering Design I ¹⁰	3	4C
CBE 452 ^P	Chemical and Biological Engineering Design II	3	4C
OR			
CIVE 402 ^P	Senior Design Principles ¹⁰	3	
CIVE 403 ^P	Senior Project Design	3	4C
OR			
ECE 401 ^P	Senior Design Project I ¹⁰	3	
ECE 402 ^P	Senior Design Project II	3	4C
OR			
MECH 486A ^P	Engineering Design Practicum I ¹⁰	4	4C
MECH 486B ^P	Engineering Design Practicum II	4	4C
Technical electives in engineering ⁹		25-27	
Additional Requirements for Graduation ³		0	
TOTAL		33	

PROGRAM TOTAL = 155 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select one pair of courses from the following subset of courses in category 3D in the AUCC: AMST 100/AMST 101, HIST 100/HIST 101, HIST 120/HIST 121, HIST 150/HIST 151, HIST 170/HIST 171. Students may also select a pair of courses designed to achieve programmatic objectives, if approved by the adviser, but at least one course must be on the category 3D list.

² Select from the list of courses in category 3C in the AUCC with the following prefixes: ANTH, ECON, JTC, POLS, PSY, or SOC.

³ Students are required to participate in the Professional Learning Institute (PLI) program as a requirement for graduation. The program consists of eleven PLI workshops distributed by focus areas as follows: Global and Cultural Diversity (2 workshops), Innovation (2 workshops), Leadership (2 workshops), Civic and Public Engagement (2 workshops), and Ethics (3 workshops). Each workshop is between 1-2 hours long and no outside preparation is required to attend any of the workshops. Attendance at the required workshops may be spread over the student's four-year program.

⁴ Select from among CO 300, CO 301A-D, CO 302, or JTC 300.

⁵From AUCC category 3B select two courses. One must have a prefix of ART, D, MU, or TH and another a prefix of E, ETST, PHIL, or SPCM.

⁶Select from the following subset of courses in category 3E in the AUCC: ANTH 200, E 238, E 245, ECON 211, ETST 253, ETST 256, LB 170, LB 171, PHIL 170, POLS 131, POLS 241, SOC 205, SA 482. The HIST courses, if selected here, cannot also be counted in category 3D.

⁷Students must complete a minor in the social sciences, or one of the following interdisciplinary minors: Asian Studies; Environmental Affairs; Latin American and Caribbean Studies; Religious Studies; Women's Studies; or, with approval of the student's adviser and the College of Liberal Arts, any other minor or interdisciplinary minor consistent with the student's program in the social sciences. The minor or interdisciplinary minor must include a minimum of 21 credits, of which 12 must be upper-division. Because courses taken in fulfillment of the AUCC may, where appropriate, be double counted in fulfilling this requirement, the actual number of new credits generated by this requirement of a minor or interdisciplinary minor program can vary.

⁸Students must complete 12 upper-division credits in at least two social sciences prefixes, not including the minor. Social sciences prefixes are ANTH, AMST, ECON, HIST, JTC, POLS, PSY, SOC, ETST (if the course has a social sciences focus), LB (456).

⁹Select from department list.

¹⁰Students in this concentration may need to obtain a prerequisite override from the appropriate department to enroll in this course.

Interdepartmental Minor in Media Studies

The Media Studies minor provides a foundation for understanding the impacts and roles of mass media in American society and other cultures. Courses focus on media and film history, criticism, law, ethics, social effects, cultural consequences, as well as multicultural and international media issues. The minor is offered jointly by the Department of Journalism and Technical Communication and the Department of Communication Studies.

Course	Title	Cr
LOWER DIVISION		
JTC 100	Media in Society	3
OR		
SPCM 100	Communication and Popular Culture	3
TOTAL		3
UPPER DIVISION		
JTC 415	Communications Law	3
OR		
SPCM 349	Freedom of Speech	3
<i>Select 15 credits from the following:</i>		
JTC 311	History of Media	3
JTC 316/ ETST 316	Multiculturalism and the Media	3
JTC 411	Media Ethics and Issues	3
JTC 412	International Mass Communication	3
JTC 413	New Communication Technologies and Society	3
JTC 414	Media Effects	3
JTC 456 ^P / LB 456 ^P	Documentary Film as a Liberal Art	3
SPCM 341	Evaluating Contemporary Television	3
SPCM 342	Critical Media Studies	3
SPCM 346 ^P	Virtual Culture and Communication	3
SPCM 354	History and Appreciation of Film	3
SPCM 350 ^P	Evaluating Contemporary Film	3
SPCM 357 ^P	Film and Social Change	3
SPCM 454/ ETST 454	Chicano/a Film and Video	3
SPCM 455 ^P / LB 455 ^P	Narrative Fiction Film as a Liberal Art	3
TOTAL		18
PROGRAM TOTAL = 21 credits		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

DEPARTMENT OF ANTHROPOLOGY

Office in Clark Building, Room B219
(970) 491-5447
anthropology.colostate.edu/

Professor Kathleen Sherman, Chair

Major in Anthropology

The mission of the Anthropology Department is 1) to offer and maintain instructional programs that provide an understanding of people and their cultures, past and present and knowledge of their social, political, economic, and environmental systems; 2) to conduct research in our programmatic areas within the various sub-disciplines of anthropology and geography, in order to advance and expand knowledge of the field of anthropology and geography; 3) to participate actively in programs of interdisciplinary research. We accomplish these through the synergistic effects of an active program of field and laboratory research and the teaching and training of students.

The program prepares undergraduate students to describe and explain the human condition through exposure to the anthropological lens of human variation and the geographical lens of spatial analysis across the world's societies and over time. Emphasis on the use of multiple tools to understand behavior and biology is fundamental to an anthropological approach to studying humankind, and invaluable in helping students examine contemporary issues in their lives and the world. The department has four programmatic areas of research and scholarship that students can benefit from: environment, globalization, health and well-being, and development.

Anthropology is an interdisciplinary department that bridges the natural and social sciences, and the humanities, with a faculty of cultural anthropologists, archaeologists, biological anthropologists, and geographers whose scholarship spans the breadth of human experience. The discipline of anthropology is concerned with processes of the human condition as well as the structure of the social, environmental, political and economic conditions within which humans operate. Thus, anthropology is both varied and integrative, drawing from geography, biology, humanities, and other social and natural sciences. The Anthropology faculty at CSU conducts research all over the world. It includes such diverse fields as contemporary

culture, ethnicity, linguistics, comparative religion, farming practices, archaeology, human ecology, human anatomy, evolution, and the behavior of non-human primates. Anthropology is a holistic field, and therefore, views the human condition as a result of the interaction of economics, social organization, history, technology, biology, ideology, and the environment.

Anthropology majors follow a liberal arts curriculum that provides a broad education with an emphasis on learning how to learn. The department has ten research and teaching laboratories and two summer field schools. Field classes that involve the excavation of archaeological sites are offered during the summer. Graduates should be able to view the human condition with equal ability from its behavioral, biological, and Historical Perspectives. The combination of a well-rounded liberal arts education with the acquisition of important marketable skills (including analytical ability, communication, geographic information systems (GIS) training, and people skills) make anthropology graduates valuable in the fields of health, international development, natural resource management, business, government, and education. This is an extremely useful major for students who plan to pursue careers in which they anticipate contact with non-Western cultures; and, with careful planning, a second major in any field can be obtained to complement and enhance professional preparation.

In addition to the anthropology major, four concentrations are offered: archaeology, biological anthropology, cultural anthropology, and geography.

Learning Outcomes

Students will:

- Demonstrate knowledge related to basic appreciation of anthropology and its potential including: 1) knowledge of and respect for the similarities and differences that characterize human societies in the world, over time and across space; 2) knowledge of key theoretical ideas that anthropologists use to comprehend these similarities and differences; 3) knowledge of key methods and tools used to research and define the nature of similarities and differences in human societies; and 4) a grasp of the relationship between theory, methods, and data.
- Integrate anthropological concepts across subfields or with other social sciences and humanities disciplines, and articulate their anthropological understandings through papers written and presented during their senior year.
- Use what they have learned in their anthropology courses in their future activities after graduation.

Potential Occupations

Anthropology, like many liberal arts majors, provides students with a broad academic background suitable for a variety of jobs in the public and private sectors. Anthropology majors are trained to think independently and critically, communicate effectively, and function in a multicultural world. Employers appreciate liberal arts majors for their multiple skills and their ability to adapt to a variety of tasks and work environments. Participating in internships and cooperative education opportunities is highly recommended to enhance students' practical training and development. Careers for graduates are available in international development, health care, education, business, natural resource management, and government. Graduates who go on for advanced studies can pursue careers in anthropology or attain advanced positions with the possibility of rising to top professional levels.

Some career opportunities for anthropology graduates include, but are not limited to: museum curator/researcher, genealogist, international relief representative, salvage archaeologist, collections assistant, resource specialist, classical or historical anthropologist, cultural affairs officer, diplomatic service representative, immigration or foreign service officer, linguist, educational television researcher, biographical writer, scientific/technical writer, reporter, ethnographic photographer, anthropological linguist, rural development worker, ethnic groups' special concerns advocate, intercultural educator, medical anthropologist, grant writer, psychological anthropologist, international development administrator, public relations representative, public opinion pollster, sales/marketing representative, consultant for cross-cultural relations, personnel worker, geographic information systems specialist.

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
ANTH 100	Introductory Cultural Anthropology ¹	3	3C
OR			
ANTH 200	Cultures and the Global System ²	3	3E
ANTH 120	Human Origins and Variation	3	3A
ANTH 121 ^P	Human Origins and Variation Laboratory	1	3A
ANTH 140	Introduction to Prehistory	3	3D
CO 150 ^P	College Composition	3	1A
	Additional Humanities ³	3	
	Mathematics ⁴	3	1B
	Electives	11	
	TOTAL	30	
SOPHOMORE			
GR 100	Introduction to Geography	3	3C
	Advanced Writing ⁵	3	2
	Additional Natural Sciences ⁶	7	
	Additional Social Sciences ⁷	3	
	Arts and Humanities ⁸	6	3B
	Biological and Physical Sciences ⁹	3	3A
	Global and Cultural Awareness ²	3	3E
OR			
	Social and Behavioral Science ¹	3	3C
	Anthropology elective ¹⁰	3	
	TOTAL	31	
JUNIOR			
ANTH 400 ^P	History of Anthropological Theory	3	4B

Select one course from the following:

Course	Title	Cr	AUCC
STAT 301 ^P	Introduction to Statistical Methods	3	
STAT 307 ^P	Introduction to Biostatistics	3	
STAT 311 ^P	Statistics for Behavioral Sciences I	3	
<i>Select one of the following archaeology courses not taken in another category:</i>			
ANTH 350 ^P	Archaeology of North America	3	
ANTH 351 ^P	Archaeology of Europe and Africa	3	
ANTH 359	Colorado Prehistory	3	
ANTH 360 ^P	Archaeological Investigation	3	
ANTH 450 ^P	Hunter-Gatherer Ecology	3	
ANTH 451 ^P	Andean Archaeology and Ethnohistory	3	
ANTH 452 ^P	Archaeology of Mesoamerica	3	
ANTH 453 ^P	Impacts on Ancient Environments	3	
ANTH 455 ^P	Great Plains Archaeology	3	
ANTH 456 ^P	Archaeology and the Public	3	
ANTH 457 ^P	Lithic Technology	3	
ANTH 460 ^P	Field Class in Archaeology	3-8	
ANTH 461 ^P	Anthropological Report Preparation	3	
ANTH 465 ^P	Zooarchaeology	3	
ANTH 478 ^{P/}	Heritage Resource Management	3	
HIST 478 ^P			
ANTH 492A ^P	Seminar: Archaeology	3	
<i>Select one of the following biological anthropology courses not taken in another category:</i>			
ANTH 330 ^P	Human Ecology	3	
ANTH 370 ^P	Primate Behavior and Ecology	3	
ANTH 372 ^P	Human Osteology	3	
ANTH 373 ^P	Human Evolution	3	
ANTH 374 ^P	Human Biological Variation	3	
ANTH 375 ^P	Evolution of Primate Behavior	3	
ANTH 376 ^P	Evolution of Human Adaptation	3	
ANTH 472 ^P	Human Biology	3	
ANTH 475 ^P	Methods of Analysis in Paleanthropology	3	
ANTH 492B ^P	Seminar: Biological Anthropology	3	
<i>Select one of the following cultural anthropology courses not taken in another category:</i>			
ANTH 310 ^P	Peoples and Cultures of Africa	3	
ANTH 312 ^P	Modern Indian Culture and Society	3	
ANTH 314 ^P	Southeast Asian Cultures and Societies	3	
ANTH 318 ^{P/}	Peoples and Cultures of the Southwest	3	
ETST 318 ^P			
ANTH 319 ^{P/}	Latin American Peasantries	3	
ETST 319 ^P			
ANTH 322 ^P	Religion, Culture, and Mind	3	
ANTH 329 ^P	Cultural Change	3	
ANTH 334 ^P	Narrative Traditions and Social Experience	4	
ANTH 335	Language and Culture	3	
ANTH 340 ^P	Medical Anthropology	3	
ANTH 412 ^P	Indians of North America	3	
ANTH 413 ^P	Indigenous Peoples Today	3	
ANTH 414/	Development in Indian Country	3	
ETST 414			
ANTH 415	Indigenous Ecologies and the Modern World	3	
ANTH 422 ^{P/}	Comparative Legal Systems	3	
SOC 422 ^P			
ANTH 423 ^P	Ethnopsychiatry and Spiritual Healing	3	
ANTH 440 ^P	Theory in Cultural Anthropology	3	
ANTH 441 ^P	Method in Cultural Anthropology	3	
ANTH 442 ^P	Ethnographic Field School	3-8	
ANTH 444 ^P	Cultures of Virtual Worlds: Research	3	
ANTH 445 ^P	Psychological Anthropology	3	
ANTH 446 ^P	New Orleans and the Caribbean	3	
	Additional Social Sciences ⁷	3	
	Anthropology electives ¹⁰	3	
	Electives	0-9	
	TOTAL	30	

SENIOR

ANTH 493 ^{8P}	Capstone Seminar ¹¹	1	4C
AND			
<i>Select one of the following AUCC 4A courses not taken in another category:¹¹</i>			
Cultural Anthropology			

Course	Title	Cr	AUCC
ANTH 329 ^P	Cultural Change	3	4A
ANTH 332 ^P	Peoples of the Caribbean	3	4A
ANTH 334 ^P	Narrative Traditions and Social Experience	4	4A
ANTH 338 ^P	Gender and Anthropology	3	4A
ANTH 340 ^P	Medical Anthropology	3	4A
ANTH 412 ^P	Indians of North America	3	4A
ANTH 415	Indigenous Ecologies and the Modern World	3	4A
Archaeology			
ANTH 450 ^P	Hunter-Gatherer Ecology	3	4A
ANTH 451 ^P	Andean Archaeology and Ethnohistory	3	4A
ANTH 452 ^P	Archaeology of Mesoamerica	3	4A
ANTH 453 ^P	Impacts on Ancient Environments	3	4A
ANTH 455 ^P	Great Plains Archaeology	3	4A
ANTH 456 ^P	Archaeology and the Public	3	4A
ANTH 461 ^P	Anthropological Report Preparation	3	4A
Biological Anthropology			
ANTH 330 ^P	Human Ecology	3	4A
ANTH 373 ^P	Human Evolution	3	4A
ANTH 374 ^P	Human Biological Variation	3	4A
ANTH 376 ^P	Evolution of Human Adaptation	3	4A
ANTH 472 ^P	Human Biology	3	4A
	Additional Humanities ³	3	
	Additional Social Sciences ⁷	3	
	Anthropology elective ¹⁰	3	
	Electives	15-16	
	TOTAL	29	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ ANTH 100 fulfills AUCC category 3C. Taking ANTH 100 in the freshman year will eliminate the requirement for 3 credits of Social and Behavioral Sciences in the sophomore year. If ANTH 200 is chosen in the freshman year instead, then 3 credits of Social and Behavior Sciences will be required in the sophomore year, selected from the list of courses in category 3C in the AUCC.

² ANTH 200 fulfills AUCC category 3E. Taking ANTH 200 in the freshman year will eliminate the requirement for 3 credits of Global and Cultural Awareness in the sophomore year. If ANTH 100 is chosen in the freshman year instead, then 3 credits of Global and Cultural Awareness will be required in the sophomore year, selected from the list of courses in category 3E in the AUCC.

³ Additional Humanities courses taken in the freshman and senior years for a total of six credits must include two prefixes, selected from among the following: ART, D, CO, E, ETST 344, ETST 430, L***, LB192 (Arts and Humanities sections only), MU, PHIL, SPCM, TH.

⁴ Select three credits, except MATH 133, from the courses in category 1B in the AUCC.

⁵ Select from the list of courses in category 2 in the All-University Core Curriculum (AUCC).

⁶ Select 7 credits including two prefixes and at least one formal laboratory from the following: AA, BMS, BIO, BZ, CHEM, GEOL, GR 210, LIFE, MATH, NR, NSCI, PH, SOCR, and STAT.

⁷ Select a total of 9 credits over the sophomore, junior and senior years as shown, and including at least two prefixes, from the following: ECON, HIST, JTC, POLS, PSY, SOC, LB 192 (social science sections only), ETST (except ETST 344 and ETST 430).

⁸ Select two courses from the list of courses in category 3B in the AUCC. (Only 3 of the 6 credits required for Arts and Humanities may come from intermediate [L* 200 and L* 201] foreign language courses.)

⁹ Select 3 credits from the list of courses in category 3A in the AUCC. ¹⁰ Select any course with the ANTH subject code.

¹⁰ Select any course with the ANTH or GR subject code.

¹¹ ANTH 493 must be taken concurrently with an AUCC 4A anthropology course. Using Competencies (AUCC 4A) must be taken concurrently with ANTH 493 Capstone Seminar. Students taking Senior Honors Thesis (HONR 499, 3 credits) are also required to register for ANTH 493 (1 credit).

Archaeology Concentration

The Archaeology concentration provides theoretical

frameworks and systematic field methods for examining ancient and historical societies in North and South America, including the trajectories of social complexity, spatial and social organization of production systems, and human impacts on ancient environments.

Course	Title	Cr	AUCC
FRESHMAN			
ANTH 100	Introductory Cultural Anthropology ¹	3	3C
OR			
ANTH 200	Cultures and the Global System ²	3	3E
ANTH 120	Human Origins and Variation	3	3A
ANTH 121 ^P	Human Origins and Variation Laboratory	1	3A
ANTH 140	Introduction to Prehistory	3	3D
CO 150 ^P	College Composition	3	1A
	Additional Humanities ³	3	
	Mathematics ⁴	3	1B
	Electives	11	
	TOTAL	30	
SOPHOMORE			
ANTH 360 ^P	Archaeological Investigation	3	
<i>Select one course from the following:</i>			
GEOL 120	Exploring Earth: Physical Geology	3	3A
GEOL 122	The Blue Planet: Geology of Our Environment	3	3A
GEOL 124	Geology of Natural Resources	3	3A
GEOL 121 ^P	Introductory Geology Laboratory	1	3A
GR 100	Introduction to Geography	3	3C
	Additional Natural Sciences ⁵	6	
	Additional Social Sciences ⁶	3	
	Advanced Writing ⁷	3	2
	Arts and Humanities ⁸	6	3B
	Global and Cultural Awareness ²	3	3E
OR			
	Social and Behavioral Sciences ¹	3	3C
	TOTAL	31	
JUNIOR			
ANTH 400 ^P	History of Anthropological Theory	3	4B
<i>Select one course from the following:</i>			
STAT 301 ^P	Introduction to Statistical Methods	3	
STAT 307 ^P	Introduction to Biostatistics	3	
STAT 311 ^P	Statistics for Behavioral Sciences I	3	
<i>Select one of the following Archaeological Concepts and Practice courses not taken in another category:</i>			
ANTH 450 ^P	Hunter-Gatherer Ecology	3	
ANTH 453 ^P	Impacts on Ancient Environments	3	
ANTH 456 ^P	Archaeology and the Public	3	
ANTH 460 ^P	Field Class in Archaeology	3-8	
ANTH 461 ^P	Anthropological Report Preparation	3	
ANTH 478 ^{P/}	Heritage Resource Management	3	
HIST 478 ^P			
<i>Select one of the following Archaeological Methods courses not taken in another category:</i>			
ANTH 352 ^P	Geoarchaeology	3	
ANTH 372 ^P	Human Osteology	3	
ANTH 457 ^P	Lithic Technology	3	
ANTH 465 ^P	Zooarchaeology	3	
<i>Select one of the following biological anthropology courses not taken in another category:</i>			
ANTH 330 ^P	Human Ecology	3	
ANTH 370 ^P	Primate Behavior and Ecology	3	
ANTH 372 ^P	Human Osteology	3	
ANTH 373 ^P	Human Evolution	3	
ANTH 374 ^P	Human Biological Variation	3	
ANTH 375 ^P	Evolution of Primate Behavior	3	
ANTH 376 ^P	Evolution of Human Adaptation	3	
ANTH 472 ^P	Human Biology	3	
ANTH 475 ^P	Methods of Analysis in Paleoanthropology	3	
ANTH 492B ^P	Seminar: Biological Anthropology	3	
<i>Select one of the following cultural anthropology courses not taken in another category:</i>			
ANTH 310 ^P	Peoples and Cultures of Africa	3	

Course	Title	Cr	AUCC
ANTH 312 ^P	Modern Indian Culture and Society	3	
ANTH 314 ^P	Southeast Asian Cultures and Societies	3	
ANTH 318 ^{P/}	Peoples and Cultures of the Southwest	3	
ETST 318 ^P			
ANTH 319 ^{P/}	Latin American Peasantries	3	
ETST 319 ^P			
ANTH 322 ^P	Religion, Culture, and Mind	3	
ANTH 329 ^P	Cultural Change	3	
ANTH 334 ^P	Narrative Traditions and Social Experience	4	
ANTH 335 ^P	Language and Culture	3	
ANTH 338 ^P	Gender and Anthropology	3	
ANTH 340 ^P	Medical Anthropology	3	
ANTH 412 ^P	Indians of North America	3	
ANTH 413 ^P	Indigenous Peoples Today	3	
ANTH 414 ^{P/}	Development in Indian Country	3	
ETST 414 ^P			
ANTH 415	Indigenous Ecologies and the Modern World	3	
ANTH 422 ^{P/}	Comparative Legal Systems	3	
SOC 422 ^P			
ANTH 423 ^P	Ethnopsychiatry and Spiritual Healing	3	
ANTH 440 ^P	Theory in Cultural Anthropology	3	
ANTH 441 ^P	Method in Cultural Anthropology	3	
ANTH 442 ^P	Ethnographic Field School	3-8	
ANTH 444 ^P	Cultures of Virtual Worlds: Research	3	
ANTH 445 ^P	Psychological Anthropology	3	
ANTH 446 ^P	New Orleans and the Caribbean	3	
	Additional Social Sciences ⁶	3	
	Electives		0-9
	TOTAL	30-31	

SENIOR			
ANTH 493 ^P	Capstone Seminar ⁹	1	4C
AND			
<i>Select one of the following AUCC 4A courses not taken in another category:⁹</i>			
ANTH 450 ^P	Hunter-Gatherer Ecology	3	4A
ANTH 451 ^P	Andean Archaeology and Ethnohistory	3	4A
ANTH 452 ^P	Archaeology of Mesoamerica	3	4A
ANTH 453 ^P	Impacts on Ancient Environments	3	4A
ANTH 455 ^P	Great Plains Archaeology	3	4A
ANTH 456 ^P	Archaeology and the Public	3	4A
ANTH 461 ^P	Anthropological Report Preparation	3	4A
<i>Select one of the following Place and Space in Archaeology courses not taken in another category:</i>			
ANTH 350 ^P	Archaeology of North America	3	
ANTH 351 ^P	Archaeology of Europe and Africa	3	
ANTH 359	Colorado Prehistory	3	
ANTH 451 ^P	Andean Archaeology and Ethnohistory	3	
ANTH 452 ^P	Archaeology of Mesoamerica	3	
ANTH 455 ^P	Great Plains Archaeology	3	
ANTH 492A ^P	Seminar: Archaeology	3	
	Additional Humanities ³	3	
	Additional Social Sciences ⁶	3	
	Electives ¹⁰		15-16
	TOTAL	28-29	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ANTH100 fulfills category 3C in the All-University Core Curriculum (AUCC). Taking ANTH100 in the freshman year will eliminate the requirement for 3 credits of Social and Behavioral Sciences in the sophomore year. If ANTH200 is chosen in the freshman year instead, then 3 credits of Social and Behavioral Sciences will be required in the sophomore year, selected from the list of courses in category 3C in the AUCC.

²ANTH200 fulfills AUCC category 3E. Taking ANTH200 in the freshman year will eliminate the requirement for 3 credits of Global and Cultural Awareness in the sophomore year. If ANTH100 is chosen in the freshman year, then 3 credits of Global and Cultural Awareness will be required in the sophomore year, selected from the list of courses in category 3E in the AUCC.

³Additional Humanities courses taken in the freshman and senior years for a total of six credits must include two prefixes, selected from among the following: ART, D, CO, E, ETST 344, ETST 430, L***, LB192 (Arts and Humanities sections only), MU, PHIL, SPCM, TH.

⁴Select three credits, except MATH 133, from the courses in category 1B in the AUCC.

⁵Select 6 credits including two prefixes from the following: AA, BMS, BIO, BZ, CHEM, GEOL, GR210, LIFE, MATH, NR, NSCI, PH, SOCR, and STAT.

⁶Select a total of 9 credits over the sophomore, junior and senior years as shown and including at least two prefixes from the following: ECON, HIST, JTC, POLS, PSY, SOC, LB192 (social science sections only), ETST (except ETST344 and ETST430).

⁷Select from the list of courses in category 2 in the AUCC.

⁸Select two courses from the list of courses in category 3B in the AUCC. (Only 3 of 6 credits required for Arts and Humanities may come from intermediate (L*200 and L* 201) foreign language courses.)

⁹ANTH493 must be taken concurrently with an AUCC 4A cultural anthropology course. Using Competencies (AUCC 4A) must be taken concurrently with ANTH493 Capstone Seminar. Students taking Senior Honors Thesis (HONR499, 3 credits) also are required to register for ANTH493 (1 credit).

¹⁰Select enough elective credits to bring program total to 120 credits.

Biological Anthropology Concentration

The concentration in Biological Anthropology provides students with a comprehensive understanding of the physiological, spatial and cultural origins and development of modern humans through the multifaceted lens of evolution, genetics, anatomy, animal behavior, and health and epidemiology.

Course	Title	Cr	AUCC
FRESHMAN			
ANTH 100	Introductory Cultural Anthropology ¹	3	3C
OR			
ANTH 200	Cultures and the Global System ²	3	3E
ANTH 120	Human Origins and Variation	3	3A
ANTH 121 ^P	Human Origins and Variation Laboratory	1	3A
ANTH 140	Introduction to Prehistory	3	3D
CO 150 ^P	College Composition	3	1A
	Additional Humanities ³	3	
	Mathematics ⁴	3	1B
	Electives	11	
	TOTAL	30	
SOPHOMORE			
<i>Select one course from the following:</i>			
STAT 301 ^P	Introduction to Statistical Methods	3	
STAT 307 ^P	Introduction to Biostatistics	3	
STAT 311 ^P	Statistics for Behavioral Sciences I	3	
<i>Select one science course group of 9-11 credits from the following:</i>			
Anatomy:			
BMS 301 ^P	Human Gross Anatomy	5	
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
Evolution:			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
BZ 220 ^P	Introduction to Evolution	3	
BZ 424 ^{P/}	Principles of Systematic Zoology	3	
BSPM 424 ^P			
Genetics (A):			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
BZ 220 ^P	Introduction to Evolution	3	
BZ 350 ^P	Molecular and General Genetics	4	
Genetics (B):			
LIFE 102	Attributes of Living Systems	4	3A
LIFE 103 ^P	Biology of Organisms—Animals and Plants	4	
LIFE 201 ^P	Introductory Genetics	3	3A
Health and Epidemiology:			
BZ 101	Humans and Other Animals	3	3A
OR			
BZ 110	Principles of Animal Biology	3	3A
OR			
LIFE 102	Attributes of Living Systems	4	3A
ERHS 220 ^P	Environmental Health		
ERHS 430	Human Disease and the Environment	3	

Course	Title	Cr	AUCC
GR 100	Introduction to Geography	3	3C
	Advanced Writing ⁵	3	2
	Additional Social Sciences ⁶	3	
	Arts and Humanities ⁷	6	3B
	Global and Cultural Awareness ²	3	3E
OR			
	Social and Behavioral Science ¹	3	3C
TOTAL		30-32	
JUNIOR			
ANTH 400 ^P	History of Anthropological Theory	3	4B
<i>Select one of the following biological anthropology Concepts and Practice courses not taken in another semester or category:</i>			
ANTH 370 ^P	Primate Behavior and Ecology	3	
ANTH 372 ^P	Human Osteology	3	
ANTH 373 ^P	Human Evolution	3	
ANTH 374 ^P	Human Biological Variation	3	
ANTH 375 ^P	Evolution of Primate Behavior	3	
ANTH 376 ^P	Evolution of Human Adaptation	3	
ANTH 472 ^P	Human Biology	3	
ANTH 475 ^P	Methods of Analysis in Paleoanthropology	3	
<i>Select one of the following archaeology courses not taken in another category:</i>			
ANTH 350 ^P	Archaeology of North America	3	
ANTH 351 ^P	Archaeology of Europe and Africa	3	
ANTH 352 ^P	Geoarchaeology	3	
ANTH 359	Colorado Prehistory	3	
ANTH 360 ^P	Archaeological Investigation	3	
ANTH 450 ^P	Hunter-Gatherer Ecology	3	
ANTH 451 ^P	Andean Archaeology and Ethnohistory	3	
ANTH 452 ^P	Archaeology of Mesoamerica	3	
ANTH 453 ^P	Impacts on Ancient Environments	3	
ANTH 455 ^P	Great Plains Archaeology	3	
ANTH 456 ^P	Archaeology and the Public	3	
ANTH 457 ^P	Lithic Technology	3	
ANTH 460 ^P	Field Class in Archaeology	3-8	
ANTH 461 ^P	Anthropological Report Preparation	3	
ANTH 465 ^P	Zooarchaeology	3	
ANTH 478 ^{P/}	Heritage Resource Management	3	
HIST 478 ^P			
ANTH 492A ^P	Seminar in Archaeology	3	
<i>Select one of the following biological anthropology Concepts and Practice courses not taken in another semester or category:</i>			
ANTH 370 ^P	Primate Behavior and Ecology	3	
ANTH 372 ^P	Human Osteology	3	
ANTH 373 ^P	Human Evolution	3	
ANTH 374 ^P	Human Biological Variation	3	
ANTH 375 ^P	Evolution of Primate Behavior	3	
ANTH 376 ^P	Evolution of Human Adaptation	3	
ANTH 472 ^P	Human Biology	3	
ANTH 475 ^P	Methods of Analysis in Paleoanthropology	3	
<i>Select one of the following biological anthropology Methods courses not taken in another category:</i>			
ANTH 372 ^P	Human Osteology	3	
ANTH 441 ^P	Method in Cultural Anthropology	3	
ANTH 457 ^P	Lithic Technology	3	
ANTH 465 ^P	Zooarchaeology	3	
ANTH 475 ^P	Methods of Analysis in Paleoanthropology	3	
GR 420 ^P	Spatial Analysis with GIS	4	
NR 323 ^P	Remote Sensing and Image Analysis	3	
<i>Select one of the following cultural anthropology courses not taken in another category:</i>			
ANTH 310 ^P	Peoples and Cultures of Africa	3	
ANTH 312 ^P	Modern Indian Culture and Society	3	
ANTH 314 ^P	Southeast Asian Cultures and Societies	3	
ANTH 318 ^{P/}	Peoples and Cultures of the Southwest	3	
ETST 318 ^P			
ANTH 319 ^{P/}	Latin American Peasantries	3	
ETST 319 ^P			

Course	Title	Cr	AUCC
ANTH 322 ^P	Religion, Culture, and Mind	3	
ANTH 329 ^P	Cultural Change	3	
ANTH 334 ^P	Narrative Traditions and Social Experience	4	
ANTH 335	Language and Culture	3	
ANTH 338 ^P	Gender and Anthropology	3	
ANTH 340 ^P	Medical Anthropology	3	
ANTH 412 ^P	Indians of North America	3	
ANTH 413 ^P	Indigenous Peoples Today	3	
ANTH 414/	Development in Indian Country	3	
ETST 414			
ANTH 415	Indigenous Ecologies and the Modern World	3	
ANTH 422 ^P / SOC 422 ^P	Comparative Legal Systems	3	
ANTH 423 ^P	Ethnopsychiatry and Spiritual Healing	3	
ANTH 440 ^P	Theory in Cultural Anthropology	3	
ANTH 441 ^P	Method in Cultural Anthropology	3	
ANTH 442 ^P	Ethnographic Field School	3-8	
ANTH 444 ^P	Cultures of Virtual Worlds: Research	3	
ANTH 445 ^P	Psychological Anthropology	3	
ANTH 446 ^P	New Orleans and the Caribbean	3	
	Additional Social Sciences ⁶	3	
	Electives	0-9	
	TOTAL	30-31	

SENIOR

ANTH 493 ^{8P}	Capstone Seminar ⁸	1	4C
AND			
<i>Select one of the following AUCC 4A biological anthropology courses not taken in another semester or category:⁸</i>			
ANTH 330 ^P	Human Ecology	3	4A
ANTH 373 ^P	Human Evolution	3	4A
ANTH 374 ^P	Human Biological Variation	3	4A
ANTH 376 ^P	Evolution of Human Adaptation	3	4A
ANTH 472 ^P	Human Biology	3	4A
<i>Select two of the following biological anthropology Concepts and Practice courses not taken in another semester or category:</i>			
ANTH 370 ^P	Primate Behavior and Ecology	3	
ANTH 372 ^P	Human Osteology	3	
ANTH 373 ^P	Human Evolution	3	
ANTH 374 ^P	Human Biological Variation	3	
ANTH 375 ^P	Evolution of Primate Behavior	3	
ANTH 376 ^P	Evolution of Human Adaptation	3	
ANTH 472 ^P	Human Biology	3	
ANTH 475 ^P	Methods of Analysis in Paleoanthropology	3	
	Additional Humanities ³	3	
	Additional Social Sciences ⁶	3	
	Electives ⁹	11-14	
	TOTAL	27-30	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ ANTH 100 fulfills AUCC category 3C. Taking ANTH 100 in the freshman year will eliminate the requirement for 3 credits of Social and Behavioral Sciences in the sophomore year. If ANTH 200 is chosen in the freshman year instead, then 3 credits of Social and Behavioral Sciences will be required in the sophomore year, selected from the list of courses in category 3C in the AUCC.

² ANTH 200 fulfills AUCC category 3E. Taking ANTH 200 in the freshman year will eliminate the requirement for 3 credits of Global and Cultural Awareness in the sophomore year. If ANTH 100 is chosen in the freshman year instead, then 3 credits of Global and Cultural Awareness will be required in the sophomore year, selected from the list of courses in category 3E in the AUCC.

³ Additional Humanities courses taken in the freshman and senior years for a total of six credits must include two prefixes, selected from among the following: ART, D, CO, E, ETST 344, ETST 430, L***, LB192 (Arts and Humanities sections only), MU, PHIL, SPCM, TH.

⁴ Select three credits, except MATH 133, from the courses in category 1B in the AUCC.

⁵ Select from the list of courses in category 2 in the All-University Core Curriculum (AUCC).

⁶ Select a total of 9 credits over the sophomore, junior and senior years as shown, and including at least two prefixes, from the following: ECON, HIST, JTC, POLS,

PSY, SOC, LB 192 (social science sections only), ETST (except ETST 344 and ETST 430).

⁷ Select two courses from the list of courses in category 3B in the AUCC. (Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁸ Capstone topic must focus on geography. ANTH 493 must be taken concurrently with an AUCC 4A anthropology course. Using Competencies (AUCC 4A) must be taken concurrently with ANTH 493 Capstone Seminar. Students taking Senior Honors Thesis (HONR 499, 3 credits) are also required to register for ANTH 493 (1 credit).

⁹ Select enough elective credits to bring program total to 120 credits.

Cultural Anthropology Concentration

The concentration in Cultural Anthropology combines place-based ethnographic exploration, rigorous fieldwork methods, and socio-cultural theory for the comparative study of society, politics, economy, and culture, emphasizing: environment, development, and sustainability; health and well-being; and languages and symbolic processes.

Course	Title	Cr	AUCC
FRESHMAN			
ANTH 100	Introductory Cultural Anthropology ¹	3	3C
OR			
ANTH 200	Cultures and the Global System ²	3	3E
ANTH 120	Human Origins and Variation	3	3A
ANTH 121 ^P	Human Origins and Variation Laboratory	1	3A
ANTH 140	Introduction to Prehistory	3	3D
CO 150 ^P	College Composition	3	1A
	Additional Humanities ³	3	
	Mathematics ⁴	3	1B
	Electives	11	
	TOTAL	30	

SOPHOMORE

<i>Select one of the following Place and Space in Cultural Anthropology courses not taken in another category:</i>			
ANTH 310 ^P	Peoples and Cultures of Africa	3	
ANTH 312 ^P	Modern Indian Culture and Society	3	
ANTH 314 ^P	Southeast Asian Cultures and Societies	3	
ANTH 412 ^P	Indians of North America	3	
ANTH 413 ^P	Indigenous Peoples Today	3	
ANTH 446 ^P	New Orleans and the Caribbean	3	
GR 100	Introduction to Geography	3	3C
	Advanced Writing ⁵	3	2
	Additional Natural Sciences ⁶	7	
	Additional Social Sciences ⁷	3	
	Arts and Humanities ⁸	6	3B
	Biological and Physical Sciences ⁹	3	3A
	Global and Cultural Awareness ²	3	3E
OR			
	Social and Behavioral Science ¹	3	3C
	TOTAL	31	

JUNIOR

ANTH 400 ^P	History of Anthropological Theory	3	4B
<i>Select one course from the following:</i>			
STAT 301 ^P	Introduction to Statistical Methods	3	
STAT 307 ^P	Introduction to Biostatistics	3	
STAT 311 ^P	Statistics for Behavioral Sciences I	3	
<i>Select one of the following archaeology courses not taken in another category:</i>			
ANTH 350 ^P	Archaeology of North America	3	
ANTH 351 ^P	Archaeology of Europe and Africa	3	
ANTH 352 ^P	Geoarchaeology	3	
ANTH 359	Colorado Prehistory	3	
ANTH 450 ^P	Hunter-Gatherer Ecology	3	
ANTH 451 ^P	Andean Archaeology and Ethnohistory	3	4A
ANTH 452 ^P	Archaeology of Mesoamerica	3	4A
ANTH 453 ^P	Impacts on Ancient Environments	3	
ANTH 455 ^P	Great Plains Archaeology	3	4A
ANTH 456 ^P	Archaeology and the Public	3	
ANTH 457 ^P	Lithic Technology	3	
ANTH 460 ^P	Field Class in Archaeology	3-8	
ANTH 461 ^P	Anthropological Report Preparation	3	

Course	Title	Cr	AUCC
ANTH 465 ^P	Zooarchaeology	3	
ANTH 478 ^P / HIST 478 ^P	Heritage Resource Management	3	
ANTH 492A ^P	Seminar: Archaeology	3	
<i>Select one of the following biological anthropology courses not taken in another category:</i>			
ANTH 330 ^P	Human Ecology	3	
ANTH 370 ^P	Primate Behavior and Ecology	3	
ANTH 372 ^P	Human Osteology	3	
ANTH 373 ^P	Human Evolution	3	
ANTH 374 ^P	Human Biological Variation	3	
ANTH 375 ^P	Evolution of Primate Behavior	3	
ANTH 376 ^P	Evolution of Human Adaptation	3	
ANTH 472 ^P	Human Biology	3	
ANTH 475 ^P	Methods of Analysis in Paleanthropology	3	
ANTH 492B ^P	Seminar: Biological Anthropology	3	
<i>Select one of the following cultural content courses not taken in another category:</i>			
ANTH 330 ^P	Human Ecology	3	
ANTH 334 ^P	Narrative Traditions and Social Experience	4	
ANTH 335	Language and Culture	3	
ANTH 340 ^P	Medical Anthropology	3	
ANTH 414/ ETST 414	Development in Indian Country	3	
ANTH 445 ^P	Psychological Anthropology	3	
<i>Select one of the following cultural theory courses not taken in another category:</i>			
ANTH 322 ^P	Religion, Culture, and Mind	3	
ANTH 329 ^P	Cultural Change	3	
ANTH 338 ^P	Gender and Anthropology	3	
ANTH 415	Indigenous Ecologies and the Modern World	3	
ANTH 440 ^P	Theory in Cultural Anthropology	3	
	Additional Social Sciences ⁷	3	
	Electives	3-9	
	TOTAL	30	

SENIOR

<i>Select one of the following cultural methods courses not taken in another category:</i>			
ANTH 441 ^P	Method in Cultural Anthropology	3	
ANTH 442 ^P	Ethnographic Field School	3-8	
ANTH 443 ^P	Ethnographic Field Preparation	3	
ANTH 444 ^P	Cultures of Virtual Worlds: Research	3	
ANTH 493 ^P	Capstone Seminar ¹⁰	1	4C
AND			
<i>Select one of the following AUCC 4A courses not taken in another category:¹⁰</i>			
ANTH 329 ^P	Cultural Change	3	4A
ANTH 332 ^P	Peoples of the Caribbean	3	4A
ANTH 334 ^P	Narrative Traditions and Social Experience	4	4A
ANTH 338 ^P	Gender and Anthropology	3	4A
ANTH 340 ^P	Medical Anthropology	3	4A
ANTH 412 ^P	Indians of North America	3	4A
ANTH 415	Indigenous Ecologies and the Modern World	3	4A
	Additional Humanities ³	3	
	Additional Social Sciences ⁷	3	
	Electives ¹¹	10-16	
	TOTAL	29	

PROGRAM TOTAL = credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ ANTH100 fulfills category 3C in the All-University Core Curriculum (AUCC). Taking ANTH100 in the freshman year will eliminate the requirement for 3 credits of Social and Behavioral Sciences in the sophomore year. If ANTH200 is chosen in the freshman year instead, then 3 credits of Social and Behavioral Sciences will be required in the sophomore year, selected from the list of courses in category 3C in the AUCC.

² ANTH200 fulfills AUCC category 3E. Taking ANTH200 in the freshman year will eliminate the requirement for 3 credits of Global and Cultural Awareness in the sophomore year. If ANTH100 is chosen in the freshman year, then 3 credits of Global and Cultural Awareness will be required in the sophomore year, selected from the list of courses in category 3E in the AUCC.

³ Additional Humanities courses taken in the freshman and senior years for a total of six credits must include two prefixes, selected from among the following: ART, D, CO, E, ETST 344, ETST 430, L***, LB192 (Arts and Humanities sections only), MU, PHIL, SPCM, TH.

⁴ Select three credits, except MATH 133, from the courses in category 1B in the AUCC.

⁵ Select from the list of courses in category 2 in the AUCC.

⁶ Select 7 credits including two prefixes and at least one formal laboratory from the following: AA, BMS, BIO, BZ, CHEM, GEOL, GR210, LIFE, MATH, NR, NSCI, PH, SOCR, and STAT.

⁷ Select a total of 9 credits over the sophomore, junior and senior years as shown and including at least two prefixes from the following: ECON, HIST, JTC, POLS, PSY, SOC, LB192 (social science sections only), ETST (except ETST344 and ETST430).

⁸ Select two courses from the list of courses in category 3B in the AUCC. (Only 3 of 6 credits required for Arts and Humanities may come from intermediate (L*200 and L* 201) foreign language courses.)

⁹ Select 3 credits from the list of courses in category 3A in the AUCC.

¹⁰ ANTH493 must be taken concurrently with an AUCC 4A cultural anthropology course. Using Competencies (AUCC 4A) must be taken concurrently with ANTH493 Capstone Seminar. Students taking Senior Honors Thesis (HONR499, 3 credits) also are required to register for ANTH493 (1 credit).

¹¹ Select enough elective credits to bring program total to 120 credits.

Geography Concentration

The concentration in Geography examines the critical interactions among space, place, people and the built and natural environment to interpret the spatial and temporal distribution of features and processes, applying spatial techniques and information technologies such as Geographic Information Systems (GIS) and remote sensing.

Course Title Cr AUCC

FRESHMAN				
ANTH 100	Introductory Cultural Anthropology ¹	3	3C	
OR				
ANTH 200	Cultures and the Global System ²	3	3E	
ANTH 120	Human Origins and Variation	3	3A	
ANTH 121 ^P	Human Origins and Variation Laboratory	1	3A	
ANTH 140	Introduction to Prehistory	3	3D	
CO 150 ^P	College Composition	3	1A	
GR 100	Introduction to Geography	3	3C	
	Additional Humanities ³	3		
	Mathematics ⁴	3	1B	
	Electives	8		
	TOTAL	30		

SOPHOMORE

GR 210	Physical Geography	3		
	Advanced Writing ⁵	3	2	
	Additional Natural Sciences ⁶	7		
	Additional Social Sciences ⁷	3		
	Arts and Humanities ⁸	6	3B	
	Biological and Physical Sciences ⁹	3	3A	
OR				
	Global and Cultural Awareness ²	3	3E	
OR				
	Social and Behavioral Science ¹	3	3C	
	Electives	3		
	TOTAL	31		

JUNIOR

ANTH 400 ^P	History of Anthropological Theory	3	4B	
GR 320 ^P	Cultural Geography	3		
NR 323 ^P	Remote Sensing and Image Analysis	3		
OR				
GR 420 ^P	Spatial Analysis with GIS	4		
<i>Select one course from the following:</i>				
STAT 301 ^P	Introduction to Statistical Methods	3		
STAT 307 ^P	Introduction to Biostatistics	3		

Course	Title	Cr	AUCC
STAT 311 ^P	Statistics for Behavioral Sciences I	3	
<i>Select one of the following archaeology courses not taken in another category:</i>			
ANTH 350 ^P	Archaeology of North America	3	
ANTH 351 ^P	Archaeology of Europe and Africa	3	
ANTH 352 ^P	Geoarchaeology	3	
ANTH 359	Colorado Prehistory	3	
ANTH 360 ^P	Archaeological Investigation	3	
ANTH 450 ^P	Hunter-Gatherer Ecology	3	
ANTH 451 ^P	Andean Archaeology and Ethnohistory	3	
ANTH 452 ^P	Archaeology of Mesoamerica	3	
ANTH 453 ^P	Impacts on Ancient Environments	3	
ANTH 455 ^P	Great Plains Archaeology	3	
ANTH 456 ^P	Archaeology and the Public	3	
ANTH 457 ^P	Lithic Technology	3	
ANTH 460 ^P	Field Class in Archaeology	3-8	
ANTH 461 ^P	Anthropological Report Preparation	3	
ANTH 465 ^P	Zooarchaeology	3	
ANTH 478 ^{P/}	Heritage Resource Management	3	
HIST 478 ^P			
ANTH 492A ^P	Seminar in Archaeology	3	
<i>Select one of the following biological anthropology courses not taken in another category:</i>			
ANTH 330 ^P	Human Ecology	3	
ANTH 370 ^P	Primate Behavior and Ecology	3	
ANTH 372 ^P	Human Osteology	3	
ANTH 373 ^P	Human Evolution	3	
ANTH 374 ^P	Human Biological Variation	3	
ANTH 375 ^P	Evolution of Primate Behavior	3	
ANTH 376 ^P	Evolution of Human Adaptation	3	
ANTH 472 ^P	Human Biology	3	
ANTH 475 ^P	Methods of Analysis in Paleoanthropology	3	
ANTH 492B ^P	Seminar: Biological Anthropology	3	
<i>Select one of the following cultural anthropology courses not taken in another category:</i>			
ANTH 310 ^P	Peoples and Cultures of Africa	3	
ANTH 312 ^P	Modern Indian Culture and Society	3	
ANTH 314 ^P	Southeast Asian Cultures and Societies	3	
ANTH 318 ^{P/}	Peoples and Cultures of the Southwest	3	
ETST 318 ^P			
ANTH 319 ^{P/}	Latin American Peasants	3	
ETST 319 ^P			
ANTH 322 ^P	Religion, Culture, and Mind	3	
ANTH 329 ^P	Cultural Change	3	
ANTH 334 ^P	Narrative Traditions and Social Experience	4	
ANTH 335 ^P	Language and Culture	3	
ANTH 340 ^P	Medical Anthropology	3	
ANTH 412 ^P	Indians of North America	3	
ANTH 413 ^P	Indigenous Peoples Today	3	
ANTH 414 ^{P/}	Development in Indian Country	3	
ETST 414 ^P			
ANTH 415	Indigenous Ecologies and the Modern World	3	
ANTH 422 ^{P/}	Comparative Legal Systems	3	
SOC 422 ^P			
ANTH 423 ^P	Ethnopsychiatry and Spiritual Healing	3	
ANTH 440 ^P	Theory in Cultural Anthropology	3	
ANTH 441 ^P	Method in Cultural Anthropology	3	
ANTH 442 ^P	Ethnographic Field School	3-8	
ANTH 444 ^P	Cultures of Virtual Worlds: Research	3	
ANTH 445 ^P	Psychological Anthropology	3	
ANTH 446 ^P	New Orleans and the Caribbean	3	
		Additional Social Sciences ⁷	3
		Electives	0-6
		TOTAL	30-35

SENIOR

ANTH 493 ^P	Capstone Seminar ¹⁰	1	4C
AND			
<i>Select one of the following AUCC 4A courses not taken in another category:¹⁰</i>			
Cultural Anthropology			
ANTH 329 ^P	Cultural Change	3	4A
ANTH 332 ^P	Peoples of the Caribbean	3	4A
ANTH 334 ^P	Narrative Traditions and Social Experience	4	4A

Course	Title	Cr	AUCC
ANTH 338 ^P	Gender and Anthropology	3	4A
ANTH 340 ^P	Medical Anthropology	3	4A
ANTH 412 ^P	Indians of North America	3	4A
ANTH 415	Indigenous Ecologies and the Modern World	3	4A
Archaeology			
ANTH 450 ^P	Hunter-Gatherer Ecology	3	4A
ANTH 451 ^P	Andean Archaeology and Ethnohistory	3	4A
ANTH 452 ^P	Archaeology of Mesoamerica	3	4A
ANTH 453 ^P	Impacts on Ancient Environments	3	4A
ANTH 455 ^P	Great Plains Archaeology	3	4A
ANTH 456 ^P	Archaeology and the Public	3	4A
ANTH 461 ^P	Anthropological Report Preparation	3	4A
Biological Anthropology			
ANTH 330 ^P	Human Ecology	3	4A
ANTH 373 ^P	Human Evolution	3	4A
ANTH 374 ^P	Human Biological Variation	3	4A
ANTH 376 ^P	Evolution of Human Adaptation	3	4A
ANTH 472 ^P	Human Biology	3	4A
<i>Select one of the following geography Content courses:</i>			
GR 342	Geography of Water Sources	3	
GR 345 ^P	Geography of Hazards	3	
GR 410 ^P	Climate Change: Science, Policy, Implications	3	
IE 492	International Development Seminar	3	
		Additional Humanities ⁵	3
		Additional Social Sciences ⁷	3
		Electives ¹¹	10-16
		TOTAL	24-29

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ ANTH 100 fulfills AUCC category 3C. Taking ANTH 100 in the freshman year will eliminate the requirement for 3 credits of Social and Behavioral Sciences in the sophomore year. If ANTH 200 is chosen in the freshman year instead, then 3 credits of Social and Behavior Sciences will be required in the sophomore year, selected from the list of courses in category 3C in the AUCC.

² ANTH 200 fulfills AUCC category 3E. Taking ANTH 200 in the freshman year will eliminate the requirement for 3 credits of Global and Cultural Awareness in the sophomore year. If ANTH 100 is chosen in the freshman year instead, then 3 credits of Global and Cultural Awareness will be required in the sophomore year, selected from the list of courses in category 3E in the AUCC.

³ Anthropology Humanities courses taken in the freshman and senior years for a total of six credits must include two prefixes, selected from among the following: ART, D, CO, E, ETST 344, ETST 430, L***, LB192 (Arts and Humanities sections only), MU, PHIL, SPCM, TH.

⁴ Select three credits, except MATH 133, from the courses in category 1B in the AUCC.

⁵ Select from the list of courses in category 2 in the All-University Core Curriculum (AUCC).

⁶ Select 7 credits including two prefixes and at least one formal laboratory from the following: AA, BMS, BIO, BZ, CHEM, GEOL, GR 210, LIFE, MATH, NR, NSCI, PH, SOCR, and STAT.

⁷ Select a total of 9 credits over the sophomore, junior and senior years as shown, and including at least two prefixes, from the following: ECON, HIST, JTC, POLS, PSY, SOC, LB 192 (social science sections only), ETST (except ETST 344 and ETST 430).

⁸ Select two courses from the list of courses in category 3B in the AUCC. (Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁹ Select 3 credits from the list of courses in category 3A in the AUCC.¹⁰ Capstone topic must focus on geography. ANTH 493 must be taken concurrently with an AUCC 4A anthropology course. Using Competencies (AUCC 4A) must be taken concurrently with ANTH 493 Capstone Seminar. Students taking Senior Honors Thesis (HONR 499, 3 credits) are also required to register for ANTH 493 (1 credit).

¹¹ Select enough elective credits to bring program total to 120 credits.

Minor in Anthropology

Anthropology focuses on a cross-cultural view of humanity,

and broadly conceived dimensions of human behavior. Description and explanation of human activities in other societies provide a sense of perspective for individuals operating within their own culture. A minor may be focused on one or more of the sub-disciplinary divisions such as physical, archaeology, ethnology, or applied anthropology; or it may be distributed across the fields like the major requirements.

Course	Title	Cr
ANTH 100	Introductory Cultural Anthropology	3
OR		
ANTH 200	Cultures and the Global System	3
ANTH 120	Human Origins and Variation	3
ANTH 121 ^P	Human Origins and Variation Laboratory	1
ANTH 140	Introduction to Prehistory	3
TOTAL		10
*Any combination of upper-division anthropology courses		12

PROGRAM TOTAL = minimum of 22 credits*

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional coursework may be required because of prerequisites.

Minor in Geography

The minor in Geography examines the critical interactions among space, place, people and the built and natural environment to interpret the spatial and temporal distribution of features and processes, applying spatial techniques and information technologies such as Geographic Information Systems (GIS) and remote sensing.

Course	Title	Cr
LOWER DIVISION		
GR 100	Introduction to Geography	3
GR 210	Physical Geography	3
UPPER DIVISION		
GR 320 ^P	Cultural Geography	3
<i>Select one or more of the following courses:</i>		
ANTH 330 ^P	Human Ecology*	3
GEOL 454 ^P	Geomorphology*	3
GR 342	Geography of Water Resources	3
GR 345 ^P	Geography of Hazards	3
IE 492	International Development Seminar	3
SOC 460 ^P	Society and Environment	3
GR 410 ^P	Climate Change: Science, Policy, Implications	3
<i>Select at least one of the following techniques courses:</i>		
GR 420 ^P	Spatial Analysis with GIS	4
NR 323	Remote Sensing of Natural Resources	3

PROGRAM TOTAL = minimum of 21 credits*

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

*Additional coursework may be required because of prerequisites.

Graduate Programs in Anthropology

The department offers graduate programs leading to a Master of Arts degree. It also has a Master of Arts specialization (Plan B) in International Development. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, <http://graduateschool>

colostate.edu/index.asp?url=catalog, and the department's website, anthropology.colostate.edu/.

DEPARTMENT OF ART

Office in Visual Arts Building, Room G100
(970) 491-6774

art.colostate.edu/

Associate Professor Gary Voss, Co-Director, School of the Arts, and Chair, Department of Art

Professor Tom Lundberg, Graduate Coordinator

Major in Art

Throughout history, art has been a fundamental language of the human spirit. Visual arts express human experience through an ever-widening range of media and materials, some of which include: oils, acrylics, pastels, charcoal, clay, plaster, steel, bronze, wood, copper, litho stones, and computers. Visual artists create abstract works and images of objects, people, nature, topography, and events. The Art Department offers several options of study. The B.F.A. (Bachelor of Fine Arts) degree in Studio Art and the B.A. (Bachelor of Arts) degree in Art History, Art Education, or Studio Art are all professional degrees, leading to related art careers.

Learning Outcomes

Students will demonstrate:

- Fundamental knowledge and mastery of media and processes necessary to communicate meaning in a work of art.
- Ability to communicate clearly about their own art and the art of others
- Knowledge about contemporary art and motivation to view and discuss current local, regional, and national exhibitions. Students well versed on contemporary art would: 1) regularly read reviews of exhibitions in local and national newspapers; 2) regularly read art periodicals; 3) attend multiple exhibitions; and 4) be knowledgeable about contemporary artists in their discipline (i.e., nationally known painters, sculptors, etc.).

Potential Occupations

Art graduates possess a number of transferable communication, analytical, and critical thinking skills, and as a result find positions in government, industry, and academia, in addition to roles as freelance artists, graphic designers, art educators, art historians, and studio fine artists. Many employers appreciate Art majors for their multiple skills and their ability to adapt to a variety of tasks and work environments. Participation in internships, cooperative education, and service learning opportunities is highly recommended to enhance practical training and development. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

Depending on student interests, the electives taken, or the concentration selected, available career choices include, but are not limited to: art appraiser; art director; art therapist; exhibit designer; art critic; jeweler; gallery director; graphic design artist; free lance artist; sculptor; woodworker; welder; foundry worker; studio photographer; technical illustrator; painter; textile designer; weaver; art educator; art historian; art curator; art librarian; art museum educator; web page designer; photo lab technician; art restorer; and master printer.

Bachelor of Fine Arts (B.F.A.)

The B.F.A. degree is a professional program for careers in studio art. Students have an opportunity to concentrate in one of nine studio fields: *drawing, graphic design, fibers, metalsmithing, painting, photo image making, pottery, printmaking, and sculpture*. The curriculum progression in the department is similar within the concentrations. Freshmen study foundation courses in the fine arts, which include drawing, painting, and sculpture, along with art history. Sophomores sample introductory concentration courses, and juniors and seniors focus on advanced topics in their chosen concentration by taking one upper-division course in their chosen field each semester.

Bachelor of Fine Arts Core Courses

A minimum grade of C (2.000) must be achieved in each upper-division art course in the student's concentration. The minimum scholastic average acceptable for graduation is 2.000 computed only for courses attempted at Colorado State.

In addition to the following, students must complete a concentration in this major:

Course	Title	Cr	AUCC
FRESHMAN			
ART 105	Issues and Practices in Art	1	
ART 110	Art History I	3	
ART 111 ^P	Art History II	3	
ART 135	Introduction to Drawing	3	
ART 136 ^P	Introduction to Figure Drawing	3	
ART 160	Two-Dimensional Visual Fundamentals	3	
ART 170	Three-Dimensional Visual Fundamentals	3	

Course	Title	Cr	AUCC
CO 150 ^P	College Composition	3	1A
	Arts and Humanities ¹	3	3B
	Elective	3	
	TOTAL	28	
SOPHOMORE			
ART 212 ^P	Art History III	3	
<i>Select three courses from the following:</i>			
ART 230 ^P	Photo Image Making I	3	
ART 240 ^P	Pottery I	3	
ART 245 ^P	Metalsmithing and Jewelry I	3	
ART 250 ^P	Fibers I	3	
ART 255 ^P	Introduction to Graphic Design	3	
ART 260 ^P	Painting I	3	
ART 265 ^P	Printmaking I-Intaglio and Relief	3	
ART 270 ^P	Sculpture I	3	
ART 235 ^P	Intermediate Drawing I	3	
	Advanced Writing ²	3	2
	Arts and Humanities ¹	3	3B
	Historical Perspectives ³	3	3D
	Mathematics ⁴	3	1B
	Social and Behavioral Sciences ⁵	3	3C
	Non-art electives	3	
	TOTAL	33	
JUNIOR			
	Global and Cultural Awareness ⁶	3	3E
	Upper-division art history ⁷	6	4A, 4B
	TOTAL	9	
SENIOR			
	Biological and Physical Sciences ⁸	7	3A
	Non-art electives	15	
	TOTAL	22	

PROGRAM TOTAL = 92 credits⁹

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses (other than ART 100) in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 2 in the AUCC.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select at least three credits from the list of courses in category 1B in the AUCC.

⁵ Select from the list of courses in category 3C in the AUCC.

⁶ Select from list of courses in category 3E in the AUCC.

⁷ Select six credits of upper-division art history. In order to complete category 4A and 4B in the AUCC, at least three credits must be from the following: ART 310, ART 311, ART 312, ART 314, ART 315, ART 316, ART 319, ART 410, ART 411, ART 412, ART 414, ART 415, ART 416, or ART 417.

⁸ Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

⁹ In order to complete the degree, a student must also complete one of the following concentrations: drawing, fibers, graphic design, metalsmithing, painting, photo image making, pottery, printmaking, or sculpture.

Drawing Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

Course	Title	Cr	AUCC
JUNIOR			
ART 335 ^P	Intermediate Drawing II	4	
ART 336 ^P	Intermediate Drawing III	4	
	Art electives ¹	12	
	TOTAL	20	
SENIOR			
ART 435 ^P	Advanced Drawing I	4	4C
ART 436 ^P	Advanced Drawing II	4	4C
	TOTAL	8	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ At least 12 upper-division credits.

Fibers Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
ART 350 ^P	Fibers II	4	
ART 351 ^P	Fibers III	4	
	Art electives ¹	4	
	TOTAL	12	
		20	
SENIOR			
ART 450 ^P	Fibers IV	4	4C
ART 451 ^P	Fibers V	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ At least eight upper-division credits.

Graphic Design Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
ART 355 ^P	Typography and Design Systems	4	
ART 356 ^P	Illustration	4	
	Art electives ¹	4	
	TOTAL	12	
		20	
SENIOR			
ART 455 ^P	Advanced Typography and Design Systems	4	4C
ART 456 ^P	Advanced Illustration	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ At least eight upper-division credits.

Metalsmithing Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
ART 345 ^P	Metalsmithing and Jewelry II	4	
ART 346 ^P	Metalsmithing and Jewelry III	4	
	Art electives ¹	4	
	TOTAL	12	
		20	
SENIOR			
ART 445 ^P	Metalsmithing and Jewelry IV	4	4C
ART 446 ^P	Metalsmithing and Jewelry V	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ At least eight upper-division credits.

Painting Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
ART 360 ^P	Painting II	4	
ART 361 ^P	Painting III	4	
	Art electives ¹	4	
	TOTAL	12	
		20	
SENIOR			
ART 460 ^P	Advanced Painting I	4	4C
ART 461 ^P	Advanced Painting II	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ At least eight upper-division credits.

Photo Image Making Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
ART 330 ^P	Photo Image Making II	4	
ART 331 ^P	Photo Image Making III	4	
	Art electives ¹	4	
	TOTAL	12	
		20	
SENIOR			
ART 430 ^P	Advanced Photo Image Making I	4	4C
ART 431 ^P	Advanced Photo Image Making II	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ At least eight upper-division credits.

Pottery Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
ART 340 ^P	Pottery II	4	
ART 341 ^P	Pottery III	4	
	Art electives ¹	4	
	TOTAL	12	
		20	
SENIOR			
ART 440 ^P	Pottery IV	4	4C
ART 441 ^P	Pottery V	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ At least eight upper-division credits.

Printmaking Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

Course	Title	Cr	AUCC
JUNIOR			
ART 365 ^P	Printmaking II-Lithography	4	
ART 366 ^P	Printmaking III-Studio Workshop	4	
	Art electives ¹	4	
	TOTAL	12	
SENIOR			
ART 465 ^P	Printmaking IV-Studio Workshop	4	4C
ART 466 ^P	Printmaking V-Studio Workshop	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ At least eight upper-division credits.

Sculpture Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

Course	Title	Cr	AUCC
JUNIOR			
ART 370 ^P	Sculpture II	4	
ART 371 ^P	Sculpture III	4	
	Art electives ¹	4	
	TOTAL	12	
SENIOR			
ART 470 ^P	Sculpture IV	4	4C
ART 471 ^P	Sculpture V	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ At least eight upper-division credits.

Bachelor of Arts

The B.A. degree has three areas of concentration available to students – Art Education, Art History, and Studio.

Art Education Concentration

The Art Education concentration embraces the artist-teacher concept, which allows students to develop a studio concentration while preparing to teach art at the K-12 level. The program is comprehensive, meaning students take course work to prepare them to teach at the elementary and secondary school levels. The art education program enjoys good working relationships with school districts in the state of Colorado. Students integrate studio, art history, criticism, and aesthetics as they observe and teach – through a variety of experiences – in the public schools.

Detailed information about the School for Teacher Education and Principal Preparation (STEPP) and licensure requirements are available on the program's web site (www.stepp.caahs.colostate.edu/) or in room 111 of the

Education Building

Art education students must maintain a 2.75 GPA for licensure.

A minimum grade of C (2.000) must be achieved in each upper-division art course in the student's concentration. The minimum scholastic average acceptable for graduation is 2.000 computed only for courses attempted at Colorado State.

Course	Title	Cr	AUCC
FRESHMAN			
ART 105	Issues and Practices in Art	1	
ART 110	Art History I	3	
ART 111 ^P	Art History II	3	
ART 135	Introduction to Drawing	3	
ART 136 ^P	Introduction to Figure Drawing	3	
ART 160	Two-Dimensional Visual Fundamentals	3	
ART 170	Three-Dimensional Visual Fundamentals	3	
CO 150 ^P	College Composition	3	1A
	Biological and Physical Sciences ¹	7	3A
	TOTAL	29	
SOPHOMORE			
ART 212 ^P	Art History III	3	
ART 230 ^P	Photo Image Making I	3	
ART 240 ^P	Pottery I	3	
ART 260 ^P	Painting I	3	
ART 270 ^P	Sculpture I	3	
EDUC 275 ^P	Schooling in the United States	3	3C
	Advanced Writing ²	3	2
	Arts and Humanities ³	3	3B
	Global and Cultural Awareness ⁴	3	3E
	Mathematics ⁵	3	1B
	Social and Behavioral Sciences ⁶	3	3C
	TOTAL	33	
JUNIOR			
ART 325 ^P	Concepts in Art Education	3	
EDUC 331 ^P	Educational Technology and Assessment	2	
EDUC 340 ^P	Literacy and the Learner	3	
EDUC 350 ^P	Instruction I- Individualization/Management	3	
EDUC 386 ^P	Practicum-Instruction I	1	
	Arts and Humanities ³	3	3B
	Fifth Studio Introduction ⁷	3	
	Historical Perspectives ⁸	3	3D
	Studio teaching emphasis ⁹	8	
	Upper-division art history ¹⁰	3	4B
	TOTAL	32	
SENIOR			
ART 326 ^P	Art Education Studio	4	
EDUC 450 ^P	Instruction II-Standards and Assessment	4	
EDUC 466 ^P	Methods and Assessment in K-12 Art Education	4	
EDUC 485A ^P	Student Teaching-Elementary	6	4A, 4C
EDUC 485B ^P	Student Teaching-Secondary	6	4A, 4C
EDUC 486E ^P	Practicum-Instruction II	1	
EDUC 493A ^P	Seminar-Professional Relations	1	4C
	TOTAL	26	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3A in the All-University Core Curriculum (AUCC). One course must have a laboratory component.

² Select from the list of courses in category 2 in the All-University Core Curriculum (AUCC).

³ Select from the list of courses, except ART 100, in category 3B in the AUCC.

Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select at least three credits from the list of courses in category 1B in the AUCC.

⁶ Select from the list of courses in category 3C in the AUCC.

⁷ Select one course from ART 245, ART 250, or ART 265.

⁸ Select from the list of courses in category 3D in the AUCC.

⁹ Select eight credits from one upper-division concentration area other than graphic design.

¹⁰ Select three credits of upper-division art history from the following: ART 310, ART 311, ART 312, ART 314, ART 315, ART 316, ART 319, ART 410, ART 411, ART 412, ART 414, ART 415, ART 416, or ART 417.

Art History Concentration

Art history provides a basic preparation in art history for graduate studies; careers in research and teaching at the college level; for positions in museums, libraries, or private collections; or for writing and criticism in the arts. Graduate studies or advanced-level classes are necessary for advancement.

A minimum grade of C (2.000) must be achieved in each upper-division art course in the student's concentration. The minimum scholastic average acceptable for graduation is 2.000 computed only for courses attempted at Colorado State.

Course	Title	Cr	AUCC
FRESHMAN			
ART 105	Issues and Practices in Art	1	
ART 110	Art History I ¹	3	
ART 111 ^P	Art History II	3	
ART 135	Introduction to Drawing	3	
ART 160	Two-Dimensional Visual Fundamentals	3	
ART 170	Three-Dimensional Visual Fundamentals	3	
CO 150 ^P	College Composition	3	1A
	Arts and Humanities ²	6	3B
	Global and Cultural Awareness ³	3	3E
	Elective	3	
	TOTAL	31	

SOPHOMORE

<i>Select two courses from the following:</i>			
ART 112	History of Asian Art	3	
ART 113	Native Art Survey	3	
ART 230 ^P	Photo Image Making I	3	
ART 240 ^P	Pottery I	3	
ART 245 ^P	Metalsmithing and Jewelry I	3	
ART 250 ^P	Fibers I	3	
ART 255 ^P	Introduction to Graphic Design	3	
ART 260 ^P	Painting I	3	
ART 265 ^P	Printmaking I-Intaglio and Relief	3	
ART 270 ^P	Sculpture I	3	
ART 212 ^P	Art History III	3	
	Additional communication ⁴	3	2
	Historical Perspectives ⁵	3	3D
	Mathematics ⁶	3	1B
	Second field ⁷	9	
	Social and Behavioral Sciences ⁸	3	3C
	TOTAL	30	

JUNIOR

<i>Select one course from the following:</i>			
LFRE 120	Reading for Proficiency-French	3	
LGER 120	Reading for Proficiency-German	3	
LSPA 120	Reading for Proficiency-Spanish	3	
L* 200 ^P	Second-Year Language I ⁹	3	
PHIL 318	Aesthetics-Visual Arts	3	
	Second field ⁷	12	
	Art history upper-division electives ¹⁰	9	4A, 4B
	TOTAL	30	

SENIOR

ART 419 ^P	Historiography and Methodology of Art History	3	4C
	Biological and Physical Sciences ¹¹	7	3A
	Art electives, upper-division	4	
	Art history electives, upper-division ¹⁰	12	
	Non-art electives	3	
	TOTAL	29	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Transfer students who have taken or transferred in credit for ART 100 may use it in lieu of ART 110.

² Select two courses (other than ART 100) from category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 3E in the AUCC.

⁴ Select from the list of courses in category 2 in the AUCC.

⁵ Select from the list of courses in category 3D in the AUCC.

⁶ Select at least three credits from the list of courses in category 1B in the AUCC.

⁷ Select 21 credits from the same non-art prefix. Satisfy remaining upper-division non-art credits to total 14.

⁸ Select from the list of courses in category 3C in the AUCC.

⁹ Effective Fall 2007, foreign language courses are in separate prefixes (all starting with L and followed by three letters designating the language, e.g., LFRE is French, LGER is German, etc.).

¹⁰ Select 21 credits of upper division art history. In order to complete category 4A and 4B in the AUCC, at least 3 credits must be from the following: ART 310, ART 311, ART 312, ART 314, ART 315, ART 316, ART 319, ART 410, ART 411, ART 412, ART 414, ART 415, ART 416, or ART 417.

¹¹ Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

Studio Concentration

The studio concentration gives students a liberal education with a focus on one or more of the visual arts. The concentration enables graduates to incorporate their specialty into their careers and life activities. People who are knowledgeable about art may contribute much by supporting community arts activities and teaching others.

A minimum grade of C (2.000) must be achieved in each upper-division art course in the student's concentration. The minimum scholastic average acceptable for graduation is 2.000 computed only for courses attempted at Colorado State.

Course	Title	Cr	AUCC
FRESHMAN			
ART 105	Issues and Practices in Art	1	
ART 110	Art History I	3	
ART 111 ^P	Art History II (ART 110)	3	
ART 135	Introduction to Drawing	3	
ART 136 ^P	Introduction to Figure Drawing	3	
ART 160	Two-Dimensional Visual Fundamentals	3	
ART 170	Three-Dimensional Visual Fundamentals	3	
CO 150 ^P	College Composition	3	1A
	Arts and Humanities ¹	3	3B
	Mathematics ²	3	1B
	Elective	3	
	TOTAL	31	

SOPHOMORE

ART 212 ^P	Art History III	3	
<i>Select two courses from the following:</i>			
ART 230 ^P	Photo Image Making I	3	
ART 240 ^P	Pottery I	3	
ART 245 ^P	Metalsmithing and Jewelry I	3	
ART 250 ^P	Fibers I	3	
ART 255 ^P	Introduction to Graphic Design	3	
ART 260 ^P	Painting I	3	
ART 265 ^P	Printmaking I-Intaglio and Relief	3	
ART 270 ^P	Sculpture I	3	
	Advanced Writing ³	3	2
	Arts and Humanities ¹	3	3B
	Global and Cultural Awareness ⁴	3	3E
	Historical Perspectives ⁵	3	3D
	Social and Behavioral Sciences ⁶	3	3C
	Non-art electives	6	
	TOTAL	30	

JUNIOR

	Biological and Physical Sciences ⁷	7	3A
	Foreign language	10	
	Upper division art history ⁸	6	4A, 4B

Course	Title	Cr	AUCC
	Upper division concentration ⁹	8	
	TOTAL	31	

SENIOR

Course	Title	Cr	AUCC
<i>Select four credits from the following in the appropriate concentration:</i>			
ART 430 ^P	Advanced Photo Image Making I	4	4C
ART 431 ^P	Advanced Photo Image Making II	4	4C
ART 435 ^P	Advanced Drawing I	4	4C
ART 436 ^P	Advanced Drawing II	4	4C
ART 440 ^P	Pottery IV	4	3C
ART 441 ^P	Pottery V	4	4C
ART 445 ^P	Metalsmithing and Jewelry IV	4	4C
ART 446 ^P	Metalsmithing and Jewelry V	4	4C
ART 450 ^P	Fibers IV	4	4C
ART 451 ^P	Fibers V	4	4C
ART 455 ^P	Advanced Typography and Design Systems	4	4C
ART 456 ^P	Advanced Illustration	4	4C
ART 460 ^P	Advanced Painting I	4	4C
ART 461 ^P	Advanced Painting II	4	4C
ART 465 ^P	Printmaking IV-Studio Workshop	4	4C
ART 466 ^P	Printmaking V-Studio Workshop	4	4C
ART 470 ^P	Sculpture IV	4	4C
ART 471 ^P	Sculpture V	4	4C
	Art electives ¹⁰	9	
	Non-art electives	15	
	TOTAL	28	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu> to see the course prerequisites.

¹ Select from the list of courses in category 3B (other than ART 100) in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.² Select at least three credits from the list of courses in category 1B in the AUCC.

³ Select from the list of courses in category 2 in the AUCC.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select from the list of courses in category 3D in the AUCC.

⁶ Select from the list of courses in category 3C in the AUCC.

⁷ Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

⁸ Select six credits of upper-division art history. In order to complete category 4A and 4B in the AUCC, at least three credits must be from the following: ART 310, ART 311, ART 312, ART 314, ART 315, ART 316, ART 319, ART 410, ART 411, ART 412, ART 414, ART 415, ART 416, or ART 417

⁹ Choose eight upper-division credits in one area of concentration in addition to the four credit capstone course.

¹⁰ Select nine credits (at least four upper division) of art electives.

Minor in Art History

The Art History minor has been declared full and students wishing to declare an art minor should seek status of the minor from the Art Department.

Art History gives the student a unique visual education in arts and humanities. A culture, an age is made more pertinent and alive through visual images. Reference to visual objects contributes to understanding of the creative process for artists and laymen. A minor in Art History has the potential of adding a different dimension and depth to humanistic learning.

Course	Title	Cr
LOWER DIVISION		
ART 100	Introduction to the Visual Arts	3
OR		
ART 110	Art History I	3
ART 111 ^P	Art History II	3
ART 212 ^P	Art History III	3
<i>Select one course from the following:</i>		

Course	Title	Cr
ART 135	Introduction to Drawing	3
ART 160	Two-Dimensional Visual Fundamentals	3
ART 170	Three-Dimensional Visual Fundamentals	3
TOTAL		12

UPPER DIVISION

ART	Art history	15
PROGRAM TOTAL = 27 credits		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu> to see the course prerequisites.

Minor in Studio Art

The Studio Art minor has been declared full and students wishing to declare an art minor should seek status of the minor from the Art Department.

A minor in Studio Art provides the student with basic technical skills and aesthetic understanding in at least one of the major studio arts. Students should consult with an art department adviser to plan a course of study in one of the following fields: drawing, fibers, metalsmithing and jewelry, painting, photo image making, pottery, printmaking, or sculpture.

Course	Title	Cr
LOWER DIVISION		
ART 100	Introduction to the Visual Arts	3
OR		
ART 110	Art History I	3
ART 111 ^P	Art History II	3
ART 212 ^P	Art History III	3
ART	200-level studio introduction ¹	3
<i>Select one course from the following:</i>		
ART 135	Introduction to Drawing	3
ART 160	Two-Dimensional Visual Fundamentals	3
ART 170	Three-Dimensional Visual Fundamentals	3
TOTAL		15

UPPER DIVISION

A minimum of 12 credits of studio art at the 300-400 level.¹

PROGRAM TOTAL = 27 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu> to see the course prerequisites.

¹After consultation with an Art Department adviser.

Graduate Programs in Art

The Art Department offers a Master of Fine Arts degree program with specializations in drawing, fibers, graphic design, metalsmithing and jewelry, painting, printmaking, and sculpture. The program requires 60 credits in two full-time academic years. Students interested in graduate work should refer to the *Graduate and Professional Bulletin* graduateschool.colostate.edu/current-students/bulletin.aspx and the department's website, art.colostate.edu/.

DEPARTMENT OF COMMUNICATION STUDIES

Office in Eddy Hall, Room 202
(970) 491-6140

communicationstudies.colostate.edu

Professor Sue D. Pendell, Chair

Major in Communication Studies

Communication Studies majors receive a broad-based, liberal arts education, designed to equip them for the challenges of the 21st century, the need to adapt to a rapidly changing workplace and the likelihood of more than one career. The major encompasses many facets of media and visual culture, relational and organizational communication, and rhetoric and civic engagement. Along with courses in communication studies, the major requires courses in the arts and humanities, the social sciences, and history and a minor or second major.

The department's goals for undergraduate majors include helping students to achieve an outstanding education in communication studies, to further their knowledge and understanding of human communication and to provide leadership in communication activities. In so doing, we hope to help students prepare for successful careers, the duties of citizenship, and productive and rewarding lives.

Learning Outcomes

Students will demonstrate:

- *Totality* Students will be able to demonstrate a comprehensive understanding of the Communication Studies discipline. They will be able to discuss the central topics in the field related to history, theory, and research. Students' knowledge of the field will also span several contexts of communication scholarship, including media and visual culture, relational and organizational communication, and rhetoric and civic engagement.
- *Synthesis* In addition to having a comprehensive understanding of the foundational concepts, theories and research domains in the Communication Studies discipline, students will be able to integrate what they have learned in these areas and apply their knowledge to address contemporary issues salient to their personal, professional, and civic lives.
- *Skillfulness* Central to the Communication Studies discipline is the development of strong oral and written skills. Students will be able to construct and deliver high-quality, evidence-based arguments tailored to

specific audiences. Additionally, students will be able to thoughtfully and ethically critique the oral and written work of their peers (as well as communicators in other professional and public settings).

Potential Occupations

The Communication Studies major, like many liberal arts majors, provides students with a broad academic background suitable for a variety of jobs in the public and private sectors. Majors are trained to think independently and critically, communicate effectively, and function in a multicultural world. Employers appreciate communication studies majors for their multiple skills and their ability to adapt to a variety of tasks and work environments.

Many majors find employment in public relations/marketing, politics, sales, human relations, government, business management, convention and meeting planning, education, and computer-mediated communication. Some students move on to graduate work in communication studies and to post-graduate study in law and theology.

Career opportunities include, but are not limited to employee relations specialist, employment counselor, human resource consultant, industrial relations representative, public relations specialist, labor relations consultant, training director, vocational rehabilitation counselor, advance agent, business communicator, equal opportunity representative, foreign service officer, cooperative extension service worker, politician, lobbyist, speechwriter, press agent, literary agent, interviewer, sales representative, scriptwriter, lawyer, teacher.

Internships are available to Communication Studies majors and are highly recommended to enhance practical training and development. Graduates who seek advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
SPCM 100	Communication and Popular Culture	3	3B
SPCM 200	Public Speaking	3	
	Biological and Physical Sciences ¹	7	3A
	Historical Perspectives ²	3	3D
	Mathematics ³	3	1B
	Social and Behavioral sciences ⁴	3	3C
	Elective	6	
	TOTAL	31	
SOPHOMORE			
SPCM 201	Rhetoric in Western Thought	3	3B
SPCM 207	Public Argumentation	3	
	Advanced Writing ⁵	3	2
	Additional Arts and Humanities ⁶	6	
	Global and Cultural Awareness ⁷	3	3E
	Additional History ⁸	6	
	Additional Social and Behavioral Sciences ⁹	6	
	TOTAL	30	

Course	Title	Cr	AUCC
JUNIOR			
	Minor or Interdisciplinary Minor ¹⁰	15	
	Communication Studies electives ¹¹	15	
	TOTAL	30	

SENIOR

Course	Title	Cr	AUCC
<i>Select one course from the following:</i>			
SPCM 311	Historical Speeches on American Issues	3	4A, 4B
SPCM 341	Evaluating Contemporary Television	3	4A, 4B
SPCM 342	Critical Media Studies	3	4A, 4B
SPCM 350	Evaluating Contemporary Film	3	4A, 4B
SPCM 354	History and Appreciation of Film	3	4A, 4B
SPCM 411	Contemporary Speeches on American Issues	3	4A, 4B
SPCM 412	Evaluating Contemporary Rhetoric	3	4A, 4B
SPCM 415 ^P	Rhetoric and Civility	3	4A, 4B
SPCM 420	Political Communication	3	4A, 4B
SPCM 434	Intercultural Communication	3	4A, 4B
SPCM 479 ^P	Capstone: Life in Postmodernity	3	4C
	Minor or Interdisciplinary Minor ¹⁰	6	
	Communication Studies Electives ¹¹	9	
	Electives ¹²	8	
	TOTAL	29	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses (one with a laboratory component) from category 3A in the All-University Core Curriculum (AUCC).

² Select one course with the subject code of HIST from the list of courses in category 3D in the AUCC.

³ Select at least three credits from the list of courses in category 1B in the AUCC.

⁴ Select from the list of courses in category 3C in the AUCC.

⁵ Select from the list of courses in category 2 in the AUCC.

⁶ Select six credits from the following subject codes: ART, D, E, ETST, L***, MU, PHIL, TH, or WS. No more than one WS course can be counted toward the completion of this requirement. [NOTE: Effective Fall 2007, foreign language courses are in separate subject codes (all starting with L and followed by three letters designating the language, e.g., LFRE is French, LGER is German).]

⁷ Select any course in category 3E in the AUCC.

⁸ Select six additional credits from courses with a HIST subject code.

⁹ Select a total of six credits from the following subject codes: ANTH, ECON, ETST, HIST, JTC, POLS, PSY, SOC, or WS. No more than one WS course can be counted toward the completion of this requirement.

¹⁰ Students must complete a university approved minor or interdisciplinary minor.

¹¹ Select a total of 24 credits of SPCM subject code courses excluding SPCM 479 and SPCM 495. Students may count up to 3 credits total, in any combination (1 credit maximum per semester, per class), of the following courses toward Communication Studies electives: SPCM 278A-G; SPCM 384; SPCM 387; SPCM 486.

¹² Select enough elective credits to bring program total 120, with a minimum of 42 upper-division credits.

Teacher Licensure Concentration

Detailed information about the School for Teacher Education and Principal Preparation (STEPP) and licensure requirements are available on the program's web site (www.stepp.cahs.colostate.edu/) or in room 111 of the Education Building

Speech Option

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
POLS 101	American Government and Politics	3	3C
SPCM 100	Communication and Popular Culture	3	3B
SPCM 200	Public Speaking	3	2A
	Biological and Physical Sciences ¹	7	3A
	Global and Cultural Awareness ²	3	3E
	Historical Perspectives ³	3	3D
	Mathematics ⁴	3	1B
	Elective	2	

Course	Title	Cr	AUCC
SOPHOMORE			
TOTAL			30
EDUC 275 ^P	Schooling in the United States	3	3C
SPCM 201	Rhetoric in Western Thought	3	3B
SPCM 207	Public Argumentation	3	

Course	Title	Cr	AUCC
<i>Select two courses from the following:</i>			
SPCM 331	Nonverbal Communication	3	
SPCM 332	Interpersonal Communication Skills	3	
SPCM 436	Conflict Management and Communication	3	
Additional endorsement Area Electives ⁵			15
TOTAL			30

JUNIOR

Course	Title	Cr	AUCC
<i>Select one course from the following:</i>			
CO 301A ^P	Writing in the Disciplines-Arts and Humanities	3	2
CO 301B ^P	Writing in the Disciplines-Science	3	2
CO 301C ^P	Writing in the Disciplines-Social Sciences	3	2
CO 301D ^P	Writing in the Disciplines-Education	3	2

Course	Title	Cr	AUCC
EDUC 331 ^P	Educational Technology and Assessment	2	
EDUC 340 ^P	Literacy and the Learner	3	
EDUC 350 ^P	Instruction I- Individualization/Management	3	
EDUC 386 ^P	Practicum-Instruction I	1	
EDUC 463 ^P	Methods in Teaching Language Arts	4	

Course	Title	Cr	AUCC
SPCM 300 ^P	Advanced Public Speaking	3	
OR			
SPCM 333 ^P	Professional Communication	3	

Course	Title	Cr	AUCC
<i>Select one course from the following:</i>			
SPCM 341	Evaluating Contemporary Television	3	4A, 4B
SPCM 342	Critical Media Studies	3	4A, 4B
SPCM 350	Evaluating Contemporary Film	3	4A, 4B
SPCM 354	History and Appreciation of Film	3	4A, 4B
SPCM 334	Co-Cultural Communication	3	

Course	Title	Cr	AUCC
OR			
SPCM 434	Intercultural Communication	3	
Additional Endorsement Area Elective ⁵			6
TOTAL			31

SENIOR

Course	Title	Cr	AUCC
EDUC 450 ^P	Instruction II-Standards and Assessment	4	
EDUC 485B ^P	Student Teaching-Secondary	11	
EDUC 486E ^P	Practicum-Instruction II	1	
EDUC 493A ^P	Seminar-Professional Relations	1	

Course	Title	Cr	AUCC
<i>Select two courses from the following:</i>			
SPCM 232 ^P	Group Communication	3	
SPCM 407 ^P	Public Deliberation	3	
SPCM 433	Communication and Organizations	3	

Course	Title	Cr	AUCC
<i>Select one course from the following:</i>			
SPCM 357	Film and Social Change	3	
SPCM 401	Rhetoric in Social Movements	3	
SPCM 412	Evaluating Contemporary Rhetoric	3	4A, 4B
SPCM 420	Political Communication	3	4A, 4B
SPCM 431	Communication, Language, and Thought	3	
SPCM 437	Studies in Persuasion	3	

Course	Title	Cr	AUCC
SPCM 479 ^P	Capstone: Life in Postmodernity	3	4C
TOTAL			29

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3A in the All-University Core Curriculum (AUCC). One course must have a laboratory component.

² Select from the list of courses in category 3E in the AUCC. Can be double-counted as a major requirement.

³ Select from the list of courses in category 3D in the AUCC. Can be double-counted as a major requirement.

⁴ Select at least three credits from the list of courses in category 1B in the AUCC.

⁵ Twenty-one (21) elective credits should apply toward student's additional endorsement area. Consult advisor and the Colorado Department of Education website for the list of appropriate courses.

Theatre Option

Advising for this option is offered through the Department of Music, Theatre and Dance.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
POLS 101	American Government and Politics	3	3C
SPCM 100	Communication and Popular Culture	3	3B
SPCM 200	Public Speaking	3	2A
TH 141	Introduction to Theatre	3	3B
TH 151	Beginning Acting	3	
TH 160	Introduction to Production Design	3	
	Biological and Physical Sciences ¹	7	3A
	Mathematics ²	3	1B
	Elective	5	
	TOTAL	36	
SOPHOMORE			
E 270	Introduction to American Literature	3	3B
E 276	Survey of British Literature I	3	3B
OR			
E 277	Survey of British Literature II	3	3B
EDUC 275 ^P	Schooling in the United States	3	3C
<i>Select one of the following courses:</i>			
ETST 250/ HIST 250	African American History	3	3D
ETST 252/ HIST 252	Asian American History	3	3D
ETST 255/ HIST 255	Native American History	3	3D
HIST 101	Western Civilization, Modern	3	3D
HIST 150	U.S. History to 1876	3	3D
HIST 151	U.S. History Since 1876	3	3D
HIST 171	World History, 1500-Present	3	3D
SPCM 201	Rhetoric in Western Thought	3	3B
SPCM 207	Public Argumentation	3	
	Global and Cultural Awareness ³	3	3E
	Theatre elective ⁴	3	
	TOTAL	24	
JUNIOR			
<i>Select one course from the following:</i>			
CO 301A ^P	Writing in the Disciplines-Arts and Humanities	3	2
CO 301B ^P	Writing in the Disciplines-Science	3	2
CO 301C ^P	Writing in the Disciplines-Social Sciences	3	2
CO 301D ^P	Writing in the Disciplines-Education	3	2
E 402 ^P	Teaching Composition	3	
E 405	Adolescents' Literature	3	
EDUC 331 ^P	Educational Technology and Assessment	2	
EDUC 340 ^P	Literacy and the Learner	3	
EDUC 350 ^P	Instruction I- Individualization/Management	3	
EDUC 386 ^P	Practicum-Instruction I	1	
EDUC 463 ^P	Methods in Teaching Language Arts	4	
TH 286	Practicum	1	
TH 341	History of Theatre in Performance	3	4A, 4B
OR			
TH 342	Contemporary Plays in Performance	3	4A, 4B
	English elective ⁵	3	
	Theatre elective ⁴	3	
	TOTAL	32	
SENIOR			
EDUC 450 ^P	Instruction II-Standards and Assessment	4	
EDUC 485B ^P	Student Teaching-Secondary	11	
EDUC 486E ^P	Practicum-Instruction II	1	
EDUC 493A ^P	Seminar-Professional Relations	1	
SPCM 479 ^P	Capstone: Life in Postmodernity	3	4C
	Theatre electives ¹	9	
	TOTAL	29	
PROGRAM TOTAL = 121 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3A in the All-University Core Curriculum (AUCC). One course must have a laboratory component.

² Select at least three credits from the list of courses in category 1B in the AUCC.

³ Select from the list of courses in category 3E in the AUCC. Can be double counted as a major requirement.

⁴ Any course with TH subject code.

⁵ Three credit elective with E subject code.

Media Studies Minor

The Departments of Communication Studies and Journalism and Technical Communication offer a minor in media studies. See the Interdepartmental Minor in Media Studies under the College of Liberal Arts listing in this section of the catalog.

Graduate Programs in Communication Studies

The graduate program leads to a Master of Arts in Communication Studies. Graduate coursework, as well as a required thesis, enables students to develop expertise in one or a combination of three areas of emphasis: 1) media and visual culture; 2) relational and organizational communication; and/or 3) rhetoric and civic engagement. In each of these areas, students select course work from among the following topics: 1) contemporary issues in media, media theories, media audiences, media texts, and media industries; 2) communication theories, communication and diversity, interpersonal theories, and discourse and organization; or 3) public address, rhetoric and public affairs, rhetorical theory, rhetorical criticism, rhetoric of everyday life, and feminist theory.

Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, communicationstudies.colostate.edu.

DEPARTMENT OF ECONOMICS

Office in Clark Building, Room C306

(970) 491-6324

economics.colostate.edu/

Professor Steven Shulman, Chair

Professor Nancy Jianakoplos, Undergraduate Coordinator

Associate Professor Robert Kling, Graduate Coordinator

Major in Economics

Economics is the study of how people and societies use scarce resources to produce the things they want. Economic theory provides a framework for understanding economic issues, analyzing and predicting the likely effects of economic behavior and government policies, and formulating efficient and equitable solutions to pressing economic problems.

A strong liberal arts curriculum including arts and humanities, social and natural sciences, advanced composition, mathematics, and statistics provides the depth and breadth of knowledge needed to systematically and logically analyze problems, generate and test ideas, and develop effective communication and quantitative skills. Economics majors develop an appreciation of economic issues, and learn to analyze and critically evaluate economic phenomena and policies. The major core includes four semesters of economic theory, a semester of econometrics, a senior capstone seminar, and several semesters of economics electives covering a wide variety of economic topics from environmental and natural resource economics to the history of economic institutions and political economy.

Learning Outcomes

Students will:

- Display command of basic microeconomic concepts such as rationality, cost/benefit, supply and demand theory, decision making at the margin, monopoly and competition, and efficiency and equity.
- Display command of basic macroeconomic concepts such as aggregate demand and supply, fiscal and monetary policy, and the use of these policies in the macro-economy.
- Understand and analyze basic economic issues
- found in the news and understand how the economic aspects of society work.

Potential Occupations

Economists are employed in a wide variety of fields from education and research to business and government. Nonprofit and international organizations use economists in overseas development, environmental conservation, and international relations. Economics, like many liberal arts majors, provides students with a broad academic background suitable for a variety of jobs. Economics majors are trained to think independently and critically, communicate effectively, and function in a multicultural world. Many employers appreciate liberal arts majors for their multiple skills and their ability to adapt to a variety of tasks and work environments. Careers for graduates are available in education, business, and government. Participation in internships or cooperative education opportunities is highly recommended to enhance practical training and development. Graduates who go on for advanced studies can pursue careers in economics or attain advanced positions with the possibility of rising to top professional levels.

Depending on interests, the electives taken, or the minor selected, available career choices include, but are not limited to: commodities/stock broker, financial analyst, economic

forecaster, trust administrator, loan counselor, pension funds administrator, foreign trade analyst, public policy analyst, regional/urban planner, foreign service officer, tax auditor, natural resource analyst, educator, program administrator, researcher, community organizer, environmental activist, international aid organization analyst or administrator, marketing analyst, purchasing agent, public relations/media planner, program consultant, contract administrator, systems evaluator, personnel planner, portfolio administrator, finance manager, secondary school teacher.

Economics majors must achieve a minimum grade of 1.670 (C-) in each of the economics courses counted toward the major.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
ECON 202 ^P	Principles of Microeconomics	3	3C
<i>Select one course from the following:</i>			
MATH 141 ^P	Calculus in Management Sciences	3	1B
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
	Arts and Humanities ¹	6	3B
	Historical Perspectives ²	3	3D
	Electives ³	11-12	
	TOTAL	30	
SOPHOMORE			
ECON 204 ^P	Principles of Macroeconomics	3	3C
<i>Select one of the following courses:</i>			
STAT 201 ^P	General Statistics	3	
STAT 204 ^P	Statistics for Business Students	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
	Biological and Physical Sciences ⁴	7	3A
	Global and Cultural Awareness ⁵	3	3E
	Additional social sciences ⁶	6-9	
	Minor/second major/interdisciplinary minor ⁷	6	
	Electives	2-5	
	TOTAL	30	
JUNIOR			
ECON 304 ^P	Intermediate Macroeconomics	3	
ECON 306 ^P	Intermediate Microeconomics	3	4A, 4B
<i>Select one course from the following:</i>			
ECON 332 ^P / POLS 332 ^P	International Political Economy	3	
ECON 372 ^P	History of Economic Institutions and Thought	3	
ECON 376 ^P	Marxist Economic Thought	3	
ECON 379 ^P / HIST 379 ^P	Economic History of the United States	3	
ECON 474 ^P	Recent Economic Thought	3	
ECON 335 ^P / AREC 335 ^P	Introduction to Econometrics	3	
	Economics ⁸	3-6	
	Minor/second major/interdisciplinary minor ⁷	6	
	Advanced Writing ⁹	3	2
	Electives ³	3-6	
	TOTAL	30	
SENIOR			
ECON 492	Seminar	3	4A, 4B, 4C
	Economics ¹⁰	6	
	Minor/second major/interdisciplinary studies program ⁷	9-15	
	Electives ³	6-12	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from the list in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3D in the AUCC.

³ Select enough elective credits to bring the program total to a minimum of 120 credits, of which at least 42 must be upper division.

⁴ Select a minimum of seven credits from the list of courses in category 3A in the AUCC. At least one course must have a laboratory component.

⁵ Select from the list of courses in category 3E in the AUCC. This course (except ECON 211) may also fulfill the Additional Social Sciences requirement. See footnote 6. This course may also fulfill a requirement within a minor, second major, or interdisciplinary minor. See footnote 7. If ECON 211 is chosen, it may also be used to fulfill the Economics requirement in footnote 8. If selecting a course that will double count for requirements within this major, then select enough elective credits to bring the program total to 120.

⁶ Select any 3 courses from the following list for a minimum of 9 credits (AUCC category 3E courses except ECON 211 may count toward the 9 credit requirement):

Any AUCC category 3E course except ECON 211 AGRI 270; AMST 100, AMST 101;

Any ANTH course *except*: ANTH 120, ANTH 121, ANTH 370, ANTH 372, ANTH 373, ANTH 374, ANTH 375, ANTH 376; BUS 205, BUS 260;

Any ETST course *except*: ETST 205, ETST 344, ETST 424, ETST 430;

Any GR course *except*: GR 210;

Any HDFS course;

Any HIST course not used to satisfy the AUCC 3D requirement;

Any IE course *except*: IE 116;

JTC 100, JTC 311, JTC 316, JTC 411, JTC 412, JTC 413, JTC 414, JTC 415;

NR 120A-B, NR 320, NR 330;

Any POLS course;

Any PSY course;

Any SOC course;

SOWK 110, SOWK 150, SOWK 233, SOWK 350, SOWK 352, SOWK 410; WS 200, WS 472

⁷ Students must complete a minor, second major, or interdisciplinary minor. See the *General Catalog* for requirements for each of these choices.

⁸ Select any 2 ECON courses.

⁹ Select from the list of courses in category 2 of the AUCC.

¹⁰ Select any 2 upper-division (300- or 400-level) ECON courses.

Minor in Economics

The minor in Economics is designed to prepare students for understanding current socioeconomic problems in the areas of resource allocation, inflation, unemployment, income distribution, environmental degradation, international trade, and monopoly power. The program can be of help to students interested in careers in business management, teaching, government, banking, public policy, and related areas.

Economics minors must achieve a 2.000 grade point average in all courses taken for the minor.

Course	Title	Cr
LOWER DIVISION		
ECON 202 ^P	Principles of Microeconomics*	3
ECON 204 ^P	Principles of Macroeconomics*	3
	TOTAL	6
UPPER DIVISION		
ECON 304 ^P	Intermediate Macroeconomics*	3
ECON 306 ^P	Intermediate Microeconomics*	3
ECON	Economics, numbered ECON 304 or higher (with prior department approval)*	9
	TOTAL	15
PROGRAM TOTAL = 21 credits without prerequisites		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

* Additional course work may be required because of prerequisites.

Graduate Programs in Economics

Programs lead to the degrees of Master of Arts and Doctor of Philosophy. Five primary areas of study are presently emphasized: international economics, public economics, political economy, environmental economics, and regional economics. Core requirements include micro, macro, and heterodox theory, as well as history of economic thought and applied econometrics. .

More information is available at the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx; and the department, economics.colostate.edu/graduate.

DEPARTMENT OF ENGLISH

Office in Eddy Hall, Room 359

(970) 491-6428

www.colostate.edu/Depts/English

Professor Louann Reid, Chair

Associate Professor William Marvin, Undergraduate

Coordinator

Associate Professor SueEllen Campbell, Graduate

Coordinator

Major in English

English majors develop an understanding of diverse cultures, literary traditions, and great works of English, American, and world literature. Students expand their ability to analyze a variety of texts and view them through the lenses of diverse critical perspectives. Majors develop the ability to write for both specialized and general audiences. There are five concentrations from which students can choose—Creative Writing, English Education, Language, Literature, or Writing.

Learning Outcomes

Students will demonstrate:

- Competency in critical reading and interpretive techniques, including:
 - formulating, developing, and supporting interpretive positions with appropriate evidence;
 - using technical and conceptual vocabulary knowledgeably;
 - using appropriate methodologies, critical approaches, and theoretical perspectives; and
 - being original and creative.

- Effective written expression in a variety of genres for a range of audiences on literary and non-literary topics.
- Familiarity with the main writers, texts, genres, and movements in the literary history of the United States and British Isles; and/or the history and development of the English language; and/or literacy issues in their historical contexts.

Potential Occupations

A major in English prepares students for business, government, or education careers which require broadly educated people who can think critically, communicate effectively, analyze texts, and write well. Many employers appreciate liberal arts majors for their multiple skills and their ability to adapt to a variety of tasks and work environments.

The department encourages experiential education by offering a variety of internship opportunities.

Students are also invited to generate their own positions in fields of interests, as well as pursue established local, regional, or national internships. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

Depending on a student's interests, the electives taken, or the concentration selected, available career choices include, but are not limited to: copy editor; project editor; manuscript reader or story analyst; sales representative; publicity and promotion specialist;; advertising coordinator; production specialist; assistant book publicist; contracts and permission specialist; agency or arts administrator; human resource manager; human services program developer; public relations; English teacher; teacher of English as a second language; curriculum developer; education administrator; grant writer; technical writer for business, industry, or science; magazine, newspaper, television, education, or government writer; biographer or writer of prose, fiction, or nonfiction; lyricist.

Creative Writing Concentration

The creative writing concentration gives students the opportunity to strengthen their creative writing and reading skills and their imaginations. Students take beginning, intermediate, and advanced courses in one or more of the following genres: fiction, poetry, and nonfiction. Intermediate and advanced courses are primarily workshop classes in which students read and critique one another's work. At the center of all creative writing courses is the study of craft. Students in the creative writing concentration also take a wide variety of literature classes, which prepare them to be writers by schooling them in literary traditions and styles. An internship program for all English majors

offers creative writing students writing and research positions that may lead to employment. In addition, the creative writing program runs a vibrant reading series that gives students the chance to meet visiting writers.

For graduation, an English major must attain a minimum grade point average of 2.000 in upper-division composition and English courses.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
SPCM 200	Public Speaking	3	2A
	Arts and Humanities ¹	6	3B
	Biological and Physical Sciences ²	7	3A
	Mathematics ³	3	1B
	English elective	3	
	Elective	5	
	TOTAL	30	
SOPHOMORE			
E 210 ^P	Beginning Creative Writing	3	
E 240	Introduction to Poetry	3	
E 270	Introduction to American Literature	3	3B
E 276	Survey of British Literature I	3	
OR			
E 277	Survey of British Literature II	3	
	Global and Cultural Awareness ⁴	3	3E
	Historical Perspectives ⁵	3	3D
	Philosophy ⁶	3	
	Social and Behavioral Sciences ⁷	3	3C
	Liberal Arts/History Elective ⁸	3	
	Elective	3	
	TOTAL	30	
JUNIOR			
<i>Select one course from the following:</i>			
CO 300 ^P	Writing Arguments	3	2
CO 301A ^P	Writing in the Disciplines-Arts and Humanities	3	2
CO 301B ^P	Writing in the Disciplines-Sciences	3	2
CO 301C ^P	Writing in the Disciplines-Social Sciences	3	2
CO 301D ^P	Writing in the Disciplines-Education	3	2
<i>Select one course from the following:</i>			
E 311A ^P	Intermediate Creative Writing-Fiction	3	
E 311B ^P	Intermediate Creative Writing-Poetry	3	
E 311C ^P	Intermediate Creative Writing-Nonfiction	3	
E 341 ^P	Principles of Literary Criticism	3	4A, 4B
	Second field ⁹	3	
	Upper division English/composition ¹⁰	6	
	Electives	12	
	TOTAL	30	
SENIOR			
<i>Select one course from the following:</i> ¹¹			
E 412A ^P	Creative Writing Workshop-Fiction	3	
E 412B ^P	Creative Writing Workshop-Poetry	3	
E 412C ^P	Creative Writing Workshop-Nonfiction	3	
<i>Select one course from the following:</i>			
E 460 ^P	Chaucer	3	4C
E 463 ^P	Milton	3	4C
E 465 ^P	Topics in Literature and Language	3	4C
E 470 ^P	Individual Author	3	4C
	Second field ⁷	9	
	Upper division English/composition ¹⁰	12	
	Electives	3	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from the list of courses in category 3B (but excluding E subject code courses) in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select two courses, one with lab, from list of courses in category 3A in the AUCC.

³ Select at least three credits from the list of courses in category 1B in the AUCC.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select from the list of courses in category 3D in the AUCC.

⁶ Select from the list of PHIL courses on English Department checksheet.

⁷ Select from the list of courses in category 3C in the AUCC.

⁸ Select either one other course from the list of courses in category 3D in the AUCC or one from the list of courses in the English Department checksheet.

⁹ The department requires majors to complete a second field. This may be met by completing the second semester of the second year of a foreign language or by completing 12 credits of upper division courses in a coherent field of study outside English.

¹⁰ The department requires creative writing concentrators to take 18 credits of upper-division E and/or CO courses: 3 credits must be in literatures of the British Isles before 1830 or in American or European literatures before 1900; 3 credits must be in literatures of the British Isles after 1830 or in American or European literatures after 1900; 3 credits must be in breakthroughs (ideological, racial, cultural, gendered), and 3 credits must be in a genre course. See the departmental check sheet for the courses that fulfill these 4 categories.

¹¹ Selection must match subtype of E 311A-C.

English Education Concentration

The English Education concentration provides students with preparation for teaching in secondary schools. It is designed for students who wish to pursue a career in teaching language arts and offers a range of courses in language, literature, and writing. Students may receive an endorsement from the State of Colorado in English Language Arts. In addition to the common requirements for the English major, students pursuing teaching licensure take several extra courses in English, as well as education classes through the School of Education.

Students interested in pursuing a teaching license through Colorado State University may refer to the School of Teacher Education and Principal Preparation (STEPP), College of Applied Human Sciences section in this catalog for general information. Detailed information about teacher licensure, including licensure, is available on the program's web site (www.stepp.cahs.colostate.edu/) or in room 111 of the Education Building.

For graduation, an English major must attain a minimum grade point average of 2.000 in upper-division composition and English courses.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
E 240	Introduction to Poetry	3	
LB 170	World Literatures to 1500	3	3E
OR			
LB 171	World Literatures-The Modern Period	3	3E
SPCM 200	Public Speaking	3	2A
	Arts and Humanities ¹	3	3B
	Biological and Physical Sciences ²	4	3A
	Historical Perspectives ³	3	3D
	Mathematics ⁴	3	1B
	Electives	6	
	TOTAL	31	
SOPHOMORE			
CO 301D ^P	Writing in the Disciplines-Education	3	2
E 270	Introduction to American Literature	3	3B
E 276	Survey of British Literature I	3	
OR			
E 277	Survey of British Literature II	3	
E 342	Shakespeare I	3	
OR			
E 343	Shakespeare II	3	
EDUC 275 ^P	Schooling in the United States	3	3C

Course	Title	Cr	AUCC
EDUC 331 ^P	Educational Technology and Assessment	2	
EDUC 340 ^P	Literacy and the Learner	3	
	Biological and Physical Sciences ²	3	3A
	Social and Behavioral Sciences ⁵	3	3C
	Electives	2	
	TOTAL	28	
JUNIOR			
E 322	English Language for Teachers I	3	
E 341 ^P	Principles of Literary Criticism	3	4A, 4B
E 401 ^P	Teaching Reading	3	
E 405	Adolescents' Literature	3	
EDUC 350 ^P	Instruction I- Individualization/Management Practicum-Instruction I	3	
EDUC 386 ^P	Practicum-Instruction I	1	
EDUC 463 ^P	Methods in Teaching Language Arts	4	
	Upper-division English electives ⁶	9	
	Electives	3	
	TOTAL	32	
SENIOR			
E 402 ^P	Teaching Composition	3	
EDUC 450 ^P	Instruction II-Standards and Assessment	4	
EDUC 485B ^P	Student Teaching-Secondary	11	
EDUC 486E ^P	Practicum-Instruction II	1	
EDUC 493A ^P	Seminar-Professional Relations English elective ⁷	1	
	Upper-division English elective ⁶	3	4C
	Elective	3	
	TOTAL	29	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in 3A in the AUCC. One must have a laboratory component.

³ Select one course from the list of courses in category 3D of the AUCC.

⁴ Select at least three credits from the list of courses in category 1B in the AUCC.

⁵ Select from the list of courses in category 3C in the AUCC.

⁶ The department requires Licensure majors to take 12 credits of upper-division E or CO prefix courses: 3 credits must be in literatures of the British Isles before 1830, or in American or European literatures before 1900; 3 credits must be in literatures of the British Isles after 1830 or in American or European literatures after 1900; 3 credits must be in either breakthroughs (ideological, racial, cultural, gendered) or genre courses. One course must be a capstone course (E 460, E 463, E 465, E 470), preferably taken in the senior year. One course must be a world literature course (E 337, E 353, E 356, E 452, E 455). See the departmental check sheet for the courses that fulfill these categories.

⁷ Any lower or upper-division E prefix course.

Language Concentration

The Language concentration focuses on linguistics and TESL/TEFL. It is designed for students interested in all aspects of language and linguistics. It offers students the ability to study key theories in linguistics and second-language learning, functional aspects of language production and reception, and the impact of social and cultural contexts on language production and reception.

For graduation, an English major must attain a minimum grade point average of 2.000 in upper-division composition and English courses.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
E 270	Introduction to American Literature	3	
SPCM 200	Public Speaking	3	2A
	Arts and Humanities ¹	6	3B

Course	Title	Cr	AUCC
	Biological and Physical Sciences ²	7	3A
	Foreign language ³	3-5	
	Mathematics ⁴	3	1B
	Electives ⁵	1-3	
	TOTAL	31	

SOPHOMORE

E	240	Introduction to Poetry	3	
E	276	Survey of British Literature I	3	
OR				
E	277	Survey of British Literature II	3	
		Foreign language ³	3-5	
		Global and Cultural Awareness ⁶	3	3E
		Historical Perspectives ⁷	3	3D
		Liberal Arts/History Elective ⁸	3	
		Philosophy ⁹	3	
		Social/behavioral science ¹⁰	3	3C
		Electives ¹¹	3-5	
		TOTAL	29	

JUNIOR

<i>Select one course from the following:</i>				
CO	300 ^P	Writing Arguments	3	2
CO	301A ^P	Writing in the Disciplines-Arts and Humanities	3	2
CO	301B ^P	Writing in the Disciplines-Sciences	3	2
CO	301C ^P	Writing in the Disciplines-Social Sciences	3	2
CO	301D ^P	Writing in the Disciplines-Education	3	2

E	326	Development of the English Language	3	
<i>Select two courses from the following:</i>				
E	327	Syntax and Semantics	3	
E	328	Phonology, Morphology, and Lexis	3	
E	329	Pragmatics and Discourse Analysis	3	

E	341 ^P	Principles of Literary Criticism	3	4A, 4B
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E	342	Shakespeare I	3	
OR				
E	343	Shakespeare II	3	
		Foreign language ³	5	
		Electives	7	
		TOTAL	30	

SENIOR

E	460 ^P	Chaucer	3	4C
OR				
E	465 ^P	Topics in Literature and Language	3	4C
		Foreign language ³	5	
		Upper division English/composition ¹²	15	
		Electives ¹³	7	
		TOTAL	30	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from the list in category 3B (excluding E subject code courses) in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select two courses from the list of courses in category 3A in the AUCC. At least one course must have a laboratory component.

³ This requirement must be met by completing the second year of one foreign language and the first year of another foreign language. Effective Fall 2007 foreign language courses are in separate prefixes (all starting with L and followed by three letters designating the language, e.g., LFRE is French, LGER is German, etc.)

⁴ Select at least three credits from the list of courses in category 1B in the AUCC.

⁵ Select enough elective credits to bring the freshman year total to 31 credits.

⁶ Select from the list of courses in category 3E in the AUCC.

⁷ Select from the list of courses in category 3D in the AUCC.

⁸ Select either one other course from the list of courses in category 3D of the AUCC or one from the list of courses on the English department check sheet.

⁹ Select from the list of courses on English Department green sheet.

¹⁰ Select from the list of courses in category 3C in the AUCC.

¹¹ Select enough elective credits to bring the sophomore year total to 29 credits.

¹² Fifteen credits of upper-division courses with E or CO prefixes, at least 9 credits of which must come from CO 401, E 311A-C, E 320, E 324, E 412A-C, and E 465.

¹³ Select enough elective credits to bring the senior year total to 30 and the program total to 120 credits. Of the 120 total program credits, at least 42 credits must be upper division.

Literature Concentration

The Literature concentration opens upon a world of writing old and new, poetry and prose, and fosters depth no less than breadth in the reading of it. The study of literature has lain at the heart of the liberal arts since their inception, for literature affords a view of experience wrought in text, with limitless variety of perception and expression. The English Department offers a curriculum featuring critical study of literature, ancient through contemporary, in poetry, prose, and drama. Students will become familiar with major figures and forces, but also with non-traditional writers outside the established canon. Courses in literary theory will give students a sense of the wide variety of approaches that can be applied to the interpretation of texts. In all courses, students practice a number of different types of analytical and critical writing.

For graduation, an English major must attain a minimum grade point average of 2.000 in upper-division composition and English courses.

Course	Title	Cr	AUCC
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FRESHMAN

CO	150 ^P	College Composition	3	1A
E	240	Introduction to Poetry	3	
E	270	Introduction to American Literature Arts and Humanities ¹	6	3B
		Biological and Physical Sciences ²	7	3A
		Mathematics ³	3	1B
		Elective	5	
		TOTAL	30	

SOPHOMORE

E	276	Survey of British Literature I	3	
E	277	Survey of British Literature II	3	
		Global and Cultural Awareness ⁴	3	3E
		Historical Perspectives ⁵	3	3D
		Philosophy ⁶	3	
		Social and Behavioral Sciences ⁷	3	3C
		English elective ⁸	3	
		Liberal Arts/History Elective ⁹	3	
		Electives	6	
		TOTAL	30	

JUNIOR

<i>Select one course from the following:</i>				
CO	300 ^P	Writing Arguments	3	2
CO	301A ^P	Writing in the Disciplines-Arts and Humanities	3	2
CO	301B ^P	Writing in the Disciplines-Sciences	3	2
CO	301C ^P	Writing in the Disciplines-Social Sciences	3	2
CO	301D ^P	Writing in the Disciplines-Education	3	2

E	341 ^P	Principles of Literary Criticism	3	4A, 4B
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E	342	Shakespeare I	3	
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OR				
E	343	Shakespeare II	3	
		Second field ¹⁰	6	
		Upper-division English/composition elective ¹¹	6	
		Electives	9	
		TOTAL	30	

SENIOR

<i>Select one course from the following:</i>				
E	460 ^P	Chaucer	3	4C
E	463 ^P	Milton	3	4C
E	465 ^P	Topics in Literature and Language	3	4C
E	470 ^P	Individual Author	3	4C
		Second field ¹⁰	6	
		Upper-division electives ¹¹	12	
		Electives	9	
		TOTAL	30	

Course	Title	Cr	AUCC
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from the list in category 3B (excluding E subject code courses) in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select two courses, one having a lab, from the list of courses for category 3A in the AUCC.

³ Select at least three credits from the list of courses in category 1B in the AUCC.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select from the list of courses in category 3D in the AUCC.

⁶ Select PHIL course from English Department checksheet.

⁷ Select from the list of courses in category 3C in the AUCC.

⁸ Select any lower or upper division E prefix course.

⁹ Select either one other course from the list of courses in category 3D of the AUCC or one from the list of courses on the English Department checksheet.

¹⁰ The department requires majors to complete a second field. This may be met by completing the equivalent of the second semester of the second year course in a foreign language or by completing 12 hours of upper division credit in a coherent field of study outside English.

¹¹ The department requires literature concentrators to take 18 credits of upper division E and/or CO courses: 3 credits must be in literatures of the British Isles before 1830 or in American or European literatures before 1900; 3 credits must be in literatures of the British Isles after 1830 or in American or European literatures after 1900; 3 credits must be in breakthroughs (ideological, racial, cultural, gendered); and 3 credits must be in genre courses. See the departmental check sheet for the courses that fulfill these 4 categories.

Writing Concentration

The Writing concentration provides an opportunity for students who wish to study writing within the framework of English studies. It allows students to take a wide range of writing and writing theory courses. Students can enroll in writing courses that focus on argumentation, informative writing, literary nonfiction, nature writing, and writing in online contexts. They can also enroll in writing theory courses that explore the influence of gender, politics, culture, technology, and education policies and practices on writing and writing instruction.

For graduation, an English major must attain a minimum grade point average of 2.000 in upper-division composition and English courses.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
E 240	Introduction to Poetry	3	
SPCM 200	Public Speaking	3	
	Arts and Humanities ¹	6	3B
	Biological and Physical Sciences ²	7	3A
	Mathematics ³	3	1B
	Electives	6	
	TOTAL	31	
SOPHOMORE			
CO 302 ^P	Writing Online	3	
E 270	Introduction to American Literature	3	
E 276	Survey of British Literature I	3	
OR			
E 277	Survey of British Literature II	3	
	Global and Cultural Awareness ⁴	3	3E
	Historical Perspectives ⁵	3	3D
	Philosophy ⁶	3	
	Social and Behavioral Sciences ⁷	3	3C
	Liberal Arts/History Elective ⁸	3	
	Electives	5	

Course	Title	Cr	AUCC
TOTAL			
29			

JUNIOR

<i>Select one course from the following:</i>			
CO 300 ^P	Writing Arguments	3	2
CO 301A ^P	Writing in the Disciplines-Arts and Humanities	3	2
CO 301B ^P	Writing in the Disciplines-Sciences	3	2
CO 301C ^P	Writing in the Disciplines-Social Sciences	3	2
CO 301D ^P	Writing in the Disciplines-Education	3	2
E 341 ^P	Principles of Literary Criticism	3	4A, 4B
	Second field ⁹	6	
	Upper-division English/composition ¹⁰	6	
	Electives	12	
	TOTAL	30	

SENIOR

CO 401 ^P	Writing and Style	3	
E 406	Topics in Literacy	3	
<i>Select one course from the following:</i>			
E 460 ^P	Chaucer	3	4C
E 463 ^P	Milton	3	4C
E 465 ^P	Topics in Literature and Language	3	4C
E 470 ^P	Individual Author	3	4C
	Second field ⁹	6	
	Upper-division electives ¹⁰	9	
	Electives	6	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from the list in category 3B (but excluding E subject code courses) in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select two courses, one with a lab, from the list of courses for category 3A in the AUCC.

³ Select at least three credits from the list of courses in category 1B in the AUCC.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select from the list of courses in category 3D in the AUCC.

⁶ Select from the list of PHIL courses on English Department checksheet.

⁷ Select from the list of courses in category 3C in the AUCC.

⁸ Select either one other course from the list of course in category 3D of the AUCC or one from the list of courses on the English Department checksheet.

⁹ The department requires majors to complete a second field. This may be met by completing the second semester of the second year of a foreign language or by completing 12 credits of upper-division courses in a coherent field of study outside of English.

¹⁰ A total of 15 credits of upper-division electives in E and CO prefix courses.

Three credits must be in designated writing courses (CO 300, CO 301A-D, E 311C, E 403, E 412C); 3 credits must be in writing theory and pedagogy courses (E 402, E 406, E 501, E 502, E 526); 3 credits must be in literature courses; and 6 credits from any upper-division writing, literature, theory, and/or language courses.

Minor in English

Students may consult with an English Department adviser to plan a course of study:

Minimum of 21 credits in courses in English, at least 12 of which must be upper division. CO 150 and E 487A-B may not count toward the minor. CO 300, CO 301A-D, CO 302, and CO 401 may count toward the minor. A minimum of 6 credits must be taken at Colorado State University.

Graduate Programs in English

The Department of English offers programs of study leading to the Master of Fine Arts degree in creative writing or the Master of Arts degree in literature, English education, teaching of English as a foreign language or second language, rhetoric and composition, or creative non-fiction.

The department shares a joint Master of Arts degree in foreign languages and the teaching of English as a second language and participates in the Peace Corps Masters International program.

Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx and the department's website, <http://www.colostate.edu/Depts/English>.

DEPARTMENT OF ETHNIC STUDIES

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Professor Irene Vernon, Chair

Major in Ethnic Studies

Ethnic Studies critically examines the interlocking forces of race, gender, class, sexuality, and other forms of social differentiation that shape the histories and experiences of racially marginalized groups. The programs of study interrogate how these socially constructed ideas impact distribution of social goods, affect life chances, identities and worldviews, and reproduce social inequalities. Drawing from interdisciplinary and comparative theoretical frameworks, we bring to bear issues of power, privilege, and social justice pertinent to the experiences of diverse populations in the U.S. and abroad. We are especially committed to nurturing civic-minded and culturally informed students who strive to strengthen the communities in which they reside. In support of the land-grant mission of Colorado State University, Ethnic Studies engages with communities on and off campus in order to effect meaningful change in public policy and social life.

Learning Outcomes

Upon completion of the programs of study, students will demonstrate:

- An understanding of the key concepts shaping the experiences of various racial and ethnic groups in the United States and abroad.
- Familiarity with social histories and experiences of racial and ethnic groups.
- Effective oral communication, writing, and research skills.

- An increase in critical thinking, intellectual, and personal growth.
- An understanding of the value of social consciousness and personal responsibility.

Potential Occupations

Both theoretical understandings of and practical experience in cross-cultural and inter-ethnic relations are invaluable in today's world. Ethnic Studies graduates work in the following fields and occupations. Education: K-12 and adult education (e.g. refugee/immigrant education, diversity training in the private sector); Human Social Services: Counseling, Health Care, Civil Service; Federal, State, Tribal & Local government and community service; Natural Resources development and technology transfer: practices, economics, and law in ethnic contexts; Communications media: newspaper, radio, video and television; Archival and museum studies; Non-profit Agencies; and Advanced studies: graduate programs in the social sciences and professional programs (e.g. Law, Social Work).

Students in the Ethnic Studies major must earn a minimum grade of C (2.00) for all Ethnic Studies courses required for the major.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
ETST 100	Introduction to Ethnic Studies	3	3E
	Arts and Humanities ¹	6	3B
	Biological and Physical Sciences ²	3	3A
	Global and Cultural Awareness ³	3	3E
	Historical Perspectives ⁴	3	3D
	Mathematics ⁵	3	1B
	Electives	3	
	TOTAL	27	

SOPHOMORE			
<i>Select one course from the following:</i>			
ETST 208/	Native American Art and Material	3	
ART 208	Culture		
ETST 234/	Introduction to Native American	3	
E 234	Literature		
ETST 240	Native American Cultural Expressions	3	
ETST 255/	Native American History	3	
HIST 255			
ETST 340	Native American Perspectives on Conquest	3	
ETST 344	Native American Religious History and Issues	3	
ETST 352/	Indigenous Women, Children, and Tribes	3	
SOWK 352			
ETST 414/	Development in Indian Country	3	
ANTH 414			
ETST 425	Indigenous Film and Video	3	
ETST 438/	Native American Literature	3	
E 438			
ETST 444/	Federal Indian Law and Policy	3	
SOC 444			
<i>Select one course from the following:</i>			
ETST 310	African American Studies	3	
ETST 312	African American Situation	3	
ETST 354	A Century of Black Cinema	3	
ETST 360	Service and Leadership in Black Communities	3	
ETST 410	African American Periods and Personalities	3	
ETST 411	Black Feminism	3	
ETST 412	Africa and African Diaspora	3	

Course	Title	Cr	AUCC
<i>Select one course from the following:</i>			
ETST E 239/239	Introduction to Chicano Literature	3	
ETST 253	Chicana/o History and Culture	3	
ETST 254	La Chicana in Society	3	
ETST 261	Latina/o Populations in the U.S.	3	
ETST 332	Contemporary Chicana/o Issues	3	
ETST 430 ^P	Latina/o Creative Expression	3	
ETST 432 ^P	Latina/o Routes to Empowerment	3	
ETST 454/SPCM 454	Chicano/a Film and Video	3	
<i>Select one course from the following:</i>			
ETST 210	Asian American Leaders and Leadership	3	
ETST 252/HIST 252	Asian American History	3	
ETST 320	Ethnicity and Film: Asian American Experience	3	
ETST 324	Asian Pacific Americans and the Law	3	
ETST 364 ^P /HIST 364 ^P	Asian-American Social Movements, 1945-Present	3	
ETST 424	Asian Pacific American Literature and Culture	3	
<i>Select one course form the following:</i>			
ETST 205	Ethnicity and the Media	3	
ETST 256	Border Crossings: People/Politics/Culture	3	
ETST 300	Queer Studies and Women of Color	3	
ETST 316/JTC 316	Multiculturalism and the Media	3	
ETST 318 ^P /ANTH 318 ^P	Peoples and Cultures of the Southwest	3	
ETST 319 ^P /ANTH 319 ^P	Latin American Peasantries	3	
ETST 365	Global Environmental Justice Movements	3	
ETST 370	Caribbean Identities	3	
ETST 371	The Modern Caribbean	3	
ETST 382/LGEN 382	Italian Ethnic Identity, Culture, and Gender	3	
	Advanced Writing ⁶	3	2
	Minor/interdisciplinary minor ⁷	3	
	Biological and Physical Sciences ²	4	3A
	Electives	6	
	TOTAL	31	
JUNIOR			
ETST 404	Race Formation in the United States	3	4A, 4B
OR			
ETST 405	Ethnicity, Class, and Gender in the U.S.	3	4A, 4B
<i>Select 12 credits from the following in consultation with advisor:^{8,9}</i>			
	African American courses, Asian/Pacific American courses, Chicano(a)/Latino(a) courses, Native American courses, Global Ethnic Studies courses	12	
	Minor/interdisciplinary minor ⁷	8	
	Social/behavioral science ¹⁰	3	3C
	Electives ¹¹	7	
	TOTAL	33	
SENIOR			
ETST 493 ^P	Ethnic Studies Research Methods and Writing	3	4A, 4B, 4C
	Minor/interdisciplinary minor ⁷	10	
	Electives ¹¹	16	
	TOTAL	29	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from the list in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select a total of seven credits from category 3A in the AUCC. One of the courses selected must have a laboratory component.

³ Select one course from the list in category 3E in the AUCC.

⁴Select one course from the list in category 3D in the AUCC.

⁵ Select at least three credits from the list in category 1B in the AUCC.

⁶Select from the list of courses in category 2 in the AUCC.

⁷ Students must complete a minor/interdisciplinary minor consistent with the student's program of study. A minimum total of 21 credits, 12 of which are upper division, is required.

⁸ Seniors may select with advisor approval ETST 541, ETST 550, ETST 531, ETST 535.

⁹ Global Ethnic Studies courses include: ETST 205, ETST 256, ETST 316/JTC 316, ETST 318/ANTH 318, ETST 319/ANTH 319, ETST 300, ETST 365, ETST 370, ETST 371, ETST 382/LGEN 382. Seniors may select with advisor approval from ETST 500-level courses.

¹⁰ Select one course from the list in category 3C in the AUCC.

¹¹ Seniors may select with advisor approval ETST 505, Academic Writing. Forty-two credits of upper-division work (300- to 400-level courses) are required for graduation. Enough upper-division elective credits should be taken to bring the overall total to 42 and the program total to 120.

Women's Studies Concentration

Office in Aylesworth Hall, 357 S.E.

(970) 491-2882

womensstudies.colostate.edu/

Coordinated by the Chair of the Center for Women's Studies and Gender Research Board

The concentration in Women's Studies prepares individuals for the needs and opportunities of an increasingly interconnected and interdependent world. Women's Studies' students are prepared to engage the complex indices of intersection including gender, sexuality, race, ethnicity, class, ability, religion and nationality as analyzed within various disciplines. The program builds awareness of the range of human experience, potential, and accomplishment. Women's Studies uniquely fills Colorado State University's central mission and contributes to intersectional, interpersonal, intercultural, and international understandings. Women's Studies transforms traditional disciplinary assumptions and theories, creates innovative models for teaching and research, and develops practices for challenging systems of power and privilege.

Learning Outcomes

Upon completion of the program of study, students will demonstrate:

- Knowledge of academic disciplines from feminist and intersectional perspectives
- An understanding of the historic and contemporary contributions of women of all cultures
- Effective oral communication, writing, and research skills
- An increase in critical thinking, intellectual, and personal growth
- A critical ideological understanding regarding women and gender implicit in social institutions

Potential Occupations

Contemporary career opportunities can be directly enhanced by students who have a women’s studies background. Students acquire jobs in the non-profit sector, such as international relief agencies, domestic violence agencies, homeless shelters, after school programs, and children and family services. Other fields our students have entered include public relations, counseling, union organizing, public policy and research, victim advocacy, and human/civil rights. In several areas such as journalism, communication, business, law, education, and human services, it is now common to choose a career that has a direct focus on women and gender.

In areas that have not traditionally focused on women and gender, an awareness of the history and culture of feminisms, women and the intersections of gender, race, class, and sexism can enhance a person’s ability to cope with dilemmas and issues related to gender and sex that arise in the workplace. In addition, students in women’s studies have the unique opportunity to apply insights from course work to their own lives, helping them to make more informed choices about careers, education, relationships, and community participation.

Students in the Ethnic Studies major must earn a minimum grade of C (2.00) for all Ethnic Studies courses required for the major.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
ETST 100	Introduction to Ethnic Studies	3	3E
SPCM 200	Public Speaking	3	2A
WS 200	Introduction to Women’s Studies	3	
	Arts and Humanities ¹	3	3B
	Biological and Physical Sciences ²	3	3A
	Mathematics ³	3	1B
	Social and Behavioral Sciences ⁴	3	3C
	Historical Perspectives ⁵	3	3D
	Electives	3	
	TOTAL	30	

SOPHOMORE

Course	Title	Cr	AUCC
<i>Select two courses from the following:</i>			
ART 208/	Native American Art and Material	3	
ETST 208	Culture		
E 234/	Introduction to Native American	3	
ETST 234	Literature		
E 239/	Introduction to Chicano Literature	3	
ETST 239			
ECON 211	Gender in the Economy	3	3E
ETST 205	Ethnicity and the Media	3	3E
ETST 210	Asian American Leaders and Leadership	3	
ETST 240	Native American Cultural Expressions	3	3B
ETST 252/	Asian American History ⁶	3	3D
HIST 252			
ETST 253	Chicana/o History and Culture	3	3E
ETST 255/	Native American History ⁶	3	3D
HIST 255			
ETST 256	Border Crossings: People/Politics/Culture	3	3E
ETST 261	Latina/o Populations in the U.S.	3	
ETST 254	La Chicana in Society	3	
PHIL 251	Feminist Philosophies	3	
	Arts and Humanities	3	3B
	Biological and Physical Sciences	4	3A
	Electives	11	
	TOTAL	30	

Course	Title	Cr	AUCC
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JUNIOR

<i>Select two courses from the following:</i>			
ANTH 318 ^P / ETST 318 ^P	Peoples and Cultures of the Southwest	3	
ANTH 319 ^P / ETST 319 ^P	Latin American Peasantries	3	
ANTH 338 ^P	Gender and Anthropology	3	
ETST 310	African American Studies	3	
ETST 312	African American Situation	3	
ETST 316/ JTC 316	Multiculturalism and the Media	3	
ETST 320	Ethnicity and Film: Asian-American Experience	3	
ETST 324	Asian Pacific Americans and the Law	3	
ETST 332	Contemporary Chicana/o Issues	3	
ETST 340	Native American Perspectives on Conquest	3	
ETST 344	Native American Religious History and Issues	3	
ETST 352/ SOWK 352	Indigenous Women, Children, and Tribes	3	
ETST 354	A Century of Black Cinema	3	
ETST 360	Service and Leadership in Black Communities	3	
ETST 365	Global Environmental Justice Movements	3	
ETST 370	Caribbean Identities	3	
ETST 371	The U.S. and the Caribbean	3	
ETST 404	Race Formation in the United States	3	
PSY 437	Psychology of Gender	3	
WS 495 ^P	Independent Study	1-3	
<i>Select one course from the following:⁷</i>			
CO 301A ^P	Writing in the Disciplines: Arts and Humanities	3	2
CO 301B ^P	Writing in the Disciplines: Sciences	3	2
CO 301C ^P	Writing in the Disciplines: Social Sciences	3	2
CO 301D ^P	Writing in the Disciplines: Education	3	2
<i>Select one course from the following:</i>			
E 330	Gender in World Literature	3	
E 332	Modern Women Writers	3	
E 334	Gay and Lesbian Literature	3	
<i>Select one course from the following:</i>			
HIST 320 ^P	Women and Gender in Europe, 1450-1789	3	
HIST 358 ^P	American Women’s History to 1800	3	
HIST 359 ^P	American Women’s History Since 1800	3	
PSY 327 ^P	Psychology of Women	3	
SPCM 335	Gender and Communication	3	
	Electives		15-17
	TOTAL		28-30

SENIOR

<i>Select two courses from the following not previously taken:</i>			
ANTH 318 ^P / ETST 318 ^P	Peoples and Cultures of the Southwest	3	
ANTH 319 ^P / ETST 319 ^P	Latin American Peasantries	3	
ANTH 338 ^P	Gender and Anthropology	3	
ETST 310	African American Studies	3	
ETST 312	African American Situation	3	
ETST 316/ JTC 316	Multiculturalism and the Media	3	
ETST 320	Ethnicity and Film: Asian-American Experience	3	
ETST 324	Asian Pacific Americans and the Law	3	
ETST 332	Contemporary Chicana/o Issues	3	
ETST 340	Native American Perspectives on Conquest	3	
ETST 344	Native American Religious History and Issues	3	
ETST 352/ SOWK 352	Indigenous Women, Children, and Tribes	3	
ETST 354	A Century of Black Cinema	3	
ETST 360	Service and Leadership in Black Communities	3	
ETST 365	Global Environmental Justice Movements	3	

Course	Title	Cr	AUCC
ETST 370	Caribbean Identities	3	
ETST 371	The U.S. and the Caribbean	3	
ETST 404	Race Formation in the United States	3	
PSY 437	Psychology of Gender	3	
WS 495 ^P	Independent Study	1-3	
ETST 405	Ethnicity, Class, and Gender in the U.S.	3	4A, 4B
ETST 493 ^P	Ethnic Studies Research Methods and Writing	3	4C
IE 470	Women and Development	3	
WS 472 ^P	Seminar in Women's Studies—Social Sciences Electives ⁸	3	
	TOTAL	14-16	
		30-32	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select a total of seven credits from the list of courses in category 3A in the AUCC. At least one course must have a laboratory component.

³ Select at least three credits from the list of courses in category 1B in the AUCC.

⁴ Select from the list of courses in category 3C in the AUCC.

⁵ Select from the list of courses in category 3D in the AUCC.

⁶ ETST 252/HIST 252 or ETST 255/HIST 255 may double count for both AUCC 3D and major requirements. Students selecting this option must take an additional elective course to bring the program total to 120 credits.

⁷ Select one course from the list of courses in category 2B of the AUCC. First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course to fulfill Category 2B of the AUCC.

⁸ Select enough elective credits to bring the program total to a minimum of 120 credits, of which at least 42 must be upper division.

Minor in Ethnic Studies

The Ethnic Studies minor offers courses on the experiences of the various racial and ethnic groups in the U.S. and abroad. Courses provide a foundation for understanding the histories and contemporary issues from a comparative framework. Drawing knowledge from multi-disciplinary sources, the program of study welcomes students from the humanities, the social sciences, and the professional degree programs such as education, business, and law.

Course	Title	Cr
ETST 100	Introduction to Ethnic Studies	3
ETST 404	Race Formation in the United States	3
	OR	
ETST 405	Ethnicity, Class, and Gender in the U.S.	3
	African American course ¹	3
	Asian Pacific American course ²	3
	Chicano(a) course ³	3
	Native American course ⁴	3
	Global Ethnic Studies course ⁵	3

PROGRAM TOTAL = 21 credits⁶

¹ Select one course from the following: ETST 310, ETST 312, ETST 354, ETST 410, ETST 412.

² Select one course from the following: ETST 210, ETST 252/HIST 252, ETST 320, ETST 324, ETST 424.

³ Select one course from the following: ETST 239/E 239, ETST 253, ETST 254, ETST 261, ETST 332, ETST 430, ETST 432, ETST 454/SPCM 454. Seniors may select with advisor approval: ETST 531, ETST 535.

⁴ Select one course from the following: ETST 208/ART 208, ETST 234/E 234, ETST 240, ETST 255/HIST 255, ETST 340, ETST 344, ETST 352/SOWK 352, ETST 414/ANTH 414, ETST 438/E 438, ETST 444/SOC 444. Seniors may select with advisor approval: ETST 541, ETST 550.

⁵ Select one course from the following: ETST 205, ETST 256, ETST 316/JTC 316, ETST 318/ANTH 318, ETST 319, ETST 365, ETST 370, ETST 371. Seniors may select with advisor approval from ETST 500-level courses.

⁶ A minimum of 12 credits must be upper division.

Graduate Program in Ethnic Studies

The Department of Ethnic Studies seeks to teach students to understand the unique and interlocking experiences of racially marginalized groups and to analyze how race intersects with other forces of social differentiation, such as gender, sexuality, and class, in national and international contexts. The program recognizes the importance not only of the history of racial exclusion and marginalization but also the creative ways in which various racial groups sustain their humanity through cultural preservation, transference, and renewal. Ethnic Studies is committed to nurturing students to become culturally aware, astute, civic-minded individuals who strive to strengthen the communities in which they reside. Because the study of ethnic groups intrinsically reveals how race structures life chances and opportunities, the scholarly orientation of the department reflects a commitment to meaningful changes in public policy and social life. The department offers graduate-level education to prepare students as leaders in the field of ethnic studies.

Students interested in earning a Master of Arts degree in ethnic studies should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the graduate program's website. Please contact the Ethnic Studies Department for further information at (970) 491-2418.

DEPARTMENT OF FOREIGN LANGUAGES AND LITERATURES

Office in Clark Building, Room C104
(970) 491-6141

languages.colostate.edu/

Professor Paola Malpezzi Price, Chair

Major in Languages, Literatures, and Cultures

Language majors accomplish:

- Real and measurable functional competencies in the target language
- A practical command of grammar and pronunciation approaching that of a native speaker
- Comprehension in reading and listening
- Ability in speaking and writing in a manner acceptable to an educated native
- A practical command of the culturally defined aspects of the language and related cultural patterns of

behavior, including non-verbal communication

- In advanced-level study, a comfortable familiarity with most of the language- and culture-specific characteristics of its literature

The department strongly encourages study abroad and has exchange agreements in place with universities in several countries. Students should visit the department prior to studying abroad for clarification on course transfers. Information is available through the Study Abroad Office on campus.

Minors are offered in Chinese, French, German, Japanese, and Spanish. Basic courses may also be taken in Arabic, Italian, Latin, Russian, and American Sign Language. Additionally, we offer Arabic and Italian Studies Interdisciplinary Minors.

Learning Outcomes

Students will demonstrate:

- Communicative oral skills in the target language, including grammatical accuracy, correct use of tense, fluency, appropriate intonation, suitable vocabulary and discourse devices for expressing opinions or when giving research presentations.
- Communicative writing skills in the target language, including clarity of ideas, grammatical accuracy and appropriate vocabulary, adequate elaboration of ideas through a variety of sentence structures and vocabulary, and logical flow of ideas through the use of discourse organizational devices.
- Analytical skill in literary and cultural texts of the target language, including ability to formulate and present a topic of inquiry, to critically analyze the topic with valid supporting evidence, and to cogently synthesize and summarize the ideas in bibliographical sources and the results of their own analytical inquiry.
- Increased sensitivity to and appreciation of cultural and linguistic differences.

Potential Occupations

Available career choices include, but are not limited to: bilingual educator, foreign language teacher, translation/interpretation, linguistics, civil service, foreign service and diplomacy, medical fields, social services, immigration/naturalization, journalism/ broadcasting, customs, banking, import/exports, sales/customer service, publishing, international business, international nonprofit organizations, government/military intelligence, global tourism.

French Concentration

All majors and minors in the department must earn a minimum grade of C (a grade of C- is not acceptable) in each upper-division course that carries the LARA, LCHI, LFRE, LGEN, LGER, LGRK, LITA, LJPJ, LKOR, LLAT, LRUS, LSGN, or LSPA subject code.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
LFRE 105 ^P	First-Year French I	5	
LFRE 107 ^P	First-Year French II	5	
	Arts and Humanities ¹	3	3B
	Historical Perspectives ²	3	3D
	Non-U.S. history ³	3	
	Social and Behavioral Sciences ⁴	3	3C
	Elective	5	
	TOTAL	30	
SOPHOMORE			
LFRE 200 ^P	Second-Year French I	3	
LFRE 201 ^P	Second-Year French II	3	
	Advanced Writing ⁵	3	2
	Arts and Humanities ¹	3	3B
	Global and Cultural Awareness ⁶	3	3E
	Mathematics ⁷	3	1B
	Biological and Physical Sciences ⁸	7	3A
	Elective	3	
	TOTAL	28	
JUNIOR			
LFRE 300 ^P	Reading and Writing for Communication-French	3	
<i>Select two of the following courses:</i>			
LFRE 301 ^P	Oral Communication-French	3	
LFRE 312 ^P	Introduction to French Linguistics	3	
LFRE 313 ^P	Introduction to French Translation and Interpreting	3	
LFRE 326 ^P	French Phonetics	3	
LFRE 345 ^P	Business French	3	
LFRE 355 ^P	20th-Century French Literature	3	
LFRE 365 ^P	Introduction to French Cinema Studies	3	
LFRE 413 ^P	Advanced French Translation and Interpreting	3	
LFRE 433A ^P	Advanced French/Francophone Culture-Representations ⁹	3	
LFRE 433B ^P	Advanced French/Francophone Culture-Center and Margins ⁹	3	
LFRE 441 ^P	Advanced Business French	3	
LFRE 460 ^P	French/Francophone Women Writers	3	
LFRE 470 ^P	French Grammar Constructions	3	
LFRE 310 ^P	Approaches to French Literature	3	
LFRE 335 ^P	Issues in French/Francophone Culture	3	
	Electives	15	
	TOTAL	30	
SENIOR			
LFRE 400 ^P	Advanced French Communication Skills	3	
LFRE 433A ^P	Advanced French/Francophone Culture-Representations	3	4A
OR			
LFRE 433B ^P	Advanced French/Francophone Culture-Center and Margins	3	4A
<i>Select one course from the following:</i>			
LFRE 450 ^P	Selected French Literary Movements and Periods	3	
LFRE 452 ^P	Genre Studies in French	3	
LFRE 453 ^P	Author Studies in French	3	
LFRE 454 ^P	Topic Studies in French	3	
LFRE 492 ^P	Seminar-French Language, Literature and Society	3	4B, 4C
OR			
LGEN 492 ^P	Seminar-Language, Literature and Society-General	3	4B, 4C
	400-level French ¹⁰	3	
	Electives ¹¹	17	
	TOTAL	32	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ Select from the list of courses in category 3B of the All-University Core Curriculum (AUCC). The 200-level French courses may not be used here.

² Select three credits of non-U.S. HIST prefix courses from the list in category 3D of the AUCC.

³ Select any non-U.S. history course.

⁴ Select from the list of courses in category 3C in the AUCC.

⁵ Select from the department list of approved courses in category 2 of the AUCC.

⁶ Select from the list of courses in category 3E of the AUCC.

⁷ Select at least three credits from the list of courses in category 1B in the AUCC.

⁸ Select seven credits from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

⁹ Choose the course not used to satisfy the 4A requirement during the senior year.

¹⁰ Select from list in junior year, or in place of the 400-level French course, students may choose a) LGEN 465A-C, or b) an upper-division non L*-prefixed course (with adviser's approval), or c) 8-12 lower and/or upper division second foreign language (non-English or non-native) credits. If c) is chosen, the credits beyond the three required for the major may be used toward general electives.

¹¹ A minimum of 12 credits of electives must be 300- and 400-level courses. The minimum is increased to 15 if option c) is selected in note 10.

Course	Title	Cr	AUCC
LGER 400 ^P	Advanced German Communication Skills	3	
LGER 434 ^P	Advanced German Culture	3	4A
<i>Select one course from the following:⁹</i>			
LGER 450 ^P	Selected German Literary Movements and Periods	3	
LGER 452 ^P	Genre Studies in German	3	
LGER 453 ^P	Author Studies in German	3	
LGER 454 ^P	Topic Studies in German	3	
LGEN 492 ^P	Language, Literature and Society-General	3	4B, 4C
OR			
LGER 492 ^P	Seminar-German Language, Literature and Society	3	4B, 4C
	400-level German ¹⁰	3	
	Electives ¹¹	17	
	TOTAL	32	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B of the All-University Core Curriculum (AUCC). The 200-level German courses may not be selected.

² Select three credits of non-U.S. HIST prefix courses from the list in category 3D of the AUCC.

³ Select any non-U.S. history course.

⁴ Select from the list of courses in category 3C in the AUCC.

⁵ Select from the list of courses in category 2 in the AUCC.

⁶ Select seven credits from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

⁷ Select from the list of courses in category 3E of the AUCC.

⁸ Select at least three credits from the list of courses in category 1B in the AUCC.

⁹ If one of these courses is selected from the choice in the junior year, a different course must be selected for this choice.

¹⁰ Select from list in junior year or in place of the 400-level German course, majors may choose a) LGEN 465A-C, or b) an upper-division, non L*-prefixed course (with adviser's approval), or c) 8-12 lower and/or upper division second foreign language (non-English or non-native) credits. If c) is chosen, the credits beyond the three required for the major may be used towards general electives.

¹¹ A minimum of 12 credits of electives must be 300- and 400-level courses. The minimum is increased to 15 if option c) is selected in note 10.

German Concentration

All majors and minors in the department must earn a minimum grade of C (a grade of C- is not acceptable) in each upper-division course that carries the LARA, LCHI, LFRE, LGEN, LGER, LGRK, LITA, LJPN, LKOR, LLAT, LRUS, LSGN, or LSPA subject code.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
LGER 105 ^P	First-Year German I	5	
LGER 107 ^P	First-Year German II	5	
	Arts and Humanities ¹	3	3B
	Historical Perspectives ²	3	3D
	Non-U.S. history ³	3	
	Social and Behavioral Sciences ⁴	3	3C
	Elective	5	
	TOTAL	30	
SOPHOMORE			
LGER 200 ^P	Second-Year German I	3	
LGER 201 ^P	Second-Year German II	3	
	Advanced Writing ⁵	3	2
	Arts and Humanities ¹	3	3B
	Biological and Physical Sciences ⁶	7	3A
	Global and Cultural Awareness ⁷	3	3E
	Mathematics ⁸	3	1B
	Elective	3	
	TOTAL	28	
JUNIOR			
LGER 300 ^P	Reading and Writing for Communication-German	3	
<i>Select two courses from the following:</i>			
LGER 301 ^P	Oral Communication-German	3	
LGER 313 ^P	Introduction to German Translation and Interpreting	3	
LGER 326 ^P	German Phonetics	3	
LGER 345 ^P	Business German	3	
LGER 355 ^P	20th Century German Literature	3	
LGER 365 ^P	Introduction to German Cinema Studies	3	
LGER 413 ^P	Advanced German Translation and Interpreting	3	
LGER 441 ^P	Advanced Business German	3	
LGER 450 ^P	Selected German Literary Movements and Periods	3	
LGER 452 ^P	Genre Studies in German	3	
LGER 453 ^P	Author Studies in German	3	
LGER 454 ^P	Topic Studies in German	3	
LGER 310 ^P	Approaches to German Literature	3	
LGER 335 ^P	Issues in German Culture	3	
	Electives	15	
	TOTAL	30	
SENIOR			

Spanish Concentration

All majors and minors in the department must earn a minimum grade of C (a grade of C- is not acceptable) in each upper-division course that carries the LARA, LCHI, LFRE, LGEN, LGER, LGRK, LITA, LJPN, LKOR, LLAT, LRUS, LSGN, or LSPA subject code.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
LSPA 105 ^P	First-Year Spanish I	5	
LSPA 107 ^P	First-Year Spanish II	5	
	Arts and Humanities ¹	3	3B
	Historical Perspectives ²	3	3D
	Non-U.S. history ³	3	
	Social and Behavioral Sciences ⁴	3	3C
	Elective	5	
	TOTAL	30	
SOPHOMORE			
LSPA 200 ^P	Second-Year Spanish I	3	
LSPA 201 ^P	Second-Year Spanish II	3	
	Advanced Writing ⁵	3	2
	Arts and Humanities ¹	3	3B
	Global and Cultural Awareness ⁶	3	3E
	Mathematics ⁷	3	1B
	Biological and Physical Sciences ⁸	7	3A
	Elective	3	
	TOTAL	28	
JUNIOR			
LSPA 300 ^P	Reading and Writing for Communication-Spanish	3	
<i>Select two courses from the following:⁹</i>			

Course	Title	Cr	AUCC
LSPA 301 ^P	Oral Communications-Spanish	3	
LSPA 312 ^P	Introduction to Spanish Linguistics	3	
LSPA 313 ^P	Introduction to Spanish Translation and Interpreting	3	
LSPA 326 ^P	Spanish Phonetics	3	
LSPA 345 ^P	Business Spanish	3	
LSPA 346 ^P	Spanish for Health Care	3	
LSPA 365 ^P	Introduction to Spanish Cinema	3	
LSPA 413 ^P	Advanced Spanish Translation and Interpreting	3	
LSPA 435 ^P	Caribbean Culture in Hispanic Literature	3	
LSPA 436 ^P	Advanced Latin American Culture	3	
LSPA 437 ^P	Advanced Spanish Culture	3	
LSPA 441 ^P	Advanced Business Spanish	3	
LSPA 442 ^P	Colonial Latin America Literature	3	
LSPA 443 ^P	Spanish Theatre	3	
LSPA 445 ^P	Women Writers in the Hispanic Worlds	3	
LSPA 449 ^P	Spanish-American Literary Movements and Periods	3	
LSPA 452 ^P	Genre Studies in Spanish	3	
LSPA 453 ^P	Author Studies in Spanish	3	
LSPA 454 ^P	Topic Studies in Spanish	3	
LSPA 468 ^P	Spanish Vocabulary and Word Formation	3	
LSPA 470 ^P	Spanish Grammatical Constructions	3	
LSPA 310 ^P	Approaches Spanish to Literature	3	
LSPA 335 ^P	Issues in Hispanic Culture	3	
	Electives	15	
	TOTAL	30	
SENIOR			
LSPA 400 ^P	Advanced Spanish Communication Skills	3	
	<i>Select one course from the following:</i> ¹⁰		
LSPA 435 ^P	Caribbean Culture in Hispanic Literature	3	4A
LSPA 436 ^P	Advanced Latin American Culture	3	4A
LSPA 437 ^P	Advanced Spanish Culture	3	4A
	<i>Select one course from the following:</i> ¹⁰		
LSPA 442 ^P	Colonial Latin America Literature	3	
LSPA 449 ^P	Spanish-American Literary Movements and Periods	3	
LSPA 452 ^P	Genre Studies in Spanish	3	
LSPA 453 ^P	Author Studies in Spanish	3	
LSPA 454 ^P	Topic Studies in Spanish	3	
LGEN 492 ^P	Seminar-Language, Literature and Society-General	3	4B, 4C
OR			
LSPA 492 ^P	Seminar-Spanish Language, Literature and Society-Spanish	3	4B, 4C
	400-level Spanish ¹¹	3	
	Electives ¹²	17	
	TOTAL	32	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B of the All-University Core Curriculum (AUCC). The 200-level Spanish courses may not be selected here.

² Select three credits of non-U.S. HIST prefix courses from the list in category 3D of the AUCC.

³ Select any non-U.S. history course.

⁴ Select from the list of courses in category 3C in the AUCC.

⁵ Select from the list of courses in category 2 in the AUCC.

⁶ Select from the list of courses in category 3E in the AUCC.

⁷ Select at least three credits from the list of courses in category 1B in the AUCC.

⁸ Select from the list of courses in category 3A in the AUCC. One of the courses must have a laboratory component.

⁹ One of the courses selected must be 300-level, the other must be 400-level.

¹⁰ If one of these courses is selected from the choice in the junior year, a different course must be selected from this list.

¹¹ Select from list in junior year, or in place of the 400-level Spanish course, majors may choose: a) LSPA 465A-C; or b) upper-division, non LSPA-prefixed course (with adviser's approval); or c) 8-12 lower and/or upper division second foreign language (non-English or non-native) credits. If c) is chosen, the credits beyond the three required for the major may be used toward general electives.

¹² A minimum of 15 credits of electives must be 300- and 400-level courses. The minimum is increased to 18 if option c) is selected in note 11.

Teaching Endorsement

Students interested in pursuing a teaching license through Colorado State University may refer to the School for Teacher Education and Principal Preparation (STEPP), College of Applied Human Sciences section in this catalog for general information. Detailed information about STEPP and licensure requirements is available on the program's website (www.stepp.cahs.colostate.edu/) or in room 111 of the Education Building.

All majors and minors in the department must earn a minimum grade of C (a grade of C- is not acceptable) in each upper-division course that carries the LARA, LCHI, LFRE, LGEN, LGER, LGRK, LITA, LJPN, LKOR, LLAT, LRUS, LSGN, or LSPA subject code.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
L*** 200 ^P	Second Year Language I ¹	3	
L*** 201 ^P	Second Year Language II ¹	3	
LB 192	College of Liberal Arts First Year Seminar	3	
SPCM 200	Public Speaking	3	2A
	Biological and Physical Sciences ²	4	3A
	Historical Perspectives ³	6	3D
	Mathematics ⁴	3	1B
	Electives	2	
	TOTAL	30	
SOPHOMORE			
CO 300 ^P	Writing Arguments	3	2
EDUC 275 ^P	Schooling in the United States	3	3C
EDUC 331 ^P	Educational Technology and Assessment	2	
L*** 300 ^P	Reading and Writing for Communication ¹	3	
L*** 310 ^P	Approaches to Literature ¹	3	
L*** 326 ^P	Phonetics ¹	3	
L*** 335 ^P	Issues in Culture ¹	3	
PSY 100	General Psychology	3	3C
	Arts and Humanities ⁵	3	3B
	Biological and Physical Sciences ²	3	3A
	Global and Cultural Awareness ⁶	3	3E
	TOTAL	32	
JUNIOR			
<i>Select one course from the following:</i>			
E 320	Introduction to the Study of Language	3	
LFRE 312 ^P	Introduction to French Linguistics	3	
LSPA 312 ^P	Introduction to Spanish Linguistics	3	
EDUC 340 ^P	Literacy and the Learner	3	
EDUC 350 ^P	Instruction I- Individualization/Management	3	
EDUC 386 ^P	Practicum-Instruction I	1	
L*** 400 ^P	Advanced Communication Skills ¹	3	
<i>Select one course from the following:</i>			
LFRE 433A-B ^P	Advanced French/Francophone Culture	3	4A
LGER 434 ^P	Advanced German Culture	3	4A
LSPA 435 ^P	Caribbean Culture in Hispanic Literature	3	4A
LSPA 436 ^P	Advanced Latin American Culture	3	4A
LSPA 437 ^P	Advanced Spanish Culture	3	4A
L*** ^P	300- or 400-level language ¹	6	
L*** ^P	400-level language ¹	3	
	Arts and Humanities ⁵	3	3B
	Elective	3	
	TOTAL	31	
SENIOR			
E 324 ^P	Teaching English as a Second Language	3	
OR			
LSPA 470 ^P	Spanish Grammatical Constructions	3	
EDUC 450 ^P	Instruction II-Standards and Assessment	4	
EDUC 462 ^P	Methods and Assessment in Teaching Languages	4	
EDUC 485B ^P	Student Teaching-Secondary	11	

Course	Title	Cr	AUCC
EDUC 486E ^P	Practicum-Instruction II	1	
EDUC 493A ^P	Seminar-Professional Relations	1	
L*** 492 ^P	Language, Literature, and Society ¹	3	4B, 4C
	TOTAL	27	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Effective Fall 2007, foreign language courses are in separate prefixes (all starting with L and followed by three letters designating the language, e.g., LFRE is French, LGER is German, etc.).

² Select from list of courses in category 3A in the All-University Core Curriculum (AUCC). One course must have a laboratory component.

³ Select three credits from HIST 101, HIST 121, or HIST 171. The three other credits can be from this list or any other non-U.S. history course.

⁴ Select at least three credits from list of courses in category 1B in the AUCC.

⁵ Select from list of courses in category 3B in the AUCC. The 200-level foreign language courses do not count for 3B.

⁶ Select from list of courses in category 3E in the AUCC.

Minor Programs

A minor in a foreign language offers opportunities for studying the language and culture of another country and complements many major fields. A student with a broadly based education, including a foreign language, will be better prepared to deal with changing technological, economic, and social conditions on an international scale. A student who minors in a foreign language may expect to develop sufficient competency to speak and write with reasonable accuracy and fluency while pursuing interest in language, literature, and culture. See the department for specific information on upper-division transfer work in the language of the minor.

All majors and minors in the department must earn a minimum grade of C (a grade of C- is not acceptable) in each upper-division course that carries the LARA, LCHI, LFRE, LGEN, LGER, LGRK, LITA, LJP, LKOR, LLAT, LRUS, LSGN, or LSPA subject code.

Minor in Chinese

Course	Title	Cr
LOWER DIVISION COURSES (9 credits may apply toward the minor) ¹		
LCHI 105	First-year Chinese I	5
LCHI 107 ^P	First-year Chinese II	5
LCHI 200 ^P	Second-year Chinese I	5
LCHI 201 ^P	Second-year Chinese II	5
	TOTAL	20
UPPER DIVISION COURSES		
<i>Select a minimum of 12 credits (earned in residence) from the following of which at least 6 credits must be at the 400 level:</i>		
LCHI 304 ^P	Third-year Chinese I	3
LCHI 305 ^P	Third-year Chinese II	3
LCHI 309	Contemporary Chinese Literature	3
LCHI 365 ^P	Introduction to Chinese Cinema Studies	3
LCHI 408 ^P	Chinese Calligraphy	1
LCHI 495 ^P	Independent Study, Chinese	1-5
LCHI 496	Group Study, Chinese	1-5
	TOTAL	15-23

PROGRAM TOTAL = 21 credits²

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Students must complete lower division language courses or place out of lower division courses through proficiency exam. All students must complete a minimum of 21 credits toward the minor.

² All students minoring in Chinese must complete a minimum of 21 credits in the language of the minor, of which at least 12 credits must be upper division (300-400 level).

Minor in French

Minimum of 21 credits in French, at least 15 of which must be upper division, including at least one literature or civilization course and at least one course at the 400-level. Courses taught in English may not be used to meet the requirements for the minor.

Minor in German

Minimum of 21 credits in German, at least 15 of which must be upper division, including at least one literature or civilization course and at least one course at the 400-level. Courses taught in English may not be used to meet the requirements for the minor.

Minor in Japanese

Minimum of 21 credits in Japanese, at least 12 of which must be upper division credits.

Minor in Spanish

Minimum of 21 credits in Spanish, at least 15 of which must be upper division, including at least one literature or civilization course and at least one course at the 400-level. Courses taught in English may not be used to meet the requirements for the minor.

Graduate Programs in Foreign Languages and Literatures

Students wishing to pursue advanced studies can earn a Master of Arts degree in Languages, Literatures, and Cultures (with specializations in French, German, or Spanish), or follow a program that combines the specialization in French, German, or Spanish with study in another field. Students can also pursue a double degree (Joint Program) in which students earn an M.A. in Languages, Literatures, and Cultures (specialization in French, German, or Spanish) and an M.A. in English (specialization of teaching English as a second language or teaching English as a foreign language, TEFL/TESL). Please consult the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, or the department's website, languages.colostate.edu/, for more information.

DEPARTMENT OF HISTORY

Office in Clark Building, Room B356
(970) 491-6335

www.colostate.edu/Depts/Hist/index.html

Professor Diane C. Margolf, Chair

Major in History

History is an account of our human past and seeks to interpret the course of human affairs through evidence and reason. Historians use written records, images, artifacts, and other materials to understand the past and also the relationship between the past and the present. Historians ask not only what happened and why, but also how the present came to be. History provides insights into how individuals and groups made decisions, exercised power, and responded to change. History helps us to understand how processes – such as revolution, migration, war, ecological disturbance, and globalization – shaped societies over time. It helps us to understand how people grappled with class, ethnicity, gender, and race, and how they conceptualized the world through religion and ideology. History provides a form of knowledge that people in all times and places have used to answer basic questions about the human predicament.

The History major is designed for students to enlarge their knowledge about the past, improve their ability to think logically and critically, and sharpen their powers of written and oral expression. It is an outstanding choice for students planning further professional study in law, medicine, ministry, academia, business, and many other fields.

Learning Outcomes

Students will demonstrate:

- Ability to analyze and interpret historical materials, such as documents, artifacts, and images
- Ability to engage in chronological reasoning, to understand causation and change over time
- Ability to examine critically how people in the past understood their own history, in scholarly works and in popular forms such as myths or commemorations
- Ability to interpret, write, and speak about the past using evidence and according to the standards and expectations of the historical discipline

Potential Occupations

Government official in foreign service, national security, military, cultural resources management, and other areas.

History teacher in public and private schools.

With additional graduate training: lawyer, physician, social worker, minister, librarian, museum curator, archivist, professor, educational administrator, or other professional. Any professional occupation in business or public service requiring a liberal arts education and skills in research, writing, and the analysis of information.

General History Concentration

The General History concentration is an excellent choice for students planning careers in history, government service,

and other professional occupations requiring broad intellectual and practical skills. History majors who select the General History concentration must complete any other major or minor offered at CSU (except History).

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
<i>Select one-course from the following:</i>			
HIST 100	Western Civilization, Pre-Modern ¹	3	
HIST 115	Islamic World to 1800 ¹	3	
HIST 120	Asian Civilizations I ¹	3	
HIST 170	World History, Ancient-1500 ¹	3	
<i>Select one course from the following:</i>			
HIST 101	Western Civilization, Modern ¹	3	3D
HIST 121	Asian Civilizations II ¹	3	3D
HIST 171	World History, 1500-Present ¹	3	3D
	Arts and Humanities ²	6	3B
	Biological and Physical Sciences ³	7	3A
	Global and Cultural Awareness ⁴	3	3E
	Mathematics ⁵	3	1B
	Elective	2	
	TOTAL	30	
SOPHOMORE			
HIST 150	U.S. History to 1876 ¹	3	3D
OR			
HIST 151	U.S. History Since 1876 ¹	3	3D
	Advanced Writing ⁶	3	2
	Social and Behavioral sciences ⁷	3	3C
	Minor or Second Major ⁸	3-15	
	Electives ⁹	6-18	
	TOTAL	30	
JUNIOR			
HIST ***	History, AUCC Category 4A ^{10,11}	3	4A
HIST ***	History, upper-division non-U.S. ^{11,12}	6	
HIST ***	History, upper-division U.S. ^{11,13}	3	
	Minor or Second Major ⁸	3-15	
	Electives ⁹	3-15	
	TOTAL	30	
SENIOR			
HIST 492 ^P	Capstone Seminar ¹	3	4A, 4B, 4C
	History electives, upper-division ¹¹	9	
	Minor or Second Major ⁸	3-15	
	Electives ⁹	3-15	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Grade of C or better required.

² Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select at least three credits from the list of courses in category 1B in the AUCC.

⁶ Select from the list of courses in category 2 of the AUCC.

⁷ Select from the list of courses in category 3C in the AUCC.

⁸ Students must complete a minor or second major to fulfill the requirements for the major in History, General History concentration. Select any minor offered at CSU except the History minor for a minimum of 21 credits; or select any second major offered at CSU for a minimum of 27 credits. ⁹Select enough elective credits to bring the program total to a minimum of 120 credits, of which at least 42 must be upper division.

¹⁰ Select from the list below of history courses that may be used to fulfill the category 4A requirement:

Category 4A Courses

Course	Title	Cr	AUCC
HIST 300 ^P	Ancient Greece to 323 B.C.E.	3	4A
HIST 301 ^P	Ancient Rome	3	4A
HIST 303 ^P	Hellenistic World: Alexander to Cleopatra	3	4A
HIST 304 ^P	Women in the Ancient World	3	4A

HIST	308 ^P	Ancient Christianity to 500 A.D.	3	4A
HIST	309 ^P	Medieval Christianity, 500-1500	3	4A
HIST	311 ^P	Medieval England	3	4A
HIST	315 ^P	Tudor Stuart England, 1485-1689	3	4A
HIST	317 ^P	Renaissance and Reformation Europe	3	4A
HIST	318 ^P	The Age of the Enlightenment	3	4A
HIST	319 ^P	Early Modern France, 1500-1789	3	4A
HIST	320 ^P	Women and Gender in Europe, 1450-1789	3	4A
HIST	321 ^P	Industrial Revolution in Europe	3	4A
HIST	322 ^P	Themes in Modern European Social History	3	4A
HIST	323 ^P	Russia Before 1700	3	4A
HIST	324 ^P	Imperial Russia	3	4A
HIST	327 ^P	Habsburg Empire	3	4A
HIST	328 ^P	Modern Europe, 1815-1914.	3	4A
HIST	329 ^P	Europe in Crisis, 1914-1941	3	4A
HIST	330 ^P	Eastern Europe Since 1918	3	4A
HIST	331 ^P	The Soviet Union	3	4A
HIST	332 ^P	Germany Since World War I	3	4A
HIST	333 ^P	Contemporary Europe	3	4A
HIST	334 ^P	European Culture in the 20th Century	3	4A
HIST	335 ^P	Britain in the 20th Century	3	4A
HIST	340 ^P	Colonial North America, 1492-1800	3	4A
HIST	341 ^P	Eighteenth Century America	3	4A
HIST	343 ^P	Early U.S. Republic	3	4A
HIST	344 ^P	Age of Jackson	3	4A
HIST	345 ^P	Civil War Era	3	4A
HIST	346 ^P	Reconstruction and the New South	3	4A
HIST	347 ^P	United States, 1876-1917	3	4A
HIST	348 ^P	United States, 1917-1945	3	4A
HIST	349 ^P	United States Since 1945	3	4A
HIST	350 ^P	United States Foreign Relations Since 1914	3	4A
HIST	351 ^P	American West to 1900	3	4A
HIST	352 ^P	American West Since 1900	3	4A
HIST	353 ^P	American Southwest.	3	4A
HIST	354 ^P	American Architectural History	3	4A
HIST	355 ^P	American Environmental History	3	4A
HIST	356 ^P	American Intellectual History	3	4A
HIST	357 ^P	The American Military Experience	3	4A
MLSC	357 ^P			
HIST	359 ^P	Women in America	3	4A
HIST	360 ^P	United States Immigration History	3	4A
HIST	410 ^P	Colonial Latin America	3	4A
HIST	412 ^P	Mexico	3	4A
HIST	413 ^P	Caribbean Civilization	3	4A
HIST	414 ^P	Revolutions in Latin America	3	4A
HIST	421 ^P	Africa: Colonialism to Independence	3	4A
HIST	422 ^P	Modern Africa	3	4A
HIST	423 ^P	South African History	3	4A
HIST	430 ^P	Ancient Near East	3	4A
HIST	431 ^P	Ancient Israel.	3	4A
HIST	432 ^P	Sacred History in the Bible and the Qur'an	3	4A
HIST	433 ^P	Muhammad and the Origins of Islam	3	4A
HIST	438 ^P	The Modern Middle East	3	4A
HIST	440 ^P	Modern South Asia	3	4A
HIST	441 ^P	South Asia Since Independence	3	4A
HIST	450 ^P	Ancient China	3	4A
HIST	451 ^P	Medieval China Central Asia	3	4A
HIST	452 ^P	China in the Modern World, 1600-Present	3	4A
HIST	455 ^P	Tokugawa and Modern Japan, 1600-Present	3	4A
HIST	461 ^P	Great Britain and the Empire, 1714-1901	3	4A
HIST	462 ^P	Themes in World History	3	4A
HIST	463 ^P	Science and Technology in Modern History	3	4A
HIST	464 ^P	Pacific Wars: Philippines-WWII	3	4A
HIST	465 ^P	Pacific Wars: Korea and Vietnam	3	4A
HIST	466 ^P	U.S. China Relations Since 1800	3	4A
HIST	469 ^P	The Crusades	3	4A
HIST	479 ^P	Practice of Public History	3	4A

Upper-Division Course Categories

Course Number Range	Title
HIST 300 – HIST 339	Europe
HIST 340 – HIST 379	North America/US
HIST 410 – HIST 419	Latin America
HIST 420 – HIST 429	Africa
HIST 430 – HIST 439	Middle East
HIST 440 – HIST 449	South Asia
HIST 450 – HIST 459	East Asia
HIST 460 – HIST 471	World/Trans-regional

Language Concentration

The Language concentration is an excellent choice for students planning to pursue graduate study in history or careers in business, education, and other professional occupations for which the study of a second language is required or advantageous.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
<i>Select one-course from the following:</i>			
HIST 100	Western Civilization, Pre-Modern ¹	3	
HIST 115	Islamic World to 1800 ¹	3	
HIST 120	Asian Civilizations I ¹	3	
HIST 170	World History, Ancient-1500 ¹	3	
<i>Select one course from the following:</i>			
HIST 101	Western Civilization, Modern ¹	3	3D
HIST 121	Asian Civilizations II ¹	3	3D
HIST 171	World History, 1500-Present ¹	3	3D
	Arts and Humanities ²	6	3B
	Biological and Physical Sciences ³	7	3A
	Global and Cultural Awareness ⁴	3	3E
	Mathematics ⁵	3	1B
	Elective ⁶	2	
	TOTAL	30	
SOPHOMORE			
HIST 150	U.S. History to 1876 ¹	3	3D
OR			
HIST 151	U.S. History Since 1876 ¹	3	3D
L*** 105 ^P	First Year Language I ^{7,8}	5	
L*** 107 ^P	First Year Language II ⁸	5	
	Advanced Writing ⁹	3	2
	Social and Behavioral Sciences ¹⁰	3	3C
	Electives ⁶	11	
	TOTAL	30	
JUNIOR			
HIST ***	History, AUCC Category 4A ^{11,12}	3	4A
HIST ***	History, upper-division non-U.S. ^{12,13}	6	
HIST ***	History, upper-division U.S. ^{12,14}	3	
L*** 200 ^P	Second Year Language I ⁷	3	
L*** 201 ^P	Second Year Language II ⁷	3	
	Electives ⁶	12	
	TOTAL	30	
SENIOR			
HIST 492 ^P	Capstone Seminar ¹	3	4A, 4B, 4C
	History electives, upper-division ¹²	9	
	Electives ⁶	18	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

¹¹ Any student seeking to register for 300- or 400-level history courses must have completed 45 credits or have received written consent from the instructor.

¹² Select one upper-division course from two categories-Africa, East Asia, Europe, Latin America/ Caribbean, Middle East, South Asia, World/Trans-regional. See table below footnote 13.

¹³ Select one upper-division course from North America/US category:

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Grade of C or better required.

² Select from the list of courses in category 3B in the All-University Core

Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select at least three credits from the list of courses in category 1B in the AUCC.

⁶ Select enough elective credits to bring the program total to a minimum of 120 credits, of which at least 42 must be upper division.

⁷ Placement exam required.

⁸ Foreign language courses are in separate prefixes (all starting with L and followed by three letters designating the language, e.g., LFRE is French, LGER is German, etc.).

⁹ Select from the list of courses in category 2 in the AUCC.

¹⁰ Select from the list of courses in category 3C in the AUCC.

¹¹ Select from the list below of history courses that may be used to fulfill the category 4A requirement:

Category 4A Courses

Course	Title	Cr	AUCC
HIST 300 ^P	Ancient Greece to 323 B.C.E.	3	4A
HIST 301 ^P	Ancient Rome	3	4A
HIST 303 ^P	Hellenistic World: Alexander to Cleopatra	3	4A
HIST 304 ^P	Women in the Ancient World	3	4A
HIST 308 ^P	Ancient Christianity to 500 A.D.	3	4A
HIST 309 ^P	Medieval Christianity, 500-1500	3	4A
HIST 311 ^P	Medieval England	3	4A
HIST 315 ^P	Tudor Stuart England, 1485-1689	3	4A
HIST 317 ^P	Renaissance and Reformation Europe	3	4A
HIST 318 ^P	The Age of the Enlightenment	3	4A
HIST 319 ^P	Early Modern France, 1500-1789	3	4A
HIST 320 ^P	Women and Gender in Europe, 1450-1789	3	4A
HIST 321 ^P	Industrial Revolution in Europe	3	4A
HIST 322 ^P	Themes in Modern European Social History	3	4A
HIST 323 ^P	Russia Before 1700	3	4A
HIST 324 ^P	Imperial Russia	3	4A
HIST 327 ^P	Habsburg Empire	3	4A
HIST 328 ^P	Modern Europe, 1815-1914.	3	4A
HIST 329 ^P	Europe in Crisis, 1914-1941	3	4A
HIST 330 ^P	Eastern Europe Since 1918	3	4A
HIST 331 ^P	The Soviet Union	3	4A
HIST 332 ^P	Germany Since World War I	3	4A
HIST 333 ^P	Contemporary Europe	3	4A
HIST 334 ^P	European Culture in the 20th Century	3	4A
HIST 335 ^P	Britain in the 20th Century	3	4A
HIST 340 ^P	Colonial North America, 1492-1800	3	4A
HIST 341 ^P	Eighteenth Century America	3	4A
HIST 343 ^P	Early U.S. Republic	3	4A
HIST 344 ^P	Age of Jackson	3	4A
HIST 345 ^P	Civil War Era	3	4A
HIST 346 ^P	Reconstruction and the New South	3	4A
HIST 347 ^P	United States, 1876-1917	3	4A
HIST 348 ^P	United States, 1917-1945	3	4A
HIST 349 ^P	United States Since 1945	3	4A
HIST 350 ^P	United States Foreign Relations Since 1914	3	4A
HIST 351 ^P	American West to 1900	3	4A
HIST 352 ^P	American West Since 1900	3	4A
HIST 353 ^P	American Southwest.	3	4A
HIST 354 ^P	American Architectural History	3	4A
HIST 355 ^P	American Environmental History	3	4A
HIST 356 ^P	American Intellectual History	3	4A
HIST 357 ^P	The American Military Experience	3	4A
MLSC 357 ^P			
HIST 359 ^P	Women in America	3	4A
HIST 360 ^P	United States Immigration History	3	4A
HIST 410 ^P	Colonial Latin America	3	4A
HIST 412 ^P	Mexico	3	4A
HIST 413 ^P	Caribbean Civilization	3	4A
HIST 414 ^P	Revolutions in Latin America	3	4A
HIST 421 ^P	Africa: Colonialism to Independence	3	4A
HIST 422 ^P	Modern Africa	3	4A
HIST 423 ^P	South African History	3	4A
HIST 430 ^P	Ancient Near East	3	4A
HIST 431 ^P	Ancient Israel.	3	4A
HIST 432 ^P	Sacred History in the Bible and the Qur'an	3	4A
HIST 433 ^P	Muhammad and the Origins of Islam	3	4A
HIST 438 ^P	The Modern Middle East	3	4A

HIST 440 ^P	Modern South Asia	3	4A
HIST 441 ^P	South Asia Since Independence	3	4A
HIST 450 ^P	Ancient China	3	4A
HIST 451 ^P	Medieval China Central Asia	3	4A
HIST 452 ^P	China in the Modern World, 1600-Present	3	4A
HIST 455 ^P	Tokugawa and Modern Japan, 1600-Present	3	4A
HIST 461 ^P	Great Britain and the Empire, 1714-1901	3	4A
HIST 462 ^P	Themes in World History	3	4A
HIST 463 ^P	Science and Technology in Modern History	3	4A
HIST 464 ^P	Pacific Wars: Philippines-WWII	3	4A
HIST 465 ^P	Pacific Wars: Korea and Vietnam	3	4A
HIST 466 ^P	U.S. China Relations Since 1800	3	4A
HIST 469 ^P	The Crusades	3	4A
HIST 479 ^P	Practice of Public History	3	4A

¹² Any student seeking to register for 300- or 400-level history courses must have completed 45 credits or have received written consent from the instructor.

¹³ Select one upper-division course from two categories-Africa, East Asia, Europe, Latin America/ Caribbean, Middle East, South Asia, World/Trans-regional. See table below footnote 14.

¹⁴ Select one upper-division course from North America/US category:

Upper-Division Course Categories

Course Number Range	Title
HIST 300 – HIST 339	Europe
HIST 340 – HIST 379	North America/US
HIST 410 – HIST 419	Latin America
HIST 420 – HIST 429	Africa
HIST 430 – HIST 439	Middle East
HIST 440 – HIST 449	South Asia
HIST 450 – HIST 459	East Asia
HIST 460 – HIST 471	World/Trans-regional

Social and Behavioral Sciences Concentration

The Social and Behavioral Sciences concentration is intended to facilitate the timely graduation of History majors who decide to transition from the Social Studies Teaching concentration to another concentration in their third or fourth year of study at CSU.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
<i>Select one course from the following:</i>			
HIST 100	Western Civilization, Pre-Modern ¹	3	
HIST 115	Islamic World to 1800 ¹	3	
HIST 120	Asian Civilizations I ¹	3	
HIST 170	World History, Ancient-1500 ¹	3	
<i>Select one course from the following:</i>			
HIST 101	Western Civilization, Modern ¹	3	3D
HIST 121	Asian Civilizations II ¹	3	3D
HIST 171	World History, 1500-Present ¹	3	3D
	Arts and Humanities ²	6	3B
	Biological and Physical Sciences ³	7	3A
	Global and Cultural Awareness ⁴	3	3E
	Mathematics ⁵	3	1B
	Elective ⁶	2	
	TOTAL	30	
SOPHOMORE			
EDUC 275 ^P	Schooling in the United States	3	3C
OR			
EDUC 340 ^P	Literacy and the Learner	3	
HIST 150	U.S. History to 1876 ¹	3	3D
OR			
HIST 151	U.S. History Since 1876 ¹	3	3D
	Advanced Writing ⁷	3	2
	Social and Behavioral Sciences ⁸	3	3C
<i>Select courses from the following:</i> ⁹			
	ANTH, ECON, GR, POLS, PSY,	3-12	
	SOC		
	Electives ⁶	6-15	

Course	Title	Cr	AUCC
TOTAL		30	
JUNIOR			
HIST ***	History, AUCC Category 4A ^{10,11}	3	4A
HIST ***	History, upper-division non-U.S. ^{11,12}	6	
HIST ***	History, upper-division U.S. ^{11,13}	3	
Select courses from the following: ⁹			
	ANTH, ECON, GR, POLS, PSY, SOC	9-18	
	Electives ⁶	0-9	
TOTAL		30	
SENIOR			
HIST 492 ^P	Capstone Seminar ¹	3	4A, 4B, 4C
	History electives, upper-division ¹¹	9	
	Electives ⁶	18	
TOTAL		30	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Grade of C or better required.

² Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select at least three credits from the list of courses in category 1B in the AUCC.

⁶ Select enough elective credits to bring the program total to a minimum of 120 credits, of which at least 42 must be upper division.

⁷ Select from the list of courses in category 2 in the AUCC.

⁸ Select from the list of courses in category 3C in the AUCC.

⁹ 12 of the 21 credits must be upper-division regular courses (300-379; 400-479).

¹⁰ Select from list below of history courses that may be used to fulfill the category 4A requirement:

Category 4A Courses

Course	Title	Cr	AUCC
HIST 300 ^P	Ancient Greece to 323 B.C.E.	3	4A
HIST 301 ^P	Ancient Rome	3	4A
HIST 303 ^P	Hellenistic World: Alexander to Cleopatra	3	4A
HIST 304 ^P	Women in the Ancient World	3	4A
HIST 308 ^P	Ancient Christianity to 500 A.D.	3	4A
HIST 309 ^P	Medieval Christianity, 500-1500	3	4A
HIST 311 ^P	Medieval England	3	4A
HIST 315 ^P	Tudor Stuart England, 1485-1689	3	4A
HIST 317 ^P	Renaissance and Reformation Europe	3	4A
HIST 318 ^P	The Age of the Enlightenment	3	4A
HIST 319 ^P	Early Modern France, 1500-1789	3	4A
HIST 320 ^P	Women and Gender in Europe, 1450-1789	3	4A
HIST 321 ^P	Industrial Revolution in Europe	3	4A
HIST 322 ^P	Themes in Modern European Social History	3	4A
HIST 323 ^P	Russia Before 1700	3	4A
HIST 324 ^P	Imperial Russia	3	4A
HIST 327 ^P	Habsburg Empire	3	4A
HIST 328 ^P	Modern Europe, 1815-1914.	3	4A
HIST 329 ^P	Europe in Crisis, 1914-1941	3	4A
HIST 330 ^P	Eastern Europe Since 1918	3	4A
HIST 331 ^P	The Soviet Union	3	4A
HIST 332 ^P	Germany Since World War I	3	4A
HIST 333 ^P	Contemporary Europe	3	4A
HIST 334 ^P	European Culture in the 20th Century	3	4A
HIST 335 ^P	Britain in the 20th Century	3	4A
HIST 340 ^P	Colonial North America, 1492-1800	3	4A
HIST 341 ^P	Eighteenth Century America	3	4A
HIST 343 ^P	Early U.S. Republic	3	4A
HIST 344 ^P	Age of Jackson	3	4A
HIST 345 ^P	Civil War Era	3	4A
HIST 346 ^P	Reconstruction and the New South	3	4A
HIST 347 ^P	United States, 1876-1917	3	4A
HIST 348 ^P	United States, 1917-1945	3	4A
HIST 349 ^P	United States Since 1945	3	4A
HIST 350 ^P	United States Foreign Relations Since 1914	3	4A
HIST 351 ^P	American West to 1900	3	4A

HIST 352 ^P	American West Since 1900	3	4A
HIST 353 ^P	American Southwest.	3	4A
HIST 354 ^P	American Architectural History	3	4A
HIST 355 ^P	American Environmental History	3	4A
HIST 356 ^P	American Intellectual History	3	4A
HIST 357 ^P /	The American Military Experience	3	4A
MLSC 357 ^P			
HIST 359 ^P	Women in America	3	4A
HIST 360 ^P	United States Immigration History	3	4A
HIST 410 ^P	Colonial Latin America	3	4A
HIST 412 ^P	Mexico	3	4A
HIST 413 ^P	Caribbean Civilization	3	4A
HIST 414 ^P	Revolutions in Latin America	3	4A
HIST 421 ^P	Africa: Colonialism to Independence	3	4A
HIST 422 ^P	Modern Africa	3	4A
HIST 423 ^P	South African History	3	4A
HIST 430 ^P	Ancient Near East	3	4A
HIST 431 ^P	Ancient Israel.	3	4A
HIST 432 ^P	Sacred History in the Bible and the Qur'an	3	4A
HIST 433 ^P	Muhammad and the Origins of Islam	3	4A
HIST 438 ^P	The Modern Middle East	3	4A
HIST 440 ^P	Modern South Asia	3	4A
HIST 441 ^P	South Asia Since Independence	3	4A
HIST 450 ^P	Ancient China	3	4A
HIST 451 ^P	Medieval China Central Asia	3	4A
HIST 452 ^P	China in the Modern World, 1600-Present	3	4A
HIST 455 ^P	Tokugawa and Modern Japan, 1600-Present	3	4A
HIST 461 ^P	Great Britain and the Empire, 1714-1901	3	4A
HIST 462 ^P	Themes in World History	3	4A
HIST 463 ^P	Science and Technology in Modern History	3	4A
HIST 464 ^P	Pacific Wars: Philippines-WWII	3	4A
HIST 465 ^P	Pacific Wars: Korea and Vietnam	3	4A
HIST 466 ^P	U.S. China Relations Since 1800	3	4A
HIST 469 ^P	The Crusades	3	4A
HIST 479 ^P	Practice of Public History	3	4A

¹¹ Any student seeking to register for 300- or 400-level history courses must have completed 45 credits or have received written consent from the instructor.

¹² Select one upper-division course from two categories-Africa, East Asia, Europe, Latin America/ Caribbean, Middle East, South Asia, World/Trans-regional. See table below footnote 13.

¹³ Select one upper-division course from North America/US category:

Upper-Division Course Categories

Course Number Range	Title
HIST 300 – HIST 339	Europe
HIST 340 – HIST 379	North America/US
HIST 410 – HIST 419	Latin America
HIST 420 – HIST 429	Africa
HIST 430 – HIST 439	Middle East
HIST 440 – HIST 449	South Asia
HIST 450 – HIST 459	East Asia
HIST 460 – HIST 471	World/Trans-regional

Social Studies Teaching Concentration

The Social Studies Teaching concentration is for students who plan to teach in junior high, middle school, or high school. Students must also complete the requirements for the social studies undergraduate teaching licensure in the College of Applied Human Sciences, School of Teacher Education and Principal Preparation.

Students interested in pursuing a teaching license through Colorado State University may refer to the School of Teacher Education and Principal Preparation (STEPP), College of Applied Human Sciences section in this catalog for general information. Detailed information about STEPP

and licensure requirements is available on the program's website (www.stepp.cahs.colostate.edu/) or in room 111 of the Education Building.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
GR 100	Introduction to Geography	3	
<i>Select one course from the following:</i>			
HIST 100	Western Civilization, Pre-Modern ¹	3	
HIST 115	Islamic World to 1800 ¹	3	
HIST 120	Asian Civilizations I ¹	3	
HIST 170	World History, Ancient-1500 ¹	3	
<i>Select one course from the following:</i>			
HIST 101	Western Civilization, Modern ¹	3	3D
HIST 121	Asian Civilizations II ¹	3	3D
HIST 171	World History, 1500-Present ¹	3	3D
SPCM 200	Public Speaking ¹	3	
	Art and Humanities ²	3	3B
	Biological and Physical Sciences ³	7	3A
	Mathematics ⁴	3	1B
	Electives	2	
	TOTAL	30	
SOPHOMORE			
<i>Select one course from the following:</i>			
ANTH 100	Introductory Cultural Anthropology	3	3C
PSY 100	General Psychology	3	3C
SOC 100	General Sociology	3	3C
SOC 105	Social Problems	3	3C
<i>Select two courses from the following:</i>			
ECON 101	Economics of Social Issues	3	3C
ECON 202 ^P	Principles of Microeconomics	3	3C
ECON 204 ^P	Principles of Macroeconomics	3	3C
ECON 211	Gender in the Economy	3	3E
ECON 212	Racial Inequality and Discrimination	3	3C
ECON 240/ AREC 240	Issues in Environmental Economics	3	3C
EDUC 275 ^P	Schooling in the United States	3	3C
EDUC 340 ^P	Literacy and the Learner	3	
HIST 150	U.S. History to 1876 ¹	3	3D
HIST 151	U.S. History Since 1876 ¹	3	3D
POLS 101	American Government and Politics	3	3C
POLS 241	Comparative Government and Politics	3	3E
	Advanced Writing ⁵	3	2
	TOTAL	30	
JUNIOR			
EDUC 331 ^P	Educational Technology and Assessment	2	
EDUC 350 ^P	Instruction I- Individualization/Management	3	
EDUC 386 ^P	Practicum-Instruction I	1	
EDUC 450 ^P	Instruction II-Standards and Assessment	4	
EDUC 465 ^P	Methods and Materials in Social Studies	4	
EDUC 486E ^P	Practicum-Instruction II	1	
GR 320 ^P	Cultural Geography	3	
HIST ***	History, AUCC Category 4A ^{6,7}	3	4A
HIST ***	History, upper-division non-U.S. ^{7,8}	3-6	
HIST ***	History, upper-division U.S. ^{7,9}	3-6	
	TOTAL	30	
SENIOR			
EDUC 485B ^P	Student Teaching-Secondary	11	
EDUC 493A ^P	Seminar-Professional Relations	1	
HIST 492 ^P	Capstone Seminar	3	4A, 4B, 4C 3B
	Arts and Humanities ²	3	
HIST ***	History, upper-division non-U.S. ^{7,8}	0-6	
HIST ***	History, upper-division U.S. ^{7,9}	0-6	
	Electives	6	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Grade of C or better required.

² Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

⁴ Select at least three credits from the list of courses in category 1B in the AUCC.

⁵ Select from the list of courses in category 2 of the AUCC.

⁶Select from the list below, with advisor approval, to fulfill the category 4A requirement. The selected course may apply towards the History, upper-division (U.S. or non-U.S.) program requirements:

Category 4A Courses

Course	Title	Cr	AUCC
HIST 300 ^P	Ancient Greece to 323 B.C.E.	3	4A
HIST 301 ^P	Ancient Rome	3	4A
HIST 303 ^P	Hellenistic World: Alexander to Cleopatra	3	4A
HIST 304 ^P	Women in the Ancient World	3	4A
HIST 308 ^P	Ancient Christianity to 500 A.D.	3	4A
HIST 309 ^P	Medieval Christianity, 500-1500	3	4A
HIST 311 ^P	Medieval England	3	4A
HIST 315 ^P	Tudor Stuart England, 1485-1689	3	4A
HIST 317 ^P	Renaissance and Reformation Europe	3	4A
HIST 318 ^P	The Age of the Enlightenment	3	4A
HIST 319 ^P	Early Modern France, 1500-1789	3	4A
HIST 320 ^P	Women and Gender in Europe, 1450-1789	3	4A
HIST 321 ^P	Industrial Revolution in Europe	3	4A
HIST 322 ^P	Themes in Modern European Social History	3	4A
HIST 323 ^P	Russia Before 1700	3	4A
HIST 324 ^P	Imperial Russia	3	4A
HIST 327 ^P	Habsburg Empire	3	4A
HIST 328 ^P	Modern Europe, 1815-1914.	3	4A
HIST 329 ^P	Europe in Crisis, 1914-1941	3	4A
HIST 330 ^P	Eastern Europe Since 1918	3	4A
HIST 331 ^P	The Soviet Union	3	4A
HIST 332 ^P	Germany Since World War I	3	4A
HIST 333 ^P	Contemporary Europe	3	4A
HIST 334 ^P	European Culture in the 20th Century	3	4A
HIST 335 ^P	Britain in the 20th Century	3	4A
HIST 340 ^P	Colonial North America, 1492-1800	3	4A
HIST 341 ^P	Eighteenth Century America	3	4A
HIST 343 ^P	Early U.S. Republic	3	4A
HIST 344 ^P	Age of Jackson	3	4A
HIST 345 ^P	Civil War Era	3	4A
HIST 346 ^P	Reconstruction and the New South	3	4A
HIST 347 ^P	United States, 1876-1917	3	4A
HIST 348 ^P	United States, 1917-1945	3	4A
HIST 349 ^P	United States Since 1945	3	4A
HIST 350 ^P	United States Foreign Relations Since 1914	3	4A
HIST 351 ^P	American West to 1900	3	4A
HIST 352 ^P	American West Since 1900	3	4A
HIST 353 ^P	American Southwest.	3	4A
HIST 354 ^P	American Architectural History	3	4A
HIST 355 ^P	American Environmental History	3	4A
HIST 356 ^P	American Intellectual History	3	4A
HIST 357 ^P / MLSC 357 ^P	The American Military Experience	3	4A
HIST 359 ^P	Women in America	3	4A
HIST 360 ^P	United States Immigration History	3	4A
HIST 410 ^P	Colonial Latin America	3	4A
HIST 412 ^P	Mexico	3	4A
HIST 413 ^P	Caribbean Civilization	3	4A
HIST 414 ^P	Revolutions in Latin America	3	4A
HIST 421 ^P	Africa: Colonialism to Independence	3	4A
HIST 422 ^P	Modern Africa	3	4A
HIST 423 ^P	South African History	3	4A
HIST 430 ^P	Ancient Near East	3	4A
HIST 431 ^P	Ancient Israel.	3	4A
HIST 432 ^P	Sacred History in the Bible and the Qur'an	3	4A
HIST 433 ^P	Muhammad and the Origins of Islam	3	4A
HIST 438 ^P	The Modern Middle East	3	4A
HIST 440 ^P	Modern South Asia	3	4A
HIST 441 ^P	South Asia Since Independence	3	4A
HIST 450 ^P	Ancient China	3	4A
HIST 451 ^P	Medieval China Central Asia	3	4A
HIST 452 ^P	China in the Modern World, 1600-Present	3	4A
HIST 455 ^P	Tokugawa and Modern Japan, 1600-Present	3	4A

HIST 461 ^P	Great Britain and the Empire, 1714-1901	3	4A
HIST 462 ^P	Themes in World History	3	4A
HIST 463 ^P	Science and Technology in Modern History	3	4A
HIST 464 ^P	Pacific Wars: Philippines-WWII	3	4A
HIST 465 ^P	Pacific Wars: Korea and Vietnam	3	4A
HIST 466 ^P	U.S. China Relations Since 1800	3	4A
HIST 469 ^P	The Crusades	3	4A
HIST 479 ^P	Practice of Public History	3	4A

HIST 477 ^P	Teaching History	3
HIST 479 ^P	Practice of Public History	3

Minor in History

The minor, consisting of 21 credits allows non-majors to earn a credential in history.

⁷ Any student seeking to register for 300- or 400-level history courses must have completed 45 credits or have received written consent from the instructor.

⁸ Select one upper-division course from three different categories-Africa, East Asia, Europe, Latin America/ Caribbean, Middle East, South Asia, World/Trans-regional for a total of 9 credits. The selected History, Category 4A course may apply towards this requirement:

Upper-Division Course Categories

Course Number Range	Title
HIST 300 – HIST 339	Europe
HIST 340 – HIST 379	North America/US
HIST 410 – HIST 419	Latin America
HIST 420 – HIST 429	Africa
HIST 430 – HIST 439	Middle East
HIST 440 – HIST 449	South Asia
HIST 450 – HIST 459	East Asia
HIST 460 – HIST 471	World/Trans-regional

⁹ Select three upper-division courses; one Pre-1876, one Post-1876, one any period from the department list of upper-division North America/US history courses for a total of 9 credits. The selected History, Category 4A course may apply towards this requirement:

U.S. History Courses – Pre-1876 and Post-1876

Course	Title	Cr
U.S. History Pre-1876		
HIST 340 ^P	Colonial North America, 1492-1800	3
HIST 341 ^P	Eighteenth Century America	3
HIST 342 ^P	The Old South	3
HIST 343 ^P	Early US Republic	3
HIST 344 ^P	Age of Jackson	3
HIST 345 ^P	Civil War Era	3
HIST 351 ^P	American West to 1900	3
HIST 358 ^P	American Women's History to 1800	3
HIST 361 ^P	American Indians in the Age of Conquest	3
HIST 366 ^P	African-American History to 1865	3
U.S. History Post-1876		
HIST 346 ^P	Reconstruction and the New South	3
HIST 347 ^P	United States, 1876-1917	3
HIST 348 ^P	United States, 1917-1945	3
HIST 349 ^P	United States Since 1945	3
HIST 350 ^P	United States Foreign Relations Since 1914	3
HIST 352 ^P	American West Since 1900	3
HIST 353 ^P	US-Mexico Borderlands	3
HIST 354 ^P	American Architectural History	3
HIST 355 ^P	American Environmental History	3
HIST 356 ^P	American Cultural and Intellectual History	3
HIST 357 ^{P/}	The American Military Experience	3
MLSC 357 ^P		
HIST 359 ^P	American Women's History Since 1800.	3
HIST 360 ^P	United States Immigration History	3
HIST 362 ^P	American Indian Renaissance in Modern America	3
HIST 363 ^P	Colorado History	3
HIST 364 ^{P/}	Asian American Social Movements, 1945-Present	3
ETST 364 ^P		
HIST 365 ^P	American West Field Study	3
HIST 367 ^P	African-American History Since 1865	3
HIST 379 ^{P/}	Economic History of the United States.	3
ECON 379 ^P		
HIST 476 ^P	History of America's National Parks	3
U.S. History Any Period		
HIST 340 ^P -	North America/US	3
HIST 379 ^P		
HIST 476 ^P	History of America's National Parks	3

LOWER DIVISION

Appropriate courses as determined in consultation with a History Department adviser.

UPPER DIVISION

Minimum of 12 credits.

PROGRAM TOTAL = 21 credits

Graduate Programs in History

The department offers graduate programs leading to the Master of Arts degree. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, www.colostate.edu/Depts/Hist/index.html.

DEPARTMENT OF JOURNALISM AND TECHNICAL COMMUNICATION

Office in Clark Building, Room C244
(970) 491-6310

journalism.colostate.edu/

Professor Greg Luft, Chair

Professor Craig Trumbo, Graduate Coordinator

Major in Journalism and Technical Communication

The study of journalism, mass communication and specialized media combines high-level professional training with a broad foundation in the liberal arts. All students complete a common 21-credit core, including writing, multimedia and conceptual courses, as well as a capstone course and an internship. Students work closely with a faculty advisor to select an additional 19 credits in a focus area crafted to match their career interests. Practical experience can be gained on the staffs of the daily *Rocky Mountain Collegian*, the award-winning campus television station CTV, *College Avenue* magazine, and KCSU-FM Radio. Graduating seniors present professional portfolios for assessment by panels of faculty and communication

professionals from Denver and elsewhere in Colorado. Because successful communicators require broad knowledge, this flexible program encourages development of a background in the humanities, social sciences, natural sciences, and in-depth study in an area of interest outside journalism. The addition of a minor or double major in disciplines such as political science; information technology; history; economics; business; communication studies; psychology; the arts; or natural or applied sciences is possible.

The Department of Journalism and Technical Communication is one of a relatively small number of departments formally recognized by the Accrediting Council on Education in Journalism and Mass Communications. Participation in volunteer activities, cooperative education opportunities or communication-related part time jobs is highly recommended to enhance practical training and development.

Learning Outcomes

Students will demonstrate:

- Competence in writing, editing, and producing media messages as well as in planning, designing and evaluating effective public information programs
- Knowledge and use of communication theory and research principles to guide the selection of communication audiences, message content and format, and media channels to enhance communication impact
- Understanding of the ethics, laws, and values associated with professional communication activity

Potential Occupations

The Journalism and Technical Communication program emphasizes the role of mass and specialized media in society and prepares students for entry-level work in private business, government, and education. Depending upon the focus of study, students may find career opportunities in a wide variety of professional communication venues. Specific career opportunities may include: advertising copywriter, designer or producer; agriculture writer, reporter or editor; attorney specializing in communication law; blogger, columnist or editorial cartoonist; college professor; communications manager or director; company spokesperson; corporate media specialist; e-mail and direct mail strategist; environmental media specialist; freelance writer, editor or photographer; health writer, editor or producer; marketing coordinator; media relations director or strategist; multimedia producer; non-profit communications director; novelist or non-fiction author; reporter or photojournalist for the web, magazines, newspapers or television; owner of public relations agency or production company; professional speaker; public affairs officer for

government agency; public relations agency account executive; publication designer for magazines or newspapers; radio disc jockey, reporter or music director; reality television producer, writer, photographer or on-camera talent; science writer or editor; social media specialist; sports writer, photographer or producer; technical writer or editor; teacher for any level of K-12 education; television news anchor or program host; television or radio news program producer or director; television documentary producer; travel writer, photographer or program host; video editor for news, corporate or entertainment television; website designer and manager.

All majors in the department must earn a minimum grade of C (a grade of C- is not acceptable) in each course that carries the JTC prefix.

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
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ASSOCIATION FOR EDUCATION IN JOURNALISM AND MASS COMMUNICATION ACCREDITATION REQUIREMENTS
 Majors in Journalism and Technical Communication must take 40 credits of JTC courses and 80 credits outside of JTC.

Of the 80 credits outside of JTC, 65 must be courses from either the College of Liberal Arts and/or the College of Natural Sciences, and 21 must meet **one** of the following Second Field criteria with approval of advisor: ¹

- 1) a Minor;
- 2) an Interdisciplinary Minor;
- 3) 21 credits in one subject code;
- 4) 9 credits from one subject code and 12 credits from a second subject code;
- 5) a selection of 21 credits comprising a Second Field developed by the student and the advisor.

Courses taken outside of the department may include AUCC courses, Minor or Second Field courses, or any other out-of-department (non-JTC) courses used to complete the major as approved by advisor.

The 40 JTC required credits include 21 credits specified in the curriculum below plus 19 credits of directed electives to create an individualized focus area from the following 4 categories (Writing, Production, Internship/Practicum, Additional credits).

DIRECTED ELECTIVES for INDIVIDUALIZED FOCUS AREA
 Over the sophomore, junior, and senior years, students must complete a minimum of 19 credits in an individually designed focus area. Students must select those 19 credits from among the following categories and courses in consultation with advisor, as follows:

Writing			
<i>Select at least three credits (one course) from the following:</i>			
JTC	310 ^P	Copy Editing	3
JTC	320 ^P	Reporting	3
JTC	328 ^P	Feature Writing	3
JTC	341 ^P	Broadcast News	3
JTC	342 ^P	Writing for Specialized Electronic Media	3
JTC	350	Public Relations	3
JTC	351 ^P	Public Relations Practices	3
JTC	355	Advertising	3
JTC	361 ^P	Writing for Specialized Magazines	3
JTC	365 ^P	Computer Mediated Communication Foundations	3 4A
JTC	420 ^P	Advanced Reporting	3 4A, 4C
JTC	450 ^P	Public Relations Cases	3 4A, 4C
JTC	461 ^P	Writing About Science, Health, and Environment	3
JTC	464 ^P	Technical Writing	3
JTC	465 ^P	Specialized and Technical Editing	3 4A, 4C
Production			
<i>Select at least three credits (one course) from the following:</i>			

Course	Title	Cr	AUCC
JTC 335 ^P	Digital Photography	3	
JTC 340 ^P	Digital Video Editing	3	
JTC 343 ^P	Advanced Television News Production	3	
JTC 345 ^P	Electronic Field Production	3	
JTC 353 ^P	Public Relations Campaigns	3	
JTC 371 ^P	Publications Design and Production	3	
JTC 372 ^P	Web Design and Management	3	
JTC 373 ^P	Digital Promotion Management	3	
JTC 433 ^P	Advanced Video Editing	3	
JTC 435 ^P	Documentary Video Production	3	
JTC 440 ^P	Advanced Electronic Media Production	3	4A, 4C
JTC 468 ^P	Convergence and Hypermedia	3	4C
Internship/Practicum⁷ <i>Select a minimum of 1 credit (a maximum of 4 credits) from the following:</i>			
JTC 386	Practicum	1	
JTC 487 ^P	Internship	1	
Additional Credits⁸ <i>Select twelve additional credits from the courses listed above under Writing, Production, Concept, and Internship/Practicum, and/or from JTC 484, JTC 490, JTC 495A-G, or JTC 496. Students may select no more than a total of 4 credits of Internship/Practicum, and no more than a total of 7 credits of reserved number (-80 to -99) courses to satisfy this requirement.</i>			
			12

FRESHMAN

CO 150 ^P	College Composition	3	1A
JTC 100	Media in Society	3	3C
	Arts and Humanities ²	6	3B
	Biological and Physical Sciences ³	7	3A
	Global and Cultural Awareness ⁴	3	3E
	Historical Perspectives ⁵	3	3D
	Mathematics ⁵	3	1B
	Electives	2	
TOTAL			30

SOPHOMORE

JTC 210 ^P	Newswriting	3	
JTC 211 ^P	Computer Mediated Visual Communication	3	
STAT 201 ^P	General Statistics	3	
OR			
	Statistics ¹²	3	
	Individualized Focus Area and/or Second Field courses ⁹	15	
	Advanced Writing ¹⁰	3	2
	Social and Behavioral Sciences ¹¹	3	3C
TOTAL			30

JUNIOR¹³

<i>Select one course from the following to fulfill the Concept Course requirement:</i>			
JTC 311	History of Media	3	
JTC 316/ETST 316	Multiculturalism and the Media	3	
JTC 411	Media Ethics and Issues	3	4A, 4B
JTC 412	International mass Communication	3	
JTC 413	New Communication Technologies and Society	3	4A, 4B
JTC 414	Media Effects	3	
JTC 415	Communications Law	3	4A, 4B
JTC 456 ^P /LB 456 ^P	Documentary Film as a Liberal Art	3	
JTC 471 ^P	Communication Research Methods	3	
JTC 326 ^P	Online Writing and Information	3	
	Individualized Focus Area and/or Second Field courses ⁹	15	
	Out-of-department courses ¹⁴	9	
TOTAL			30

SENIOR¹³

JTC 411	Media Ethics and Issues ¹⁵	3	4A, 4B
OR			
JTC 415	Communications Law ¹⁵	3	4A, 4B

Course	Title	Cr	AUCC
JTC 460 ^P	Media Development ^{13, 16}	3	4C
	Individualized Focus Area and/or Second Field courses ⁹	10	
	Out-of-department courses ¹⁴	14	
TOTAL			30

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Students selecting 21 credits from outside the College of Liberal Arts and the College of Natural Sciences will still be required to meet the requirement of 65 credits from within those colleges and may end up taking more than 120 credits to complete the degree. Of the 21 credits required for the Second Field, 12 must be upper division and none may be from JTC.

² Select two courses from category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L***200 and L***201) foreign language courses.

³ Select a total of seven credits from category 3A in the AUCC, including one laboratory course.

⁴ Select three credits from category 3E in the AUCC.

⁵ Select three credits from category 3D in the AUCC.

⁶ Select three credits from category 1B in the AUCC.

⁷ With approval of department and advisor, students may substitute a 400-level Journalism and Technical Communication study abroad course for 1 credit of the Internship/Practicum requirement and up to 3 credits of the Additional Credits requirement, for a maximum total of 4 credits for study abroad.

⁸ High-achieving students, with approval of advisor, may select JTC 535, Electronic Media Regulation and Policy, or JTC 544, Corporate and Institutional Media Production, to satisfy 3 credits of the Additional Credit requirement.

⁹ Select a minimum of 19 credits of Focus Area courses and 21 credits of Second Field courses over the sophomore, junior, and senior years, in consultation with advisor.

¹⁰ Select 3 credits other than JTC 300 from category 2 in the AUCC.

¹¹ Select 3 credits other than JTC 100 from category 3C in the AUCC. Students in this major must take 3 credits of Social and Behavioral Sciences other than JTC 100, which is required in the freshman year.

¹² Select a three-credit statistics course offered by any department, with approval of advisor.

¹³ Students must complete a minimum of 6 credits of AUCC category 4, comprising categories 4A, 4B, and 4C for this major.

¹⁴ Of the 23 credits required for out-of-department courses in the junior and senior years, a minimum of 5 credits must be upper division.

¹⁵ If either JTC 411 or JTC 415 was taken as a Concept Course in the junior year, select the remaining course here. High-achieving students, with approval of advisor, may select JTC 535 as an alternative here, providing they have completed or will complete the AUCC category 4B requirement with another course.

¹⁶ Students enrolled in the university prior to Fall 2011 may substitute JTC 420, JTC 440, JTC 450, JTC 465, or JTC 468 for their category 4C capstone course, in consultation with advisor.

Media Studies Minor

The Departments of Journalism and Technical Communication and Communication Studies offer a minor in media studies. See the Interdepartmental Minor in Media Studies under the College of Liberal Arts listing in this section of the catalog.

Graduate Programs in Public Communication and Technology

The department offers a Master of Science degree in Public Communication and Technology for students aspiring to communication management careers in technical and scientific communication, public relations, or public information for business, industry, government, and educational institutions.

The department's Ph.D. program in Public Communication and Technology enables students to explore the role of information in the public's understanding of contemporary issues and the impact of new communication technologies in people's lives. Doctoral students develop expertise in one of three areas: human behavior and technology, organizations and technology, or social policy and technology.

A description of these programs may be found in the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, journalism.colostate.edu/.

DEPARTMENT OF MUSIC, THEATRE, AND DANCE

Office in University Center for the Arts, Room 120
(970) 491-5529

sota.colostate.edu/
www.music.colostate.edu/
www.theatre.colostate.edu/
www.dance.colostate.edu/

Dr. Todd Queen, Co-Director, School of the Arts, and Chair, Department of Music, Theatre, and Dance

Major in Music (B.M.)

Our primary goal is to prepare students to become highly skilled music educators, music therapists, performers, composers, and conductors. Program goals encourage and develop high standards of teaching, scholarship, performance, and research in music. We are pleased to offer small academic classes, applied study with highly qualified faculty, and careful attention to advising. Courses in music appreciation, music theory fundamentals, and ensembles are open to all students regardless of major.

Learning Outcomes

Students will demonstrate:

- Ability to perform music from a variety of historical/style periods, and exhibit the appropriate skills for musical self-expression in juried performances. These skills include: techniques, musicianship, tone, diction/articulation, style, interpretation, and artistry.
- Understanding of the common elements and organizational patterns of music, including musical forms, processes, and structures.
- Knowledge of music history and representative composers and works from each on a defined evaluation instrument.

Music majors are expected to pass comprehensive examinations in music history and theory upon completion of course sequences in those areas. Students are also expected to learn music literature from all periods through aural and score analysis. Performance skills are tested at the end of the sophomore year and in a graduation recital if required by the degree option. Some programs require satisfactory completion of supervised student teaching, an internship, or a senior project.

In addition, all students must pass a piano proficiency examination.

Potential Occupations

The undergraduate music curricula at Colorado State University can lead to personally fulfilling careers as music educators, music therapists, performers, composers, and conductors. Music graduates from Colorado State have successfully gained employment in public and private schools, hospitals and institutions, and as professional performers, conductors, and composers.

Composition Concentration

The Composition concentration is designed to prepare the student to compose original music for a wide variety of venues including live concerts, music to accompany film, video, dance, and theatre. Course work emphasizes comprehensive musicianship throughout the curriculum with particular emphasis on individualized study in music composition.

A minimum grade of C is required in all music courses used to satisfy the requirements of the major programs (B.A. and B.M.) in music.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
MU 117 ^P	Music Theory I	4	
MU 118 ^P	Music Theory II	4	
MU 131	Introduction to Music History and Literature	3	3B
MU 172A ^P	Freshman Voice Studio I ¹	2	
AND			
MU 172B ^P	Freshman Voice Studio II ¹	2	
OR			
MU 272A-V ^P	Applied Music Instruction ¹	2	
MU	Ensemble ²	2	
	Historical Perspectives ³	3	3D
	Mathematics ⁴	3	1B
	Electives ⁵	4-6	
	TOTAL	30	
SOPHOMORE			
MU 217 ^P	Music Theory III	4	
MU 218 ^P	Music Theory IV	4	
MU 254 ^P	Beginning Conducting	2	
MU 272A-V ^P	Applied Music Instruction ¹	2	
MU 273 ^P	Composition Instruction	2	
MU	Ensemble ²	2	
PSY 100	General Psychology	3	3C
	Advanced writing ⁶	3	2
	Electives	8	
	TOTAL	30	

Course	Title	Cr	AUCC
JUNIOR			
MU 317 ^P	Music Theory V	2	
MU 318 ^P	Arranging and Orchestration	2	
MU 334 ^P	Music History I	3	4A, 4B
MU 335 ^P	Music History II	3	4A, 4B
MU 355 ^P	Choral Conducting and Literature	2	
OR			
MU 356	Instrumental Conducting and Literature	2	
MU 473 ^P	Composition Instruction	4	
MU 499 ^P	Thesis	1	
MU	Ensemble ²	2	
	Arts and Humanities ⁷	3	3B
	Music electives	3	
	Electives	5	
	TOTAL	30	
SENIOR			
MU 417	Counterpoint	3	
MU 418 ^P	Advanced Orchestration	2	
MU 419 ^P	Electronic Music Composition	2	
MU 471 ^P	Recital	1	4C
MU 473 ^P	Composition Instruction	4	
MU	Ensemble ²	2	
	Biological and Physical Sciences ⁸	7	3A
	Global and Cultural Awareness ⁹	3	3E
	Electives	6	
	TOTAL	30	

PROGRAM TOTAL = 120 credits¹⁰

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ First-year Voice students take MU 172A and MU 172B, then MU 272Q the second year for 2 semesters. Instrumentalists take MU 272A-P or MU 272R-V on a major instrument for 2 semesters each of the first 2 years.

² Two semesters.

³ Select a course from the list in category 3D of the AUCC.

⁴ Select at least three credits from the list of courses in category 1B in the AUCC.

⁵ Voice students take four credits of electives. Instrumentalists take six credits of electives.

⁶ Select one course from the list in category 2 of the AUCC.

⁷ Select from the list of courses in category 3B in the AUCC. Only three of the six credits required in arts and humanities may come from foreign language courses.

⁸ Select two courses (one with a laboratory) from the list of courses in category 3A in the AUCC.

⁹ Select from the list of courses in category 3E in the AUCC.

¹⁰ Minimum number of credits required to complete the major. Forty-two of these credits must be upper division.

Music Education Concentration

The Music Education program at Colorado State University is one of the leading teacher-training programs in the nation. Faculty members are in demand as clinicians, guest lecturers, conductors, and researchers. Undergraduate Music Education majors pursue an accredited curriculum that develops musical knowledge and skills, and prepares students to become accomplished music educators. Students must select one of two options, instrumental or vocal.

Students interested in pursuing a teaching license through Colorado State University may refer to the School for Teacher Education and Principal Preparation (STEPP), College of Applied Human Sciences section in this catalog for general information. Detailed information on STEPP and licensure requirements is available on the program's website (www.stepp.cahs.colostate.edu/) or in room 111 of the Education Building.

Instrumental Option

A minimum grade of C is required in all music courses used to satisfy the requirements of the major programs (B.A. and B.M.) in music. Music majors concentrating in music education must also complete all required education courses with a minimum grade of C.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
MU 117 ^P	Music Theory I	4	
MU 118 ^P	Music Theory II	4	
MU 131	Introduction to Music History and Literature	3	3B
MU 251 ^P	Voice Techniques	1	
MU 252A	Instrumental Techniques-Brass	2	
MU 252D	Instrumental Techniques-Percussion	1	
MU 272A-V ^P	Applied Music Instruction ¹	2	
MU 286	Practicum—Music Education	1	
MU	Ensembles ²	2	
	Arts and Humanities ³	3	3B
	Historical Perspectives ⁴	3	3D
	Mathematics ⁵	3	1B
	TOTAL	32	
SOPHOMORE			
EDUC 275 ^P	Schooling in the United States	3	3C
EDUC 340 ^P	Literacy and the Learner	3	
MU 217 ^P	Music Theory III	4	
MU 218 ^P	Music Theory IV	4	
MU 252B	Instrumental Techniques-Woodwinds	2	
MU 252C	Instrumental Techniques-Strings	1	
MU 254 ^P	Beginning Conducting	2	
MU 272A-V ^P	Applied Music Instruction ¹	2	
MU 425	Jazz Pedagogy	2	
MU	Ensembles ²	2	
PSY 100	General Psychology	3	3C
	Advanced writing ⁵	3	2
	TOTAL	31	
JUNIOR			
EDUC 331 ^P	Educational Technology and Assessment	2	
EDUC 350 ^P	Instruction I- Individualization/Management	3	
EDUC 386 ^P	Practicum-Instruction I	1	
EDUC 474 ^P	Elementary Music Methods I	2	
EDUC 475 ^P	Elementary School Music Methods II	2	
MU 317 ^P	Music Theory V	2	
MU 318 ^P	Arranging and Orchestration	2	
MU 334 ^P	Music History I	3	4A, 4B
MU 335 ^P	Music History II	3	4A, 4B
MU 356	Instrumental Conducting and Literature	2	
MU 420 ^P	Marching Band Techniques ⁷	2	
OR			
MU 421 ^P	Orchestral Techniques ⁷	2	
MU 472A-V ^P	Applied Music Instruction ¹	2	
MU	Ensembles ²	2	
	Biological and Physical Sciences ⁸	3	3A
	Electives	2	
	TOTAL	33	
SENIOR			
EDUC 450 ^P	Instruction II-Standards and Assessment	4	
EDUC 477 ^P	Instrumental Methods for Secondary Schools	2	
EDUC 485A ^P	Student Teaching-Elementary	6	
EDUC 485B ^P	Student Teaching-Secondary	6	
EDUC 486 ^P	Practicum-Instruction II	1	
EDUC 493A ^P	Seminar-Professional Relations	1	
MU 471 ^P	Recital	1	4C
MU 472A-V ^P	Applied Music Instruction	1	
MU	Ensemble ²	1	
	Biological and Physical Sciences ⁸	4	3A
	Global and Cultural Awareness ⁹	3	3E

Course	Title	Cr	AUCC
TOTAL		30	
PROGRAM TOTAL = 126 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Major instrument; two semesters except senior year.

² Wind and percussion majors must take MU 204 (Marching Band) twice during their four year program.

³ Select from list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁴ Select from list of courses in category 3D in the AUCC.

⁵ Select at least three credits from list of courses in category 1B in the AUCC.

⁶ Select a course from the list in category 2 of the AUCC.

⁷ Wind and percussion majors take MU 420; string majors take MU 421.

⁸ Select from list of courses in category 3A in the AUCC. One course must have a laboratory component.

⁹ Select from list of courses in category 3E in the AUCC.

Vocal Option

A minimum grade of C is required in all music courses used to satisfy the requirements of the major programs (B.A. and B.M.) in music. Music majors concentrating in music education must also complete all required education courses with a minimum grade of C.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
MU 117 ^P	Music Theory I	4	
MU 118	Music Theory II	4	
MU 131	Introduction to Music History and Literature	3	3B
MU 172A ^P	Freshman Voice Studio—English/Italian	2	
MU 172B ^P	Freshman Voice Studio—German/French	2	
MU 252A	Instrumental Techniques—Brass	2	
OR			
MU 252B	Instrumental Techniques—Woodwinds	2	
MU 286	Practicum—Music Education	1	
MU	Ensembles ¹	2	
	Arts and Humanities ²	3	3B
	Historical Perspectives ³	3	3D
	Mathematics ⁴	3	1B
TOTAL		32	
SOPHOMORE			
EDUC 275 ^P	Schooling in the United States	3	3C
EDUC 340 ^P	Literacy and the Learner	3	
MU 217 ^P	Music Theory III	4	
MU 218 ^P	Music Theory IV	4	
MU 252C	Instrumental Techniques-Strings	1	
MU 254 ^P	Beginning Conducting	2	
MU 272A-V ^P	Applied Music Instruction	2	
MU 425	Jazz Pedagogy	2	
MU	Ensembles ¹	2	
PSY 100	General Psychology	3	3C
	Advanced writing ⁵	3	2
	Electives	2	
TOTAL		31	
JUNIOR			
EDUC 331 ^P	Educational Technology and Assessment	2	
EDUC 350 ^P	Instruction I-Individualization/Management	3	
EDUC 386 ^P	Practicum-Instruction I	1	
EDUC 474 ^P	Elementary Music Methods I	2	
EDUC 475 ^P	Elementary School Music Methods II	2	
MU 317 ^P	Music Theory V	2	
MU 318 ^P	Arranging and Orchestration	2	
MU 334 ^P	Music History I	3	4A, 4B
MU 335 ^P	Music History II	3	4A, 4B
MU 355	Choral Conducting and Literature	2	

Course	Title	Cr	AUCC
MU 466	Song Literature	2	
MU 472A-V ^P	Applied Music Instruction	2	
MU	Ensembles ¹	2	
	Biological and Physical Sciences ⁶	3	3A
TOTAL		31	
SENIOR			
EDUC 450 ^P	Instruction II-Standards and Assessment	4	
EDUC 476 ^P	Choral Methods for Secondary Schools	2	
EDUC 485A ^P	Student Teaching-Elementary	6	
EDUC 485B ^P	Student Teaching-Secondary	6	
EDUC 486E ^P	Practicum-Instruction II	1	
EDUC 493A ^P	Seminar-Professional Relations	1	
MU 467 ^P	Vocal Pedagogy	2	
MU 471 ^P	Recital	1	4C
MU 472A-V ^P	Applied Music Instruction	1	
MU	Ensemble	1	
	Biological and Physical Sciences ⁶	4	3A
	Global and Cultural Awareness ⁷	3	3E
TOTAL		32	
PROGRAM TOTAL = 126 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Two semesters.

² Select from list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from list of courses in category 3D in the AUCC.

⁴ Select at least three credits from list of courses in category 1B in the AUCC.

⁵ Select from list of courses in category 2 in the AUCC.

⁶ Select from list of courses in category 3A in the AUCC. One course must have a laboratory component.

⁷ Select from list of courses in category 3E in the AUCC.

Music Therapy Concentration

The Music Therapy concentration is designed to prepare the student to work in a variety of health care settings, including hospitals, clinics, rehabilitation facilities, assisted living centers, and in special education settings. Some music therapists maintain private practices or serve as consultant. The music therapy program at Colorado State University is internationally recognized for its leadership in clinical training and research and houses the Center for Biomedical Research in Music, a major research center for study of neurologic music therapy.

A minimum grade of C is required in all music courses used to satisfy the requirements of the major programs (B.A. and B.M.) in music.

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 103	Chemistry in Context	3	3A
CO 150 ^P	College Composition	3	1A
MU 117 ^P	Music Theory I	4	
MU 118 ^P	Music Theory II	4	
MU 131	Introduction to Music History and Literature	3	3B
MU 155	Guitar Class I	2	
MU 172A ^P	Freshman Voice Studio I ¹	2	
AND			
MU 172B ^P	Freshman Voice Studio II ¹	2	
OR			
MU 272A-V ^P	Applied Music Instruction ¹	2	
MU 241	Introduction to Music Therapy	3	
PSY 100	General Psychology	3	3C
	Ensemble ²	2	

Course	Title	Cr	AUCC
	Mathematics ³	3	1B
	TOTAL	32-34	
SOPHOMORE			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
MU 153 ^P	Piano Class IV	2	
MU 217 ^P	Music Theory III	4	
MU 218 ^P	Music Theory IV	4	
MU 250 ^P	Music Therapy Practice	3	
MU 252D	Instrumental Techniques- <i>Percussion</i>	1	
MU 254 ^P	Beginning Conducting	2	
MU 272A- V ^P	Applied Music Instruction ¹	2	
MU	Ensemble ²	2	
OT 215	Medical Terminology	1	
PHIL 100	Appreciation of Philosophy	3	3B
	Advanced writing ⁴	2	
	TOTAL	31	
JUNIOR			
BMS 300 ^P	Principles of Human Physiology	4	
BMS 345 ^P	Functional Neuroanatomy	4	
MU 157	Voice Class I ⁵	2	
MU 335 ^P	Music History II	3	4A, 4B
MU 342 ^P	Psychology of Music	3	
MU 440 ^P	Music Therapy Methods I	3	
MU 443 ^P	Music Therapy Methods II	3	
MU 472A- V ^P	Applied Music Instruction	1	
MU 486A ^P	Practicum-Music Therapy	1	
MU	Ensemble ⁶	1	
PSY 252 ^P	Mind, Brain, and Behavior	3	
PSY 320 ^P	Abnormal Psychology	3	
	TOTAL	29-31	
SENIOR			
MU 343 ^P	Research Methods in Music Therapy	3	
MU 444 ^P	Music Therapy Methods III	3	
MU 445 ^P	Improvisation Techniques in Music Therapy	2	
MU 486A ^P	Practicum-Music Therapy ²	2	4C
MU 487 ^P	Internship	1	
<i>Select one course from the following:</i>			
PSY 452 ^P	Cognitive Psychology	3	
PSY 454 ^P	Biological Psychology	3	
PSY 458 ^P	Cognitive Neuroscience	3	
STAT 201 ^P	General Statistics	3	
	Global and Cultural Awareness ⁷	3	3E
	Historical Perspectives ⁸	3	3D
	Music electives	3	
	TOTAL	26	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ First-year Voice students must take MU 172A and MU 172B, then MU 272Q the second year for two semesters; instrumentalists take MU 272A-P or MU 272R-V on a major instrument for 2 semesters each of the first two years.

² Two semesters.

³ Select at least three credits from the list of courses in category 1B in the All-University Core Curriculum (AUCC).

⁴ Select one course from the list in category 2 of the AUCC.

⁵ Instrumental majors only.

⁶ One semester.

⁷ Select from the list of courses in category 3E in the AUCC.

⁸ Select from the list of courses in category 3D in the AUCC.

Performance Concentration

The Bachelor of Music in Performance degree program features extensive private applied instruction by a specialist on each instrument or voice. Many performance opportunities are included in the four-year curriculum, ranging from solo recitals to large and small ensemble participation. Only the most proficient undergraduate

musicians are accepted into the Performance degree option and graduation from this program indicates that the student has achieved a high degree of musical achievement. Six options exist in this concentration – *Orchestral Instrument, Organ, Piano, Piano Pedagogy, String Pedagogy, and Voice.*

A minimum grade of C is required in all music courses used to satisfy the requirements of the major programs (B.A. and B.M.) in music.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
MU 117 ^P	Music Theory I	4	
MU 118 ^P	Music Theory II	4	
MU 131	Introduction to Music History and Literature	3	3B
MU	Ensemble ¹	2	
	Historical Perspectives ²	3	3D
	Mathematics ³	3	1B
	Elective	2	
	TOTAL	24	
SOPHOMORE			
MU 217 ^P	Music Theory III	4	
MU 218 ^P	Music Theory IV	4	
MU	Ensemble ¹	2	
PSY 100	General Psychology	3	3C
	Advanced writing ⁴	3	2
	Elective	4	
	TOTAL	20	
JUNIOR			
MU 254 ^P	Beginning Conducting ⁵	2	
MU 317 ^P	Music Theory V	2	
MU 318 ^P	Arranging and Orchestration	2	
MU 334 ^P	Music History I	3	4A, 4B
MU 335 ^P	Music History II	3	4A, 4B
MU 417	Counterpoint	3	
MU 471 ^P	Recital ⁶	1	
MU 472A- V ^P	Applied Music Instruction ⁷	4	
MU	Ensemble ¹	2	
	Arts and Humanities ⁸	3	3B
	TOTAL	22-25	
SENIOR			
MU 471 ^P	Recital (written consent of instructor)	1	4C
MU 472A- V ^P	Applied Music Instruction ⁷	4	
MU	Ensemble ⁹	2	
OR			
MU 407 ^P	Accompanying ¹⁰	2	
	Biological and Physical Sciences ¹¹	7	3A
	Global and Cultural Awareness ¹²	3	3E
	Music electives	3	
	TOTAL	20-23	
PROGRAM TOTAL = 120 credits¹³			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Two semesters.

² Select from the list of courses in category 3D in the AUCC.

³ Select at least three credits from the list of courses in category 1B in the AUCC.

⁴ Select one course from the list in category 2 of the AUCC.

⁵ MU 254 is not required for the piano pedagogy option.

⁶ Junior recital not required for the Piano Pedagogy and String Pedagogy options.

⁷ Two semesters; major instrument or voice.

⁸ Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁹ Not required for Piano and Piano Pedagogy options.

¹⁰ For the Piano and Piano Pedagogy options only.

¹¹ Select from the list of courses in category 3A of the AUCC. One course must have a laboratory component.

¹² Select from the list of courses in category 3E of the AUCC.

¹³ In order to complete the Performance concentration, students must select from one of the following options: *Orchestral Instrument, Organ, Piano, Piano Pedagogy,*

String Pedagogy, or Voice. The complete program is 120 credits, 42 of which are to be upper division (300-400 level).

Jazz Studies Option

The entire program is shown.

A minimum grade of C is required in all music courses used to satisfy the requirements of the major programs (B.A. and B.M.) in music.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
MU 117 ^P	Music Theory I	4	
MU 118 ^P	Music Theory II	4	
MU 131	Introduction to Music History and Literature	3	3B
MU 150	Piano Class I	2	
MU 272A-V ^P	Applied Music Instruction ¹	2	
MU 274A-G	Applied Jazz Instruction ¹	2	
MU ***	Ensembles ²	4	
	Mathematics ³	3	1B
	Electives	3	
	TOTAL	30	
SOPHOMORE			
ETST 250/	African American History	3	3D
HIST 250			
MU 154	Jazz Piano Class	1	
MU 217 ^P	Music Theory III	4	
MU 218 ^P	Music Theory IV	4	
MU 225 ^P	Jazz Theory	2	
MU 272A-V ^P	Applied Music Instruction ¹	2	
MU 274A-G	Applied Jazz Instruction ¹	2	
MU ***	Ensembles ²	4	
PSY 100	General Psychology	3	3C
	Advanced Writing ⁴	3	2
	Biological and Physical Sciences ⁵	3	3A
	TOTAL	31	
JUNIOR			
MU 317 ^P	Music Theory V	2	
MU 320 ^P	Jazz Improvisation	1	
MU 325 ^P	Jazz Composition/Arranging	2	
MU 334 ^P	Music History I	3	4A, 4B
MU 335 ^P	Music History II	3	4A, 4B
MU 471 ^P	Recital	1	4C
MU 474 ^P	Applied Jazz Instruction	4	
MU ***	Ensembles ²	2	
MU ***	Music Electives	6	
	Arts and Humanities ⁶	3	3B
	Electives	3	
	TOTAL	30	
SENIOR			
MU 332	History of Jazz	3	
MU 415 ^P	Advanced Jazz Techniques	2	
MU 425	Jazz Pedagogy	2	
MU 471 ^P	Recital	1	4C
MU 474 ^P	Applied Jazz Instruction	4	
MU ***	Ensembles ²	2	
	Biological and Physical Sciences ⁵	4	3A
	Global and Cultural Awareness ⁷	3	3E
	Electives ⁸	8	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Major instrument, two semesters for freshman and sophomore.

² Students enrolled in MU 272 should be concurrently enrolled in a concert band (MU 205, Concert Band; MU 304, Symphonic Band; MU 404, Symphonic Wind Ensemble). Eight of the total ensemble credits should be satisfied through participation in either MU 309, Jazz Ensemble or MU 310, Jazz Combo.

³ Select at least 3 credits from the list of courses in category 1B of the All-University Core Curriculum (AUCC).

⁴ Select one course from the list of courses in category 2 of the AUCC.

⁵ Select at least 7 credits total from the list of courses in category 3A in the AUCC.

At least one course must include a laboratory component.

⁶ Select from the list of courses in category 3B in the AUCC.

⁷ Select from the list of courses in category 3E in the AUCC.

⁸ Select enough elective credits to bring program total to 120 credits, of which at least 42 must be upper division (300-400 level).

Orchestral Instrument Option

In addition to the Performance concentration core courses, the following must be completed:

Course	Title	Cr	AUCC
FRESHMAN			
MU 272A-V ^P	Applied Music Instruction ¹	2-4	
	Electives	2-4	
	TOTAL	6	
SOPHOMORE			
MU 272A-V ^P	Applied Music Instruction ¹	4	
	Electives	7	
	TOTAL	11	
JUNIOR			
	Electives	4	
SENIOR			
	Electives	7	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ Two semesters; major instrument

Organ Option

In addition to the Performance concentration core courses, the following must be completed:

Course	Title	Cr	AUCC
FRESHMAN			
MU 272H ^P	Applied Music Instruction-Organ ¹	2-4	
	Electives	2-4	
	TOTAL	6	
SOPHOMORE			
MU 272H ^P	Applied Music Instruction-Organ ¹	4	
	Foreign language ¹	10	
	TOTAL	14	
JUNIOR			
	Electives	4	
SENIOR			
MU 437 ^P	History and Structure of the Organ	2	
MU 468 ^P	Organ Literature	2	
	TOTAL	4	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Two semesters.

Piano Option

In addition to the Performance concentration core courses, the following must be completed

Course	Title	Cr	AUCC
FRESHMAN			
MU 272I ^P	Applied Music Instruction-Piano ¹	2-4	
	Electives	2-4	
	TOTAL	6	
SOPHOMORE			
MU 272I ^P	Applied Music Instruction-Piano ¹	4	
	Foreign language ¹	10	
	TOTAL	14	

Course	Title	Cr	AUCC
JUNIOR			
	Electives	3	
SENIOR			
MU 465	Keyboard Literature	2	
	Electives	5	
	TOTAL	7	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.
¹ Two semesters.

Piano Pedagogy Option

In addition to the Performance concentration core courses, the following must be completed:

Course	Title	Cr	AUCC
FRESHMAN			
MU 272 ^P	Applied Music Instruction-Piano ¹	2	
	Electives	4	
	TOTAL	6	
SOPHOMORE			
MU 272 ^P	Applied Music Instruction-Piano ¹	4	
	Foreign language ¹	10	
	TOTAL	14	
JUNIOR			
MU 495G	Independent Study-Pedagogy	3	
PSY 260 ^P	Child Psychology	3	
OR			
PSY 465 ^P	Adolescent Psychology	3	
	TOTAL	6	
SENIOR			
MU 465	Keyboard Literature	2	
MU 495G	Independent Study-Pedagogy	3	
	Electives	3	
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.
¹ Two semesters.

String Pedagogy Option

In addition to the Performance concentration core courses, the following must be completed:

Course	Title	Cr	AUCC
FRESHMAN			
MU 272M-P ^P	Applied Music Instruction ¹	2	
	Electives	4	
	TOTAL	6	
SOPHOMORE			
MU 272M-P ^P	Applied Music Instruction ¹	2-4	
	Electives	6-8	
	TOTAL	10	
JUNIOR			
MU 351A-C	String Pedagogy I ²	2	
MU 352A-C ^P	String Pedagogy II ²	2	
PSY 260 ^P	Child Psychology	3	
OR			
PSY 465 ^P	Adolescent Psychology	3	
	TOTAL	7	
SENIOR			
MU 451A-C ^P	String Pedagogy III ²	2	
MU 464A-C ^P	String Literature ²	2	
	Electives	2	
	TOTAL	6	

Course	Title	Cr	AUCC
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.
¹ Two semesters.
² Choose subtopic A) Violin, or B) Violoncello, or C) String Bass.

Voice Option

The entire program is shown.

A minimum grade of C is required in all music courses used to satisfy the requirements of the major programs (B.A. and B.M.) in music.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
LGFR ***	Foreign Language (German)	5	
MU 117 ^P	Music Theory I	4	
MU 118 ^P	Music Theory II	4	
MU 131	Introduction to Music History and Literature	3	3B
MU 172A ^P	Freshman Voice Studio I	2	
MU 172B ^P	Freshman Voice Studio II	2	
MU ***	Ensemble ¹	2	
	Mathematics ²	3	1B
	Elective	2	
	TOTAL	30	
SOPHOMORE			
LFRE ***	Foreign language (French)	5	
LITA ***	Foreign language (Italian)	5	
MU 217 ^P	Music Theory III	4	
MU 218 ^P	Music Theory IV	4	
MU 272Q ^P	Applied Music Instruction—Voice ¹	4	
MU 365A ^P	Advanced Diction: Italian and English	1	
MU 365B ^P	Advanced Diction: French and German	1	
MU ***	Ensemble ¹	2	
	Advanced writing ³	3	2
	TOTAL	29	
JUNIOR			
MU 254 ^P	Beginning Conducting	2	
MU 317 ^P	Music Theory V	2	
MU 334 ^P	Music History I	3	4A, 4B
MU 335 ^P	Music History II	3	4A, 4B
MU 417	Composition Skills: Counterpoint	3	
MU 471 ^P	Recital	1	
MU 472Q ^P	Applied Music Instruction—Voice ¹	4	
MU ***	Ensemble ¹	2	
	Arts and Humanities ⁴	3	3B
	Biological and Physical Sciences ⁵	7	3A
	TOTAL	30	
SENIOR			
MU 338 ^P	Opera History and Literature	2	
MU 466	Song Literature	2	
MU 467 ^P	Vocal Pedagogy	2	
MU 471 ^P	Recital	1	4C
MU 472Q ^P	Applied Music Instruction—Voice ¹	4	
MU ***	Ensemble ¹	2	
PSY 100	General Psychology	3	3C
	Historical Perspectives ⁶	3	3D
	Global and Cultural Awareness ⁷	3	3E
	Music electives	3	
	Electives ⁸	6	
	TOTAL	31	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog at <http://catalog.colostate.edu/> to see the course prerequisites.
¹ Two semesters.
² Select at least three credits from the list of courses in category 1B in the All-University Core Curriculum (AUCC).
³ Select from the list of courses in category 2 in the AUCC.

⁴Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁵Select from the list of courses in category 3A of the AUCC. One course must have a laboratory component.

⁶Select from the list of courses in category 3D in the AUCC.

⁷Select from the list of courses in category 3E of the AUCC.

⁸Select enough elective credits to bring program total to 120 credits, 42 of which are to be upper division (300-400 level).

Major in Music (B.A.)

This major allows students to study music within a larger context of a liberal education. In comparison to majors leading to the bachelor of music (B.M.), less emphasis is placed on studies specific to music. In lieu of fewer credits in music, the student completes a 21-credit option in an area outside of music. Options include programs in business, journalism, theatre, or dance, to mention a few. In addition, completion of a major paper, lecture/recital, or full recital is required during the senior year.

A minimum grade of C is required in all music courses used to satisfy the requirements of the major programs (B.A. and B.M.) in music.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
MU 117 ^P	Music Theory I	4	
MU 118 ^P	Music Theory II	4	
MU 131	Introduction to Music History and Literature	3	3B
MU 172A ^P	Freshman Voice Studio I ¹	2	
AND			
MU 172B ^P	Freshman Voice Studio II ¹	2	
OR			
MU V ^P	Applied Music Instruction ¹	2	
MU	Ensemble ²	2	
	Mathematics ³	3	1B
	Electives	6-8	
	TOTAL	29	
SOPHOMORE			
MU 217 ^P	Music Theory III	4	
MU 218 ^P	Music Theory IV	4	
MU V ^P	Applied Music Instruction ¹	2	
MU	Ensemble ²	2	
	Advanced writing ⁴	3	2
	Foreign language ²	6	
	Option ⁵	6	
	Electives	3	
	TOTAL	30	
JUNIOR			
MU 334 ^P	Music History I	3	4A, 4B
MU 335 ^P	Music History II	3	4A, 4B
	Arts and Humanities ⁶	3	3B
	Biological and Physical Sciences ⁷	3	3A
	Historical Perspectives ⁸	3	3D
	Option ⁵	6	
	Music theory, upper-division	2	
	Music electives ⁹	3	
	Electives	6	
	TOTAL	32	
SENIOR			
MU 471 ^P	Recital	1	4C
OR			
MU 499 ^P	Thesis	1	4C
	Biological and Physical Sciences ⁷	4	3A
	Global and Cultural Awareness ¹⁰	3	3E
	Option ⁵	9	
	Social and Behavioral Sciences ¹¹	3	3C

Course	Title	Cr	AUCC
	Music electives ⁹	6	
	Electives	3	
	TOTAL	29	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ First-year voice students must take MU 172A and MU 172B (total of four credits), and then take MU 272Q for one credit each semester of the second year (a total of two credits); instrumentalists take MU 272A-P or MU 272R-V on major instrument for one credit each semester of the first 2 years (total of four credits).

² Two semesters.

³ Select at least three credits from the list of courses in category 1B in the All-University Core Curriculum (AUCC).

⁴ Select one course from the list in category 2 of the AUCC.

⁵ A coherent field of study outside the field of music, including at least 12 upper-division credits.

⁶ Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁷ Select from the list of courses in category 3A. One course must have a laboratory component.

⁸ Select from the list of courses in category 3D in the AUCC.

⁹ Select from the following: history and literature, theory, composition or orchestration; applied music-performance; maximum of 4 credits in ensemble.

¹⁰ Select from the list of course in category 3E in the AUCC.

¹¹ Select from the list of courses in category 3C of the AUCC.

Minor in Music

A performance minor in music enables a student to broaden career opportunities or to pursue avocational interests. The student music minor must complete a minimum of 22 credits of which a minimum of 12 must be upper division (300- and/or 400-level courses).

Course	Title	Cr
LOWER DIVISION		
MU 100	Music Appreciation	3
MU 111	Music Theory Fundamentals ¹	3
MU V ^P	Applied Music Instruction ²	4
	TOTAL	10
UPPER DIVISION		
	Music ensembles	8
	Music electives	4
	TOTAL	12

PROGRAM TOTAL = 22 credits without prerequisites

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu> to see the course prerequisites.

¹ Students may opt to test out of MU 111 by successfully passing a waiver examination. In this case, three additional MU elective credits must be taken.

² Four semesters; additional course work may be required because of prerequisites.

Graduate Programs in Music

The department offers graduate programs leading to the Master of Music (M.M.) degree with specializations in Choral Conducting, Collaborative Piano, Instrumental Conducting, Music Education, Music Education with Kodaly Emphasis, Music Therapy, Music Therapy with Performance option, and Music Education--Conducting. Applicants to graduate programs in music must have a B.M., B.M.E., or equivalent bachelor's degree. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/

current-students/bulletin.aspx, and the department's website, www.music.colostate.edu/.

Major in Performing Arts

Dance Concentration

Office in University Center for the Arts, Room 120
(970) 491-5562
www.dance.colostate.edu/

Professor Jane Slusarski-Harris, Director

Creative involvement in all forms of dance characterizes the dance program at Colorado State. The dance curriculum includes courses in ballet and modern dance technique, choreography, repertory, history, dance appreciation, production, and teaching methods. Students will have a theoretical foundation complete with practical experience in the area of dance education and a basic working knowledge of anatomy, kinesiology, and various movement theories relating to dance techniques. Students are placed in the technique level where they may best be challenged toward developing expertise in many forms and styles of dance. Close supervision and personal evaluations help monitor students' progress.

Visiting guest artists teach master classes and workshops and choreograph for the students on a regular basis. Graduates will achieve an intermediate/advanced level of proficiency in modern and ballet technique and have a solid knowledge and appreciation of the history and philosophy of dance from many cultures and time periods.

Many performing, choreography, and teaching opportunities are available. Students and faculty collaborate to produce works that incorporate many styles of dance, including the fall and spring dance concerts, senior concerts and studio night. Dance students are encouraged to audition for departmental musical and opera productions of which all three areas in the department—music, theater, and dance—collaborate. There are also performing and teaching opportunities in the community with the C.S.U. touring dance group, local public schools, and dance companies in the Fort Collins area. Creative and Performing Arts Awards are available for talented dance majors.

Potential Occupations

Dance careers are rigorous and demanding, requiring years of training and discipline. Dance professionals must be versatile with a broad base of experiences in dance or related fields. Dance majors often select a second major such as music, theatre, business, occupational therapy,

technical journalism, or exercise and sport science to enhance their job prospects. Experience acquired through extracurricular performances or internships is highly recommended to enhance practical training, development, and career opportunities. Students are encouraged to go on for advanced study at the graduate level in dance in order to secure teaching positions in higher education.

Some examples of the career opportunities in dance include, but are not limited to: professional dancer, professional choreographer, artistic director, university/college faculty, studio owner and faculty, conservatory or school faculty, dance critic, dance therapist, dance somatics specialist, arts manager, lighting designer, costume designer, sound designer, theatre technician, production crew, producer, fashion coordinator, special events coordinator, makeup artist, musical theatre director.

Course	Title	Cr	AUCC
FRESHMAN			
BZ 101	Humans and Other Animals	3	3A
CO 150 ^P	College Composition	3	1A
D 286 ^P	Practicum	1	
TH 160	Introduction to Production Design	3	
TH 161 ^P	Technical Theatre: Stagecraft	3	
	Arts and humanities ¹	6	3B
	Dance techniques-ballet ²	6	
	Dance techniques-modern ³	4	
	Mathematics ⁴	3	1B
	TOTAL	32	
SOPHOMORE			
CO 301A ^P	Writing in the Disciplines-Arts and Humanities ⁴	3	2B
CHEM 103	Chemistry in Context	3	3A
CHEM 104 ^P	Chemistry in Context Laboratory	1	3A
D 226 ^P	Dance Choreography I	2	
D 286 ^P	Practicum	2	
D 325 ^P	Dance Production	3	
	Dance techniques-ballet ²	6	
	Dance techniques-modern ³	4	
	Historical perspectives ⁵	3	3D
	Social/behavioral sciences ⁶	3	3C
	TOTAL	30	
JUNIOR			
BMS 300 ^P	Principles of Human Physiology	4	
D 286 ^P	Practicum	2	
D 324	Teaching Creative Movement for Children	2	
D 326 ^P	Dance Choreography II	2	
D 427	Dance History I	3	4A
HES 207	Anatomical Kinesiology	3	
TH 263 ^P	Costume Design I	3	
	Dance techniques-ballet ²	6	
	Dance techniques-modern ³	6	
	TOTAL	31	
SENIOR			
D 424 ^P	Dance Pedagogy	3	
D 428	Dance History II	3	4B
D 471 ^P	Dance Concert	3	4C
D 486 ^P	Practicum	3	
	Dance techniques-ballet ²	6	
	Dance techniques-modern ³	6	
	Global and cultural awareness ⁷	3	3E
	TOTAL	27	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

²Select appropriate level course (one each semester).

³Select appropriate level course.

⁴First-time students entering a college or university on or after July 1, 2008, must take an

advanced writing course to fulfill Category 2B of the AUCC.

⁵Select from the list of courses in category 3D in the AUCC.

⁶Select from the list of courses in category 3C in the AUCC.

⁷Select from the list of courses in category 3E in the AUCC.

Theatre Concentration

Division of Theatre and Dance

Office in University Center for the Arts, UCA120F

(970) 491- 1808

www.theatre.colostate.edu/

Professor Walton Jones, Director

The liberal arts curriculum of the theatre program at CSU presumes that distinction in theatre education can only be achieved when the student is given a solid background in dramatic literature, aesthetics, and the history of theatrical performance as well as practical exposure to course sequences within the main artistic components of theatrical art performance and design. Finally, such an education should incorporate participation in the production process itself in a wide variety of faculty-directed productions chosen from a broad range of genres and styles, from classical to contemporary dramatic literature.

Within the School of the Arts, Division of Theatre and Dance, the C.S.U. Theatre Program offers a concentration in the performing arts major and two minors in theatre. In addition to providing an integrated program for students desiring a major or minor, the curriculum provides courses to fulfill the fine arts and humanities requirements for the All-University Core Curriculum as well as challenging and creative elective courses for the general student desiring experiences in theatre. Senior majors are required to complete a capstone project that reflects their personal interest in an area of theatre expertise. Projects include directing a play, playing a significant role in a faculty-directed production, stage managing a faculty-directed production, designing or lighting a main stage production, presenting an acting recital, or writing a major theatre research paper.

Our mission is to give undergraduates the tools and background to develop their own artistic visions, and to create precocious and entrepreneurial young artists who will shape the future of the American theatre. Additionally, through our mainstage and student productions, the theatre program gives all students, faculty, and staff at C.S.U. and the greater Fort Collins community challenging and entertaining theatre.

The theatre program also stages four faculty-directed theatrical productions per year chosen from a wide range of genres and content. These productions feature the work of

undergraduate actors, designers, stage managers, and technicians. In addition, undergraduates have the opportunity to conceive and stage their own work in a 50-seat, fully-equipped, student-run theatre space, *YPO Theatre*, which is available for sign-out almost every weekend during the academic year.

Theatre also offers minors in acting/directing and design/technical theatre in order to give students in related majors the opportunity to formalize their interest in theatre. These minors offer an opportunity for concentrated study in at least one of the basic theatre crafts as well as a background in general theatre practice and history. For information on the theatre minors, interested students should contact Walton Jones at his office at the 120F University Center for the Arts, 1400 Remington Street, (970) 491-1808, or by e-mail: Walt.Jones@colostate.edu.

Any student who has been accepted to Colorado State University is eligible to declare the performing arts major/theatre concentration as their program of study. Auditions and/or interviews or portfolio reviews are only required for certain upper-division courses and no separate application must be filed. Continuing C.S.U. students who wish to change their major to performing arts/theatre concentration must file the appropriate paper work through the Records and Registration Section of the Registrar's Office, Room 100 Administration Annex.

Potential Occupations

While a degree in performing arts/theatre does not guarantee students with a career in the professional theatre or entertainment industry, several C.S.U. alums have gone on to be very successful in acting and design. Graduates are, however, well prepared for advanced study in all areas of theatre at the graduate level. Graduates also have a competitive edge in entry-level positions in the professional theatre or the entertainment industry, particularly in design and technical positions.

Possible career opportunities include, but are not limited to: professional actor (theatre or media), scenic, costume, lighting, or digital media design or assistants to (theatre); assistant production designer, costume director, or lighting director (media); stage manager (theater) floor manager (media); technical director, carpenter, scenic painter (charge artist), master electrician, sound master (theatre); technical director, carpenter, charge artist, gaffer, best boy, key grip, wardrobe assistant, sound mixer, production

assistant (media); production manager (theatre), properties manager (theatre and media).

Students selecting a concentration in theatre should contact the Director of the Program in Theatre for additional information.

Course	Title	Cr	AUCC
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FRESHMAN

<i>Select one course from the following:</i>			
ART 100	Introduction to the Visual Arts	3	3B
D 110	Understanding Dance	3	3B
MU 100	Music Appreciation	3	3B
CO 150 ^P	College Composition	3	1A
TH 141	Introduction to Theatre ¹	3	
OR			
TH 192	From Page to State: Freshman Theatre Seminar ²	3	
TH 151	Beginning Acting	3	
TH 160	Introduction to Production Design	3	
TH 161 ^P	Technical Theatre: Stagecraft Practicum ³	3	
TH 286	Biological/physical science ⁴	3	3A
	Mathematics ⁵	3	1B
	Electives	5	
	TOTAL	31	

SOPHOMORE

TH 251 ^P	Intermediate Acting	3	
TH 263 ^P	Costume Design I	3	
TH 265 ^P	Scenic Design: Fundamentals	3	
TH 286	Practicum	1	
	Arts/humanities ⁶	3	3B
	Biological/physical sciences ⁴	4	3A
	Global and cultural awareness ⁷	3	3E
	Historical perspectives ⁸	3	3D
	Social/behavioral sciences ⁹	3	3C
	Electives	3	
	TOTAL	29	

JUNIOR

TH 341	History of Theatre in Performance	3	4A, 4B
TH 342	Contemporary Plays in Performance	3	4A, 4B
TH 470A-I ^P	Applied Theatre Production ¹⁰	4	
	Additional communication ¹¹	3	2A or 2B
	Directed study ¹²	6	
	Upper division focus ¹³	6	
	Electives	5	
	TOTAL	30	

SENIOR

TH 470A-I ^P	Applied Theatre Production ¹⁰	2	
TH 499 ^P	Thesis ¹⁴	3	4C
	Directed study ¹²	6	
	Upper division focus ¹³	3	
	Electives	16	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu> to see the course prerequisites.

¹ New majors who have passed 45 or more credit hours.

² Entering freshmen or new majors who have passed less than 45 credit hours.

³ Two semesters.

⁴ Select from list of approved courses in Category 3A of the AUCC. One course must have a laboratory component.

⁵ Select at least three credits from the list of approved courses in category 1B of the AUCC.

⁶ Select from list of approved courses in category 3B of the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁷ Select from list of approved courses in category 3E of the AUCC.

⁸ Select from list of approved courses in category 3D of the AUCC.

⁹ Select from list of approved courses in category 3C of the AUCC.

¹⁰ Students must take at least two different subtopics in TH 470A-I.

¹¹ Select from list of approved courses in category 2A or 2B of the AUCC. First-time student entering a college or university on or after July 1, 2008, must take an advanced writing course (category 2B).

¹² Students must complete a second major, minor, or an adviser approved upper division 12 credit area of study.

¹³ Choose three courses from the following list: D 325, TH 351, TH 361, TH 363, TH 365, TH 455, TH 475.

¹⁴ Students must secure a faculty adviser in the junior year.

Minors in Theatre**Acting/Directing Minor**

Course	Title	Cr
LOWER DIVISION		
TH 141	Introduction to Theatre	3
TH 151	Beginning Acting	3
TH 262 ^P	Stage Management I	3
	TOTAL	9
UPPER DIVISION		
TH 341 ^{P*}	History of Theatre in Performance	3
TH 342	Contemporary Plays in Performance	3
TH 351 ^{P*}	Advanced Acting	3
TH 455 ^{P*}	Directing Process	4
	TOTAL	13
PROGRAM TOTAL = 22 credits		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu> to see the course prerequisites.

*Additional course work may be required because of prerequisites.

Design/Technical Theatre Minor

Course	Title	Cr
LOWER DIVISION		
TH 141	Introduction to Theatre	3
TH 160	Introduction to Production Design	3
TH 161 ^P	Technical Theatre: Stagecraft	3
TH 263 ^P	Costume Design I	3
TH 265 ^P	Scenic Design: Fundamentals	3
	TOTAL	15
UPPER DIVISION		
TH 341	History of Theatre in Performance	3
TH 342	Contemporary Plays in Performance	3
<i>Select two courses from the following:</i>		
D 325 ^P	Dance Production	3
TH 361 ^P	Technical Theatre: Technical Direction	3
TH 363 ^P	Advanced Costume Design	3
TH 365 ^P	Advanced Scenic Design	3
	TOTAL	12
PROGRAM TOTAL = 27 credits		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu> to see the course prerequisites.

DEPARTMENT OF PHILOSOPHY

Office in Eddy Hall, Room 243

(970) 491-6315

philosophy.colostate.edu

Professor Jane Kneller, Chair

Major in Philosophy

Philosophy is the oldest form of systematic, scholarly inquiry. It is the study of the most basic moral, legal, aesthetic, religious, and metaphysical ideas by which we quest for understanding and develop principles of conduct.

Philosophers seek to establish standards of evidence, provide rational methods of resolving conflicts, establish criteria for a just social order, and create techniques for evaluating ideas and arguments.

The study of philosophy broadens and intensifies liberal education while enhancing interpretive abilities in many fields. The curriculum encourages a broad liberal arts background, including courses in foreign languages and a plan for graduate school and teaching careers in philosophy. The broad relevance of philosophy to other fields permits most students to work toward goals such as professional training in law, medicine, business, or the ministry. There are three concentrations available to Philosophy majors: General Philosophy, Philosophy and Religion, and Philosophy, Science, and Technology. It is not unusual for Philosophy majors to also major in other disciplines, and these concentrations combine easily with other majors in the University.

Learning Outcomes

Philosophy students will:

- Recognize and analyze arguments; reconstruct arguments from major texts in both the history of philosophy and in significant contemporary philosophical work; evaluate these arguments for the validity of argument structures and the truth of premises (soundness); and construct valid and sound arguments of their own in a fashion that is as clear and concise as possible.
- Demonstrate in their senior year knowledge of major historical figures in their most significant works as well as significant current issues from the major sub-disciplines of philosophy, particularly ethics, metaphysics, and epistemology.
- Demonstrate in their senior year skills in oral presentation, engaging in fruitful oral discussion, debate, and formal presentations that are logically coherent, clearly and concisely stated, and accessible to their peers in philosophy.

Potential Occupations

A major in Philosophy prepares students for a wide variety of professional goals including graduate school in philosophy or other disciplines, training in law, computer technology, social work, health care, the ministry, business, and general intellectual flexibility in a changing world. The high level of skill Philosophy majors acquire in communication, writing, analytical and critical thinking enables them to secure jobs in a variety of private and public sector professions.

Depending on the concentration selected, available career

opportunities include, but are not limited to: public policy analyst, business manager, public administrator, computer programmer, intelligence officer, legislator, teacher; foreign diplomat, social worker, community developer, philanthropic organizer, medical doctor, lawyer, researcher, writer, theologian, human resource management, publishers, ethics consultant in a variety of fields, e.g. medicine, engineering, and the sciences.

Students are required to receive at least a C- (1.670) in each philosophy course required for the major or minor in philosophy. The minimum scholastic average acceptable for graduation is 2.000 computed only for courses attempted at Colorado State.

General Philosophy Concentration

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
PHIL 100	Appreciation of Philosophy	3	3B
OR			
PHIL 103	Moral and Social Problems	3	3B
PHIL 120	History and Philosophy of Scientific Thought	3	3B
OR			
PHIL 170	World Philosophies	3	3E
PHIL 110	Logic and Critical Thinking	3	3B
	Arts and Humanities ¹	3	3B
	Biological and Physical Sciences ²	7	3A
	Historical Perspectives ³	3	3D
	Social and Behavioral Sciences ⁴	6	3C
	TOTAL	31	
SOPHOMORE			
PHIL 205 ^P	Introduction to Ethics	3	
PHIL 206 ^P	Knowledge and Existence-An Introduction	3	
PHIL 210 ^P	Introduction to Formal Logic	3	
	Advanced Writing ⁵	3	2
	Global and Cultural Awareness ⁶	6	3E
	Mathematics ⁷	3	1B
	Electives	12	
	TOTAL	33	
JUNIOR			
PHIL 300 ^P	Ancient Greek Philosophy	3	4A
PHIL 301 ^P	17th and 18th Century European Philosophy	3	4A
PHIL 302 ^P	19th-Century Philosophy	3	
OR			
PHIL 409 ^P	20th-Century Philosophy	3	
	Upper-division philosophy	3	
	Electives	16	
	TOTAL	28	
SENIOR			
PHIL 425 ^P	Epistemology	3	
PHIL 435 ^P	Metaphysics	3	
PHIL 447 ^P	Ethical Theory	3	
PHIL 462 ^P	Capstone Seminar	3	4B, 4C
	Electives ⁸	16	
	TOTAL	28	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only three of the six credits required in arts and humanities may come from foreign language courses.

² Select from the list of courses in category 3A in the AUCC. One must have a laboratory component.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select from the list of courses in category 3C in the AUCC.

⁵ Select from the list of courses in category 2 in the AUCC.

⁶ Select from the list of courses in category 3E in the AUCC.

⁷ Select at least three credits from the list of courses in category 1B in the AUCC.

⁸Take appropriate number of electives to bring total credits for the program to 120. Total credits required to graduate is 120, of which 42 must be upper-division.

Philosophy and Religion Concentration

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
PHIL 106	Wisdom of the East-Oriental Philosophy	3	
OR			
PHIL 172	Religions of the East	3	
PHIL 110	Logic and Critical Thinking	3	3B
PHIL 170	World Philosophies	3	3E
PHIL 171	Religions of the West	3	
	Arts and Humanities ¹	3	3B
	Biological and Physical Sciences ²	7	3A
	Historical Perspectives ³	3	3D
	Social and Behavioral Sciences ⁴	6	3C
	TOTAL	34	
SOPHOMORE			
PHIL 205 ^P	Introduction to Ethics	3	
OR			
PHIL 206 ^P	Knowledge and Existence-An Introduction	3	
PHIL 210 ^P	Introduction to Formal Logic	3	
PHIL 270 ^P	Issues in the Study of Religion	3	
	Advanced Writing ⁵	3	2
	Global and Cultural Awareness ⁶	6	3E
	Mathematics ⁷	3	1B
	Electives	12	
	TOTAL	33	
JUNIOR			
PHIL 300 ^P	Ancient Greek Philosophy	3	4A
PHIL 301 ^P	17th and 18th Century European Philosophy	3	4A
<i>Select one course from the following:</i>			
PHIL 355 ^P	Philosophy of Religion	3	
PHIL 370 ^P	Contemporary Western Religious Thought	3	
PHIL 372 ^P	Meaning and Truth in Religion	3	
PHIL 375 ^P	Science and Religion	3	
<i>Select one course from the following:</i>			
PHIL 349 ^P	Philosophies of East Asia	3	
PHIL 360 ^P	Topics in Asian Philosophy	3	
PHIL 371 ^P	Contemporary Eastern Religious Thought	3	
PHIL 379 ^P	Mysticism East and West	3	
	Electives	16	
	TOTAL	28	
SENIOR			
PHIL 425 ^P	Epistemology	3	
OR			
PHIL 435 ^P	Metaphysics	3	
<i>Select one course from the following:</i>			
PHIL 447 ^P	Ethical Theory	3	
PHIL 455 ^P	Islamic Philosophy	3	
PHIL 463	Seminar in Religious Studies	3	
PHIL 462 ^P	Capstone Seminar	3	4B, 4C
	Electives ⁸	16	
	TOTAL	28	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3A in the AUCC. One must have a laboratory component.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select from the list of courses in category 3C in the AUCC.

⁵ Select from the list of courses in category 2 in the AUCC.

⁶ Select from the list of courses in category 3E in the AUCC.

⁷ Select at least three credits from the list of courses in category 1B in the AUCC.

⁸ Take appropriate number of electives to bring total credits for the program to 120. Total credits required to graduate is 120, of which 42 must be upper division.

Philosophy, Science, and Technology Concentration

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
PHIL 110	Logic and Critical Thinking	3	3B
PHIL 120	History and Philosophy of Scientific Thought	3	3B
	Arts and Humanities ¹	3	3B
	Biological and Physical Sciences ²	7	3A
	Historical Perspectives ³	3	3D
	Social and Behavioral Sciences ⁴	6	3C
	TOTAL	28	
SOPHOMORE			
PHIL 205 ^P	Introduction to Ethics	3	
PHIL 206 ^P	Knowledge and Existence-An Introduction	3	
PHIL 210 ^P	Introduction to Formal Logic	3	
	Advanced Writing ⁵	3	2
	Global and Cultural Awareness ⁶	6	3E
	Mathematics ⁷	3	1B
	Science and technology elective ⁸	3	
	Electives	12	
	TOTAL	36	
JUNIOR			
PHIL 300 ^P	Ancient Greek Philosophy	3	4A
PHIL 301 ^P	17th and 18th Century European Philosophy	3	4A
PHIL 302 ^P	19th-Century Philosophy	3	
OR			
PHIL 409 ^P	20th-Century Philosophy	3	
PHIL 325 ^P	Philosophy of Natural Science	3	
OR			
PHIL 327 ^P	Philosophy of Behavioral Sciences	3	
PHIL 345 ^P	Environmental Ethics	3	
OR			
PHIL 375 ^P	Science and Religion	3	
	Electives	13	
	TOTAL	28	
SENIOR			
PHIL 410 ^P	Formal Logic	3	
OR			
PHIL 415	Logic and Scientific Method	3	
PHIL 425 ^P	Epistemology	3	
PHIL 435 ^P	Metaphysics	3	
PHIL 462 ^P	Capstone Seminar	3	4B, 4C
	Electives ⁹	16	
	TOTAL	28	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3A in the AUCC. One must have a laboratory component.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select from the list of courses in category 3C in the AUCC.

⁵ Select from the list of courses in category 2 in the AUCC.

⁶ Select from the list of courses in category 3E in the AUCC.

⁷ Select at least three credits from the list of courses in category 1B in the AUCC.

⁸ Three credits in addition to the AUCC science requirement. Course must be in the College of Natural Sciences or the College of Engineering.

⁹ Take appropriate number of electives to bring total credits for the program to 120. Total credits required to graduate is 120, of which 42 must be upper-division.

Minors in Philosophy

A minor in Philosophy is intended to broaden students' education and to complement and encourage critical and constructive reflection in other courses. Students may choose a minor in General Philosophy or in Religious Studies.

Students are required to receive at least a C- (1.670) in each philosophy course required for the major or minor in philosophy. The minimum scholastic average acceptable for graduation is 2.000 computed only for courses attempted at Colorado State.

Minor in General Philosophy

Course	Title	Cr
LOWER DIVISION		
<i>Select one course from the following:</i>		
PHIL 100	Appreciation of Philosophy	3
PHIL 103	Moral and Social Problems	3
PHIL 120	History and Philosophy of Scientific Thought	3
PHIL 170	World Philosophies	3
PHIL 205 ^P	Introduction to Ethics	3
OR		
PHIL 206 ^P	Knowledge and Existence-An Introduction	3
PHIL 210 ^P	Introduction to Formal Logic	3
TOTAL		9
UPPER DIVISION		
PHIL 300 ^P	Ancient Greek Philosophy	3
PHIL 301 ^P	17th and 18th Century European Philosophy	3
PHIL 425 ^P	Epistemology	3
OR		
PHIL 435 ^P	Metaphysics	3
PHIL 447 ^P	Ethical Theory	3
OR		
PHIL 462 ^P	Capstone Seminar	3
TOTAL		12
PROGRAM TOTAL = 21 credits		

Substitutions allowed with prior approval of department chair.

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

Minor in Religious Studies

Course	Title	Cr
LOWER DIVISION		
<i>Select one course from the following:</i>		
PHIL 106	Wisdom of the East-Oriental Philosophy	3
PHIL 171	Religions of the West	3
PHIL 172	Religions of the East	3
PHIL 205 ^P	Introduction to Ethics	3
OR		
PHIL 206 ^P	Knowledge and Existence-An Introduction	3
PHIL 270 ^P	Issues in the Study of Religion	3
TOTAL		9
UPPER DIVISION		
PHIL 300 ^P	Ancient Greek Philosophy	3
OR		
PHIL 301 ^P	17th and 18th Century European Philosophy	3
<i>Select one course from the following:</i>		
PHIL 349 ^P	Philosophies of East Asia	3
PHIL 360 ^P	Topics in Asian Philosophy	3
PHIL 371	Contemporary Eastern Religious Thought	3
PHIL 379 ^P	Mysticism East and West	3
<i>Select one course from the following:</i>		

Course	Title	Cr
PHIL 355 ^P	Philosophy of Religion	3
PHIL 370 ^P	Contemporary Western Religious Thought	3
PHIL 372 ^P	Meaning and Truth in Religion	3
PHIL 375 ^P	Science and Religion	3
PHIL 447 ^P	Ethical Theory	3
OR		
PHIL 462 ^{P*}	Capstone Seminar	3
TOTAL		12
PROGRAM TOTAL = 21 credits		

Substitutions allowed with prior approval of department chair.

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

* Additional coursework may be required because of prerequisites.

Graduate Programs in Philosophy

The Department of Philosophy offers courses of study that lead to a Master of Arts degree in Philosophy. Master's students can choose to emphasize applied ethics, particularly animal welfare and environmental ethics, comparative philosophy, ethical theory, history of modern philosophy, metaphysics, aesthetics, and epistemology. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, philosophy.colostate.edu/

DEPARTMENT OF POLITICAL SCIENCE

Office in Clark Building, Room C346
(970) 491-5156
polisci.colostate.edu/

Professor Robert J. Duffy, Chair

Major in Political Science

Political Science is the study of politics and political action in society. It encompasses international agreements and organizations as well as the patterns of political action which both create and shape them. It encompasses citizen action and the institutions which produce public policy at the local, state, and national levels within the United States. It encompasses systems of voting, political parties, courts, compared across national political systems. It encompasses the raising of normative questions about the nature and purposes of political life. The presence of politics is felt in all areas and sectors of society at all times. The dynamic and transformative effects of political action are seen virtually everywhere.

The department's curriculum is distributed across five subfields of the discipline: American politics, political theory, comparative politics, international relations, and

public policy. Political science major course work across the subfields of the discipline is complemented by the requirement that each political science major completes a designated support option, which include: a minor in another department, an interdisciplinary studies program, the Second Language support option, the Methods support option, or a second major.

Learning Outcomes

In all of the areas of the department’s curriculum, American, comparative, and international, students majoring in political science shall demonstrate the following:

- Ability to reason through political claims and assertions by political actors
- Skill in recognizing and responding to diverse ideological perspectives
- Ability to locate political issues and controversies within their relevant institutional and historical contexts
- Familiarity with the institutional processes of politics in numerous global and domestic political arenas

Confidence in expressing opinions and presenting analyses of political problems and their solutions.

Potential Occupations

The political science major, like all studies in the liberal arts, provides students with a broad academic background that is serviceable across a broad spectrum of employment in the public and private sectors. Political science majors are trained to be independent and critical thinkers; to be discerning and active observers and listeners; to communicate persuasively; to constructively engage and solve intellectual and practical problems; to adapt and function effectively in a number of distinct occupational and institutional settings; to function comfortably in a multiethnic, multiracial, and globalizing society. The employment profiles of departmental alumni attest to the breadth of possibilities for today’s graduates: public and non-profit organization managers, prosecutors, public policy analysts and consultants, federal law enforcement agents, legislators and legislative analysts, foreign service officers, private attorneys, demographers, criminal investigators, advertising specialists, urban/regional planners, environmental policy analysts, state budget analysts, public relations representatives, market researchers, elementary and high school teachers, international businessmen and businesswomen, lobbyists, novelists, construction industry managers, insurance agents and managers, financiers, and real estate brokers. Some graduates join professions following advanced study in law, international relations, area studies, public administration, public policy analysis, and business management.

Political science majors must achieve a minimum grade of C- (1.670) in each of the political science (POLS) courses counted toward meeting the requirement of the major.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
POLS 101	American Government and Politics	3	3C
POLS 103	State and Local Government and Politics	3	3C
	Arts and Humanities ¹	6	3B
	Biological and Physical Sciences ²	4	3A
	Historical Perspectives ³	3	3D
	Mathematics ⁴	3	1B
	Electives	5	
	TOTAL	30	
SOPHOMORE			
<i>Select one course from the following:</i>			
CO 300 ^P	Writing Arguments	3	2
CO 301A-D ^P	Writing in the Disciplines	3	2
CO 302 ^P	Writing Online	3	2
JTC 300 ^P	Professional and Technical Communication	3	2
<i>Select from the following:</i>			
ECON 101	Economics of Social Issues	3	3C
OR			
ECON 202 ^P	Principles of Microeconomics ⁵	3	3C
ECON 204 ^P	Principles of Macroeconomics	3	3C
POLS 232	International Relations	3	3E
POLS 241	Comparative Government and Politics	3	3E
	Biological and Physical Sciences ²	3	3A
	Political science, upper-division ⁶	3	
	Support option ⁷	3-6	
	Electives	6-9	
	TOTAL	30-33	
JUNIOR			
	Political Science—AUCC Categories 4A and/or 4B ^{6,8}	0-3	4A, 4B
	Political science, upper-division ⁶	6-9	
	Support option ⁷	6-12	
	Electives	9-12	
	TOTAL	27-30	
SENIOR			
POLS 492 ^P	Capstone Seminar ^{8,9}	3	4A, 4B, 4C
	Political Science—AUCC Categories 4A and/or 4B ^{6,8}	0-3	4A, 4B
	Political science, upper-division ⁶	6-9	4A, 4B
	Support option ⁷	6-12	
	Electives ¹⁰	6-12	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select a total of seven credits from the list of courses in category 3A in the AUCC. One of the courses selected must have a laboratory component.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select at least three credits from the list of courses in category 1B in the AUCC.

⁵ ECON 202 and ECON 204 should be taken by students who plan to take advanced courses in economics.

⁶ At least 24 credits of upper division political science courses must be completed for the major, including the senior capstone course, POLS 492, and at least one upper-division course in each of the following subfields: American politics and law: POLS 302, POLS 303, POLS 304, POLS 305, POLS 306, POLS 405, POLS 409, POLS 410, POLS 413; Comparative Politics: POLS 341, POLS 345, POLS 444, POLS 445, POLS 446, POLS 447, POLS 448, POLS 449; International Relations: POLS 331, POLS 332, POLS 431, POLS 433, POLS 435, POLS 436, POLS 437; Political Theory: POLS 420, POLS 421, POLS 423; and Public Policy and Administration: POLS 351, POLS 361, POLS 362, POLS 460, POLS 462. Students choosing the Methods support option must take POLS. Credits earned in POLS 495

may not be used to satisfy this requirement. A maximum of three credits earned in POLS 486 may be used to satisfy this requirement.

⁷ Choose from among the following support options:

(1) Foreign language option [15-22 credits] – a minimum of 5 courses totaling at least 15 credits in a single foreign language, including at least 2 courses of language instruction or in the language at the upper-division level.

(2) Methods option [21 credits] – POLS 320 and STAT 301; 6 credits from among PHIL 120, PHIL 327, and PHIL 415; 3 credits from among STAT 305, STAT 340, and STAT 350; 6 credits from among the following: ANTH 441, ECON 335/AREC 335, SOC 210 and SOC 311.

(3) Completion of either a minor or a second major.

(4) An approved program proposed by student containing at least 21 credits including at least 12 upper-division credits.

⁸ Of the 24 credits of upper division (300- to 400-level) political science courses to be completed for the major, a minimum of 3 credits must satisfy categories 4A and 4B of the AUCC (in addition to 3 credits of POLS 492). See department list of courses that have been approved for categories 4A and 4B.

⁹ Students must have completed upper division courses in at least four of the five subfields listed in footnote 7 in order to enroll in POLS 492.

¹⁰ Select sufficient elective credits to bring the total program of study to a minimum of 120 credits including a minimum of 42 upper-division credits.

Minor in Political Science

The minor provides a sound academic core for students in other social science or non-social science majors who are interested in politics. It may be particularly useful for persons preparing themselves for careers in law, teaching in the social sciences, journalism, and public service.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
LOWER DIVISION		
POLS 101	American Government and Politics	3
<i>Select two courses from the following:</i>		
POLS 103	State and Local Government and Politics	3
POLS 232	International Relations	3
POLS 241	Comparative Government and Politics	3
TOTAL		9

UPPER DIVISION

Twelve credits in political science courses with at least three credits in political theory and in at least one additional subfield of political science. Credits earned in POLS 486 and POLS 495 may not be used to satisfy this upper-division credit requirement.

PROGRAM TOTAL = 21 credits

Graduate Programs in Political Science

The department offers graduate programs in Political Science leading to the Master of Arts and Doctor of Philosophy degrees. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, polisci.colostate.edu/.

DEPARTMENT OF SOCIOLOGY

Office in Clark Building, Room B258
(970) 491-6044
sociology.colostate.edu/

Associate Professor Jack Brouillette, Chair
Associate Professor Mike Lacy, Director of Graduate Studies

Major in Sociology

Sociology is the study of social life, focusing on the mutual interaction between human groups and institutions. Human beings, through patterned social interactions, construct and reconstruct the social webs within which they live. The nature and type of social relationships are central to their lives. Sociologists study relationships within family units from the most primitive cultures to interactions of large, bureaucratic institutions in major industrialized nations. Social issues are studied in a variety of ways: direct observation of groups; surveying or interviewing individuals; analyzing historical research; and a variety of other methods.

Sociology majors have many opportunities to pursue broad and diverse ranges of interest. Students gain a sense of social perspective, an understanding of human affairs, an ability to think critically, and a capacity to write well. The curriculum includes general courses in the arts and humanities and the social sciences along with sociology course work. A generous selection of electives allows students to major or minor in a complementary discipline. A Sociology major also may enroll in one of the interdisciplinary minors, such as Asian Studies, Latin American and Caribbean Studies, Religious Studies, or Women's Studies.

Learning Outcomes

Students will:

- Analyze critically the major classical and contemporary theories from the 19th and 20th centuries. Students are expected to demonstrate how well these theories help us understand or explain current social phenomena both in the U.S. and abroad. Students will learn to apply a wide variety of theories, including European critical theory, functionalism, symbolic interactionism, and post-modern theory, in required empirical research.
- Analyze critically sociological phenomena by applying objective social research methodologies. Students will demonstrate a working knowledge of sociological theories and the application of these theories to real world social phenomena. Specifically, students will understand conceptual frameworks associated with 1) social structure (social stratification, ethnic structures, social institutions, small group dynamics, social demography, and social organizations); 2) culture (socialization and the development of personalities, social norms, framing normative assumptions of societies and organizations); and 3) social agency (the behavior of the individual, collective behavior such as with social movements, and the principles of social-psychology).
- Analyze critically sociological phenomena by applying social statistical techniques. Students will demonstrate a strong working knowledge of statistical techniques

including 1) parametric statistics, 2) non-parametric statistics, 3) ordinary least squares statistical analysis, and 4) the application of the SPSS statistical package.

Potential Occupations

Careers are exceptionally varied. Participating in internships and cooperative education opportunities is highly recommended to enhance practical training and development. Sociology graduates apply their education to a large variety of occupations in the non-profit, private, and public sectors. Because Sociology graduates possess a number of transferable communication, analytical, and people skills, they find positions in government, industry, and academia. Many employers appreciate liberal arts majors for their multiple skills and their ability to adapt to a variety of tasks and work environments. Graduates who go on for advanced studies can pursue careers in sociology or attain advanced positions with the possibility of rising to top professional levels.

Depending on student interests, the electives taken, or the concentration selected, available career choices include, but are not limited to: business manager, personnel director, city manager, clinical social worker, college/university instructor, human relations director, demographer, government aide, labor relations specialist, market analyst, researcher, medical administrator, police officer, politician, probation/parole officer, program director/manager, public administrator, publishers, sociologist-specialist, consultant, criminologist, lawyer, librarian.

Criminology and Criminal Justice Concentration

Sociology majors who opt for the Criminology and Criminal Justice concentration will supplement their general sociological training with course work focused on social aspects of crime and criminal justice. Such students will find the concentration helpful in enhancing their ability to think critically about issues of crime and justice, and in preparing for various careers within the criminal justice system.

Sociology majors in the Criminology and Criminal Justice concentration must achieve a minimum grade of C- (1.670) in each Sociology course counted toward the concentration, and in POLS 413 and SOWK 371B or SOWK 371C, if these courses are counted toward the concentration.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
SOC 100	General Sociology	3	3C
OR			
SOC 105	Social Problems	3	3C
SOC 253 ^P	Introduction to Criminal Justice	3	
	Arts and Humanities ¹	3	3B
	Biological and Physical Sciences ²	3-4	3A
	Mathematics ³	3	1B
	Social and Behavioral Sciences ⁴	3	

Course	Title	Cr	AUCC
Electives		7-8	
TOTAL		29	
SOPHOMORE			
	Advanced Writing ⁵	3	2
	Arts and Humanities ¹	3	3B
	Biological and Physical Sciences ²	3-4	3A
	Global and Cultural Awareness ⁶	3	3E
	Historical Perspectives ⁷	3	3D
	Social and Behavioral Sciences ⁴	6	
	Electives	9	
TOTAL		30-31	
JUNIOR			
SOC 210 ^P	Quantitative Sociological Analysis	3	
OR			
STAT 2** ^P	Statistics ⁸	3	
SOC 301 ^P	Development of Sociological Thought	3	
OR			
SOC 302 ^P	Contemporary Sociological Theory	3	
SOC 311 ^P	Methods of Sociological Inquiry	3	4A, 4B
SOC 313 ^P	Computer Methods in Sociology	1	
<i>Select one of the following:</i>			
SOC 352 ^P	Criminology	3	
SOC 372 ^P	Sociology of Deviance	3	
SOC 482B	Travel Study in Sociology: Crime and Deviance	3	
SOC 354 ^P	Law Enforcement and Society	3	
	Social and Behavioral Sciences ⁴	12	
	Electives	3	
TOTAL		31	
SENIOR			
POLS 413 ^P	U.S. Civil Rights and Liberties	3	
OR			
SOC 455 ^P	Sociology of Law	3	
<i>Select one of the following:</i>			
SOC 358 ^P	Correctional Organizations	3	
SOWK 371B	Social Work-Juvenile Offenders	3	
SOWK 371C	Social Work-Adult Offenders	3	
SOC 403 ^P	Capstone Seminar	3	4C
OR			
SOC 487 ^P	Internship	3	4C
SOC 492 ^P	Seminar	1	4C
Electives ⁹		19-21	
TOTAL		29-30	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

³ Select three credits of Mathematics from category 1B in the AUCC except MATH 133 and MATH 135.

⁴Select from a department list of approved courses.

⁵ Select from the list of courses in category 2 in the AUCC.

⁶ Select from the list of courses in category 3E in the AUCC.

⁷ Select from the list of courses in category 3D in the AUCC.

⁸ Select STAT 201, General Statistics, or any statistics course 200-level and above.

⁹ Select enough elective credits to bring program total to 120 credits. A minimum of 42 upper-division credits is required.

Environmental Sociology Concentration

The Environmental Sociology concentration takes sociology's long established disciplinary orientation to the world and applies it to the study of nature-society relations. Sociology is about people, institutions, and behaviors. It is about social interactions and social structures. The task of the sociologist, therefore, is to stand back from commonsense views of the world and understanding the structure and processes of a society as a whole, including

global societies. Environmental Sociology is about translating these tasks into analysis and action around environmental issues. Some of the pressing contemporary environmental issues that Environmental Sociology can be applied to are, for example, transboundary pollution, climate change, biodiversity loss, and water and soil degradation. Students will find the concentration helpful in preparing them for a growing number of jobs that have a focus in environmentally related matters.

Sociology majors in the Environmental Sociology concentration must achieve a minimum grade of C- (1.67) in each Sociology course counted toward the concentration, and in each course that carries the ANTH, NR, or POLS prefix, if these courses are counted toward the concentration.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
SOC 100	General Sociology	3	3C
OR			
SOC 105	Social Problems	3	3C
	Arts and Humanities ¹	3	3B
	Biological and Physical Sciences ²	4	3A
	Mathematics ³	3	1B
	Social and Behavioral Sciences ⁴	3	
	Electives	11	
	TOTAL	30	
SOPHOMORE			
SOC 220	Global Environmental Issues	3	
	Advanced Writing ⁵	3	2
	Arts and Humanities ¹	3	3B
	Biological and Physical Sciences ²	3	3A
	Global/Cultural Awareness ⁶	3	3E
	Historical Perspectives ⁷	3	3D
	Social and Behavioral Sciences ⁴	6	
	Environmental Sociology Electives ⁸	3	
	Electives	3	
	TOTAL	30	
JUNIOR			
SOC 210 ^P	Quantitative Sociological Analysis	3	
OR			
STAT 2** ^P	Statistics ⁹	3	
SOC 301 ^P	Development of Sociological Thought	3	
OR			
SOC 302 ^P	Contemporary Sociological Theory	3	
SOC 311 ^P	Methods of Sociological Inquiry	3	4A, 4B
SOC 313 ^P	Computer Methods in Sociology	1	
	Social and Behavioral Sciences	12	
	Environmental Sociology Electives ⁸	3	
	Electives ¹⁰	5	
	TOTAL	30	
SENIOR			
SOC 403 ^P	Capstone Seminar	3	4C
OR			
SOC 487 ^P	Internship	3	4C
SOC 492 ^P	Seminar	1	4C
	Environmental Sociology Electives ⁸	6	
	Electives ¹⁰	20-21	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.
¹Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.
²Select from the list of courses in category 3A of the AUCC. One course must have a laboratory component.
³Select three credits of Mathematics from category 1B of the AUCC except MATH 133 and MATH 135.
⁴Select from a department list of approved courses.
⁵Select from the list of courses in category 2 of the AUCC.
⁶Select from the list of courses in category 3E of the AUCC.
⁷Select from the list of courses in category 3D of the AUCC.

⁸Select 12 credits from the following: SOC 320, SOC 321, SOC 360, SOC 362, SOC 364, SOC 460, SOC 461, SOC 463, SOC 564. A total of 6 credits can come from outside sociology. Students can petition for program credit when >25% of course material and grading are related to environment and society. Preapproved courses that satisfy this requirement and need no petitioning include: ANTH 415, ANTH 446, ERHS 220, ERHS 430, HIST 355, HIST 470, NR 320, NR 330, NR 425, PHIL 345POL 361, POLS 362, PSY 316.
⁹Select STAT 201, General Statistics, or any statistics course 200-level and above.
¹⁰Select enough elective credits to bring program total to 120 credits, with a minimum of 42 upper-division (300-400 level) credits.

General Sociology Concentration

The General Sociology concentration is designed to provide students with a broad liberal arts education and a greater understanding and insight into the social systems and processes that bear upon everyday lives. Students will find the concentration helpful in enhancing their ability to grasp the complexities of the world so as to prepare them for a variety of jobs upon graduation. Opportunities for students with bachelor's degrees in sociology are quite varied. Some go on to work for human service agencies; others work in the fields of criminal justices and urban planning; others enter graduate programs in sociology, education, law, medicine, or social work.

Sociology majors in the General Sociology concentration must achieve a minimum grade of C- (1.670) in each of the Sociology courses counted toward the concentration.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
SOC 100	General Sociology	3	3C
OR			
SOC 105	Social Problems	3	3C
	Arts and Humanities ¹	3	3B
	Biological and Physical Sciences ²	3-4	3A
	Mathematics ³	3	1B
	Social and Behavioral Sciences ⁴	3	
	Sociology electives ⁵	3	
	Electives	8-9	
	TOTAL	30	
SOPHOMORE			
	Advanced Writing ⁶	3	2
	Arts and Humanities ¹	3	3B
	Biological and Physical Sciences ²	3-4	3A
	Global and Cultural Awareness ⁷	3	3E
	Historical Perspectives ⁸	3	3D
	Social and Behavioral Sciences ⁴	6	
	Sociology electives ⁵	6	
	Electives	3	
	TOTAL	30-31	
JUNIOR			
SOC 210 ^P	Quantitative Sociological Analysis	3	
OR			
STAT 2** ^P	Statistics ⁹	3	
SOC 301 ^P	Development of Sociological Thought	3	
OR			
SOC 302 ^P	Contemporary Sociological Theory	3	
SOC 311 ^P	Methods of Sociological Inquiry	3	4A, 4B
SOC 313 ^P	Computer Methods in Sociology	1	
	Social and Behavioral Sciences ⁴	12	
	Upper division Sociology	3	
	Electives	4-5	
	TOTAL	29-30	
SENIOR			
SOC 403 ^P	Capstone Seminar	3	4C
OR			
SOC 487 ^P	Internship	3	4C
SOC 492 ^P	Seminar	1	4C

Course	Title	Cr	AUCC
	Upper division Sociology Electives ¹⁰	3	23-24
	TOTAL	30	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

³ Select three credits of Mathematics from category 1B in the AUCC except MATH 133 and MATH 135.

⁴ Select from a department list of approved courses.

⁵ Select courses representing the major areas of sociology, or ANTH 440.

⁶ Select from the list of courses in category 2 in the AUCC.

⁷ Select from the list of courses in category 3E in the AUCC.

⁸ Select from the list of courses in category 3D in the AUCC.

⁹ Select STAT 201, General Statistics, or any Statistics course 200-level or above.

¹⁰ Select enough elective credits to bring program total to 120 credits, with a minimum of 42 upper-division credits.

Minors in Sociology

Minor in Criminology and Criminal Justice

The department offers a minor in Criminology and Criminal Justice for students from other departments who wish some experience in an area outside their majors. Minors require fewer credit hours to complete than majors. Students will focus on the social aspects of crime, deviance, and criminal justice.

Course	Title	Cr
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LOWER DIVISION

SOC 100	General Sociology	3
OR		
SOC 105	Social Problems	3
SOC 253 ^P	Introduction to Criminal Justice	3
	TOTAL	6

UPPER DIVISION

SOC 301 ^P	Development of Sociological Thought	3
OR		
SOC 302 ^P	Contemporary Sociological Theory	3
SOC 311 ^P	Methods of Sociological Inquiry	3

Choose one course from three of the following five categories:

Category I		
SOC 352 ^P	Criminology	3
SOC 372	Sociology of Deviance	3
SOC 482B	Travel Study in Sociology: Crime and Deviance	3
Category II		
SOC 354 ^P	Law Enforcement and Society	3
Category III		
POLS 413 ^{P*}	Civil Rights and Liberties	3
SOC 455 ^P	Sociology of Law	3

Course	Title	Cr
Category IV		
SOC 358 ^P	Correctional Organizations	3
SOC 450 ^P	Gender, Crime, and Criminal Justice	3
SOWK 371B	Social Work with Juvenile Offenders	3
SOWK 371C	Social Work with Adult Offenders	3
Category V		
SOC 482A	Travel Study in Sociology: Criminal Justice Systems	3
SOC 564 ^P	Environmental Justice	3
	TOTAL	15

PROGRAM TOTAL = 21 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

* Additional course work may be required because of prerequisites.

Minor in General Sociology

A minor in Sociology provides the student with basic technical skills and conceptual framework to study human societies. From an array of courses, the student can select the areas of study which enhance the focus of his/her major.

Course	Title	Cr
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LOWER DIVISION

SOC 100	General Sociology	3
OR		
SOC 105	Social Problems	3

UPPER DIVISION

SOC 301 ^P	Development of Sociological Thought	3
OR		
SOC 302 ^P	Contemporary Sociological Theory	3
SOC 311 ^P	Methods of Sociological Inquiry	3
OR		
Equivalent course work in social research		

Minimum of 12 credits in upper-division sociology courses beyond specific requirements chosen on the basis of relevance to student's program of study.

	TOTAL	18
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PROGRAM TOTAL = 21 credits*

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required because of prerequisites.

Graduate Programs in Sociology

Programs leading to M.A. and Ph.D. degrees are described in the *Graduate and Professional Bulletin*, graduate.school.colostate.edu/current-students/bulletin.aspx, and the department's website, sociology.colostate.edu/. Direct inquiries to the Department of Sociology, B258 Clark Building.

Colorado State University reserves the right at any time, without notice, to change, modify, or cancel any course, program, procedure, policy, financial requirement, or disciplinary arrangement set forth in this catalog whenever, in its sole discretion, it determines such action to be appropriate. Furthermore, Colorado State will not be responsible for any failure to present or complete any course or program or to perform any other activity, function, or obligation mentioned in this catalog. Since changes may occur at any time, students must check the relevant website (as noted throughout various chapters in this catalog).

Warner College of Natural Resources

Office in Natural Resources Building, Room 101
(970) 491-6675
www.warnercnr.colostate.edu

Professor Joyce Berry, Dean
Associate Professor Peter Newman, Associate Dean

UNDERGRADUATE MAJORS

Fish, Wildlife, and Conservation Biology
Forestry
Geology
Natural Resource Recreation and Tourism
Natural Resources Management
Rangeland Ecology
Watershed Science

UNDERGRADUATE MINORS

Ecological Restoration
Fishery Biology
Forestry
Geology
Range Ecology
Spatial Information Management
Watershed Science
Wilderness Management

The College offers studies and professional training in the management, administration, and scientific investigation of renewable and nonrenewable natural resources. Programs include the study of every component of natural systems with particular emphasis on fish, forests, minerals, range, watershed, wildlife, and outdoor recreation areas.

The Natural Resource Ecology Laboratory, housed in the College, is devoted to research and training in ecosystem science and management.

The College also houses the Center for Environmental Management of Military Lands which is a team of environmental professionals experienced in the

conservation and sustainable management of natural and cultural resources on Department of Defense lands.

COLLEGE PROGRAMS

Undergraduate Majors

The scope of the College's programs is more broadly based than most natural resources schools. There are eight undergraduate curricula, most with specialized concentrations or designated areas of further study. Undergraduate majors in all four departments lead to the Bachelor of Science degree, which requires a minimum of 120 credits. A minimum of 42 credits in upper division courses is required for all majors.

Field Training Programs

Most undergraduate majors require the completion of a four-week summer field training program (five credits) *before* their junior year. Summer field instruction is given at the Pingree Park campus, 55 miles west of Fort Collins. Permanent quarters and meals are provided. Information concerning the summer program is available in February from the Dean's Office of the Warner College of Natural Resources.

During interim or summer periods, some majors devote several weeks to advanced field training programs off campus. Students taking advanced ROTC should arrange their schedules with their advisers in their junior year to avoid conflicts during senior spring semester. It is recommended for all majors, and required for some, that students have a minimum of one summer of field experience before graduation.

International Education

International resources management is an increasingly important concern of the Warner College of Natural Resources. It is desirable that students in the College have opportunities to study abroad, just as students from abroad are encouraged to study here. The University has agreements covering study abroad opportunities with institutions throughout the world. Students may complete

one or two semesters of resources management education abroad. Students interested in study abroad should plan, far in advance, by discussing opportunities with their academic adviser and by visiting the Office of International Programs in Laurel Hall, www.international.colostate.edu/.

Graduate Programs

Master of Science and Doctor of Philosophy degree programs are offered in each department. A program leading to the professional degree, Master of Natural Resources Stewardship, is offered in the Department of Forest, and Rangeland Stewardship. The Department of Fish, Wildlife, and Conservation Biology also offers a professional degree, Master of Fish, Wildlife, and Conservation Biology. Descriptions of the various graduate programs may be found in the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, or on the departmental websites.

ADMISSION INFORMATION

For High School Graduates

High school students are advised to take all the English, science, and mathematics courses possible to prepare for college-level work in natural resources.

Limitation on Transfer of Credits

Students planning to attend another college or junior college prior to enrolling at Colorado State University should follow the freshman program for their chosen major as closely as possible. To assure that they have the opportunity to complete all degree requirements in four years, they should plan to transfer to Colorado State no later than the beginning of their junior year. Students whose majors include the summer field training program should transfer for the summer session prior to their junior year. Credits which transfer but are not equivalent to specific curriculum requirements may be used as elective credits.

Transfer Students

Students are required to choose a major when enrolling. Transfer students, therefore, should follow the departmental curriculum closely. Check the individual major and concentration for specific courses.

DEPARTMENT OF ECOSYSTEM SCIENCE AND SUSTAINABILITY

*Office in The Natural and Environmental Science Building, Room A202
(970) 491-5589
<http://warnercnr.colostate.edu/dess-home/>*

Professor John C. Moore, Department Head

The Department of Ecosystem Science and Sustainability currently offers a B.S in Watershed Science, a minor in Watershed Science, and an M.S in Watershed Science. Undergraduate and graduate degrees in ecosystem science and sustainability are under development. Students are encouraged to visit the web site warnercnr.colostate.edu/dess-home and follow the links to the majors in Ecosystem Science and Sustainability.

Major in Watershed Science

It can easily be argued that water is our most important natural resource. The management, use, and stewardship of fresh water resources is an increasingly important and complex challenge in Colorado and worldwide. Watershed science is the interdisciplinary study of all of the natural processes and human activities that affect water resources on a watershed scale. The program requires a solid grounding in the physical and natural sciences in preparation for the upper-division courses in topics such as land use hydrology, land use and water quality, eolian and fluvial transport processes, and watershed analysis.

Learning Outcomes

Students will demonstrate:

- Understanding of the key concepts in watershed science, a familiarity and understanding of commonly-used models, and an ability to analyze complex data. Performance standards include the following: 1) knowledge and ability to collect, analyze and evaluate meteorological, hydrological, and water quality data; 2) knowledge of surface water hydrology, including the ability to quantify a design storm, development of a water balance, and use of runoff prediction tools; 3) knowledge of erosion processes and sediment pond design; 4) knowledge and use of conceptual, empirical, and physically-based models; and 5) knowledge of water quality hydrology including the design and implementation of water quality monitoring programs to assess influences of land use activities

- Ability to prepare comprehensive and technical reports and orally present the results of their work. Students will develop the following skills: 1) organization of a presentation; 2) ability to clearly communicate technical content; 3) use of quality graphics and technology; and 4) confidence and delivery in the oral presentation

Potential Occupations

Completion of the undergraduate degree qualifies students for a wide variety of careers in hydrology, watershed, and water resources management. Employment opportunities include consulting firms; governmental bodies at the local, regional, and national levels; international development and resource management agencies; and private industry. Participation in internships, volunteer activities, or co-operative education opportunities is highly recommended to enhance practical training and development.

Examples of possible careers include, but are not limited to: watershed scientists, hydrologist, environmental consultant, water quality analyst, watershed manager, watershed analyst, land use specialist, water conservation specialist.

Course	Title	Cr	AUCC
FRESHMAN			
BZ 104	Basic Concepts of Plant Life	3	3A
OR			
LIFE 103 ^P	Biology of Organisms-Animals and Plants ¹	4	
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CO 150 ^P	College Composition	3	1A
GEOL 150	Physical Geology for Scientists and Engineers	4	
OR			
GR 210	Physical Geography ²	3	
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
MATH 125 ^P	Numerical Trigonometry	1	1B
MATH 126 ^P	Analytical Trigonometry	1	1B
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
OR			
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
	Social/behavioral sciences ³	3	3C
	Elective	2	
	TOTAL	26-28	
SOPHOMORE			
CO 301A-D ^P	Writing in the Disciplines	3	2B
OR			
JTC 300 ^P	Professional and Technical Communication	3	2B
NR 220 ^P	Natural Resources Ecology and Measurements	5	
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
OR			
MATH 255 ^P	Calculus for Biological Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
SOCR 240 ^P	Introductory Soil Science	4	
SPCM 200	Public Speaking	3	2A
STAT 301 ^P	Introduction to Statistical Methods	3	
	Global and cultural awareness ⁴	3	3E
	Historical perspectives ⁵	3	3D
	TOTAL	33	

Course	Title	Cr	AUCC
JUNIOR			
GR 342	Geography of Water Resources ²	3	
SOCR 322 ^P	Principles of Microclimatology	3	
WR 416 ^P	Land Use Hydrology ²	3	4B
WR 417 ^P	Watershed Measurements ²	3	
WR 418 ^P	Land Use and Water Quality ²	3	
WR 419 ^P	Water Quality Laboratory for Wildland Managers	2	
WR 420 ^P	Watershed Field Practicum	2	
WR 474 ^P	Snow Hydrology	3	
	Arts/humanities ⁶	6	3B
	Electives ⁷	3	
	TOTAL	31	
SENIOR			
<i>Select two courses from the following:</i>			
CIVE 322 ^P	Basic Hydrology ²	3	
ENVE 322 ^P			
CIVE 413 ^P	Environmental River Mechanics	3	
GEOL 454 ^P	Geomorphology	4	
SOCR 440	Pedology	4	
WR 406 ^P	Seasonal Snow Environments	3	
GEOL 452 ^P	Hydrogeology	4	
NR 322	Introduction to Geographic Information Systems	4	
SOCR 470 ^P	Soil Physics	3	
SOCR 471 ^P	Soil Physics Laboratory	1	
WR 440 ^P	Watershed Problem Analysis	3	4A, 4B, 4C
	Electives ⁷	5-9	
	TOTAL	28-30	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ In order to take this course, students may need to obtain a registration override from the appropriate department.

² Partially satisfies requirements of the Water Resources Interdisciplinary Studies Program. (Refer to CSU Catalog.)

³ Select from the list of courses in category 3C in the All-University Core Curriculum (AUCC).

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select from the list of courses in category 3D in the AUCC.

⁶ Select two courses from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁷ Consult with adviser.

Minor in Watershed Science

The minor in watershed science provides an opportunity to obtain a background in watershed science to complement other majors. While it has sufficient flexibility to be applied to a variety of subject areas, the minor is especially tailored to those majors within the Warner College of Natural Resources. Advice on the selection of minor electives is available in the department.

Course	Title	Cr
LOWER DIVISION		
GEOL 150	Physical Geology for Scientists and Engineers	4
OR		
GR 210	Physical Geography	3
UPPER DIVISION		
<i>Select at least 10 credits from the following:</i>		
AREC 342	Water law, Policy, and Institutions	3
ATS 350	Introduction to Weather and Climate	2
CIVE 322 ^P	Basic Hydrology	3
ENVE 322 ^P		
CIVE 413 ^P	Environmental River Mechanics	3
CIVE 423 ^P	Groundwater Engineering	3
CIVE 440 ^P	Nonpoint Source Pollution	3
GEOL 452 ^P	Hydrogeology	4
GEOL 454 ^P	Geomorphology	4
SOCR 322 ^P	Principles of Microclimatology	3

<u>Course</u>	<u>Title</u>	<u>Cr</u>
SOCR 470 ^P	Soil Physics	3
SOCR 471 ^P	Soil Physics Laboratory	1
SOC 461 ^P	Water, Society and Environment	3
WR 417 ^P	Watershed Measurements	3
WR 418 ^P	Land Use and Water Quality	3
WR 419 ^P	Water Quality Laboratory for Wildland Managers	2
WR 474 ^P	Snow Hydrology	3
GR 342	Geography of Water Resources	3
WR 416 ^P	Land Use Hydrology	3
WR 420 ^P	Watershed Field Practicum	2
TOTAL		18

PROGRAM TOTAL = 21-22 credits without prerequisites

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

Graduate Programs in Ecosystem Science and Sustainability

The department offers a graduate program leading to master of watershed science. Programs leading to a master of science and a doctor of philosophy degree in ecosystem science and sustainability are under development. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website warnercnr.colostate.edu/dess-home.

DEPARTMENT OF FISH, WILDLIFE, AND CONSERVATION BIOLOGY

*Office in Wagar Building, Room 109D
(970) 491-5020
<http://warnercnr.colostate.edu/fwcb-home/>*

Professor Kenneth R. Wilson, Department Head

The Department of Fish, Wildlife, and Conservation Biology offers one major of fish, wildlife, and conservation biology with three concentrations. Those concentrations are conservation biology, fisheries and aquatic sciences, and wildlife biology. We also offer a minor in fishery biology.

Students are encouraged to visit the web site warnercnr.colostate.edu/fwcb-home and follow the links to the major in fish, wildlife, and conservation biology.

Major in Fish, Wildlife, and Conservation Biology

Professor Will Clements, in charge

Fish, wildlife, and conservation biology is intended for students interested in understanding wildlife and the habitats in which they live. We offer three concentrations: conservation biology; fisheries and aquatic sciences; and wildlife biology. The curriculum has a strong foundation in the biological, physical, and social sciences with the focus on solving current and future issues related to conservation and sustainability of wild animals and their habitats. The faculty offers a wide range of expertise with a keen interest in innovative teaching and research methods. Our program prepares students for professional careers involving fish, wildlife, and conservation that include federal and state agencies, nongovernmental organizations, the private sector, graduate school, and academic institutions. Students have access to a wide array of facilities, research and internship opportunities, and professional associations to further their studies, practical experience, and career potential. Required natural science courses include general biology, vertebrate biology, botany, calculus, and statistics. A summer field course at Colorado State University's mountain campus at Pingree Park provides students with hands-on learning about natural resource ecology and measurements. Along with a strong technical foundation, problem solving and communication skills are important to resolve difficult issues faced by natural resource professionals in today's world.

Learning Outcomes

Students will:

- Demonstrate a mastery of ecological concepts and fundamental principles and techniques to manage and conserve fish and wildlife populations, and how they apply to current natural resource management issues
- Demonstrate mathematical, statistical, and study design knowledge and skills required for careers in fishery, wildlife, and conservation biology
- Become effective in oral and written communication about issues related to the environment and natural resources, including as members of multi-disciplinary teams
- Learn approaches to solving complex natural resource management issues, including planning, organizing, creating, and presenting group projects

Potential Occupations

Federal and state agencies that manage natural resources offer most employment opportunities in fish, wildlife, and conservation biology. These include federal agencies such as the U.S. Forest Service, Fish and Wildlife Service, Bureau of Land Management, Geological Survey, National Park Service, Environmental Protection Agency, Bureau of Reclamation, National Marine Fisheries Service, and state departments of wildlife and natural

resources. Non-governmental organizations, e.g., The Nature Conservancy, as well as private companies and environmental consultants also offer excellent opportunities. Participation in internships, volunteer activities, or cooperative education opportunities is highly recommended to enhance practical training and development. Undergraduates who go on for graduate-level studies can attain more advanced positions with the possibility of rising to top professional levels, including as researchers and teachers in academic institutions. Our degree is also excellent preparation for veterinary school.

Examples of career opportunities include, but are not limited to: fishery/wildlife/conservation biologist, ecologist, wildlife refuge or natural resource manager, environmental consultant, research scientist, and educator. Within these areas, a variety of specializations are possible including fish, wildlife, and conservation education and interpretation, habitat enhancement and restoration, administration, research, law enforcement, sampling of biological populations, statistical analyst, and resolution of human-wildlife issues.

A minimum grade of C (2.000) is required in all biological, mathematical/ statistical, physical science, fish, wildlife, and conservation biology, and natural resource courses used to meet graduation requirements for the fish, wildlife, and conservation biology major. The minimum applies to courses taken as substitutions for meeting these requirements. The minimum scholastic average acceptable for graduation is 2.000, computed only for courses attempted at Colorado State University.

Fish, Wildlife, and Conservation Biology Core Courses

Course	Title	Cr	AUCC
FRESHMAN			
<i>Select one set of courses from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
BZ 120	Principles of Plant Biology	4	3A
OR			
LIFE 102 ^P	Attributes of Living Systems	4	3A
LIFE 103 ^P	Biology of Organisms-Animals and Plants	4	
<i>Select one set of chemistry and physics courses from the following:</i>			
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
PH 121 ^P	General Physics I	5	3A
PH 122 ^P	General Physics II	5	3A
OR			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
PH 110	Descriptive Physics	3	3A
PH 111 ^P	Descriptive Physics Laboratory	1	3A
FW 104	Wildlife Ecology and Conservation	3	3A
MATH 155 ^P	Calculus for Biological Scientists I ¹	4	1B
OR			
MATH 160 ^P	Calculus for Physical Scientists I ¹	4	1B
	Arts/humanities ²	3	3B
	TOTAL	31-33	
SOPHOMORE			
<i>Select one course from the following:</i>			

Course	Title	Cr	AUCC
AREC 202	Agricultural and Resource Economics	3	3C
ECON 101	Economics of Social Issues	3	3C
ECON 202 ^P	Principles of Microeconomics	3	3C
AREC 240	Issues in Environmental Economics	3	3C
ECON 204 ^P	Principles of Macroeconomics	3	3C
ECON 212	Racial Inequality and Discrimination	3	3C
ECON 240	Issues in Environmental Economics	3	3C
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
CHEM 246 ^P	Fundamentals of Organic Chemistry Laboratory	1	
CO 150 ^P	College Composition	3	1A
FW 260 ^P	Principles of Wildlife Management	3	
LIFE 320 ^P	Ecology	3	
NR 220 ^P	Natural Resources Ecology and Measurements	5	
SPCM 200	Public Speaking	3	2A
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			
STAT 307 ^P	Introduction to Biostatistics	3	
	TOTAL	28	
JUNIOR			
<i>Select three to four credits from the following:</i>			
BSPM 302	Applied and General Entomology	2	
AND			
BSPM 303A-C ^P	Entomology Laboratory	1-2	
BSPM 445 ^P	Aquatic Insects	4	
BZ 212 ^P	Animal Biology-Invertebrates	4	
<i>Select six to seven credits from the following:^{3,4}</i>			
BZ 214 ^P	Animal Biology-Vertebrates	4	
BZ 329 ^P	Herpetology	3	
BZ 330 ^P	Mammalogy	3	
BZ 335 ^P	Ornithology	3	
FW 300 ^P	Ichthyology	2	
AND			
FW 301 ^P	Ichthyology Laboratory	1	
<i>Select one course from the following:</i>			
BZ 220 ^P	Introduction to Evolution	3	
BZ 346 ^P	Population and Evolutionary Genetics	3	
BZ 350 ^P	Molecular and General Genetics	4	
SOCR 330 ^P	Principles of Genetics	3	
<i>Select one course from the following:</i>			
CO 300 ^P	Writing Arguments	3	2B
CO 301A-D ^P	Writing in the Disciplines	3	2B
JTC 300 ^P	Professional and Technical Communication	3	2B
FW 370 ^P	Design of Fish and Wildlife Projects	3	4A, 4B
NR 320	Natural Resources History and Policy	3	3D
	Arts/humanities ²	3	3B
	Global and cultural awareness ⁵	3	3E
	TOTAL	27-30	
SENIOR			
<i>Select one course from the following:</i>			
NR 330 ^P	Human Dimensions in Natural Resources ⁶	3	
NR 365	Environmental Education	3	
NR 400 ^P	Public Relations in Natural Resources	3	
NRRT 330	Social Aspects of Natural Resource Management	3	
SOC 320 ^P	Population-Natural Resources and Environment ⁶	3	
	TOTAL	3	
CORE TOTAL = 89-94 credits⁷			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ MATH 117, MATH 118, MATH 124, and MATH 125 are considered review courses by the Department of Fish, Wildlife, and Conservation Biology. Credits in these courses, either by examination or completion, may not be used toward a degree in this department.

² Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ FW 300 and FW 301 together count as one selection in this choice.

⁴ For students in the wildlife biology concentration, one course must be BZ 330 or BZ 335.

⁵ Select from the list of courses in category 3E in the AUCC.
⁶ Students will need to obtain a registration override from the appropriate department to take this course.
⁷ In order to complete the major, one of the following concentrations must be selected: conservation biology, fisheries and aquatic sciences, or wildlife biology.

Conservation Biology Concentration

The conservation biology concentration focuses on understanding the ecological processes necessary to conserve biological diversity with an emphasis on fish and wildlife species and their habitats.

A minimum grade of C (2.000) is required in all biological, mathematical/ statistical, physical science, fish, wildlife, and conservation biology, and natural resource courses used to meet graduation requirements for the fish, wildlife, and conservation biology major. The minimum applies to courses taken as substitutions for meeting these requirements. The minimum scholastic average acceptable for graduation is 2.000, computed only for courses attempted at Colorado State University.

In addition to the fish, wildlife, and conservation biology core courses, the following must be completed:

Course	Title	Cr	AUCC
SOPHOMORE			
<i>Select one course from the following:</i>			
BZ 223 ^P	Plant Identification	3	
BZ 321 ^P	Aquatic Vascular Plants ¹	3	
BZ 325 ^P	Plant Systematics	4	
BZ 332 ^P	Introductory Phycology	4	
F 311 ^P	Forest Ecology	3	
NR 326 ^P	Forest Vegetation Management	3	
RS 331 ^P	Wildland Plants and Plant Communities ¹	3	
NR 319 ^P	Geospatial Applications in Natural Resources ¹	4	
OR			
NR 322	Introduction to Geographic Information Systems	4	
TOTAL		7-8	
SENIOR			
FW 401 ^P	Fishery Science	3	4C
OR			
FW 471 ^P	Wildlife Data Collection and Analysis	4	4C
<i>Select one course from the following:</i>			
HIST 355 ^P	American Environmental History ¹	3	
PHIL 345 ^P	Environmental Ethics	3	
POLS 361 ^P	U.S. Environmental Politics and Policy ¹	3	
SOC 320 ^P	Population-Natural Resources and Environment ¹	3	
NR 300 ^P	Biological Diversity ^{1,2}	3	
NR 420 ^P	Integrated Ecosystem Management	4	
	Aquatic ecology elective ³	3-4	
	Habitat management elective ³	3	
	Wildlife elective ³	3-4	
	Other technical elective ^{3,4}	0-2	
TOTAL		22-25	
PROGRAM TOTAL = 120-128 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.
¹ Students will need to obtain a registration override from the appropriate department to take this course.
² Students may select FW 555 in place of NR 300.
³ Select from departmental list.
⁴ Enough elective credits need to be selected to bring the program total to 120 credits with a minimum of 42 upper-division credits.

Fisheries and Aquatic Sciences Concentration

Fisheries and aquatic sciences allow students to focus on a strong background in basic fishery ecology, management, and conservation, which includes an understanding of the linkages between land and water.

Students choosing the fisheries and aquatic sciences concentration are also required to complete at least 160 hours of employment related to fishery and aquatic biology.

A minimum grade of C (2.000) is required in all biological, mathematical/ statistical, physical science, fish, wildlife, and conservation biology, and natural resource courses used to meet graduation requirements for the fish, wildlife, and conservation biology major. The minimum applies to courses taken as substitutions for meeting these requirements. The minimum scholastic average acceptable for graduation is 2.000, computed only for courses attempted at Colorado State University.

In addition to the fish, wildlife, and conservation biology core courses, the following must be completed:

Course	Title	Cr	AUCC
SOPHOMORE			
<i>Select one course from the following:</i>			
BZ 321 ^P	Aquatic Vascular Plants ¹	3	
BZ 332 ^P	Introductory Phycology	4	
F 311 ^P	Forest Ecology	3	
RS 331 ^P	Wildland Plants and Plant Communities ¹	3	
FW 204	Introduction to Fishery Biology	3	
<i>Select four credits from the following:²</i>			
GEOL 120	Exploring Earth: Physical Geology	3	3A
GEOL 121 ^P	Introductory Geology Laboratory	1	3A
GEOL 122	The Blue Planet: Geology of Our Environment	3	3A
GEOL 124	Geology of Natural Resources	3	3A
GEOL 150	Physical Geology for Scientists and Engineers	4	
NR 319 ^P	Geospatial Applications in Natural Resources ¹	4	
NR 322	Introduction to Geographic Information Systems	4	
SOCR 240 ^P	Introductory Soil Science	4	
WR 304	Principles of Watershed Management	3	3A
TOTAL		9-11	
SENIOR			
BZ 474 ^P	Limnology ¹	3	
OR			
BZ 471 ^P	Stream Biology and Ecology ¹	3	
BZ 472 ^P	Stream Biology and Ecology Laboratory	1	
<i>Select one course from the following:</i>			
F 311 ^P	Forest Ecology ³	3	
NR 420 ^P	Integrated Ecosystem Management	4	
RS 331 ^P	Rangeland Ecogeography ^{1,3}	3	
WR 304	Principles of Watershed Management ³	3	
WR 416 ^P	Land Use Hydrology	3	
<i>Select two courses from the following:</i>			
FW 400 ^P	Conservation of Fish in Aquatic Ecosystems ⁴	3	
FW 402 ^P	Fish Culture	4	
FW 405 ^P	Fish Physiology	3	
FW 401 ^P	Fishery Science	3	4C
	Fishery/aquatic electives ⁴	0-7	
TOTAL		18-22	
PROGRAM TOTAL = 120-124 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Students will need to obtain a registration override from the appropriate department to take this course.
² Students selecting WR 304 only need select three credits. Students selecting one of the geosciences lecture courses (GEOL 120, GEOL 122, GEOL 124) also need to take GEOL 121.
³ If course is selected in the sophomore year, another course must be chosen here.
⁴ Select from departmental list. Enough elective credits must be selected to bring the program total to 120 credits.

Wildlife Biology Concentration

Wildlife biology focuses primarily on terrestrial vertebrates and their habitats, and builds a strong foundation in basic wildlife ecology, management, and conservation.

A minimum grade of C (2.000) is required in all biological, mathematical/ statistical, physical science, fish, wildlife and conservation biology, and natural resource courses used to meet graduation requirements for the fish, wildlife, and conservation biology major. The minimum applies to courses taken as substitutions for meeting these requirements. The minimum scholastic average acceptable for graduation is 2.000, computed only for courses attempted at Colorado State University.

In addition to the fish, wildlife, and conservation biology core courses, the following must be completed:

Course	Title	Cr	AUCC
SOPHOMORE			
BZ 223 ^P	Plant Identification	3	
NR 319 ^P	Geospatial Applications in Natural Resources ¹	4	
OR			
NR 322	Introduction to Geographic Information Systems	4	
TOTAL		7	
SENIOR			
FW 471 ^P	Wildlife Data Collection and Analysis	4	4C
	Biological elective ²	3-4	
	Ecosystem management elective ³	3-4	
	Wildlife electives ³	3-4	
	Other technical electives ³	6	
	Elective ⁴	0-3	
TOTAL		19-25	

PROGRAM TOTAL = 120-121 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.
¹ Students will need to obtain a registration override from the appropriate department to take this course.
² Select from departmental list. Students who took LIFE 102 and LIFE 103 should select from the botany courses to ensure a total of 9 botany credits to qualify as a Wildlife Biologist on the Federal Register.
³ Select from departmental list.
⁴ Enough elective credits must be selected to bring the program total to a minimum of 120 credits. Selection of courses at the 300 level is recommended to ensure meeting the university requirement of 42 credits at the 300 level or higher.

Minor in Fishery Biology

Students majoring in watershed science, forestry, rangeland ecology, zoology, and others may find that a minor in fishery biology will increase employment opportunities. The requirements for this minor provide a solid base for aquatic work.

Course	Title	Cr
LOWER DIVISION		
LAND 220 ^{P*/}	Fundamentals of Ecology	3
LIFE 220 ^{P*}		
OR		
LIFE 320 ^{P*}	Ecology	3
<i>Select one set of courses from the following:</i>		
BZ 110	Principles of Animal Biology	3
BZ 111 ^P	Animal Biology Laboratory	1
BZ 120	Principles of Plant Biology	4
OR		
LIFE 102 ^P	Attributes of Living Systems	4
LIFE 103 ^P	Biology of Organisms-Animals and Plants	4
TOTAL		11
LOWER OR UPPER DIVISION		
<i>Select one course from the following:</i>		
FW 204	Introduction to Fishery Biology	3
FW 260 ^{P*}	Principles of Wildlife Management	3
FW 370 ^{P*}	Design of Fish and Wildlife Projects	3
TOTAL		3
UPPER DIVISION		
FW 300 ^P	Ichthyology	2
FW 301 ^P	Ichthyology Laboratory	1
<i>Select two courses from the following:</i>		
FW 400 ^P	Fish Ecology	3
FW 401 ^{P*}	Fishery Science	3
FW 402 ^P	Fish Culture	4
	Adviser-approved aquatic course	3-4
TOTAL		12-14

PROGRAM TOTAL = 26-28 credits without prerequisites

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.
 *Additional course work may be required because of prerequisites.

Graduate Programs in Fish, Wildlife, and Conservation Biology

Graduate programs lead to the master of fish, wildlife, and conservation biology, Master of Science, and Doctor of Philosophy degrees. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, warnercnr.colostate.edu/fwcb-home/.

Students should indicate their interest when writing for further information about graduate programs and research. Contact the department for application instructions or visit our website at warnercnr.colostate.edu/fwcb-graduate-degrees/.

DEPARTMENT OF FOREST AND RANGELAND STEWARDSHIP*

*(Department name change is pending approval by the Board of Governors June 23, 2011)

Office in Forestry Building, Room 121
 (970) 491-6911
warnercnr.colostate.edu/frws-home/

Professor Frederick "Skip" W. Smith, Department Head

Cara Marie DiEnno, PhD, Undergraduate Program Coordinator
 Sonya Le Febre, PhD, Graduate Program Coordinator

Major in Forestry

Forest landscapes are always changing, sometimes very slowly as a result of long-term processes, followed by rapid changes as a result of fires or harvesting. Sustaining forests in the modern world requires managers who understand these changes, and how forests connect to global, ecological, and social systems. The Department of Forest and Rangeland Stewardship provides forestry education that spans the entire range of experiences necessary to understand and manage forests. Curricula include a broad background in the biological, physical, social, and management sciences, followed by professional forestry courses. The program includes a summer course at CSU's Pingree Park mountain campus for field studies in forest ecology, plant and animal identification, wildland fire measurements, forest mapping, and forest measurements. Forestry education is supported by departmental strengths in the full spectrum of land stewardship, including research, and application of knowledge to address real-world issues in forests and communities.

Four concentrations are available in the forestry major – forest biology, forest fire science, forest management, and forestry-business.

Learning Outcomes

Students will:

- Effectively communicate knowledge of forestry and natural resources, both verbally and in writing
- Demonstrate proficiency in subject areas outside their major study focus, including principles/issues in wildlife, water, recreation, wilderness, soil, range, and fishery resources
- Demonstrate comprehensive knowledge of subject areas relevant to the major fields of study in forest sciences, including forest ecology and forest management, and apply this knowledge in a complex, problem-solving environment

Potential Occupations

Careers in forestry and natural resources are exceptionally varied, challenging, and personally satisfying. Opportunities are available in rural and urban settings worldwide. Participation in internships, volunteer activities, or cooperative education opportunities is highly recommended to enhance practical training and development. Positions are available in industry,

education, consulting, public service, and government agencies. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

The demographics of an aging workforce in federal natural resource management agencies will be creating significant opportunities for graduates of this program over the next three to five years.

Some examples of career opportunities include, but are not limited to: forest manager, forest/park ranger, environmental policy and conservation consultant, fire fighter/manager, natural resource journalist, naturalist, land use planner, geospatial information systems specialist, forest products business person, researcher/professor.

Forestry Core Program

Course	Title	Cr	AUCC
FRESHMAN			
BZ 120	Principles of Plant Biology	4	3A
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
CO 150 ^P	College Composition	3	1A
F 210 ^P	Forest Ecogeography	3	
SPCM 200	Public Speaking	3	2A
	Electives	2	
	TOTAL	20	
SOPHOMORE			
ECON 202 ^P	Principles of Microeconomics	3	3C
LIFE 320 ^P	Ecology	3	
SOCR 240 ^P	Introductory Soil Science	4	
	TOTAL	10	
JUNIOR			
F 311 ^P	Forestry Ecology	3	
F 321 ^P	Forest Biometry	3	
F 322 ^P	Economics of the Forest Environment	3	
F 325 ^P	Silviculture	3	
NR 320	Natural Resources History and Policy	3	3D
	TOTAL	15	
SENIOR			
NR 420 ^P	Integrated Ecosystem Management	4	4C
CORE TOTAL = 49 credits¹			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Students must select one of the following concentrations: forest biology, forest fire science, forest management, or forestry-business to complete the major.

Forest Biology Concentration

Forest biology is intended for students interested in forest ecology and tree biology. This concentration prepares students for graduate studies in forest biological sciences and eventual careers in teaching or research. The curriculum focuses on forest biology, forest ecology, natural resource management, and the physical sciences.

In addition to the forestry core courses, the following must be completed:

Course	Title	Cr	AUCC
FRESHMAN			
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
	Arts/humanities ¹	6	3B
	TOTAL	10	
SOPHOMORE			
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
F 230	Forestry Field Measurements	2	
NR 220 ^P	Natural Resources Ecology and Measurements	5	
PH 121 ^P	General Physics I	5	
	Global and cultural awareness ²	3	3E
	TOTAL	19	
JUNIOR			
BZ 440 ^P	Plant Physiology	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
WR 304	Principles of Watershed Management	3	3A
	Field experience ³	0	
	Electives	11	
	TOTAL	20	
SENIOR			
BSPM 365 ^P	Integrated Tree Health Management	4	4A
JTC 300 ^P	Professional and Technical Communication	3	2B
NR 425 ^P	Natural Resource Policy and Sustainability	3	4B
	Biology electives ⁴	12	
	TOTAL	22	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.
¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.
² Select from the list of courses in category 3E in the AUCC.
³ Student must complete one semester of acceptable field experience.
⁴ Select from departmental list of approved courses in consultation with adviser.

Forest Fire Science Concentration

Forest fire science is the study of fire as an ecological process and its application as a forest management tool. Students learn how to control wildfires and how prescribed fires can enhance habitat, prepare seedbeds, control forest insects and disease, and reduce fuel hazards. This program is the largest of its kind in the United States. The curriculum combines courses in fire science, forest biology, natural resource management, and the physical sciences to build skills for a career or graduate study in fire science.

In addition to the forestry core courses, the following must be completed:

Course	Title	Cr	AUCC
FRESHMAN			
MATH 141 ^P	Calculus in Management Sciences ¹	3	1B
PH 110	Descriptive Physics	3	3A
	Elective	3	
	TOTAL	9	
SOPHOMORE			
ATS 350	Introduction to Weather and Climate	2	
F 230	Forestry Field Measurements	2	
NR 220 ^P	Natural Resources Ecology and Measurements	5	
STAT 301 ^P	Introduction to Statistical Methods	3	
	Arts/humanities ²	6	3B
	TOTAL	18	
JUNIOR			
BSPM 365 ^P	Integrated Tree Health Management	4	
CO 300 ^P	Writing Arguments	3	2B

Course	Title	Cr	AUCC
F 324 ^P	Fire Effects and Adaptations	3	
F 330 ^P	Timber Harvesting and the Environment	3	
NR 319 ^P	Geospatial Applications in Natural Resources	4	
	Field experience ³	0	
	Electives	2	
	TOTAL	19	
SENIOR			
F 421 ^P	Forest Stand Management	4	4A
F 422 ^P	Quantitative Methods in Forest Management	3	
F 424 ^P	Wildland Fire Behavior and Management	3	4B
F 425 ^P	Advanced Wildland Fire Behavior and Management	3	
NR 425 ^P	Natural Resource Policy and Sustainability	3	4B
NR 444 ^P	Fire Economics and Policy	3	
WR 304	Principles of Watershed Management	3	3A
	Global and cultural awareness ⁴	3	3E
	TOTAL	25	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.
¹ Students considering graduate study in forest fire science should substitute MATH 155-MATH 255 or MATH 160-MATH 161 for MATH 141.
² Select from list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.
³ Students must complete one summer of acceptable field experience.
⁴ Select from list of courses in category 3E in the AUCC.

Forest Management Concentration

Forest management is a forestry concentration designed to instill an understanding of the basic principles of forest ecology and forest management.

Although many students go on to graduate studies, the program is primarily intended for students interested in managing forestlands. State and federal land management agencies, private forestland owners, consultants, and conservation organizations employ graduates. The curriculum includes a balanced mix of courses in forest biology, integrated forest resource management, and the physical sciences. Students learn about forest productivity, economics, policy, conservation, and the latest in computer-based management tools.

In addition to the forestry core courses, the following must be completed:

Course	Title	Cr	AUCC
FRESHMAN			
MATH 141 ^P	Calculus in Management Sciences	3	1B
	Elective	4	
	TOTAL	7	
SOPHOMORE			
F 230	Forestry Field Measurements	2	
NR 220 ^P	Natural Resources Ecology and Measurements	5	
STAT 301 ^P	Introduction to Statistical Methods	3	
WR 304	Principles of Watershed Management	3	3A
	Arts/humanities ¹	6	3B
	Global and cultural awareness ²	3	3E
	TOTAL	22	
JUNIOR			
F 330 ^P	Timber Harvesting and the Environment	3	

Course	Title	Cr	AUCC
JTC 300 ^P	Professional and Technical Communication	3	2B
NR 319 ^P	Geospatial Applications in Natural Resources	4	
	Field experience ³	0	
	Electives	5	
	TOTAL	15	
SENIOR			
BSPM 365 ^P	Integrated Tree Health Management	4	
F 421 ^P	Forest Stand Management	4	4A
F 422 ^P	Quantitative Methods in Forest Management	3	
F 424 ^P	Wildland Fire Behavior and Management	3	
NR 425 ^P	Natural Resource Policy and Sustainability	3	4B
	Electives	10	
	TOTAL	27	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3E in the AUCC.

³ Students must complete one summer of acceptable field experience.

Forestry-Business Concentration

The forestry-business concentration is for students who wish to study forestry with an emphasis in business. The concentration prepares students for careers in the public sector or private enterprise. Students learn business applications as these relate to forestry. The curriculum includes a mix of forest management and business administration courses. Graduates may also be eligible for graduate studies in forestry and M.B.A. programs.

In addition to the forestry core courses, the following must be completed:

Course	Title	Cr	AUCC
FRESHMAN			
MATH 141 ^P	Calculus in Management Sciences	3	1B
SOPHOMORE			
STAT 204 ^P	Statistics for Business Students	3	
WR 304	Principles of Watershed Management	3	3A
	Arts/humanities ¹	6	3B
	Electives	12	
	TOTAL	24	
JUNIOR			
ACT 205	Fundamentals of Accounting	3	
F 330 ^P	Timber Harvesting and the Environment	3	
JTC 300 ^P	Professional and Technical Communication	3	2B
MKT 305 ^P	Fundamentals of Marketing	3	
	Global and cultural awareness ²	3	3E
	Field experience ³	0	
	TOTAL	15	
SENIOR			
BSPM 365 ^P	Integrated Tree Health Management	4	
BUS 205	Legal and Ethical Issues in Business	3	
F 421 ^P	Forest Stand Management	4	4A
F 422 ^P	Quantitative Methods in Forest Management	3	
F 424 ^P	Wildland Fire Behavior and Management	3	
FIN 305 ^P	Fundamentals of Finance	3	
MGT 301 ^P	Supply Chain Management	3	
MGT 305	Fundamentals of Management ⁴	3	

Course	Title	Cr	AUCC
NR 425 ^P	Natural Resource Policy and Sustainability	3	4B
	TOTAL	29	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3E in the AUCC.

³ Students must complete one semester of acceptable field experience.

⁴ Students wishing to continue in an MBA program should consider substituting MGT 320.

Major in Natural Resources Management

The goal of the natural resources management major is to provide students with a broad-based understanding of the interconnectedness of social, political, and ecological systems. This knowledge will enable students to design sustainable solutions to address natural resource conservation and management problems. Students will learn about natural resource stewardship in both theory and practice, with an eye toward designing systems that are adaptable and resilient in light of the social and ecological complexity and change that characterize today's challenges. Using an integrative approach, students will learn how to develop local solutions that are sustainable and ethical at larger, global scales. Environmental issues such as land-use change and planning, conservation biology, energy use, climate change, renewable resource management, and citizen engagement in place-based conservation will be addressed. Field measurements and field skills are important components of this major, and students are required to attend a 4-week summer field course in ecological investigations and resource management.

Specific objectives are to provide each student with: 1) a science-based core curriculum in biological, physical, and social sciences; 2) a broad foundation in natural resources science and environmental management; and 3) specialization in a subject relevant to natural resources management. The breadth of the major allows students to specialize in a wide range of topics, including conservation biology, geographic information systems, forest management, rangeland ecology, restoration ecology, natural resource policy, recreation resources, watershed management, wildlife management, or other topics related to natural resources management. This specialization is accomplished by coupling the major with a required minor, typically declared by a student's junior year.

Students are encouraged to participate in internships and obtain related work experience. Participating in seasonal and voluntary work, internships, and cooperative

education opportunities will enhance your chances for permanent full-time employment. The department offers numerous opportunities to become engaged in these kinds of endeavors. At the completion of the program, students should have the technical and communication skills that are critical to resolving important natural resource management problems.

Learning Outcomes

Students will:

- Demonstrate knowledge of a wide range of natural resource topics spanning ecological, social and physical aspects of wildland ecosystems
- Demonstrate proficiency in an area of specialization through completion of a minor in an area complementary to natural resource management. Some minors that students find well-suited to develop a proficiency are Global Environmental Sustainability, Forestry, Rangeland Ecology, Ecological Restoration, Watershed Science, Conservation Biology or Environmental Affairs, though there are many additional options
- Be able to apply their broad natural resources knowledge to create sustainable solutions at local, national, and global scales
- Accurately communicate their knowledge of natural resources, both verbally and in written form

Potential Occupations

Opportunities are available with a wide array of local, national, and international organizations and institutions involved in natural resource management. Graduates apply their education in science, technology, social science, and policy to solving today's critical natural resource and environmental problems. Positions are found with federal, state, and local government agencies, industry, and education and advocacy organizations. Some natural resource professionals are employed in environmental consulting firms and corporate environmental departments. The nonprofit sector provides a variety of environmentally-related jobs, ranging from science application to policy development, education, and collaborative conservation.

Examples of available career choices include, but are not limited to: natural resource manager; professional forester; land use planner; geographic information system (GIS) or remote sensing specialist; fishery/wildlife manager; environmental policy analyst; environmental advocate; environmental consultant; fire management specialist; resources/environmental lawyer; youth agency administrator; natural resource communications specialist; law enforcement officer; natural resources/environmental

educator; restoration specialist; multiple resource use planner; regulatory compliance enforcement officer.

Course	Title	Cr	AUCC
FRESHMAN			
BZ 110	Principles of Animal Biology	3	3A
BZ 120	Principles of Plant Biology	4	3A
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
MATH 141 ^P	Calculus in Management Sciences	3	1B
OR			
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	6	3B
	Global and cultural awareness ²	3	3E
	Electives	2	
	TOTAL	29-30	
SOPHOMORE			
CO 150 ^P	College Composition	3	1A
ECON 202 ^P	Principles of Microeconomics	3	3C
F 210 ^P	Forest Ecogeography	3	
GEOL 120	Exploring Earth: Physical Geology	3	3A
OR			
GEOL 124	Geology of Natural Resources	3	3A
GEOL 121 ^P	Introductory Geology Laboratory	3	3A
LAND 220 ^P / LIFE 220 ^P	Fundamental of Ecology	3	
OR			
LIFE 320 ^P	Ecology	3	
NR 220 ^P	Natural Resources Ecology and Measurements	5	
SOCR 240 ^P	Introductory Soil Science	4	
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			
STAT 307 ^P	Introduction to Biostatistics	3	
	Minor ³	3	
	TOTAL	31	
JUNIOR			
<i>Select one course from the following:</i>			
BZ 471 ^P	Stream Biology and Ecology	3	
F 311 ^P	Forest Ecology	3	
RS 351 ^P	Wildland Ecosystems in a Changing World	3	
<i>Select one course from the following:</i>			
CO 300 ^P	Writing Arguments	3	2B
CO 301B ^P	Writing in the Disciplines-Science	3	2B
JTC 300 ^P	Professional and Technical Communication	3	2B
AREC 340 ^P / ECON 340 ^P	Introduction to Economics of Natural Resources	3	
OR			
F 322 ^P	Economics of the Forest Environment	3	
NR 319 ^P	Geospatial Application in Natural Resources	4	
NR 320	Natural Resources History and Policy	3	3D
NR 326 ^P	Forest Vegetation Management	3	
	Minor ³	6	
	Electives	4	
	TOTAL	29	
SENIOR			
<i>Select two courses from the following:</i>			
FW 260 ^P	Principles of Wildlife Management	3	
RS 300 ^P	Rangeland Conservation and Stewardship	3	
	Social and political dimensions ⁴	3	
NR 400 ^P	Public Relations in Natural Resources	3	4A, 4B
NR 420 ^P	Integrated Ecosystem Management	4	4C
NR 421 ^P	Natural Resources Sampling	3	
WR 304	Principles of Watershed Management	3	3A
OR			
WR 416 ^P	Land Use Hydrology	3	
	Minor ³	12	
	Summer field experience ⁵	0	
	TOTAL	31	
PROGRAM TOTAL = 120-121 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3E in the AUCC.

³ Students must complete the requirements for a minor in any discipline, or the interdisciplinary studies program in either conservation biology or environmental affairs.

⁴ Select one of the following courses: HIST 355, PHIL 345, POLS 361, SOC 320.

⁵ Each student is required to complete a summer of acceptable field experience.

Major in Rangeland Ecology

The major in rangeland ecology emphasizes interdisciplinary study, research, and management of the world’s rangelands. Rangelands occupy nearly 50 percent of the earth’s land surface and consist of natural grasslands, savannas, shrublands, riparian areas, deserts, tundra, and coastal marshes. Colorado is an ideal setting for the study of rangeland ecology and management with shortgrass steppe to the east and high elevation grasslands, woodlands, and riparian areas to the west.

Students are prepared to understand and manage the animal, soil, and vegetation resources on rangelands for state and federal land management agencies as well as a variety of private companies and non-governmental agencies. The curricula are accredited by the Society for Range Management and meet U.S. Civil Service requirements for range conservationist and soil conservationist. With a few additional courses, graduates can meet U.S. Civil Service requirements for soil scientist and ecologist. Students develop an in-depth understanding of basic plant and animal biology; a basic understanding of the physical sciences as they relate to rangeland ecology; knowledge of important concepts of ecology and range management; an understanding of economics related to recognizing alternatives; and analytical and decision making skills. Students also develop communication, political and interpersonal skills to make their education effective.

Three concentrations are offered: conservation and management, range and forest management, and restoration ecology.

Learning Outcomes

Students will:

- Accurately and effectively communicate their understanding of rangeland ecology both verbally and in written form
- Demonstrate learning of subject areas outside their major study focus, including (but not restricted to) principles/issues in wildlife, water, recreation, wilderness, soil, range, and fishery resources;

Demonstrate learning of subject areas outside their major study focus, including (but not restricted to) principles/issues in wildlife, water, recreation, wilderness, soil, range, and fishery resources; students will also demonstrate knowledge of social science analytic techniques

- Demonstrate comprehensive knowledge of subject areas relevant to the major fields of study in range ecology and management, including plant/animal interactions, grazing methods, range improvements, animal nutrition, plant ecology, and soil science, and apply this knowledge in a complex, problem-solving environment

Potential Occupations

Examples of career opportunities include, but are not limited to: restoration ecologist, rangeland scientist, range management specialist, soil conservationist, soil scientist, rangeland conservationist, plant ecologist, riparian ecologist, ranch management, researcher, commercial sales and service representative, consultants, mine rehabilitation specialist, real estate/land manager, international rangeland specialist.

Participation in internships, volunteer activities, or cooperative education opportunities is highly recommended to enhance practical training and development. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

Conservation and Management Concentration

Rangeland conservation and management focuses on the stewardship of rangelands for multiple uses. These uses include both consumptive and non-consumptive activities such as recreation, preservation of wildlife habitat, providing for aesthetic beauty, livestock grazing, and ranching.

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
BZ 120	Principles of Plant Biology	4	3A
CHEM 107 ^P	Fundamentals of Chemistry ¹	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
CO 150 ^P	College Composition	3	1A
MATH 141 ^P	Calculus in Management Sciences ¹	3	1B
	Arts and Humanities ²	6	3B
	Global and Cultural Awareness ³	3	3E
	Electives	6	
	TOTAL	30	
SOPHOMORE			
AREC 202 ^P	Agricultural and Resource Economics ¹	3	3C
OR			
ECON 202 ^P	Principles of Microeconomics ¹	3	3C
BZ 223 ^P	Plant Identification	3	
FW 104	Wildlife Ecology and Conservation	3	
OR			
NR 300 ^P	Biological Diversity	3	

Course	Title	Cr	AUCC
LIFE 320 ^P	Ecology	3	
NR 220 ^P	Natural Resources Ecology and Measurements ¹	5	
NRRT 262	Principles of Environmental Communication	3	
OR			
SPCM 200	Public Speaking	3	
RS 300 ^P	Rangeland Conservation and Stewardship	3	
SOCR 240 ^P	Introductory Soil Science	4	
STAT 301 ^P	Introduction to Statistical Methods ¹	3	
OR			
STAT 307 ^P	Introduction to Biostatistics ¹	3	
TOTAL		30	

JUNIOR

<i>Select two courses from the following:</i>			
BSPM 308 ^P	Ecology and Management of Weeds	3	
BZ 440 ^P	Plant Physiology	3	
FW 356	Leopold's Ethic for Wildlife and Land	3	
FW 357	Wildlife Habitat on the Great Plains	3	
<i>Select one course from the following:</i>			
CO 300 ^P	Writing Arguments	3	2B
CO 301B ^P	Writing in the Disciplines—Sciences	3	2B
JTC 300 ^P	Professional and Technical Communication	3	2B
NR 319 ^P	Geospatial Applications in Natural Resources	4	
OR			
NR 322	Introduction to Geographic Information Systems	4	
NR 320	Natural Resources History and Policy	3	3D
RS 329 ^P	Rangeland Assessment	1	
RS 331 ^P	Wildland Plants and Plant Communities	3	
RS 351 ^P	Wildland Ecosystems in a Changing World	3	4A, 4B
RS 432 ^P	Rangeland Measurements and Monitoring	2	
SOCR 440	Pedology	4	
OR			
SOCR 442	Forest and Range Soils	3	
WR 304	Principles of Watershed Management	3	3A
TOTAL		31-32	

SENIOR

ANEQ 472 ^P	Sheep Systems	3	
OR			
ANEQ 478 ^P	Beef Systems	3	
AREC 305 ^F	Agricultural and Resource Enterprise Analysis	3	
<i>Select one course from the following:</i>			
BZ 353 ^P / NR 353 ^P	Global Change Ecology, Impacts and Mitigation	3	
BZ 450 ^P	Plant Ecology	4	
BZ 471 ^P	Stream Biology and Ecology	3	
LAND 444 ^P	Ecology of Landscapes	3	
<i>Select one course from the following:</i>			
NR 400 ^P	Public Relations in Natural Resources	3	
NRRT 360 ^P	Group Decision Making	3	
NRRT 362 ^P	Environmental Conflict Management	3	
NR 420 ^P	Integrated Ecosystem Management	4	4C
RS 452 ^P	Rangeland Herbivore Ecology and Management	3	4B
RS 478 ^P	Ecological Restoration	3	
		5-7	
TOTAL		28-29	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ MATH 117, MATH 118, and MATH 124 are considered review courses; credit in these courses may not be used toward completion of a degree in Rangeland Ecology, but are enforced prerequisites for AREC 202, CHEM 107, ECON 202, FW 200, MATH 141, NR 220, STAT 301, and STAT 307.

² Select two courses from the list of courses in category 3B of the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from the intermediate (L*** 200 and L*** 201) foreign language courses.

³ Select from the list of courses in category 3E in the AUCC.

⁴ Select enough credits to bring the program total to 120 credits.

Range and Forest Management Concentration

Range and forest management prepares students in multiple-use principles to manage and administer both rangeland and forest resources for federal and state government agencies or private business.

Course	Title	Cr	AUCC
FRESHMAN			
BZ 120	Principles of Plant Biology	4	3A
CHEM 107 ^P	Fundamentals of Chemistry ¹	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
CO 150 ^P	College Composition	3	1A
MATH 141 ^P	Calculus in Management Sciences ¹	3	1B
	Arts/humanities ²	6	3B
	Global and cultural awareness ³	3	3E
	Electives	3	
TOTAL		27	
SOPHOMORE			
BZ 223 ^P	Plant Identification	3	
F 210 ^P	Forest Ecogeography	3	
F 230	Forestry Field Measurements	2	
RS 300 ^P	Rangeland Conservation and Stewardship	3	
LIFE 320 ^P	Ecology	3	
AREC 202 ^P	Agricultural and Resource Economics	3	3C
OR			
ECON 202 ^P	Principles of Microeconomics	3	3C
SOCR 240 ^P	Introductory Soil Science	4	
SPCM 200	Public Speaking	3	2A
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			
STAT 307 ^P	Introduction to Biostatistics ¹	3	
NR 220 ^P	Natural Resources Ecology and Measurements	5	
	Electives ⁵	1	
TOTAL		33	
JUNIOR			
NR 320	Natural Resources History and Policy	3	3D
<i>Select one of the following:</i>			
JTC 300 ^P	Professional and Technical Communication	3	2B
CO 301B ^P	Writing in the Disciplines—Science	3	2B
CO 300 ^P	Writing Arguments	3	2B
NR 319 ^P	Geospatial Applications in Natural Resources	4	
OR			
NR 322	Introduction to Geographic Information Systems	4	
F 311 ^P	Forest Ecology	3	
F 321 ^P	Forest Biometry	3	
F 322 ^P	Economics of the Forest Environment	3	
F 325 ^P	Silviculture	3	
WR 304	Principles of Watershed Management	3	3A
RS 329 ^P	Rangeland Assessment	1	
RS 331 ^P	Rangeland Ecogeography	3	
RS 351 ^P	Wildland Ecosystems in a Changing World	3	4A, 4B
TOTAL		32	
SENIOR			
ANEQ 472 ^P	Sheep Systems	3	
OR			
ANEQ 478 ^P	Beef Systems	3	
NR 420 ^P	Integrated Ecosystem Management	4	4C
RS 432	Rangeland Measurements and Monitoring	2	
RS 452	Rangeland Herbivore Ecology and Management	3	4B
<i>Select one from the following:</i>			
BZ 440 ^P	Plant Physiology	3	

Course	Title	Cr	AUCC
F 324 ^P	Fire Effects and Adaptations	3	
SOCR 440	Pedology	4	
SOCR 442	Forest and Range Soils	3	
SOCR 478 ^P	Environmental Soil Science	3	
<i>Select one from the following:</i>			
BSPM 308 ^P	Ecology and Management of Weeds	3	
BSPM 365 ^P	Integrated Tree Health Management	4	
F 330 ^P	Timber harvesting and the Environment	3	
F 421 ^P	Forest Stand Management	4	
F 422 ^P	Quantitative Methods in Forest Management	3	
F 424 ^P	Wildland Fire Behavior and Management	3	
RS 478 ^P	Restoration Ecology Electives ⁴	5-7	
TOTAL		28	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ MATH 117, MATH 118, and MATH 124 are considered review courses; credits in these courses may not be used toward completion of a degree in rangeland ecology, but are enforced prerequisites for CHEM 107, MATH 141, NR 220, STAT 301, and STAT 307.

² Select two courses from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only three of the six credits required in arts and humanities may come from foreign language courses.

³ Select from the list of courses in category 3E in the AUCC.

⁴ Enough elective credits must be taken to bring the program total to 120 credits. Forty-two credits must be upper-division (300- and 400-level).

Restoration Ecology Concentration

Restoration ecology provides students with skills important to restoration and rehabilitation of damaged rangeland ecosystems.

Course	Title	Cr	AUCC
FRESHMAN			
BZ 120	Principles of Plant Biology	4	3A
CHEM 107 ^P	Fundamentals of Chemistry ¹	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
CO 150 ^P	College Composition	3	1A
MATH 141 ^P	Calculus in Management Sciences ¹	3	1B
	Arts and Humanities ²	6	3B
	Global and cultural awareness ³	3	3E
	Electives	4	
TOTAL		28	

SOPHOMORE

AREC 202 ^P	Agricultural and Resource Economics	3	3C
OR			
ECON 202 ^P	Principles of Microeconomics	3	3C
BZ 223 ^P	Plant Identification	3	
FW 104	Wildlife Ecology and Conservation	3	
OR			
NR 300 ^P	Biological Diversity	3	
LIFE 320 ^P	Ecology	3	
NR 220 ^P	Natural Resources Ecology and Measurements ¹	5	
RS 300 ^P	Rangeland Conservation and Stewardship	3	
SOCR 240 ^P	Introductory Soil Science	4	
SPCM 200	Public Speaking ⁴	3	2A
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			
STAT 307 ^P	Introduction to Biostatistics ¹	3	
	Electives	4	
TOTAL		34	

JUNIOR

BSPM 308 ^P	Ecology and Management of Weeds	3	
<i>Select two from the following:</i>			
BZ 440 ^P	Plant Physiology	3	
SOCR 341 ^P	Soil Ecology	1	
SOCR 350 ^P	Soil Fertility Management	3	

Course	Title	Cr	AUCC
SOCR 440	Pedology	4	
SOCR 442	Forest and Range Soils	3	
SOCR 455 ^P	Soil Microbiology	3	
SOCR 467 ^P	Soil and Environmental Chemistry	3	
SOCR 478 ^P	Environmental Soil Sciences	3	
<i>Select one from the following:</i> ⁴			
JTC 300 ^P	Professional and Technical Communication	3	2B
CO 300 ^P	Writing Arguments	3	2B
CO 301B ^P	Writing in the Disciplines-Sciences	3	2B
NR 319 ^P	Geospatial Applications in Natural Resources	4	
OR			
NR 322	Introduction to Geographic Information Systems	4	
NR 320	Natural Resources History and Policy	3	3D
RS 329 ^P	Rangeland Assessment	1	
RS 331 ^P	Wildland Plants and Plant Communities	3	
RS 351 ^P	Wildland Ecosystems in a Changing World	3	4A, 4B
WR 304	Principles of Watershed Management	3	3A
TOTAL		27-	30

SENIOR

BZ 450 ^P	Plant Ecology	4	
OR			
BZ 471 ^P	Stream Biology and Ecology	3	
<i>Select two from the following:</i>			
F 210 ^P	Forest Ecogeography	3	
F 311 ^P	Forest Ecology	3	
F 324 ^P	Fire Effects and Adaptations	3	
F 325 ^P	Silviculture	3	
F 424 ^P	Wildland Fire Behavior and Management	3	
F 425 ^P	Advanced Wildland Fire Behavior and Management	3	
NR 326 ^P	Forest Vegetation Management	3	
NR 420 ^P	Integrated Ecosystem Management	4	4C
RS 432 ^P	Rangeland Measurements and Monitoring	2	
RS 452 ^P	Rangeland Herbivore Ecology and Management	3	4B
RS 478 ^P	Restoration Ecology Electives ⁵	3	4A
TOTAL		28-	31

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ MATH 117, MATH 118, and MATH 124 are considered review courses; credits in these courses may not be used toward completion of a degree in rangeland ecology, but are enforced prerequisites for CHEM 107, MATH 141, NR 220, STAT 307.

² Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 3E in the AUCC.

⁴ First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course to fulfill Category 2B of the AUCC.

⁵ Select enough elective credits to bring the program total to 120 credits.

Minors in Forest and Rangeland Stewardship

Minor in Ecological Restoration

The Ecological Restoration Minor allows students in related majors to gain knowledge of the science and art of restoring ecosystems. This background is especially valuable to students who will be working in the various natural resource management fields. Since the prevalence

of damaged, degraded or destroyed ecosystems is likely to increase in the future, restoration will be imperative for transforming these lands to once again provide ecosystem services.

Course	Title	Cr
SECOND YEAR		
NR 300 ^P	Biological Diversity	3
RS 300 ^P	Rangeland Conservation and Stewardship	3
	TOTAL	6
THIRD YEAR		
BSPM 308 ^P	Ecology and Management of Weeds	3
<i>Select two of the following courses:</i>		
F 311 ^P	Forest Ecology	3
F 325 ^P	Silviculture	3
FW 260 ^P	Principles of Wildlife Management	3
NR 326 ^P	Forest Vegetation Management	3
WR 304	Principles of Watershed Management	3
F 324 ^P	Fire Effects and Adaptations	3
	TOTAL	12
FOURTH YEAR		
NR 479 ^P	Restoration Case Studies	2
RS 478 ^P	Ecological Restoration	3
	TOTAL	5
PROGRAM TOTAL = 23 credits		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

Minor in Forestry

The minor in forestry provides students with the opportunity to obtain exposure to forest sciences. It provides insight into the management of forested lands and is particularly appropriate for students majoring in other natural resource disciplines or natural sciences.

Course	Title	Cr
LOWER DIVISION		
F 210 ^P	Forest Ecogeography*	3
UPPER DIVISION		
BSPM 365 ^P	Integrated Tree Health Management*	4
OR		
F 424 ^P	Wildland Fire Behavior and Management*	3
F 311 ^P	Forest Ecology*	3
F 321 ^P	Forest Biometry*	3
F 325 ^P	Silviculture*	3
F 330 ^P	Timber Harvesting and the Environment	3
F 421 ^P	Forest Stand Management*	4
NR 319 ^P	Geospatial Applications in Natural Resources	4
	TOTAL	23-24
PROGRAM TOTAL = 26-27 credits without prerequisites		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.
*Additional course work may be required because of prerequisites.

Minor in Range Ecology

The minor in range ecology provides an academic background for students interested in wildlife habitat, integrated land management, ranch management, applied ecology, and international development of arid lands. The minor provides additional flexibility for students who have a liberal arts or international education goal, but would like to increase their employment potential in an applied area. A minimum of 12 credits in the minor must

be from RS courses.

Course	Title	Cr
LOWER DIVISION		
<i>Select a minimum of nine credits from the following:¹</i>		
BZ 223 ^P	Plant Identification *	3
F 210 ^P	Forest Ecogeography*	3
LIFE 320 ^P	Ecology	3
NR 220 ^P	Natural Resources Ecology and Measurements*	5
SOCR 240 ^P	Introductory Soil Science*	4
UPPER DIVISION		
RS 300 ^P	Rangeland Conservation and Stewardship*	3
RS 331 ^P	Wildland Plants and Plant Communities	3
RS 432 ^P	Rangeland Measurements and Monitoring*	2
<i>Select a minimum of four credits from the following:</i>		
RS 329 ^P	Rangeland Assessment	1
RS 351 ^P	Wildland Ecosystems in a Changing World	3
RS 452 ^P	Rangeland Herbivore Ecology and Management*	3
RS 478 ^P	Restoration Ecology	3
	TOTAL	12
PROGRAM TOTAL = 21 credits without prerequisites		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ SOCR 240 and one of BZ 223, F 210, or NR 220 are recommended.

*Additional course work may be required because of prerequisites.

Minor in Spatial Information Management

The minor in Spatial Information Management provides students with fundamental geospatial skills in natural resource management. Geographic information systems, global positioning systems, and remote sensing are key tools for the workforce of the 21st Century.

This minor is designed for students desiring to gain technical skills and to increase their employment potential in an applied area. The SIMs minor has a broad interdisciplinary appeal due to the ability to adapt and use these technologies in many disciplines.

Course	Title	Cr
LOWER DIVISION		
CS 150 ^P	Interactive Programming with Java	4
LOWER DIVISION OR UPPER DIVISION		
<i>Select a minimum of four credits from the following:¹</i>		
CS 200 ^P	Algorithms and Data Structures*	4
GR 100	Introduction to Geography	3
GR 210	Physical Geography	3
NR 401 ^P	Techniques in Public Relations*	2
NR 440	Land Use Planning	3
NR 493 ^P	Seminar on GIS and Remote Sensing Applications ²	1
NR 495	Independent Study	Var
STAT 305 ^P	Sampling Technique*	3
STAT 312 ^P	Statistics for Behavioral Sciences II*	3
STAT 460 ^P	Applied Multivariate Analysis*	3
UPPER DIVISION		
NR 322	Introduction to Geographic Information Systems	4
NR 323/GR 323	Remote Sensing and Image Interpretation	3
NR 422 ^P	GIS Applications in Natural Resource Management	4
NR 423 ^P	Applications of Global Positioning Systems	1
NR 493 ^P	Seminar on GIS and Remote Sensing Applications ²	1

<u>Course</u>	<u>Title</u>	<u>Cr</u>
	TOTAL	13
PROGRAM TOTAL = 21 credits without prerequisites		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ At least one credit must be NR 493 or NR 495.

² May be repeated as an elective.

*Additional course work may be required because of prerequisites.

Graduate Programs in Forest and Rangeland Stewardship

The department offers graduate programs leading to master of natural resources stewardship; master of science degrees in forest sciences, rangeland ecosystem science, and watershed science; and doctor of philosophy degrees in forest sciences, rangeland ecosystem science, and earth sciences (with a specialization in watershed science). Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, <http://graduateschool.colostate.edu/current-students/bulletin.aspx>, and the department's website, www.warnercnr.colostate.edu/frws/.

DEPARTMENT OF GEOSCIENCES

Office in Natural Resources Building, Room 322
(970) 491-5661

www.warnercnr.colostate.edu/geo/

Associate Professor Sally Sutton, Head

Major in Geology

The geology major is broad based, allowing students to obtain a sound academic and practical basis for professional careers in private sector resource industries, federal and state natural resource management and regulatory agencies, or education, or for graduate training in specialized areas of geology or related fields in the earth and atmospheric sciences.

The geology curriculum provides a technical background within the broader framework of a liberal education. Emphasis is placed on integrating field studies in the Rocky Mountains with on-campus work in both the classroom and the laboratory. In addition to a solid core in geology, students complete course work in math, the physical sciences, communications, and the liberal arts. Four concentrations are offered: environmental geology, geology, geophysics, and hydrogeology.

Learning Outcomes

Students will demonstrate:

- A solid foundation in the physical sciences and broad understanding of geological processes
- Application of scientific reasoning skills to data analysis and problem solving in the geosciences, both individually and in teams
- An awareness of sociopolitical and economic factors and ethical standards that apply to careers in geosciences

Potential Occupations

A variety of opportunities exist for geology graduates in the private and public sectors and in education. Petroleum companies, petroleum service companies, mining companies, power companies, computer software companies, and entrepreneurs hire geologists for exploration, development, mining, production, and research. Federal government resource agencies use geologists for geologic mapping, oil-gas-coal-groundwater resource evaluation, geochemical water studies, leasing and conservation studies, resource restoration and rehabilitation programs, and research. State and local governments hire geologists for geologic and soils mapping, resource evaluation, public information, consulting, and writing. Environmental, engineering, and groundwater firms use geologists for mapping, restoration and rehabilitation planning, monitoring and evaluation of geologic hazards, and site evaluation for feasibility and implementation of construction projects, water reuse evaluation, groundwater pollution assessment, groundwater cleanup, and pollution prevention. Schools, colleges, universities, national laboratories, and private research firms employ geologists in a variety of teaching, research, and administrative positions.

Participation in internships, volunteer activities, or cooperative education opportunities is highly recommended to enhance practical training and development. Graduates who go on for advanced studies can continue in one of a number of geological disciplines or can opt for related fields of study, such as seismology, hydrology, meteorology, oceanography, and the space sciences. Those with advanced degrees can attain more responsible positions with the possibility of rising to top professional levels. Some examples of career possibilities include, but are not limited to: educator, environmental consultant, exploration geologist, environmental geologist, geologist, geophysicist, hydrologist, mining geologist, oceanographer, production geologist, researcher, resource evaluator, or seismologist. With additional training, geologists may also pursue careers in business, law, or even medicine.

Environmental Geology Concentration

Environmental geology prepares students to address the environmental implications of geologic processes and

human effects on the earth. Graduates find careers in environmental, engineering, and groundwater firms, and in government agencies.

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CO 150 ^P	College Composition	3	1A
GEOL 150	Physical Geology for Scientists and Engineers ¹	4	
GEOL 154 ^P	Historical and Analytical Geology	4	
MATH 155 ^P	Calculus for Biological Scientists I ²	4	1B
	Arts/humanities ³	3	3B
	Global and cultural awareness ⁴	3	3E
	TOTAL	26	
SOPHOMORE			
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 300 ^P	Writing Arguments	3	2B
	OR		
CO 301B ^P	Writing in the Disciplines-Science	3	2B
GEOL 232 ^P	Mineralogy	3	
GEOL 250	The Solid Earth	3	
GEOL 344 ^P	Stratigraphy and Sedimentology	4	4A
GEOL 364 ^P	Igneous and Metamorphic Petrology	4	4B
MATH 255 ^P	Calculus for Biological Scientists II ²	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	TOTAL	30	
JUNIOR			
GEOL 366 ^P	Sedimentary Petrology and Geochemistry	4	4A, 4B
GEOL 372 ^P	Structural Geology	4	4B
GEOL 376 ^P	Geologic Field Methods	3	4A, 4C
NR 319 ^P	Geospatial Applications in Natural Resources	4	
	OR		
NR 322	Introduction to Geographic Information Systems	4	
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	OR		
SOCR 470 ^P	Soil Physics	3	
SOCR 240 ^P	Introductory Soil Science	4	
STAT 301 ^P	Introduction to Statistical Methods ⁵	3	
	OR		
STAT 315	Statistics for Engineers and Scientists	3	
	Arts/humanities ⁵	3	3B
	Historical perspectives ⁶	3	3D
	TOTAL	32-34	
SUMMER SESSION			
GEOL 436 ^P	Geology Summer Field Course	6	4C
SENIOR			
GEOL 446 ^P	Environmental Geology	3	
GEOL 452 ^P	Hydrogeology	4	
GEOL 454 ^P	Geomorphology	4	
WR 416	Land Use Hydrology	3	
	Directed Technical Electives ⁷	7-11	
	Social/behavioral sciences ⁸	3	3C
	TOTAL	24-28	
PROGRAM TOTAL = 120-122 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ GEOL 120, 122, or 124 in combination with GEOL 121 may be substituted for GEOL 150.

² MATH 160, MATH 161, and MATH 261 may be substituted for MATH 155 and MATH 255.

³ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L*** 200 and L*** 201) foreign language courses.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ MATH 340 may be substituted for STAT 301.

⁶ Select from the list of courses in category 3D in the AUCC.

⁷ Select three classes from department advising list of regular upper division classes in Geology or cognate sciences. At least one of these classes must be a Geology class.

⁸ Select from the list of courses in category 3C in the AUCC.

Geology Concentration

The geology concentration covers general geology using a practical, field-oriented approach suited to employment opportunities in the petroleum and mining industries and other traditional geologic fields. This concentration also provides a strong basis for graduate studies in geology. By obtaining a teaching certificate, graduates can teach earth sciences and related subjects in primary and secondary schools.

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CO 150 ^P	College Composition	3	1A
GEOL 150	Physical Geology for Scientists and Engineers ¹	4	
GEOL 154 ^P	Historical and Analytical Geology	4	
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
MATH 125 ^P	Numerical Trigonometry	1	1B
MATH 126 ^P	Analytic Trigonometry	1	1B
MATH 155 ^P	Calculus for Biological Scientists I ²	4	1B
	Arts/humanities ³	3	3B
	Global and cultural awareness ⁴	3	3E
	Electives	3	
	TOTAL	32	
SOPHOMORE			
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 300 ^P	Writing Arguments	3	2B
	OR		
CO 301B ^P	Writing in the Discipline-Science	3	2B
GEOL 232 ^P	Mineralogy	3	
GEOL 250 ^P	The Solid Earth	3	
GEOL 332 ^P	Optical Mineralogy	2	
GEOL 364 ^P	Igneous and Metamorphic Petrology	4	4B
MATH 255 ^P	Calculus for Biological Scientists II ²	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	Social/behavioral sciences ⁵	3	3C
	TOTAL	31	
JUNIOR			
GEOL 344 ^P	Stratigraphy and Sedimentology	4	4A
GEOL 372 ^P	Structural Geology	4	4B
GEOL 376 ^P	Geologic Field Methods	3	4A, 4C
NR 319 ^P	Geospatial Applications in Natural Resources	4	
	OR		
NR 322	Introduction to Geographic Information Systems	4	
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	OR		
SOCR 470 ^P	Soil Physics	3	
STAT 301 ^P	Introduction to Statistical Methods ⁶	3	
	OR		
STAT 315 ^P	Statistics for Engineers and Scientists	3	
	Arts/humanities ⁵	3	3B
	Historical perspectives ⁷	3	3D
	TOTAL	27-29	
SUMMER SESSION			
GEOL 436 ^P	Geology Summer Field Course	6	4C
SENIOR			
GEOL 366 ^P	Sedimentary Petrology and Geochemistry	4	4A, 4B
GEOL 454 ^P	Geomorphology	4	
	Geology electives ⁸	7	
	Technical elective ⁹	3	
	Electives ¹⁰	4-6	
	TOTAL	22-24	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ GEOL 120, GEOL 122 or GEOL 124 in combination with GEOL 121 may be substituted for GEOL 150.

² MATH 160, MATH 161, and MATH 261 may be substituted for MATH 155 and MATH 255.

³ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select from the list of courses in category 3C in the AUCC.

⁶ MATH 340 may be substituted for STAT 301.

⁷ Select from the list of courses in category 3D in the AUCC.

⁸ Select two regular upper-division geology courses.

⁹ Select upper-division science or engineering courses, excluding geology, from departmental advising list.

¹⁰ Select electives as required for a minimum total of 120 program credits.

Geophysics Concentration

The geophysics concentration combines a strong foundation in geology with additional training in geophysics, physics, and mathematics. Students pursuing this concentration are well prepared both for the employment opportunities in traditional geological fields, and for graduate training in any aspect of geophysics, including seismology and exploration geophysics.

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CO 150 ^P	College Composition	3	1A
GEOL 150	Physical Geology for Scientists and Engineers ¹	4	
GEOL 154 ^P	Historical and Analytical Geology	4	
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
	Arts/humanities ²	3	3B
	Global and cultural awareness ³	3	3E
	Electives	3	
	TOTAL	29	
SOPHOMORE			
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
GEOL 232 ^P	Mineralogy	3	
GEOL 250 ^P	The Solid Earth	3	
GEOL 364 ^P	Igneous and Metamorphic Petrology	4	4B
CO 300 ^P	Writing Arguments	3	2B
OR			
CO 301B ^P	Writing in the Disciplines—Science	3	2B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
MATH 261 ^P	Calculus for Physical Scientists III	4	
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	Social/behavioral sciences ⁴	3	3C
	TOTAL	33	
JUNIOR			
GEOL 344 ^P	Stratigraphy and Sedimentology	4	4A
GEOL 372 ^P	Structural Geology	4	4B
GEOL 376 ^P	Geologic Field Methods	3	4A, 4C
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
CS 155	Introduction to Unix	1	
CS 156 ^P	Introduction to C Programming I	1	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	
CS 157 ^P	Introduction to C Programming II	1	
OR			
CS 158/			
MATH 158 ^P	Mathematical Algorithms in C	1	
<i>Select one of the following:</i>			
STAT 301 ^P	Introduction to Statistical Methods	3	
STAT 315 ^P	Statistics for Engineers and Scientists	3	
MATH 369 ^P	Linear Algebra	3	
	Arts/humanities ⁵	3	3B
	Historical Perspectives ⁵	3	3D
	TOTAL	32	
SUMMER SESSION			
GEOL 436 ^P	Geology Summer Field Course	6	4C
SENIOR			
	Geology electives ⁶	6	

Course	Title	Cr	AUCC
	Directed Technical electives ⁷	9	
	Electives	5	
	TOTAL	20	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ GEOL 120, 122 or 124 in combination with GEOL 121 may be substituted for GEOL 150.

² Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 3E in the AUCC.

⁴ Select from the list of courses in category 3C in the AUCC.

⁵ Select from the list of courses in category 3D in the AUCC.

⁶ Select two upper-division geology courses of three or more credits each.

⁷ Select upper-division geology, physics, mathematics, or engineering courses from departmental advising list.

Hydrogeology Concentration

The hydrogeology concentration provides additional training in geological aspects of water resources and in allied disciplines, while ensuring students are well prepared for traditional geological fields. Students pursuing this concentration will be particularly well prepared for employment in environmental, engineering, and groundwater firms, government agencies managing or assessing water resources, or for graduate training in hydrogeology or other water resource-related disciplines.

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CO 150 ^P	College Composition	3	1A
GEOL 150 ^P	Physical Geology for Scientists and Engineers ¹	4	
GEOL 154 ^P	Historical and Analytical Geology	4	
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
MATH 125 ^P	Numerical Trigonometry	1	1B
MATH 126 ^P	Analytical Trigonometry	1	1B
MATH 155 ^P	Calculus for Biological Scientists I ²	4	1B
	Arts and Humanities ³	3	3B
	Global and Cultural Awareness ⁴	3	3E
	Social and Behavioral Science ⁵	3	3C
	TOTAL	32	
SOPHOMORE			
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 300 ^P	Writing Arguments	3	2B
OR			
CO 301B ^P	Writing in the Discipline—Science	3	2B
GEOL 232 ^P	Mineralogy	3	
GEOL 250 ^P	The Solid Earth	3	
GEOL 344 ^P	Stratigraphy and Sedimentology	4	
GEOL 364 ^P	Igneous and Metamorphic Petrology	4	4B
MATH 255 ^P	Calculus for Biological Scientists II ²	4	
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	Historical Perspectives ⁶	3	3D
	TOTAL	33	
JUNIOR			
GEOL 366 ^P	Sedimentary Petrology and Geochemistry	4	4A, 4B
GEOL 372 ^P	Structural Geology	4	4B
GEOL 376 ^P	Geologic Field Methods	3	4A, 4C
MATH 340 ^P	Introduction to Ordinary Differential	4	

Course	Title	Cr	AUCC
PH 142 ^P	Equations		
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			
STAT 315 ^P	Statistics for Engineers and Scientists	3	
WR 416 ^P	Land Use Hydrology	3	
	Arts and Humanities ³	3	
	TOTAL	29	
SUMMER SESSION			
GEOL 436 ^P	Geology Summer Field Course	6	4C
	TOTAL	6	
SENIOR			
GEOL 452 ^P	Hydrogeology	4	
GEOL 454 ^P	Geomorphology	4	
NR 319 ^P	Geospatial Applications in Natural Resources	4	
OR			
NR 322	Introduction to Geographical Information Systems	4	
	Directed Technical Electives ⁷	8	
	TOTAL	20	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ GEOL 120, 122, or 124 in combination with GEOL 121 may be substituted for GEOL 150.

² MATH 160, MATH 161, and MATH 261 may be substituted for MATH 155 and MATH 255.

³ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L*** 200 and L*** 201) foreign language courses.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select from the list of courses in category 3C in the AUCC.

⁶ Select from the list of courses in category 3D in the AUCC.

⁷ Select three upper division regular geology, civil engineering, mathematics, soil and crop sciences, or watershed sciences courses from the department advising list. At least one of the selected courses must be a geology course.

Minor in Geology

The minor in geology provides an opportunity to obtain a valuable background in geology to enhance other majors. While it is flexibly designed to be applicable to a variety of disciplines, the minor is especially suitable for the natural science major in the College of Natural Sciences or the natural resources management major in the Warner College of Natural Resources. The geology minor adviser can provide advice on the selection of minor electives.

Course	Title	Cr
Students must complete a minimum of 21 credits without prerequisites, of which at least 12 credits must be upper division (300- to 400-level).		
Required:		
<i>Select four credits from the following</i>		
GEOL 120	Exploring Earth: Physical Geology	3
GEOL 122	The Blue Planet: Geology of Our Environment	3
GEOL 124	Geology of Natural Resources	3
GEOL 121 ^P	Introductory Geology Laboratory	1
GEOL 150	Physical Geology for Scientists and Engineers	4
GEOL 154 ^P	Historical and Analytical Geology	4
	TOTAL	8
Electives:		
<i>Select at least 13 credits from the following. A minimum of 12 credits must be upper division (300-400 level):</i>		
GEOL 232 ^{P*}	Mineralogy	3
GEOL 250 ^{P*}	The Solid Earth	3
GEOL 332 ^P	Optical Mineralogy	2

Course	Title	Cr
GEOL 342 ^P	Paleontology	3
GEOL 344 ^P	Stratigraphy and Sedimentology	4
GEOL 364 ^P	Igneous and Metamorphic Petrology	4
GEOL 372 ^{P*}	Structural Geology	4
GEOL 376 ^P	Geologic Field Methods	3
GEOL 401 ^P	Geology of the Rocky Mountain Region	1
GEOL 442 ^{P*}	Applied Geophysics	4
GEOL 446 ^{P*}	Environmental Geology	3
GEOL 447 ^P	Mineral Deposits	3
GEOL 452 ^{P*}	Hydrogeology	4
GEOL 454 ^{P*}	Geomorphology	4
	TOTAL	13
PROGRAM TOTAL = 21 credits without prerequisites		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.
*Additional course work may be required because of prerequisites.

Graduate Programs in Geosciences

The department offers graduate programs leading to Master of Science in geosciences and Doctor of Philosophy in earth sciences degrees. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, www.warnercnr.colostate.edu/geo/.

DEPARTMENT OF HUMAN DIMENSIONS OF NATURAL RESOURCES

Office in Forestry Building, Room 233
(970) 491-6591
warnercnr.colostate.edu/welcome-to-hdnr/

Professor Michael Manfredo, Chairman
Paul Layden, M.S., Undergraduate Coordinator
Associate Professor Alan Bright, Graduate Coordinator

Major in Natural Resource Recreation and Tourism

Graduates possess technical skills in problem solving, systems planning, integrative team decision making, quantitative analysis, oral and verbal communications, and computer operations. Additionally, graduates are familiar with the historic evolution of environmental conservation and develop an appreciation for how their discipline contributes to environmental stewardship. Four concentrations are offered – environmental communication, global tourism, natural resource tourism, and parks and protected area management.

Learning Outcomes

Students will demonstrate:

- Written and oral communication skills, with a focus on writing skills. Student writing and speaking will embody characteristics that represent attention to high quality communication skills, including substance of the issue addressed, organization of the paper or presentation, mechanics, or evidence
- Research and analytical skills. These skills will include the ability to generate a problem statement, associated research questions, data acquisition methodologies, synthesis of related information and the development of management implications and conclusions
- Planning skills. This will involve an ability to implement the planning process, including setting goals and objectives, acquiring relevant background information, synthesizing information, conceptualizing ideas, constructing alternative courses of action, making recommendations and considering ways of evaluating decisions

Potential Occupations

Graduates work in a variety of federal, state, and local resource management agencies, nonprofit environmental conservation and education organizations, and private commercial recreation enterprises. Competition can be intense for full time/permanent positions in highly attractive natural resource locations, although ample opportunities exist to gain experience through seasonal/temporary and volunteer work. Participation in a high quality, pre-approved internship is required for the degree. Additional cooperative education opportunities are highly recommended to enhance your practical training and development. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

The following are some of the career opportunities available to natural resource recreation and tourism majors with an environmental communication concentration: public involvement coordinator; interpretive writer, planner, consultant; outdoor education specialist; nature photographer; exhibit developer/evaluator; environmental/ conservation education/visitor information specialist; interpretive ranger; naturalist; nature center manager; museum interpreter/educator; public relations/affairs specialist; park ranger. Examples of opportunities available to graduates in the global and natural resource tourism concentrations include, but are not limited to: convention sales coordinator; marketing/public relations specialist; trip counselor; small tourism enterprise/ecotourism owner/manager; tourism planner; concession specialist;

marketing/sales manager; conference/meeting/event planner; resort services director; camp and nature center director; tourist information center manager. Opportunities for graduates in the parks and protected area management concentration include: park/backcountry/wilderness ranger; parks director/superintendent/manager; conservation officer; natural resource/wilderness specialist; open space/lands planner; camp counselor/administrator/manager; recreation manager; forest recreation technician.

Environmental Communication Concentration

Environmental communication develops expertise in communicating with and educating the public in order to enhance enjoyment of natural resources and facilitate informed public participation in the decision making process. The curriculum emphasizes course work in foundations of natural resource management, social science theory and research methodologies, communication theory and techniques, public relations, leadership, and management. The department works closely with the National Association for Interpretation to provide students with professional networking, training, and certification opportunities to further enhance their careers.

Course	Title	Cr	AUCC
FRESHMAN			
<i>Select four credits from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
OR			
BZ 120	Principles of Plant Biology	4	3A
CO 150 ^P	College Composition	3	1A
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	6	3B
	Biological/physical sciences ²	3	3A
	Social/Behavioral Sciences ³	3	3C
	Electives	5	
	TOTAL	30	
SUMMER SESSION			
NR 220 ^P	Natural Resources Ecology and Measurements	5	
SOPHOMORE			
<i>Select one of the following:</i>			
CO 300 ^P	Writing Arguments	3	2B
CO 301B ^P	Writing in the Disciplines—Science	3	2B
JTC 300 ^P	Professional and Technical Communication	3	2B
LAND 220 ^P	Fundamentals of Ecology	3	
LIFE 220 ^P			
NR 120A	Environmental Conservation	3	3A
NRRT 231	Principles Parks/Protected Area Management	3	
NRRT 262	Principles of Environmental Communication	3	
STAT 201 ^P	General Statistics	3	
	Guided Natural Resources Electives ⁴	6	
	Global and cultural awareness ⁵	3	3E
	TOTAL	27	
JUNIOR			
<i>Select one course from the following:</i>			
JTC 411	Media Ethics and Issues	3	
JTC 412	International Mass Communication	3	

Course	Title	Cr	AUCC
JTC 413	New Communication Technologies and Society	3	
JTC 414	Media Effects	3	
NR 300 ^P	Biological Diversity	3	
NR 320	Natural Resources History and Policy	3	3D
NR 365	Environmental Education	3	
OR			
NRRT 360 ^P	Group Decision Making	3	
NR 387	Internship I	1	
NR 330 ^P	Human Dimensions in Natural Resources	3	
OR			
NRRT 330	Social Aspects of Natural Resource Management	3	4A
NRRT 361 ^P	Natural Resources and the Media	3	
NRRT 376 ^P	Human Dimensions Research and Analysis	3	
<i>Select one course from the following:</i>			
SPCM 232 ^P	Group Communication	3	
SPCM 300 ^P	Advanced Public Speaking	3	
SPCM 332	Interpersonal Communication Skills	3	
SPCM 342	Critical Media Studies	3	
	Guided Natural Resources Electives ⁶	3	
	TOTAL	28	
SENIOR			
NR 460 ^P	Wilderness Management	3	
OR			
NRRT 331 ^P	Management of Parks and Protected Areas	3	
NRRT 362 ^P	Environmental Conflict Management	3	
NRRT 462 ^P	Environmental Communication-Natural Resources	3	4B, 4C
NRRT 463 ^P	Non-Profit Administration in Conservation	3	
NRRT 487	Internship	5	
PHIL 345 ^P	Environmental Ethics	3	
	Guided Natural Resource Electives ⁷	6	
	Electives	4	
	TOTAL	30	

PROGRAM TOTAL = 120-121 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from the list of courses in category 3B of the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3A of the AUCC.

³ Select from the list of courses in category 3C or the AUCC.

⁴ With adviser's approval, select two courses from list of courses available in the department.

⁵ Select from the list of courses in category 3E or the AUCC.

⁶ With adviser's approval, select from list of courses available in the department.

⁷ With adviser's approval, select upper division courses from list of courses available in the department.

Global Tourism Concentration

The global tourism concentration is focused on a unique blend of subjects. Business and tourism topics provide students with planning, management, marketing, financial, and entrepreneurship skills essential in the tourism industry. Because sustainable tourism requires a healthy natural environment, the environment is another area of study. Finally, students are provided cross-cultural experience by learning a second language, studying at a university abroad, and participating in an international internship.

LARA 105, LCHI 105, LFRE 105, LFRE 106, LGER 105, LITA 105, LJPJ 105, LKOR 105, LLAT 105, LRUS 105, LSPA 105, and LSPA 106 are considered review courses for the concentration in global tourism in the major in natural resource recreation and tourism. Credit for these courses, either by examination or completion, may not be used toward the concentration.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
ECON 202 ^P	Principles of Microeconomics	3	3C
L*** 107 ^P	First Year Language II	5	
OR			
L*** 108 ^{P1}	Intensive Language I	5	
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
NR 120A-B	Environmental Conservation	3-4	
SPCM 200	Public Speaking	3	2A
	Arts/humanities ²	3	3B
	Biological/physical sciences ³	7	3A
	Elective	1	
	TOTAL	31-32	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
BUS 205	Legal and Ethical Issues in Business	3	
L*** 200 ^{P1}	Second Year Language I	3	
L*** 201 ^{P1}	Second Year Language II	3	
RRM 101	Hospitality Industry	3	
RRM 200 ^P	Resort Operations	3	
NRRT 270	Principles of Natural Resource Tourism	3	
STAT 201 ^P	General Statistics	3	
	Arts/humanities ²	3	3B
	TOTAL	27	
JUNIOR			
<i>Select one course from the following:</i>			
CO 300 ^P	Writing Arguments	3	2B
CO 301A ^P	Writing in the Disciplines-Arts and Humanities	3	2B
CO 301B ^P	Writing in the Disciplines-Science	3	2B
CO 301C ^P	Writing in the Disciplines-Social Sciences	3	2B
CO 301D ^P	Writing in the Disciplines-Education	3	2B
JTC 300 ^P	Professional and Technical Communication	3	2B
L*** 300 ^{P1}	Reading and Writing for Communication	3	
OR			
L*** 304 ^{P1}	Third-Year Language I	3	
L*** 305 ^{P1}	Third-Year Language II	3	
OR			
L*** 335 ^{P1}	Issues in Culture	3	
MGT 305	Fundamentals of Management	3	
MKT 305 ^P	Fundamentals of Marketing	3	
NR 320	Natural Resources History and Policy	3	3D
NR 387	Internship I	1	
NRRT 320	International Issues-Recreation and Tourism	3	
NRRT 370 ^P	Managing Tourism in the E-Commerce Era	3	
NRRT 376 ^P	Human Dimensions Research and Analysis	3	
	Global and cultural awareness ⁴	0	3E
	TOTAL	28	
SENIOR			
MGT 475 ^P	International Business Management ⁵	3	
OR			
MKT 365 ^P	International Marketing	3	
NR 300 ^P	Biological Diversity	3	
NRRT 442 ^P	Tourism Planning	3	4B, 4C
NRRT 470 ^P	Tourism Impacts	3	4A
NRRT 471 ^P	Starting and Managing Tourism enterprise	3	
NRRT 487	Internship	4	
NRRT 499	Senior Thesis	3	
RRM 350 ^P	Restaurant and Resort Marketing	3	
	Upper-division language electives	9	
	TOTAL	34	

Course	Title	Cr	AUCC
PROGRAM TOTAL = 120-121 credits			

Course	Title	Cr	AUCC
PROGRAM TOTAL = 120-121 credits			

PROGRAM TOTAL = 120-121 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Effective Fall 2007, foreign language courses are in separate prefixes (all starting with L and followed by three letters designating the language, e.g., LFRE is French, LGER is German, etc.).

² Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). The foreign language courses in this category may not be selected to fulfill the category.

³ Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

⁴ This requirement is automatically satisfied by studying abroad with SA 482.

⁵ In order to take this course, students may need to obtain a registration override from the appropriate department.

Natural Resource Tourism Concentration

The natural resource tourism curriculum emphasizes courses in tourism management, marketing and planning, natural resources, business, entrepreneurship, and social science to develop appropriate skills for work in recreation and tourism enterprises. The department works closely with several natural resource-focused Colorado resorts and private tourism enterprises.

Course	Title	Cr	AUCC
FRESHMAN			
AGRI 140	Technology in Agriculture	3	
OR			
BUS 150	Business Computing Concepts and Applications	3	
CO 150 ^P	College Composition	3	1A
ECON 202 ^P	Principles of Macroeconomics	3	3C
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
	Arts/humanities ¹	6	3B
	Biological/physical sciences ²	7	3A
	Political science elective ³	3	
	Guided elective ³	2	
	TOTAL	30	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
BUS 205	Legal and Ethical Issues in Business	3	
NRRT 231	Principles Parks/Protected Area Management	3	
NRRT 262	Principles of Environmental Communications	3	
NRRT 270	Principles of Natural Resource Tourism	3	
RRM 101	Hospitality Industry	3	
SPCM 200	Public Speaking	3	2A
STAT 201 ^P	General Statistics	3	
	Guided elective ³	3	
	TOTAL	27	
JUNIOR			
MGT 305	Fundamentals of Management	3	
MKT 305 ^P	Fundamentals of Marketing	3	
JTC 350	Public Relations	3	
OR			
NR 400 ^P	Public Relations in Natural Resources	3	
NR 320	Natural Resources History and Policy	3	3D
NR 387	Internship I	1	
NRRT 320	International Issues-Recreation and Tourism	3	
NRRT 376 ^P	Human Dimensions Research and Analysis	3	
	Advanced writing ⁴	3	2B
	Global and cultural awareness ⁵	3	3E
	Guided electives ³	6	
	TOTAL	31	
SENIOR			
NRRT 330	Social Aspects of Natural Resource Management	3	
NRRT 372 ^P	Tourism Promotion	3	
NRRT 442 ^P	Tourism Planning	3	4B, 4C
NRRT 460 ^P / RRM 460 ^P	Event and Conference Planning	3	
NRRT 470 ^P	Tourism Impacts	3	4A
NRRT 471 ^P	Starting and Managing Tourism Enterprise	3	
NRRT 487	Internship	5	
	Guided electives ³	9	

Course	Title	Cr	AUCC
TOTAL		32	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from the list in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

³ Select from departmental list of approved courses.

⁴ Select from the list of courses in category 2B in the AUCC.

⁵ Select from the list of courses in category 3E in the AUCC.

Parks and Protected Area Management Concentration

Parks and protected area management graduates develop expertise in inventorying, planning, and managing public lands and waters, and providing quality outdoor recreational experiences to their visitors. The concentration is oriented to employment with government agencies from the federal to local levels, including local open space and natural area programs. The department works closely with federal and Colorado resource management agencies and nonprofit land management organizations. The department works internationally with several Central American, South American, and Asian countries as establishment of parks and outdoor recreation programs has become a worldwide trend. The curriculum emphasizes natural resource management and recreation with supporting courses in the social sciences, natural sciences, and communications.

Course	Title	Cr	AUCC
FRESHMAN			
<i>Select four credits from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
OR			
BZ 120	Principles of Plant Biology	4	3A
CO 150 ^P	College Composition	3	1A
ECON 202 ^P	Principles of Macroeconomics	3	3C
<i>Select one course from the following:</i>			
GEOL 120	Exploring Earth: Physical Geology	3	3A
GEOL 122	The Blue Planet: Geology of Our Environment	3	3A
GEOL 124	Geology of Natural Resources	3	3A
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
PSY 100	General Psychology	3	3C
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	6	3B
	Guided electives ²	3	
	TOTAL	31	
SOPHOMORE			
FW 200 ^P	Wildlife Conservation	3	
LAND 220 ^P / LIFE 220 ^P	Fundamentals of Ecology	3	
NR 220 ^P	Natural Resources Ecology and Measurements	5	
NRRT 231	Principles-Parks/Protected Area Management	3	
NRRT 262	Principles of Environmental Communications	3	
NRRT 270	Principles of Natural Resource Tourism	3	
STAT 201 ^P	General Statistics	3	
	Global and cultural awareness ³	3	3E

Course	Title	Cr	AUCC
	Guided electives ²	5	
	TOTAL	31	

JUNIOR

Select one course from the following:			
CO	300 ^P	Writing Arguments	3 2B
CO	301A ^P	Writing in the Disciplines-Arts and Humanities	3 2B
CO	301B ^P	Writing in the Disciplines-Science	3 2B
CO	301C ^P	Writing in the Disciplines-Social Sciences	3 2B
CO	301D ^P	Writing in the Disciplines-Education	3 2B
JTC	300 ^P	Professional and Technical Communication	3 2B

NR	300 ^P	Biological Diversity	3
NR	320	Natural Resources History and Policy	3 3D
NR	387	Internship I	1
NRRT	330	Social Aspects of Natural Resource Management	3 4A
NRRT	331 ^P	Management of Parks and Protected Areas	3 4B
NRRT	376 ^P	Human Dimensions Research and Analysis	3

PHIL	330/	Agricultural Ethics	3
AGRI	330		
OR			
PHIL	345 ^P	Environmental Ethics	3
		Guided electives ²	6
		TOTAL	28

SENIOR

Select one course from the following:			
NR	365	Environmental Education	3
NRRT	371 ^P	Techniques in Interpretation	3
NRRT	462 ^P	Environmental Communication-Natural Resources	3

NR	420 ^P	Integrated Ecosystem Management	4 4C
NR	440	Land Use Planning	3
NR	460 ^P	Wilderness Management	3

OR			
NRRT	439 ^P	Open Space and Natural Area Management	3
NRRT	431 ^P	Park and Protected Area Management	3
NRRT	441 ^P	Spatial Analysis of Protected Areas	3
NRRT	487	Internship	5
		Electives	6
		TOTAL	30

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from department list of approved courses

³ Select from the list of courses in category 3E in the AUCC.

Minor in Wilderness Management

The wilderness management minor is relevant for students interested in pursuing a career in local, state, and federal land management agencies, or with environmental organizations working to preserve natural ecosystems.

All courses required for this minor, except NRRT 487, are correspondence courses. Registration for these courses is through the Division of Continuing Education and will require separate payment and enrollment procedures. Contact the Division for more information. Students must be enrolled in a degree program to complete a minor.

Course	Title	Cr
UPPER DIVISION		
NRRT 450	Wilderness Philosophy and Ethic Development	3
NRRT 451 ^P	National Wilderness Preservation System	3
NRRT 452 ^P	Management of the Wilderness Resources	4
NRRT 453 ^P	Management of Recreation Resources	3
NRRT 454 ^P	Wilderness Management Planning	3
NRRT 455 ^P	Wilderness Management Skills and Projections	3
NRRT 487	Internship	3
	TOTAL	22

PROGRAM TOTAL = 22 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

Graduate Programs in Human Dimensions of Natural Resources

Programs lead to the Master of Science and Doctor of Philosophy degrees. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, warnercnr.colostate.edu/hdnr-graduate-degrees/

Colorado State University reserves the right at any time, without notice, to change, modify, or cancel any course, program, procedure, policy, financial requirement, or disciplinary arrangement set forth in this catalog whenever, in its sole discretion, it determines such action to be appropriate. Furthermore, Colorado State will not be responsible for any failure to present or complete any course or program or to perform any other activity, function, or obligation mentioned in this catalog. Since changes may occur at any time, students must check the relevant website (as noted throughout various chapters in this catalog)

College of Natural Sciences

Office in Statistics Building, Room 117
(970) 491-1300
www.natsci.colostate.edu/

Professor Janice Nerger, Dean
Professor Simon Tavener, Associate Dean for Academics
Professor James Sites, Senior Associate Dean

UNDERGRADUATE MAJORS

Applied Computing Technology
Biochemistry
Biological Science
Chemistry
Computer Science
Mathematics
Natural Sciences
Physics
Psychology
Zoology

UNDERGRADUATE MINORS

Biochemistry
Botany
Chemistry
Computer Science
Mathematics
Physics
Statistics
Zoology

COLLEGE PROGRAMS

Our goal is to provide an extraordinary education to students in the natural sciences in order to prepare them for careers in modern research, industry, and academia. The College of Natural Sciences offers students the chance to meet with an academic advisor to plan the coursework necessary to graduate from Colorado State. If you are working toward a major or minor in a specific department, you should contact that department for advising. The College of Natural Sciences, in conjunction with the C.S.U. Career Center, has a satellite office located on the Oval in the Statistics building. Our services are offered to all Natural Science students and alumni in all aspects of their career development.

Undergraduate Majors

The college's eight departments offer ten undergraduate majors, all leading to a Bachelor of Science degree which requires a minimum of 120 credits with a minimum of 42 credits in upper-division courses.

In addition to degree programs, the College of Natural Sciences provides foundational courses in the biological, mathematical, behavioral, and physical sciences for Colorado State's seven other colleges. In this role the College serves Colorado State's broad liberal and general education objectives.

The college provides a range of service (Ambassadors, Student Leaders in Science), living-learning community (Ingersoll Hall) and research opportunities (Undergraduate Research Institute). For details see the college's Website at www.natsci.colostate.edu.

Preparation for the Science- and Mathematics-based Professions

Students earning degrees in College of Natural Sciences majors will be well prepared to succeed in careers in middle/high school science and math instruction, biochemistry, biology, chemistry, computer science, mathematics, physics and statistics. Details are provided under the catalog section for each department.

Since many students seeking entry into health professions are interested in the sciences, majors in the College of Natural Sciences including biological sciences, biochemistry, zoology and psychology are popular pre-health professions majors..

Students planning to enter a human or animal health profession must formally declare an academic major (there is no specific premedical, pre-veterinary, etc. major at C.S.U.). Health profession programs do not require a specific major, just specific prerequisite course work. A major should be chosen based on educational and alternative career objectives in mind. The pre-health professions advisors are located at the Center for Advising and Student Achievement (CASA), 121 The Institute for Learning and Teaching (TILT).

Study Abroad

Study abroad programs are available to students in the College of Natural Sciences. Because the knowledge of at least one other culture is valuable in understanding our own, students are strongly encouraged to take a semester or longer to study outside the United States as part of their overall program at Colorado State University. Students interested in study abroad should plan, well in advance, by discussing opportunities with their academic adviser and by visiting the Office of International Programs in Laurel Hall, www.studyabroad.colostate.edu.

The College of Natural Sciences has a special agreement to exchange students with the University of Tasmania. The college is also developing exchange agreements with other institutions, in particular, Ireland, China, and Russia.

Graduate Programs

The faculty of the College of Natural Sciences is involved with cutting-edge research in multiple disciplines. Graduate student education is also a major area in which the college excels. The College of Natural Sciences offers graduate programs in a variety of disciplines. The Master of Science and Doctor of Philosophy degrees are offered by all departments and a Master of Natural Sciences Education is offered through the college. The college also offers a Master of Professional Natural Sciences with a specialization in Zoo, Aquarium and Animal Shelters. For detailed information, and graduate degree program consult the appropriate department and see the *Graduate and Professional Bulletin* at graduateschool.colostate.edu/current-students/bulletin.aspx.

INTERDEPARTMENTAL MAJORS

Major in Natural Sciences

The Bachelor of Science in Natural Sciences meets the needs of two audiences:

- Students who want to become high school or junior high/middle school science teachers
- Students who want a broad exposure to mathematics and the physical sciences, rather than specialization in one discipline

Learning Outcomes

Students will demonstrate:

- Skills to critically interpret scientific data.
- Logical and critical thinking.

- Analysis and solving of complex problems.
- Strong written and oral communication skills.

Potential Occupations

Graduates with *licensure in secondary science education* will find a strong demand for high school and junior high/middle school teachers in Colorado and elsewhere in the nation. In addition, these graduates will also have the background required for graduate science education programs.

With proper planning, *physical science* graduates can meet requirements for professional schools (e.g., medicine or law) or graduate programs in the basic or applied sciences. Internships and volunteer activities can provide practical training and experience.

Secondary Education

The Bachelor of Science in Natural Sciences degree provides the subject matter, the education classes, and the classroom experience required for secondary education licensure in Colorado.

Concentrations in the Natural Sciences major include: Biology Education, Chemistry Education; Geology Education; and Physics Education.

The program includes science courses in a concentration such as biology, geology, physics, chemistry; the All-University Core Curriculum; and professional classes in the School for Teacher Licensing and Principal Preparation (STEPP) program in the College of Applied Human Sciences. In addition, the STEPP program helps schedule classroom visits and practica. The experience culminates in a semester of student teaching under the supervision of a master teacher.

Students interested in pursuing a teaching license through Colorado State University may refer to the Educator Licensing Program under the College of Applied Human Sciences section in this catalog for general information. Detailed information about the Educator Licensing Program and licensure requirements are available on the program's web site www.stepp.cahs.colostate.edu/ or in room 111 of the Education Building.

Biology Education Concentration

Course	Title	Cr	AUCC
FRESHMAN			
<i>Select four credits from the following</i>			
AA 100	Introduction to Astronomy	3	3A
AA 101 ^P	Astronomy Laboratory	1	3A
OR			
GEOL 120	Exploring Earth: Physical Geology	3	3A
GEOL 121 ^P	Introductory Geology Laboratory	1	3A
CHEM 107 ^P	Fundamentals of Chemistry	4	3A

Course	Title	Cr	AUCC
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
CO 150 ^P	College Composition	3	1A
LIFE 102 ^P	Attributes of Living Systems	4	3A
LIFE 103 ^P	Biology of Organisms-Animals and Plants	4	
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
	Arts and Humanities ¹	3	3B
	Global and Cultural Awareness ²	3	3E
	TOTAL	30	
SOPHOMORE			
BZ 220 ^P	Introduction to Evolution	3	
BZ 350 ^P	Molecular and General Genetics	4	
	OR		
SOCR 330 ^P	Principles of Genetics	3	
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
CHEM 246 ^P	Fundamentals of Organic Chemistry Laboratory	1	
LIFE 320 ^P	Ecology	3	
	<i>Select one pair of courses from the following:</i>		
PH 121 ^P	General Physics I	5	3A
PH 122 ^P	General Physics II	5	3A
	OR		
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
STAT 301 ^P	Introduction to Statistical Methods	3	
	Science Elective ³	3	
	TOTAL	30-31	
JUNIOR			
BZ 310 ^P	Cell Biology	4	
BZ 311 ^P	Developmental Biology	4	
BMS 300 ^P	Principles of Human Anatomy and Physiology	4	
EDUC 275 ^P	Schooling in the United States	3	3C
EDUC 331 ^P	Educational Technology and Assessment	2	
EDUC 340 ^P	Literacy and the Learner	3	
EDUC 350 ^P	Instruction I- Individualization/Management	3	
EDUC 386 ^P	Practicum-Instruction I	1	
	Advanced Writing ⁴	3	2
	Historical Perspectives ⁵	3	3D
	Science Elective ³	3	
	TOTAL	33	
SENIOR			
EDUC 450 ^P	Instruction II-Standards and Assessment	4	
EDUC 460 ^P	Methods and Materials in Teaching Science	4	
EDUC 485B ^P	Student Teaching-Secondary	11	4A, 4B, 4C
EDUC 486E ^P	Practicum-Instruction II	1	
EDUC 493A ^P	Seminar-Professional Relations	1	4C
LIFE 205	Survey of Microbial Biology	3	
LIFE 206 ^P	Microbial Biology Laboratory	2	
	Arts and Humanities ¹	3	3B
	TOTAL	29	
PROGRAM TOTAL = 122-123 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from list of courses in category 3E in the AUCC.

³ Select course(s) in consultation with advisor.

⁴ Select one course from the list of courses in category 2 of the AUCC.

⁵ Select from list of courses in category 3D in the AUCC.

Chemistry Education Concentration

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	

Course	Title	Cr	AUCC
LIFE 102 ^P	Attributes of Living Systems	4	3A
LIFE 103 ^P	Biology of Organisms-Animal and Plants	4	
	<i>Select one pair of courses from the following:</i>		
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
MATH 255 ^P	Calculus for Biological Scientists II	4	1B
	OR		
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
CO 150 ^P	College Composition ¹	3	1A
	Elective	2	
	TOTAL	30	

Course	Title	Cr	AUCC
SOPHOMORE			
CHEM 261 ^P	Fundamentals of Inorganic Chemistry	3	
CHEM 345 ^P	Organic Chemistry I	4	
CHEM 346 ^P	Organic Chemistry II	4	
	<i>Select one pair of courses from the following:</i>		
PH 121 ^P	General Physics I	5	3A
PH 122 ^P	General Physics II	5	3A
	OR		
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
STAT 301 ^P	Introduction to Statistical Methods	3	
	Advanced Writing ²	3	2
	Arts and Humanities ³	3	3B
	TOTAL	30	

Course	Title	Cr	AUCC
JUNIOR			
	<i>Select four credits from the following:</i>		
AA 100	Introduction to Astronomy	3	3A
AA 101 ^P	Astronomy Laboratory	1	3A
	OR		
GEOL 120	Exploring Earth: Physical Geology	3	3A
GEOL 121 ^P	Introductory Geology Laboratory	1	3A
CHEM 331 ^P	Quantitative Analysis-Biological Sciences	3	
CHEM 334 ^P	Quantitative Analysis Laboratory	1	
CHEM 471 ^P	Physical Chemistry for Biological Sciences	4	
EDUC 275 ^P	Schooling in the United States	3	3C
EDUC 331 ^P	Educational Technology and Assessment	2	
EDUC 340 ^P	Literacy and the Learner	3	
EDUC 350 ^P	Instruction I- Individualization/Management	3	
EDUC 386 ^P	Practicum-Instruction I	1	
	Historical Perspectives ⁴	3	3D
	Social and Behavioral Sciences ⁵	3	3C
	TOTAL	30	

Course	Title	Cr	AUCC
SENIOR			
BC 351 ^P	Principles of Biochemistry	4	
EDUC 450 ^P	Instruction II-Standards and Assessment	4	
EDUC 460 ^P	Methods and Materials in Teaching Science	4	
EDUC 485B ^P	Student Teaching-Secondary	11	4A, 4B, 4C
EDUC 486E ^P	Practicum-Instruction II	1	
EDUC 493A ^P	Seminar-Professional Relations	1	4C
	Arts and Humanities ³	3	3B
	Global and Cultural Awareness ⁶	3	3E
	TOTAL	31	

PROGRAM TOTAL = 121 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from list of courses in category 1A in the All-University Core Curriculum (AUCC).

² Select from list of courses in category 2 in the AUCC.

³ Select from list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁴ Select from list of courses in category 3D in the AUCC.

⁵ Select from list of courses in category 3C in the AUCC.

⁶ Select from list of courses in category 3E in the AUCC.

Geology Education Concentration

Course	Title	Cr	AUCC
FRESHMAN			
AA 100	Introduction to Astronomy	3	3A
OR			
NR 150	Oceanography	3	3A
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CO 150 ^P	College Composition	3	1A
GEOL 120	Exploring Earth: Physical Geology	3	
GEOL 121 ^P	Introductory Geology Laboratory	1	
OR			
GEOL 150	Physical Geology for Scientists and Engineers	4	
GEOL 154 ^P	Historical and Analytic Geology	4	
LIFE 102 ^P	Attributes of Living Systems	4	3A
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
OR			
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
	Arts and Humanities ¹	3	3B
	TOTAL	30	
SOPHOMORE			
ATS 350	Introduction to Weather and Climate	2	
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
EDUC 275 ^P	Schooling in the United States	3	3C
EDUC 340 ^P	Literacy and the Learner	3	
GEOL 232 ^P	Mineralogy	3	
LIFE 103 ^P	Biology of Organisms-Animals and Plants	4	
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
OR			
MATH 255 ^P	Calculus for Biological Scientists II	4	1B
	Advanced Writing ⁴	3	2
	Historical Perspectives ⁵	3	3D
	Elective	0-6	
	TOTAL	29-35	
JUNIOR			
EDUC 331 ^P	Educational Technology and Assessment	2	
EDUC 350 ^P	Instruction I- Individualization/Management	3	
EDUC 386 ^P	Practicum-Instruction I	1	
<i>Select three courses from the following:</i>			
GEOL 250 ^P	The Solid Earth	3	
GEOL 342 ^P	Paleontology	3	
GEOL 344 ^P	Stratigraphy and Sedimentology	4	
GEOL 364 ^P	Igneous and Metamorphic Petrology	4	
GEOL 372 ^P	Structural Geology	4	
GEOL 446 ^P	Environmental Geology	3	
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
STAT 301 ^P	Introduction to Statistical Methods	3	
	TOTAL	28-31	
SENIOR			
EDUC 450 ^P	Instruction II-Standards and Assessment	4	
EDUC 460 ^P	Methods and Materials in Teaching Science	4	
EDUC 485B ^P	Student-Teaching-Secondary	11	4A, 4B, 4C
EDUC 486E ^P	Practicum-Instruction II	1	
EDUC 493A ^P	Seminar-Professional Relations	1	4C
GEOL 454 ^P	Geomorphology	4	
	Arts and Humanities ¹	3	3B
	Science Elective ⁵	3	3E
	TOTAL	31	
PROGRAM TOTAL = 121-124 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses..

² Select one course from the list of courses in category 2 of the AUCC.

³ Select from list of courses in category 3E in the AUCC.

⁴ Select from the list of courses in category 3D in the AUCC.

⁵ Select course(s) in consultation with advisor.

Physics Education Concentration

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
	Science Elective ¹	4	
	TOTAL	29	
SOPHOMORE			
AA 100	Introduction to Astronomy	3	3A
AA 101 ^P	Astronomy Laboratory	1	3A
LIFE 102 ^P	Attributes of Living Systems	4	3A
LIFE 103 ^P	Biology of Organisms-Animals and Plants	4	
MATH 261 ^P	Calculus for Physical Scientists III	4	
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
PH 314 ^P	Introduction to Modern Physics	4	4A, 4B
	Advanced Writing ²	3	2
	Arts and Humanities ³	3	3B
	TOTAL	31	
JUNIOR			
CS 150 ^P	Interactive Programming with Java	4	
EDUC 275 ^P	Schooling in the United States	3	3C
EDUC 331 ^P	Educational Technology and Assessment	2	
EDUC 340 ^P	Literacy and the Learner	3	
PH 245 ^P	Introduction to Electronics	3	
PH 315 ^P	Modern Physics Laboratory	2	4A, 4B
PH 361 ^P	Physical Thermodynamics	3	4A, 4B
	Arts and Humanities ³	3	3B
	Global and Cultural Awareness ⁴	3	3E
	Historical Perspectives ⁵	3	3D
	Science Electives ¹	3	
	TOTAL	32	
SENIOR			
EDUC 350 ^P	Instruction I- Individualization/Management	3	
EDUC 386 ^P	Practicum-Instruction I	1	
EDUC 450 ^P	Instruction II-Standards and Assessment	4	
EDUC 460 ^P	Methods and Materials in Teaching Science	4	
EDUC 485B ^P	Student Teaching-Secondary	11	4A, 4C
EDUC 486E ^P	Practicum-Instruction II	1	
EDUC 493A ^P	Seminar-Professional Relations	1	4C
PH 353 ^P	Optics and Waves	4	4A, 4B
	TOTAL	29	
PROGRAM TOTAL = 121 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select course(s) in consultation with advisor.

² Select one course from the list of courses in category 2 of the AUCC.

³ Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses..

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select from the list of courses in category 3D in the AUCC.

Physical Science Concentration

The Physical Science concentration begins with two semesters each of calculus, chemistry, and physics, plus a semester of biological science. Students then complete the major by earning two minors selected from biochemistry, chemistry, computer science, geology, mathematics, or physics. Completion of the double minor gives an unusual breadth in the physical sciences. Recent graduates have pursued careers in science. Others use this background as a basis for graduate work and research or for entry into medical or veterinary professional programs. Graduates can also add the certification requirements for secondary education to this concentration.

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CO 150 ^P	College Composition	3	1A
MATH 117 ^L	College Algebra in Context I	1	1B
MATH 118 ^L	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
MATH 125 ^P	Numerical Trigonometry	1	1B
MATH 126 ^P	Analytic Trigonometry	1	1B
	Advanced Writing ¹	3	2
	Minor ²	9	
	Elective	3	
	TOTAL	28	
SOPHOMORE			
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
<i>Select one pair of courses from the following:</i>			
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
MATH 255 ^P	Calculus for Biological Scientists II	4	1B
OR			
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
STAT 301 ^P	Introduction to Statistical Methods	3	
	Minor ²	6	
	TOTAL	31	
JUNIOR			
	Arts and Humanities ³	3	3B
	Biological and Physical Sciences ⁴	3	3A
	Global and Cultural Awareness ⁵	3	3E
	Historical Perspectives ⁶	3	3D
	Minor ²	15	
	Social and Behavioral Sciences ⁷	3	3C
	TOTAL	30	
SENIOR			
	Arts and Humanities ³	3	3B
	Building foundations/perspectives ⁸	3	4B
	Capstone course ⁹	3	4C
	Using competencies ¹⁰	3	4A
	Minor ²	12	
	Electives ¹¹	7	
	TOTAL	31	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 2 in the All-University Core Curriculum (AUCC).

² Declare and complete two minors from the following list: biochemistry, chemistry, computer science, geology, mathematics, physics, statistics.

³ Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁴ Select from the list of courses in category 3A in the AUCC.

⁵ Select from the list of courses in category 3E in the AUCC.

⁶ Select from the list of courses in category 3D in the AUCC.

⁷ Select from the list of courses in category 3C in the AUCC.

⁸ Complete a course satisfying AUCC category 4B that is offered within a major that is the same as one of the minors that will be completed.

⁹ Complete a course satisfying AUCC category 4C that is offered within a major that is the same as one of the minors that will be completed.

¹⁰ Complete a course satisfying AUCC category 4A that is offered within a major that is the same as one of the minors that will be completed.

¹¹ Majors must take enough electives to total 120 credits. Of the 120 credits, 42 must be upper-division (300- and 400-level) credits.

DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOLOGY

Office in Molecular and Radiological Biosciences

Building, Room 316

(970) 491-5602

www.bmb.colostate.edu

Professor P. Shing Ho, Chair

Major in Biochemistry

As the name suggests, biochemistry links biology and chemistry. Biochemistry is most simply defined as the chemistry of living systems. It is the science that tries to explain how “lifeless” molecules work together to make “living” organisms. The methods of chemistry and molecular biology are used to study the structure and behavior of the complex molecules found in biological materials and the ways these molecules interact to form cells, tissues, and whole organisms. Biochemistry provides the basis for advances in human and veterinary medicine, agriculture, and biotechnology. Biochemists may participate in interdisciplinary research and development projects alongside chemical engineers, biologists, microbiologists, agronomists, physicians, and other professionals. They investigate the molecular mechanisms of such diseases as AIDS, diabetes, cancer, heart disease and stroke, and develop solutions to environmental problems through biotechnology.

The Biochemistry major provides a student with a strong, well-balanced background in the biological, physical, and mathematical sciences. As a biochemistry major, studies include macromolecular structure and function; cellular biochemistry; metabolism; gene expression, DNA and protein structure, DNA replication, and repair; cell organization, communication, growth, aging, and death. Students are also required to take courses in physics, organic chemistry, physical chemistry for life sciences, and statistical measurements and methods used in research. Independent study and internships during the junior and senior years provide opportunities for experiential learning and working closely with the faculty, sometimes leading to authorship of original publications.

Learning Outcomes

Students will obtain:

- A command of the basic concepts of chemistry, biology, biochemistry, molecular biology, and cellular biology
- The ability to critically analyze, and present the methods, results, and conclusions of scientific papers in the current biochemical literature, and orally present technical material in a clear and comprehensible form
- Experience in use of a variety of laboratory techniques; critically interpret experimental results; and design new experiments
- Demonstrate the ability to perform original research in biochemistry and molecular biology

Potential Occupations

Possible career opportunities include, but are not limited to: process research technician, production/quality assurance lab technician, biomedical/pharmaceutical researcher or salesperson, molecular biologist, biophysicist, cytologist, toxicologist, crime scene investigator, industrial hygienist, dairy technologist, environmental analyst, hygienist, or chemist, wastewater treatment chemist, food and drug inspector, museum technician, teacher, writer, fisheries biologist, research analyst, medical or clinical lab technologist. Many biochemistry majors go on to graduate school or health care related professional schools.

General Biochemistry Concentration

This concentration is designed to provide a broad education in biochemistry and can be tailored to meet the individual needs of specific students. The general degree is recommended for students considering teaching and/or research as a career.

A minimum grade of C (2.000) must be earned for BC 493 and all biochemistry (BC) and LIFE subject code lecture and laboratory courses at or above the 200-level required in the biochemistry major.

Course	Title	Cr	AUCC
FRESHMAN			
BC 192	Biochemistry Freshman Seminar	2	
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A
LIFE 102 ^P	Attributes of Living Systems	4	3A
LIFE 201B ^P	Introductory Genetics	3	
LIFE 203 ^P	Introductory Genetics Laboratory	2	
<i>Select one pair of courses from the following:</i>			
MATH 155 ^P	Calculus for Biological Scientists I	4	1B

Course	Title	Cr	AUCC
MATH 255 ^P	Calculus for Biological Scientists II	4	1B
OR			
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
TOTAL		31	
SOPHOMORE			
CHEM 341 ^P	Modern Organic Chemistry I	3	
CHEM 343 ^P	Modern Organic Chemistry II	3	
CHEM 344 ^P	Modern Organic Chemistry Laboratory	2	
LIFE 210 ^P	Introductory Eukaryotic Cell Biology	3	
LIFE 212 ^P	Introductory Cell Biology Laboratory	2	
PH 121 ^P	General Physics I	5	3A
OR			
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
		Additional communication ¹	3 2A or 2B
		AUCC Category 3 courses ²	6 3B-3E
		Bioscience Elective ³	3-4
TOTAL		30-	
		31	
JUNIOR			
BC 401 ^P	Comprehensive Biochemistry I	3	4A
BC 403 ^P	Comprehensive Biochemistry II	3	4B
BC 404 ^P	Comprehensive Biochemistry Laboratory	2	4B
PH 122 ^P	General Physics II	5	3A
OR			
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			
STAT 307 ^P	Introduction to Biostatistics	3	
		Bioscience elective ³	3-4
		AUCC Category 3 courses ²	3 3B-3E
		Electives	6
TOTAL		28-	
		29	
SENIOR			
BC 411 ^P	Physical Biochemistry	4	
BC 463 ^P	Molecular Genetics	3	4C
BC 465 ^P	Molecular Regulation of Cell Function	3	
BC 493 ^P	Senior Seminar	1	4A, 4C
BC 499A	Thesis-Laboratory Research-Based	3	
OR			
BC 499B	Thesis-Literature-Based	3	
		Bioscience elective ³	3-4
		AUCC Category 3 course ²	6 3B-3E
		Electives	6-7
TOTAL		29-	
		31	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 2A or 2B in the All-University Core Curriculum (AUCC). First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (category 2B).

² Select from the list of courses in categories 3B-3E (six credits [two courses] must come from 3B; one course each from categories 3C, 3D, and 3E) in the AUCC.

Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select in consultation with adviser using list approved by the department.

Health and Medical Sciences Concentration

This concentration augments the General Biochemistry concentration with additional coursework in anatomy and physiology, the biochemistry of disease, and medical internship by requiring an additional 14-15 credits of concentration-specific coursework. The Medical and

Health Sciences concentration is geared toward students interested in medical, veterinary or dentistry careers.

A minimum grade of C (2.000) must be earned for BC 493 and all biochemistry (BC) and LIFE subject code lecture and laboratory courses at or above the 200-level required in the biochemistry major.

Course	Title	Cr	AUCC
FRESHMAN			
BC 192	Biochemistry Freshman Seminar	2	
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A
LIFE 102 ^P	Attributes of Living Systems	4	3A
LIFE 201B ^P	Introductory Genetics	3	
LIFE 203 ^P	Introductory Genetics Laboratory	2	
<i>Select one pair of courses from the following:</i>			
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
MATH 255 ^P	Calculus for Biological Scientists II	4	1B
OR			
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
TOTAL		31	
SOPHOMORE			
BMS 300 ^P	Principles of Human Physiology	4	
OR			
BMS 360 ^P	Fundamentals of Physiology	4	
CHEM 341 ^P	Modern Organic Chemistry I	3	
CHEM 343 ^P	Modern Organic Chemistry II	3	
CHEM 344 ^P	Modern Organic Chemistry Laboratory	2	
LIFE 210 ^P	Introductory Eukaryotic Cell Biology	3	
LIFE 212 ^P	Introductory Cell Biology Laboratory	2	
PH 121 ^P	General Physics I	5	3A
OR			
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
		Advanced Writing ¹	3 2
		AUCC Category 3 courses ²	6 3B-3E
TOTAL		31	
JUNIOR			
BC 401 ^P	Comprehensive Biochemistry I	3	4A
BC 403 ^P	Comprehensive Biochemistry II	3	4B
BC 404 ^P	Comprehensive Biochemistry Laboratory	2	4B
<i>Select one of the following courses:</i>			
BC 475 ^P	Mentored Research	3	
BC 487A ^P	Internship	3	
BC 495 ^P	Independent Study	3	
BMS 301 ^P	Human Gross Anatomy	5	
OR			
BMS 305 ^P	Domestic Animal Gross Anatomy	4	
PH 122 ^P	General Physics II	5	3A
OR			
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			
STAT 307 ^P	Introduction to Biostatistics	3	
		AUCC Category 3 courses ²	3
		Elective	3
TOTAL		29-30	
SENIOR			
BC 411 ^P	Physical Biochemistry	4	
BC 463 ^P	Molecular Genetics	3	4C
BC 465 ^P	Molecular Regulation of Cell Function	3	
BC 467 ^P	Biochemistry of Disease	3	
BC 493 ^P	Senior Seminar	1	4A, 4C
BC 499A	Thesis-Laboratory Research-Based	3	
OR			
BC 499C	Thesis-Literature-Based, Health and Med. Sci.	3	

Course	Title	Cr	AUCC
		AUCC Category 3 course ²	6 3B-3E
		Electives	5-6
TOTAL		28-29	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select one course from the list in category 2 of the All-University Core Curriculum (AUCC).

² Select from the list of courses in categories 3B-3E (six credits [two courses] must come from 3B; one course each from categories 3C, 3D, and 3E) in the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

Pre-Pharmacy Concentration

This concentration augments the General Biochemistry concentration with additional coursework in physiology, microbiology, immunology, and public speaking. This concentration fulfills the prerequisite courses for admission to most pharmacy schools. It is also an appropriate concentration for a career as a medical technician.

Course	Title	Cr	AUCC
FRESHMAN			
BC 192	Biochemistry Freshman Seminar	2	
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A
LIFE 102 ^P	Attributes of Living Systems	4	3A
LIFE 201B ^P	Introductory Genetics	3	
LIFE 203 ^P	Introductory Genetics Laboratory	2	
<i>Select one pair of courses from the following:</i>			
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
MATH 255 ^P	Calculus for Biological Scientists II	4	1B
OR			
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
TOTAL		31	
SOPHOMORE			
BMS 300 ^P	Principles of Human Physiology	4	
OR			
BMS 360 ^P	Fundamentals of Physiology	4	
BMS 302 ^P	Laboratory Principles in Physiology	2	
CHEM 341 ^P	Modern Organic Chemistry I	3	
CHEM 343 ^P	Modern Organic Chemistry II	3	
CHEM 344 ^P	Modern Organic Chemistry Laboratory	2	
LIFE 210 ^P	Introductory Eukaryotic Cell Biology	3	
LIFE 212 ^P	Introductory Cell Biology Laboratory	2	
PH 121 ^P	General Physics I	5	3A
OR			
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
SPCM 200	Public Speaking	3	
		Advanced Writing ¹	3 2
TOTAL		30	
JUNIOR			
BC 401 ^P	Comprehensive Biochemistry I	3	4A
BC 403 ^P	Comprehensive Biochemistry II	3	4B
BC 404 ^P	Comprehensive Biochemistry Laboratory	2	4B
ECON 202 ^P	Principles of Microeconomics	3	3C
MIP 300 ^P	General Microbiology	3	
MIP 302 ^P	General Microbiology Laboratory	2	
PH 122 ^P	General Physics II	5	3A
OR			
PH 142 ^P	Physics for Scientists and Engineers II	5	3A

Course	Title	Cr	AUCC
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			
STAT 307 ^P	Introduction to Biostatistics	3	
	AUCC Category 3 courses ²	3	3B, 3D, 3E
	Elective	3	
	TOTAL	30	
SENIOR			
BC 411 ^P	Physical Biochemistry	4	
BC 463 ^P	Molecular Genetics	3	4C
BC 465 ^P	Molecular Regulation of Cell Function	3	
BC 493 ^P	Senior Seminar	1	4A, 4C
BC 499A	Thesis-Laboratory Research-Based	3	
OR			
BC 499D	Thesis-Literature-Based, Pre-Pharmacy	3	
MIP 342 ^P	Immunology	4	
	AUCC Category 3 courses ²	9	3B, 3D, 3E
	Elective	2	
	TOTAL	29	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹Select from the list of courses in category 2 of the All-University Core Curriculum (AUCC).

²Select from the list of courses in categories 3B-3E (six credits [two courses] must come from 3B; one course each from categories 3C, 3D, and 3E) in the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

Minor in Biochemistry

The minor is valuable to students majoring in any biological or physical science or in engineering. The minor requires a sound chemistry background, provides fundamental courses in molecular biosciences, and augments the latter with more specialized courses in biochemistry and molecular genetics.

Course	Title	Cr
LOWER DIVISION		
LIFE 201B ^P	Introductory Genetics*	3
LIFE 203 ^P	Introductory Genetics Laboratory	2
LIFE 210 ^P	Introductory Eukaryotic Cell Biology*	3
LIFE 212 ^P	Introductory Cell Biology Laboratory*	2
	TOTAL	10
UPPER DIVISION		
BC 401 ^P	Comprehensive Biochemistry I*	3
BC 403 ^P	Comprehensive Biochemistry II	3
BC 404 ^P	Comprehensive Biochemistry Laboratory*	2
<i>Select one of the following:</i>		
BC 411 ^P	Physical Biochemistry	4
BC 463 ^P	Molecular Genetics	3
BC 465 ^P	Molecular Regulation of Cell Function	3
BC 493 ^P	Senior Seminar	1
	TOTAL	12-13

PROGRAM TOTAL = 22-23 credits without prerequisites

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional work may be required because of prerequisites.

Graduate Programs in Biochemistry

The department offers graduate programs leading to Master of Science and Doctor of Philosophy degrees. Students interested in graduate work should refer to the

Graduate and Professional Bulletin, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, www.bmb.colostate.edu.

DEPARTMENT OF BIOLOGY

Office in Anatomy-Zoology Building, Room E106
(970) 491-7011

www.colostate.edu/Depts/Biology

Professor Michael F. Antolin, Interim Chair

Major in Biological Science

Biology is the study of all living things – from bacteria and viruses that can be seen only under a microscope, to plants, animals, and humans and their relationship to their environments. Biological Science majors study the structure and function of cells, organ systems and tissues in animals and plants, ecology (the relationship between living things and their environment), and evolution. They learn about physiology, behavior, genetics and heredity, aquatic toxicology, microscopic organisms such as bacteria, and laboratory techniques for diverse areas ranging from field research to biotechnology. This major provides a solid foundation of understanding in the basic biological sciences. It also offers an opportunity to choose an area of emphasis within life sciences that is related to particular career goals (for example, the ecology of organisms in the field, cell and molecular biology for biomedical professions or biotechnology, aquatic biology for marine biologists, plant molecular biology for agricultural biotechnology, and bioenergy, etc.).

Learning Outcomes

Students will:

- Interpret scientific data
- Demonstrate strong organizational and laboratory skills
- Define scientific hypotheses and design experiments to test them
- Work effectively in groups
- Demonstrate strong writing and oral communication skills

Potential Occupations

Training in biology prepares students for a very large number of occupations. Some involve daily interaction with dozens of people, others can be done in relative isolation; some are highly focused, others require

knowledge far beyond science. Career options related to biology include water quality assessments, field and lab technician work, biotechnology in biomedical sciences and agriculture, genetic research, agriculture, or sales (i.e., pharmaceutical, agricultural). Graduates work in small business, multinational corporations, academia, and government research laboratories and policy agencies. A degree in biological sciences offers a broad foundation for dental, medical, or veterinary school, and a number of health professions such as podiatry or optometry. Graduates often pursue advanced degrees in life sciences to carry out basic research or advance into leadership positions in industry. Participation in internships and/or laboratory research experience is highly recommended and strongly encouraged by the department to enhance practical training and development.

Combining biology with non-science skills can also lead to exciting careers. Biology and English can be incorporated into a career as a technical writer or science fiction novelist. Biology and art are combined in medical and scientific illustration. Biology and computer science can be linked in the exciting area of bioinformatics, or as an historian of science or medicine. Work in both biology and philosophy/ religion can be incorporated in careers in bioethics. Biology is linked with psychology for the neuroscientist or genetic counselor. Study biology and political science to work in environmental law or be a patent lawyer in biotechnology. Try mixing biology and business to get into hospital administration, small business or biotechnology administration. Specialized master's degrees are designed for many of these unique career paths.

Some career opportunities include, but are not limited to: aquarium, zoo, and museum worker; assistant research scientist; research technician in industry or university laboratories; biology photographer; biotechnologist; brewery laboratory assistant; consumer product researcher; marine bacteriologist, biologist, or ecologist; nuclear medicine technician; park naturalist; pharmaceutical researcher or salesperson; public health officer; science librarian; environmental educator, health specialist, or impact specialist; ecologist; fisheries biologist or conservationist; industrial hygienist; occupational therapist (with a master's degree); and medical or clinical laboratory technologist.

Biological Science Concentration

The curriculum includes a two-semester introductory biology sequence, cell biology, developmental biology, ecology, evolution, and genetics. Required courses in the physical sciences include a minimum of one year in introductory chemistry and in physics (with labs), and at least one course in organic chemistry (with lab), and one in biochemistry. A calculus course and a statistics course

are also required. In addition, students choose a selected field of 12 credits on one of the following: anatomy/physiology, aquatic biology, behavioral biology, cellular/molecular and genetic biology, ecology, evolution/genetics and systematics, microbiology, or integrative organismal biology. There is an additional requirement of one course in two other fields, which assures a broad base of study.

To be qualified for graduation, students in the biological science major must have a minimum grade of C- in each of their biological, physical science, and mathematical courses used to meet requirements for the major. This applies to courses taken as substitutions for meeting these requirements. The minimum scholastic average acceptable for graduation is 2.000 computed only for courses attempted at Colorado State.

Course	Title	Cr	AUCC
FRESHMAN			
<i>Select one set of courses from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
BZ 120	Principles of Plant Biology	4	3A
OR			
LIFE 102 ^P	Attributes of Living Systems	4	3A
LIFE 103 ^P	Biology of Organisms-Animals and Plants	4	
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
OR			
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
	Advanced Writing ¹	3	2
	Arts and Humanities ²	3	3B
	Elective	2	
	TOTAL	32	
SOPHOMORE			
BZ 220 ^P	Introduction to Evolution	3	
BZ 310 ^P	Cell Biology	4	
BZ 311 ^P	Developmental Biology	4	
<i>Select one set from the following:</i>			
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
CHEM 246 ^P	Fundamentals of Organic Chemistry Laboratory	1	
OR			
CHEM 345 ^P	Organic Chemistry I	4	
CHEM 346 ^P	Organic Chemistry II	4	
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			
STAT 307 ^P	Introduction to Biostatistics	3	
	Arts and Humanities ²	3	3B
	Historical Perspectives ³	3	3D
	Social and Behavioral Sciences ⁴	3	3C
	Elective	2	
	TOTAL	30-33	
JUNIOR			
BZ 350 ^P	Molecular and General Genetics	4	4A, 4B
<i>Select one pair from the following:</i>			
PH 121 ^P	General Physics I	5	3A
PH 122 ^P	General Physics II	5	3A
OR			
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Selected field ⁵	6	
	Additional fields ⁶	3	
	Elective	6	

Course	Title	Cr	AUCC
TOTAL		29	
SENIOR			
BC 351 ^P	Principles of Biochemistry	4	
OR			
BC 401 ^P	Comprehensive Biochemistry I	3	
AND			
BC 403 ^P	Comprehensive Biochemistry II	3	
BZ 450 ^P	Plant Ecology	3	4C
OR			
LIFE 320 ^P	Ecology	4	4C
	Global and Cultural Awareness ⁷	3	3E
	Selected field ⁵	6	
	Additional field ⁶	3	
	Electives	10	
TOTAL		29-32	

PROGRAM TOTAL = 120-126 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from list of courses in category 2 in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select from the list of courses in category 3C in the AUCC.

⁵ The Biology Department maintains a list of current selected fields. Twelve credits must be taken from one field.

⁶ A minimum of one course must be selected from two additional fields (cannot use courses that were used to fulfill selected field). Courses in additional fields must be at least three credits.

⁷ Select from the list of courses in category 3E of the AUCC.

Botany Concentration

Botany is the general study of plants from microscopic algae to giant redwoods, from mushrooming fungi to flowering angiosperms. Plant anatomy, how plants grow and develop, and how they survive and interrelate within their environments are topics of study. For students who like the outdoors, a career in plant ecology, taxonomy, or forestry might be appealing. Students attracted to the beauty and design of the microscopic world might enjoy a career in plant anatomy or plant developmental biology. Those interested in chemistry might enjoy plant biochemistry, molecular biology, or plant biotechnology. Those intrigued by plant diseases might become plant pathologists and the mathematically oriented might explore systems ecology, genetics, or plant biotechnology.

The Botany curriculum begins with a solid foundation in mathematics, the biological sciences, chemistry, organic chemistry, physics, evolution, and genetics. Biochemistry, botany emphasizing terrestrial plant studies including plant systematics, anatomy, and ecology, and earth sciences round out the core. Botany students also take liberal arts and communications courses to give breadth to their education.

To be qualified for graduation, students in the biological science major must have a minimum grade of C- in each of their biological, physical science, and mathematical courses used to meet requirements for the major. This applies to courses taken as substitutions for meeting these

requirements. The minimum scholastic average acceptable for graduation is 2.000 computed only for courses attempted at Colorado State.

Course	Title	Cr	AUCC
FRESHMAN			
<i>Select one set from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
BZ 120	Principles of Plant Biology	4	3A
OR			
LIFE 102 ^P	Attributes of Living Systems	4	3A
LIFE 103 ^P	Biology of Organisms-Animals and Plants	4	
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
OR			
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
	Advanced Writing ¹	3	2
	Arts and Humanities ²	3	3B
	Elective	2	
TOTAL		32	

Course	Title	Cr	AUCC
SOPHOMORE			
<i>Select two courses from the following:</i>			
ATS 350	Introduction to Weather and Climate	2	
GEOL 122	The Blue Planet: Geology of Our Environment	3	3A
GR 210	Physical Geography	3	
SOCR 240 ^P	Introductory Soil Science	4	
BZ 220 ^P	Introduction to Evolution	3	
<i>Select one set from the following:</i>			
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
CHEM 246 ^P	Fundamentals of Organic Chemistry Laboratory	1	
OR			
CHEM 345 ^P	Organic Chemistry I	4	
CHEM 346 ^P	Organic Chemistry II	4	
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			
STAT 307 ^P	Introduction to Biostatistics	3	
	Arts and Humanities ²	3	3B
	Historical Perspectives ³	3	3D
	Social and Behavioral Sciences ⁴	3	3C
	Electives	2	
TOTAL		27-32	

Course	Title	Cr	AUCC
JUNIOR			
BIO 310 ^P	Cell Biology	4	
BZ 350 ^P	Molecular and General Genetics	4	4A, 4B
BZ 450 ^P	Plant Ecology	4	4C
<i>Select one pair from the following:</i>			
PH 121 ^P	General Physics I	5	3A
PH 122 ^P	General Physics II	5	3A
OR			
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Global and Cultural Awareness ⁵	3	3E
	Electives	3	
TOTAL		28	

Course	Title	Cr	AUCC
SENIOR			
BC 351 ^P	Principles of Biochemistry	4	
OR			
BC 401 ^P	Comprehensive Biochemistry I	3	
AND			
BC 403 ^P	Comprehensive Biochemistry II	3	
BZ 325 ^P	Plant Systematics	4	
BZ 331 ^P	Developmental Plant Anatomy	4	
<i>Select at least two courses from the following:</i>			
BZ 332 ^P	Introductory Phycology	4	
BZ 333 ^P	Introductory Mycology	4	

Course	Title	Cr	AUCC
BZ 338 ^P	Comparative Morphology of Vascular Plants	4	
BZ 440 ^P	Plant Physiology	3	
BZ 441 ^P	Plant Physiology Laboratory	2	
	Electives ⁶	1-8	
	TOTAL	28-33	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from list of courses in category 2 in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select from the list of courses in category 3C in the AUCC.

⁵ Select from the list of courses in category 3E in the AUCC.

⁶ Select enough elective credits to bring total number of credits to 120; 42 credits must be in courses numbered 300 or above.

Major in Zoology

Zoologists study animals – their origin, behavior, diseases, and life processes. Some experiment with live animals in controlled or natural surroundings while others study the structure and function of animal cells, tissues, and organ systems. Some zoologists go on to study veterinary medicine. Zoologists participate in research that has practical outcomes in farming, medicine, pharmacy, wildlife conservation, and pest control. Zoology encompasses many specialties. At Colorado State, students may focus on general training in animal biology or concentration in the following areas: animal behavior, development, aquatic biology, ecology (how animals adapt to their environments), genetics and evolution, invertebrate organisms, cellular/ molecular biology and physiology, systematics, and morphology of vertebrate organisms.

The curriculum is designed to provide a basic understanding of zoology through a variety of laboratory experiences in combination with the study of basic theories and defining concepts. The program encourages flexibility, strength, and depth. The course work includes a two-semester introductory biology sequence, one course each in invertebrates and vertebrates, and courses in evolution and ecology. Required courses in the physical sciences include a minimum of one year of introductory chemistry and at least one course in organic chemistry, two courses in physics (all with labs) and one in biochemistry. A course each in calculus and statistics is also required. In addition, students select a minimum of 15 credits of zoology courses in their chosen areas of concentration.

Learning Outcomes

Students will:

- Interpret scientific data

- Demonstrate strong organizational and laboratory skills
- Define scientific hypotheses and design experiments to test them
- Work effectively in groups
- Demonstrate strong writing and oral communication skills

Potential Occupations

This major prepares students to work in various areas of zoology, such as research or private industry, or to begin graduate school or professional studies. Career opportunities include medical biotechnology, research technician, protective agencies such as shelters and refuges, trainers and handlers, animal-related business, aquatic/marine biologists, exotic animal specialists, and wildlife conservation. It is an appropriate major for students planning to attend medical or veterinary school. Graduates often pursue advanced degrees to carry out basic research or advance into leadership positions in industry. Participation in internships, laboratory, or research opportunities is highly recommended encouraged by the department to enhance practical training and development.

Careers for Zoology majors include, but are not limited to: aquarium and museum curator/director; zoo keeper, animal trainer and instructor, science librarian, environmental technician, fish and wildlife technician, veterinary technician/assistant, marine bacteriologist or biologist or ecologist, humane society positions, cytotechnologist, ecologist, fisheries biologist or conservationist, laboratory technician, marketing researcher, medical technologist, park ranger, pharmaceutical sales representative, production supervisor, quality analysis technician in food or pharmaceutical industry, radiation protection technician, research technician, industrial hygienist, wildlife photographer.

To be qualified for graduation, students in the zoology major must have a minimum grade of C- in each of their biological, physical science, and mathematical courses used to meet requirements for the major. This applies to courses taken as substitutions for meeting these requirements. The minimum scholastic average acceptable for graduation is 2.000 computed only for courses attempted at Colorado State.

Course	Title	Cr	AUCC
FRESHMAN			
<i>Select one set from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
BZ 120	Principles of Plant Biology	4	3A
OR			
LIFE 102 ^P	Attributes of Living Systems	4	3A
LIFE 103 ^P	Biology of Organisms-Animals and Plants	4	
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	

Course	Title	Cr	AUCC
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
OR			
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
	Advanced Writing ¹	3	2
	Social and Behavioral Sciences ²	3	3C
	TOTAL	30	
SOPHOMORE			
BZ 212 ^P	Animal Biology-Invertebrates	4	
BZ 214 ^P	Animal Biology-Vertebrates	4	
BZ 220 ^P	Introduction to Evolution	3	
<i>Select one set from the following:</i>			
CHEM 245 ^P	Fundamentals of Organic Chemistry	4	
CHEM 246 ^P	Fundamentals of Organic Chemistry Laboratory	1	
OR			
CHEM 345 ^P	Organic Chemistry I	4	
CHEM 346 ^P	Organic Chemistry II	4	
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			
STAT 307 ^P	Introduction to Biostatistics	3	
	Arts and Humanities ³	6	3B
	Global and cultural awareness ⁴	3	3E
	Historical Perspectives ⁵	3	3D
	TOTAL	31-34	
JUNIOR			
BZ 310 ^P	Cell Biology	4	
BZ 350 ^P	Molecular and General Genetics	4	4A, 4B
<i>Select one pair from the following:</i>			
PH 121 ^P	General Physics I	5	3A
PH 122 ^P	General Physics II	5	3A
OR			
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Social and Behavioral Sciences ²	3	3C
	Upper-division zoology courses ⁶	6	
	Electives	2	
	TOTAL	29	
SENIOR			
BC 351 ^P	Principles of Biochemistry	4	
OR			
BC 401 ^P	Comprehensive Biochemistry I	3	
AND			
BC 403 ^P	Comprehensive Biochemistry II	3	
LIFE 320 ^P	Ecology	3	4C
	Upper-division zoology courses ⁶	9	
	Electives ⁷	9-14	
	TOTAL	27-30	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from list of courses in category 2 in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3C in the AUCC.

³ Select two courses from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses..

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select from the list of courses in category 3D in the AUCC.

⁶ A minimum of 15 upper-division zoology credits must be taken. A list of acceptable courses is available in the Biology Department.

⁷ Select enough elective credits to bring total number of credits to 120; 42 credits must be in courses numbered 300 or above.

Minor in Botany

The minor in Botany is offered to provide interested students with maximum breadth and depth in botanical science utilizing a limited number of requirements. The program also serves to broaden the academic background of students seeking employment in the interdisciplinary job market associated with the plant sciences.

Course	Title	Cr
LOWER DIVISION		
BZ 120	Principles of Plant Biology	4
OR		
LIFE 102 ^P	Attributes of Living Systems	4
AND		
LIFE 103 ^P	Biology of Organisms-Animals and Plants	4
	TOTAL	4-8

UPPER DIVISION

Minimum of 10 credits of BZ courses specified for the botany concentration. A minimum of 7 additional credits from BZ courses or other courses approved by the department.*

PROGRAM TOTAL = 21-25 credits without prerequisites

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional coursework may be required because of prerequisites.

Minor in Zoology

The minor in Zoology is a useful complement to a major in animal science, biological science, botany, fishery biology, geology, natural resource recreation and tourism, or wildlife biology.

Course	Title	Cr
LOWER DIVISION		
BZ 212 ^P	Animal Biology-Invertebrates	4
BZ 214 ^P	Animal Biology-Vertebrates	4
LIFE 102 ^P	Attributes of Living Systems	4
LIFE 103 ^P	Biology of Organisms-Animals and Plants	4
	TOTAL	16

UPPER DIVISION

Select a minimum of 12 credits in zoologically oriented courses from four of the seven following areas:¹ animal behavior; aquatic biology; cell biology and physiology; ecology; genetics, evolution, and systematics; invertebrate organisms; vertebrate organisms.*

PROGRAM TOTAL = 28 credits without prerequisites

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ A list of zoologically-oriented courses in each area (specialties in zoology) is available from the department office.

* Additional course work may be required because of prerequisites.

Graduate Programs in Biology

The department offers graduate programs leading to Master of Science and Doctor of Philosophy degrees in Botany and Zoology. Students interested in graduate work should refer to the *Graduate and Professional Bulletin at: graduateschool.colostate.edu/current-students/bulletin.aspx*, and the department's website, www.biology.colostate.edu.

DEPARTMENT OF CHEMISTRY

Office in Chemistry Building, Room B101
(970) 491-6381
www.chem.colostate.edu

Professor Ellen R. Fisher, Chair

Major in Chemistry

Chemists study the atomic structure of physical matter and analyze how it changes. More specifically, they analyze how basic atomic and molecular components are combined and can be manipulated to produce useful or improved products. Chemistry majors develop a solid foundation in general chemistry and mathematics followed by course work in organic chemistry, quantitative analysis, physical chemistry, inorganic chemistry, and physics. The curriculum is rounded out by courses in the liberal and communications arts.

Students are encouraged to participate in undergraduate research. Students have access to state-of-the-art laboratories and equipment including NMR, FTIR, UV/Vis, fluorescence, Raman and mass spectrometers, vacuum lines, and x-ray diffraction. Additionally, ample opportunities exist for undergraduate students to become involved in graduate-level research in the laboratories of individual faculty members. Undergraduate research is strongly encouraged for any student planning a career in chemistry.

Learning Outcomes

Chemistry students will:

- Organize, critically evaluate, and present chemical information coherently through oral and written discourse
- Upon obtaining a Bachelor of Science degree in chemistry, have the contemporary skills and knowledge necessary for entry-level positions in the field, or for admission to graduate or to professional school
- Demonstrate original research skills, namely the ability to plan investigations to resolve research questions, conduct such theoretical and/or laboratory experimentation, solve problems arising in such situations and interpret and communicate results

Potential Occupations

Chemists are employed in a wide array of professional fields in private industry, government, and education. Chemists work in research, development, analysis and testing, consulting, industrial quality control,

environmental resource management, and forensics. Principal employers are petrochemical firms, biotechnology firms, consumer chemical firms, environmental testing laboratories, pharmaceutical companies, agricultural companies, governmental regulatory agencies, governmental and educational research laboratories, and manufacturing firms. Chemistry is also an excellent major for those preparing for careers in veterinary medicine and the health professions. Students whose career goals involve teaching at the secondary school level have the opportunity to complete the teacher licensure program through the School of Education.

Some occupations include, but are not limited to: agricultural chemist, air and water quality analyst, biochemical technician, chemical sales and marketing representative, clinical chemist, consultant, educator, forensic analyst, laboratory technician/bench chemist, materials analyst, patent examiner, pharmaceutical chemist, polymer technician, technical writer, toxicologist.

ACS Certified Concentration

Students who wish to work as professional chemists should select the ACS Certified concentration to obtain professional certification by the American Chemical Society. This objective entails additional courses in inorganic chemistry, biochemistry, instrumental analysis, and statistics.

Chemistry majors must achieve a minimum grade of C- in all the listed courses required for the major in chemistry.

Course	Title	Cr	AUCC
FRESHMAN			
<i>Select four credits from the following:</i>			
CHEM 111 ^P	General Chemistry I	4	3A
OR			
CHEM 117 ^P	General Chemistry I for Chemistry Majors	3	
CHEM 192 ^P	Introductory Seminar in Chemistry	1	
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
	Advanced Writing ¹	3	2
	Biological sciences ²	4	3A
	Elective	4	
	TOTAL	31	
SOPHOMORE			
CHEM 261 ^P	Fundamentals of Inorganic Chemistry	3	
CHEM 345 ^P	Organic Chemistry I	4	
CHEM 346 ^P	Organic Chemistry II	4	
MATH 261 ^P	Calculus for Physical Scientists III	4	
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			

Course	Title	Cr	AUCC
STAT 315 ^P	Statistics for Engineers and Scientists	3	
	Arts and Humanities ³	3	3B
	TOTAL	31	
JUNIOR			
CHEM 334 ^P	Quantitative Analysis Laboratory	1	
CHEM 335 ^P	Introduction to Analytical Chemistry	3	4A
CHEM 440 ^P	Advanced Organic Chemistry Laboratory	2	4B
CHEM 474 ^P	Physical Chemistry I	3	
CHEM 475 ^P	Physical Chemistry Laboratory I	1	
CHEM 476 ^P	Physical Chemistry II	3	4B
CHEM 477 ^P	Physical Chemistry Laboratory II	1	
	Arts and Humanities ³	3	3B
	Global and Cultural Awareness ⁴	3	3E
	Historical Perspectives ⁵	3	3D
	Social and Behavioral Sciences ⁶	3	3C
	Electives	5	
	TOTAL	31	
SENIOR			
BC 351 ^P	Principles of Biochemistry	4	
	OR		
BC 401 ^P	Comprehensive Biochemistry I	3	
CHEM 431 ^P	Instrumental Analysis	4	
CHEM 461 ^P	Inorganic Chemistry	3	
CHEM 462 ^P	Inorganic Chemistry Laboratory	2	
CHEM 493 ^P	Seminar	2	4C
	Advanced science electives ⁷	7-8	
	Electives	5	
	TOTAL	27	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 2 in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3A in the AUCC with BZ or LIFE prefixes. Must include a lab.

³ Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select from the list of courses in category 3D in the AUCC.

⁶ Select from the list of courses in category 3C in the AUCC.

⁷ Additional advanced science courses (300+) to make a total of 10 credits when combined with the choice of BC 351 or BC 401.

Non-ACS Certified Concentration

Chemistry majors must achieve a minimum grade of C- in all the listed courses required for the major in chemistry.

Course	Title	Cr	AUCC
FRESHMAN			
	<i>Select four credits from the following:</i>		
CHEM 111 ^P	General Chemistry I	4	3A
	OR		
CHEM 117 ^P	General Chemistry I for Chemistry Majors	3	
CHEM 192 ^P	Introductory Seminar in Chemistry	1	
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
	Advanced Writing ¹	3	2
	Biological sciences ²	4	3A
	Elective	4	
	TOTAL	31	

Course	Title	Cr	AUCC
SOPHOMORE			
CHEM 261 ^P	Fundamentals of Inorganic Chemistry	3	
CHEM 345 ^P	Organic Chemistry I	4	
CHEM 346 ^P	Organic Chemistry II	4	
MATH 261 ^P	Calculus for Physical Scientists III	4	
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Mathematics-based requirement ³	3	
	Electives	3	
	TOTAL	31	
JUNIOR			
CHEM 334 ^P	Quantitative Analysis Laboratory	1	
CHEM 335	Introduction to Analytical Chemistry	3	4A
CHEM 440 ^P	Advanced Organic Chemistry Laboratory	2	
	OR		
CHEM 462 ^P	Inorganic Chemistry Laboratory	2	
CHEM 474 ^P	Physical Chemistry I	3	
CHEM 475 ^P	Physical Chemistry Laboratory I	1	
CHEM 476 ^P	Physical Chemistry II	3	4B
	Arts and Humanities ⁴	3	3B
	Global and Cultural Awareness ⁵	3	3E
	Historical Perspectives ⁶	3	3D
	Social and Behavioral Sciences ⁷	3	3C
	Electives	3	
	TOTAL	28	
SENIOR			
CHEM 493 ^P	Seminar	2	4C
	Advanced science electives	10	
	Arts and Humanities ⁴	3	3B
	Electives ⁸	15	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 2 in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3A in the AUCC with BZ or LIFE prefixes. Must include a lab.

³ Additional mathematics: 300-level MATH, CS, or STAT course.

⁴ Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁵ Select from the list of courses in category 3E in the AUCC.

⁶ Select from the list of courses in category 3D in the AUCC.

⁷ Select from the list of courses in category 3C in the AUCC.

⁸ Minimum number of elective credits required to bring program to 120 credits. At least 4 credits must be upper-division to meet the minimum requirement of 42 upper-division credits.

Minor in Chemistry

The Chemistry Department offers a minor in Chemistry to interested students from other disciplines. The program serves to broaden the academic background of students seeking employment in the biosciences and related fields.

A minimum grade of C- is required in all of the chemistry courses required for the minor in chemistry.

Course	Title	Cr
LOWER DIVISION		
CHEM 111 ^P	General Chemistry I*	4
CHEM 112 ^P	General Chemistry Laboratory I	1
CHEM 113 ^P	General Chemistry II*	3
CHEM 114 ^P	General Chemistry Laboratory II	1
	TOTAL	9

Course	Title	Cr
UPPER DIVISION		
Students must take 15 upper division chemistry credits from at least two different areas of chemistry—analytical, inorganic, organic and physical—as follows:		15
1) Choose either 15 upper division chemistry credits OR CHEM 261 ^P (3 credits) plus 12 credits from 300-level and above chemistry courses.		
2) At least two of these courses must include a laboratory component (which cannot be fulfilled by CHEM 384 ^P , CHEM 487 ^P , CHEM 493 ^P , CHEM 495 ^P , or CHEM 498 ^P).		
Three of these 15 credits may be fulfilled by CHEM 384 ^P , CHEM 487 ^P , CHEM 493 ^P , CHEM 495 ^P , or CHEM 498 ^P .		
TOTAL		15
PROGRAM TOTAL = 24 credits without prerequisites		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required because of prerequisites.

Graduate Programs in Chemistry

Master of Science and Doctor of Philosophy degree programs are offered in Chemistry, with areas of study in analytical, chemistry education, inorganic, organic, and physical chemistry. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx and the department's website, www.chem.colostate.edu. A graduate program brochure is available from the department.

DEPARTMENT OF COMPUTER SCIENCE

Office in Computer Science Building, Second Floor
(970) 491-5792
www.cs.colostate.edu

Professor L. Darrell Whitley, Chair

Major in Computer Science

Computer science is the systematic study of algorithmic processes that describe and transform information: their theory, analysis, design, efficiency, implementation, and application. Computer scientists seek to advance the fundamental understanding of how information is processed, as well as the practical design of software and hardware to perform specific functions. Computer Science courses include, but are not limited to, the study of operating system design, networks, programming languages, software engineering, graphics, databases, and artificial intelligence.

Computer Science majors are required to complete basic courses in calculus, core courses in programming and mathematical foundations, computer organization, data structures, software engineering, theory, computer security, and systems software. An understanding of statistics is also required. Majors select senior-level courses from offerings such as graphics, artificial intelligence, networks, compilers, embedded systems, architecture, Parallel programming, cloud computing, and database systems. A minor in Computer Science is also available.

Department of Computer Science laboratories are open to students 24/7. All major systems are networked and accessible by direct network connection from student residences.

Learning Outcomes

Students will:

- Demonstrate proficiency in the areas of software design and development, computing systems, and theory and mathematics of computer science. Students will, upon completing this program, have a thorough grounding in the key principles and practices of computing, and in the mathematical and scientific principles of computation
- Work effectively in groups to develop solutions to complex, field-specific problems
- Communicate ideas effectively, both generally and specifically, with regard to computer science-related subject matter, and independently craft presentations exhibiting coherence, organization, grammatical correctness, style, thesis development, and research
- Upon completing this program, either attend graduate school in computer science or find professional computer-related employment

Potential Occupations

Most Computer Science students are able to find related employment at graduation. The proven performance of Colorado State graduates has resulted in annual recruiting visits by a wide variety of commercial firms, government agencies, and research laboratories. Graduates have found employment with computer manufacturers, software companies, and with research and development teams in manufacturing companies. Internships are available that enhance skills and marketability.

Some career opportunities include, but are not limited to: systems programmer, hardware or software designer, computer researcher, systems administrator, security systems designer, database programmer, consultant, documentation/technical writer, technical product support

personnel, technical sales and marketing specialist, educator.

A minimum grade of C is required in CO 150 and in all mathematics, statistics, computer science, and departmental Group II courses which are required for graduation.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
CS 160 ^P	Foundations in Programming	4	
CS 161 ^P	Object-Oriented Problem Solving	4	
CS 192 ^P	First Year Seminar in Computer Science	2	
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B

<i>Select at least two courses from two departments totaling a minimum of 7 credits from the following (one course must be or include the sequenced laboratory):</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111 ^P	Animal Biology Laboratory	1	3A
OR			
BZ 120	Principles of Plant Biology	4	3A
OR			
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
OR			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
OR			
GEOL 120	Exploring Earth: Physical Geology	3	3A
GEOL 121 ^P	Introductory Geology Laboratory	1	3A
OR			
LIFE 102 ^P	Attributes of Living Systems	4	3A
OR			
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
Electives		3	
TOTAL		31	

SOPHOMORE			
CS 200 ^P	Algorithms and Data Structures	4	
CS 253 ^P	Problem Solving with C++	4	
CS 270 ^P	Computer Organization	4	
MATH 229 ^P	Matrices and Linear Equations	2	
OR			
MATH 369 ^P	Linear Algebra	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			
STAT 315 ^P	Statistics for Engineers and Scientists	3	
Advanced Writing ¹		3	2
Arts and Humanities ²		3	3B
Social and Behavioral Sciences ³		3	3C
Electives		2-3	
TOTAL		29	

JUNIOR			
CS 314 ^P	Software Development Methods	3	
CS 320 ^P	Algorithms—Theory and Practice	3	
CS 356 ^P	Systems Security	3	
CS 370 ^P	System Architecture and Software	3	
<i>Select a minimum of 5 credits additional science from the list of 3A courses in the freshman year and/or from the following for a total of at least 12 credits:</i>			
AA 301 ^P	Astrophysics I	5	
ATS 350	Introduction to Weather and Climate	2	
ATS 351 ^P	Introduction to Weather and Climate Laboratory	1	
BZ 220 ^P	Introduction to Evolution	3	
CHEM 113 ^P	General Chemistry II	3	
AND			

Course	Title	Cr	AUCC
CHEM 114 ^P	General Chemistry Laboratory II	1	
CIVE 260 ^P	Engineering Mechanics—Statics	3	
GEOL 154 ^P	Historical and Analytical Geology	4	
LIFE 201A ^P	Introductory Genetics—Applied, Population, Conservation	3	
LIFE 201B ^P	Introductory Genetics—Molecular, Immunological, Developmental	3	
PH 142 ^P	Physics for Scientists and Engineers II	5	
PSY 352 ^P	Learning and Memory	3	
SOCR 330 ^P	Principles of Genetics	3	
SOCR 331 ^P	Genetics Laboratory	1	
Arts and Humanities ²		3	3B
Global and Cultural Awareness ⁴		3	3E
Historical Perspectives ⁵		3	3D
Electives		1	
Upper division electives ⁶		2	
TOTAL		29	

SENIOR

Group 1-A			
<i>Select one course from the following:</i>			
CS 410 ^P	Introduction to Computer Graphics	4	4A, 4C
CS 414 ^P	Object-Oriented Design	4	4A, 4C
CS 440 ^P	Introduction to Artificial Intelligence	4	4A, 4C
CS 451 ^P	Operating Systems	4	4A, 4C
CS 454 ^P	Principles of Programming Languages	4	4A, 4C
CS 455 ^P	Introduction to Distributed Systems	4	4A, 4C
CS 475 ^P	Parallel Programming	4	4A, 4C
Group II			
Technical Electives ⁷		6-9	4B
Group 1-B			
<i>Select three courses (not previously taken) from Group 1-A above and/or from the following for a minimum of 12 credits:</i>			
CS 420 ^P	Introduction to Analysis of Algorithms	4	4C
CS 430 ^P	Database Systems	4	4C
CS 453 ^P	Introduction to Compiler Construction	4	4C
CS 457 ^P	Computer Networks and the Internet	4	4C
CS 460 ^P	Embedded Systems	4	4C
ECE 460 ^P			
CS 470 ^P	Computer Architecture	4	4C
Electives		6-9	
TOTAL		31	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 2 of the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3B of the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 3C of the AUCC.

⁴ Select from the list of courses in category 3E of the AUCC.

⁵ Select from the list of courses in category 3D of the AUCC.

⁶ Choose two credits of courses numbered 300 or above.

⁷ Select three courses from the CS Department Group II list for a total of 6-9 credits (6 credits if MATH 369 is taken to meet the linear algebra requirement in the Sophomore year).

Major in Applied Computing Technology

The Applied Computing Technology major is a computer generalist program oriented towards the use of computers and computer applications in specific domains depending on the student's concentration, rather than towards

developing large-scale commercial computer applications and software. Students will receive a strong background in computer programming and information technology in a specific application area. At this time there are three concentrations: Computing and Human Factors, Computing Technology, and Computing Education.

Learning Outcomes

Students completing this program will be able to:

- Write complex and sophisticated computer programs
- Develop computer applications to be used in a variety of subject areas
- Develop web sites, including web-based software and databases for use by experts in a broad range of fields
- Grasp and demonstrate the subject matter of a specific field in which computers are to be used
- Work effectively in groups to develop solutions to complex, field-specific problems
- Communicate through writing about their technical activities
- Make connections between their technical work and the larger social structure

Computing and Human Factors Concentration

This concentration is designed to meet the demand for experts in human factors in computing and interface design, and provide an academic program for students interested in the interdisciplinary study of cognitive psychology and artificial intelligence applied to human-computer interaction.

The program combines computer science courses leading to expertise in artificial intelligence and graphics with cognitive psychology courses and specialized courses in human-computer interaction. This program aims to produce an understanding of human psychological abilities and relate them to computer use and the ergonomics of computational services.

Potential Occupations

This program prepares students for work in computer interface design and organizations evaluating human factors in computer software design. Graduates of this program may go on to become user interface designers and architects, human factors engineers/interaction designers, user trial engineers/researchers, computer user interface programmers, computer ergonomics consultants.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
CS 160 ^P	Foundations in Programming	4	
MATH 160 ^P	Calculus for Physical Scientists I	4	1B

Course	Title	Cr	AUCC
PSY 100	General Psychology	3	3C
	Arts and Humanities ¹	3	3B
	Biological and Physical Sciences ²	4	3A
	Global and Cultural Awareness ³	3	3E
	Historical Perspectives ⁴	3	3D
	Electives	2	
TOTAL		29	
SOPHOMORE			
CS 161 ^P	Object-Oriented Problem Solving	4	
CS 200 ^P	Algorithms and Data Structures	4	
CS 270 ^P	Computer Organization	4	
MATH 161 ^P	Calculus for Physical Scientists II	4	
MATH 229 ^P	Matrices and Linear Equations	2	
PSY 250 ^P	Research Methods in Psychology	4	
PSY 252 ^P	Mind, Brain, and Behavior	3	
	Advanced Writing ⁵	3	2
	Biological and Physical Sciences ²	3	3A
TOTAL		31	
JUNIOR			
CS 253 ^P	Problem Solving with C++	4	
CS 320 ^P	Algorithms—Theory and Practice	3	
CT 310 ^P	Web Development	4	
PSY 354 ^P	Human-Computer Interaction	3	4B, 4C
<i>Select 3-6 credits from the following:</i>			
STAT 301 ^P	Introduction to Statistical Methods	3	
STAT 307 ^P	Introduction to Biostatistics	3	
STAT 311 ^P	Statistics for Behavioral Sciences I	3	
AND			
STAT 312 ^P	Statistics for Behavioral Sciences II	3	
STAT 315 ^P	Statistics for Engineers and Scientists	3	
	Arts and Humanities ¹	3	3B
	Electives	3-6	
	Upper division electives	4	
TOTAL		30	
SENIOR			
CS 410 ^P	Introduction to Computer Graphics	4	
CS 440 ^P	Introduction to Artificial Intelligence	4	4A, 4C
<i>Select two courses from the following:</i>			
PSY 452 ^P	Cognitive Psychology	3	
PSY 454 ^P	Physiological Psychology	3	
PSY 456 ^P	Sensation and Perception	3	
<i>Select one course from the following:</i>			
PSY 453 ^P	Cognitive Psychology Laboratory	2	
PSY 455 ^P	Physiological Psychology Laboratory	2	
PSY 457 ^P	Sensation and Perception Laboratory	2	
	Upper division electives	6-9	
	Electives	5-8	
TOTAL		30	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B of the All-University Core Curriculum. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3A of the AUCC. At least one course must have a laboratory component.

³ Select from the list of courses in category 3E of the AUCC.

⁴ Select from the list of courses in category 3D of the AUCC.

⁵ Select from the list of courses in category 2A or 2B of the AUCC. First-time students entering a college or university on or after July 1, 2008, must select a course from category 2B (advanced writing).

Computing Education Concentration

This teacher education program leads to a Bachelor of Science degree in Applied Computing Technology with a concentration in Computing Education (K-12 technology education) with state licensure in Instructional Technology (computers) and provides students with a background in education, computer programming, and

computer systems enabling graduates to teach computing principles and serve as computing technology experts in public schools.

Students interested in pursuing a teaching license through Colorado State University may refer to the School for Teacher Education and Principal Preparation (STEPP) program, College of Applied Human Sciences, section in this catalog for general information. Detailed information about the STEPP program and licensure requirements are available in the program's web site (www.stepp.cahs.colostate.edu/) or in room 111 of the Education Building.

Potential Occupations

Graduates of this program can go on to become teachers in public schools and will be capable of teaching a broad range of computing technology: computer applications, web development, and programming, including AP computer science courses. They will also be capable of providing expert information technology support for schools for instructional and administrative purposes.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
CS 110	Personal Computing	4	
CS 160 ^P	Foundations in Programming	4	
<i>Select one course from the following:¹</i>			
MATH 141 ^P	Calculus in the Management Sciences	3	1B
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
SPCM 200	Public Speaking	3	
	Biological/physical science ²	7	3A
	Global and Cultural Awareness ³	3	3E
	Elective	3	
	TOTAL	30-31	
SOPHOMORE			
CS 161 ^P	Object-Oriented Problem Solving	4	
CS 200 ^P	Algorithms and Data Structures	4	
CS 270 ^P	Computer Organization	4	
EDUC 275 ^P	Schooling in the United States	3	3C
<i>Select one course from the following:</i>			
STAT 201 ^P	General Statistics	3	
STAT 204 ^P	Statistics for Business Students	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
	Arts and Humanities ⁴	6	3B
	Behavioral/social science ⁵	3	3C
	Historical Perspectives ⁶	3	3D
	Elective	1	
	TOTAL	31	
JUNIOR			
CIS 355 ^P	Business Database Systems ⁷	3	
CS 253 ^P	Problem Solving with C++	4	
CT 310 ^P	Web Development	4	
CT 320 ^P	Network and System Administration	4	
EDUC 331 ^P	Educational Technology and Assessment	2	
EDUC 340 ^P	Literacy and the Learner	3	
EDUC 350 ^P	Instruction I- Individualization/Management	3	
EDUC 386 ^P	Practicum-Instruction I	1	
JTC 413	New Communication Technologies and Society	3	4B
	300-level computer science	3	
	TOTAL	30	
SENIOR			
EDCT 465 ^P	Methods and Materials in Technology	3	

Course	Title	Cr	AUCC
	Education		
EDCT 485 ^P	Student Teaching	11	4A, 4C
EDUC 450 ^P	Instruction II-Standards and Assessment	4	
EDUC 486 ^P	Practicum-Instruction II	1	
EDUC 493A ^P	Seminar-Professional Relations	1	4C
	400-level computer science ^{7, 8}	4	
	Advanced Writing ⁹	3	2
	Electives	1-2	
	TOTAL	28-29	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ For all concentrations of the applied computing technology degree, the department considers precalculus mathematics (MATH 117, MATH 118, MATH 125, and MATH 126) to be review courses. They may be taken as electives in the program.

² Select a minimum of two courses (for a total of seven credits) from the list in category 3A in the All-University Core Curriculum (AUCC). One of the courses selected must have a laboratory component.

³ Select one course from the list in category 3E in the AUCC.

⁴ Select two courses from the list in category 3B in the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁵ Select one course from the list in category 3C in the AUCC.

⁶ Select one course from the list in category 3D in the AUCC.

⁷ Students may need to obtain a registration override from the appropriate department to take this course.

⁸ The 400-level computer science course must be numbered less than 485.

⁹ Select one course from the list in category 2 of the AUCC.

Computing Technology Concentration

The Applied Computing Technology program emphasizes the use of programming skills and computer applications and technology (e.g., web development, computer and network system administration) in a variety of computer application areas needed in industry and other organizations.

The Computing Technology concentration includes all computer science classes taken by computer science majors in the first and second year, and combines those with specialized computing technology courses, business courses, and a selection of advanced courses from the Departments of Computer Science and Computer Information Systems.

Potential Occupations

The computing technology concentration prepares students for careers in information technology in which knowledge of computer programming, applications, and computing systems are used in businesses or other organizational settings. Computing technology students explore computer programming, web development, network and system administration, and business principles. Graduates of the program go on to become information technology specialists in businesses, government agencies, and other organizations.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A

Course	Title	Cr	AUCC
CS 160 ^P	Foundations in Programming	4	2B
ECON 202 ^P	Principles of Microeconomics	3	3C
ECON 204 ^P	Principles of Macroeconomics	3	3F
<i>Select one course from the following:</i> ¹			
MATH 141 ^P	Calculus for Management Sciences	3	1B
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
	Arts and Humanities ²	3	3B
	Biological and Physical Sciences ³	7	3A
	Electives ⁴	3-4	
	TOTAL	30	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
CS 161 ^P	Object-Oriented Problem Solving	4	
CS 200 ^P	Algorithms and Data Structures	4	
CT 310 ^P	Web Development	4	
JTC 300 ^P	Professional and Technical Communication	3	2
<i>Select one course from the following:</i>			
STAT 201 ^P	General Statistics	3	
STAT 204 ^P	Statistics for Business Students	3	
STAT 301 ^P	Introduction to Statistical Methods	3	
	Arts and Humanities ²	3	3B
	Global and Cultural Awareness ⁵	3	3E
	Electives ⁴	3	
	TOTAL	30	
JUNIOR			
CS 253 ^P	Problem Solving with C++	4	
CS 270 ^P	Computer Organization	4	
CT 320 ^P	Network and System Administration	4	
FIN 305 ^P	Fundamentals of Finance	3	
MKT 305 ^P	Fundamentals of Marketing	3	
MGT 305	Fundamentals of Management	3	
	Historical Perspectives ⁶	3	3D
	Advanced technology electives ⁷	3	
	Electives ⁴	3	
	TOTAL	30	
SENIOR			
CS 314 ^P	Software Development Methods	3	4A, 4B
CS 314 ^P	Software Development Methods	4	4A, 4B
JTC 413	New Communication Technologies and Society	3	4A, 4B, 4C
	Advanced technology electives ⁷	9	
	Electives ^{4,8}	15	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ For all concentrations of the applied computing technology degree, the department considers precalculus mathematics (MATH 117, MATH 118, MATH 125, and MATH 126) to be review courses. They may be taken as electives in the program.

² Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses..

³ Select a minimum of two courses (for a total of seven credits) from the list in category 3A in the AUCC. One of the courses selected must have a laboratory component.

⁴ Students are encouraged to carefully choose their free electives in conjunction with an advisor to provide a focus area relevant to their career goals.

⁵ Select from the list of courses in category 3E in the AUCC.

⁶ Select from the list of courses in category 3D in the AUCC.

⁷ Select a total of 12 credits from the following list: CIS 320, CIS 355, CIS 360, CS 370, CS 414, CS 451, CS 457, ECE 325, or MATH 360.

⁸ Forty-two credits of upper-division work (300- to 400-level courses) is required for graduation. Enough upper-division elective credits should be taken to bring the overall total to 42.

Minor in Computer Science

The minor in Computer Science offers students a core of courses in computer hardware and software to support their major field of study.

A minimum grade of C is required in all courses required for the minor, and their prerequisites.

Course	Title	Cr
LOWER DIVISION		
CS 160 ^P	Foundations in Programming*	4
CS 161 ^P	Object-Oriented Problem Solving*	4
CS 200 ^P	Algorithms and Data Structures*	4
CS 270 ^P	Computer Organization*	4
	TOTAL	16
UPPER DIVISION		
CS	Courses numbered 300 or above*	12
PROGRAM TOTAL = 28 credits without prerequisites		

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required because of prerequisites; all prerequisites *must* be completed.

Graduate Programs in Computer Science

Master of Science, Master of Computer Science, and Doctor of Philosophy degree programs in Computer Science are offered emphasizing either theoretical or practical aspects of computer science. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, www.cs.colostate.edu.

DEPARTMENT OF MATHEMATICS

Office in Weber Building, Room 101
(970) 491-1303
www.math.colostate.edu

Professor Gerhard Dangelmayr, Chair

Major in Mathematics

Mathematics is the science of numbers, shapes, probabilities, and measurements. It is a universal language in which information is stated in the simplest possible form. Mathematics has a dual nature – it is an independent discipline valued for its precision and elegance, and it is an essential source of ideas and techniques for many, if not most, other scientific endeavors.

The undergraduate program is structured to provide both a broad liberal arts education in Mathematics, as well as a concentration in one of seven focused areas. The liberal arts component requires students to acquire a broad background in communication skills, humanities, social sciences, and natural sciences. The major core focuses on developing students' understanding and appreciation of the mathematical sciences, problem solving skills, and their ability to combine knowledge and skills in productive ways. Core Mathematics subjects include calculus, matrices and linear equations, advanced calculus of a single variable, abstract algebra, linear algebra, computer programming, and statistics.

Seven concentrations are available in the program: Actuarial Science, Applied Mathematics, Computational Mathematics, General Mathematics, Mathematics Education, Mathematics of Information, and Statistics.

Learning Outcomes

Graduates will:

- Obtain a solid background in theoretical mathematics and will be able to participate in mathematical work in a variety of fields or continue on to graduate school
- Be able to apply a range of mathematical and statistical tools to a diverse set of problems as presented to them in either employment or in the pursuit of further education
- Be capable of describing their mathematical assumptions and results to colleagues

Potential Occupations

The Mathematics major prepares students for a wide variety of occupations in business, industry, government, and education. Although a national shortage of mathematics teachers no longer exists, our Mathematics Education graduates have been successful in finding positions. Actuarial Science graduates who have passed the first two professional actuary exams can expect to find positions in large metropolitan areas with good entry-level salaries. Applied Mathematics graduates continue to find employment opportunities in government and private industry. Many pursue advanced degrees in mathematics, computational science, or engineering. About one-third of General Mathematics graduates continue on to graduate school in Mathematics or other disciplines, with the rest finding employment in a large variety of capacities. Participation in internships, volunteer activities, or cooperative education opportunities is highly recommended to enhance practical training and development. Graduates who continue to pursue advanced degrees can attain more responsible positions with the possibility of rising to top professional levels.

Career opportunities include, but are not limited to: applied mathematician, actuary, engineer, statistician, financial analyst/adviser, computer programmer, computer systems analyst, mortgage officer, market analyst, risk analyst, tax auditor, accountant, math educator.

Actuarial Science Concentration

The Actuarial Science concentration trains students how to use mathematics, statistics, business, and economics to analyze and plan for future situations involving financial uncertainties and risks. This concentration is designed to qualify students to take the first two examinations administered by the Society of Actuaries and provides the foundation for the remaining examinations.

A minimum grade of C is required in all mathematics, statistics, and computer science courses which are required for graduation.

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
CO 150 ^P	College Composition	3	1A
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	
MATH 192	First-Year Seminar in Mathematical Sciences	1	
STAT 192	First Year Seminar in Mathematical Sciences	1	
	Arts and Humanities ¹	6	3B
	Biological and Physical Sciences ²	4-5	3A
	Global and Cultural Awareness ³	3	3E
	Historical Perspectives ⁴	3	3D
	TOTAL	29-30	
SOPHOMORE			
ACT 210 ^P	Introduction to Financial Accounting ⁵	3	
ECON 202 ^P	Principles of Microeconomics	3	3C
ECON 204 ^P	Principles of Macroeconomics	3	
FIN 310 ^P	Financial Markets and Institutions	3	
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 369 ^P	Linear Algebra	3	4A
STAT 315 ^P	Statistics for Engineers and Scientists	3	
	Biological and Physical Sciences ²	3-5	3A
	Introductory programming ⁶	4	
	TOTAL	29-31	
JUNIOR			
FIN 300 ^P	Principles of Finance	3	
FIN 370 ^P	Financial Management-Theory and Applications	3	
ECON 335 ^P / AREC 335 ^P	Introduction to Econometrics	3	
MATH 345 ^P	Differential Equations	4	
STAT 321 ^P	Elementary Probabilistic-Stochastic Modeling	3	
STAT 420 ^P	Probability and Mathematical Statistics I	3	
STAT 430 ^P	Probability and Mathematical Statistics II	3	
	Electives ⁷	9	
	TOTAL	31	
SENIOR			
BUS 205	Legal and Ethical Issues in Business	3	
FIN 342 ^P	Risk Management and Insurance	3	
JTC 300 ^P	Professional and Technical Communication	3	2
MATH 317 ^P	Advanced Calculus of One Variable	4	4B
MATH 417 ^P	Advanced Calculus I	3	4C
MATH 495 ^P	Independent Study ⁸	1	
	Biological and Physical Sciences ⁹	0-3	3A

Course	Title	Cr	AUCC
	Electives ⁷	11	
	TOTAL	28-31	
PROGRAM TOTAL = 120 credits			

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from the list in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3A in the AUCC. Students in this concentration must take a total of 10 credits in category 3A, and at least one course must have a laboratory component.

³ Select from the list of courses in category 3E in the AUCC.

⁴ Select from the list of courses in category 3D in the AUCC.

⁵ Students in this concentration may need to obtain a prerequisite override from the appropriate department to enroll in this class.

⁶ Students must take either CS 160 (4 credits) or CS 155 and CS 156 plus two of the following courses: CS 157, MATH 151, MATH 152, and/or MATH 158/CS 158.

⁷ At least one credit of electives must come from a 300- or 400- level course.

Select enough elective credits to bring program total to a minimum of 120 credits, of which 42 must be upper division.⁸ Preparation for Exam I.

⁹ Select up to 3 additional credits from the AUCC category 3A list to bring the total credits for biological and physical sciences to a minimum of 10 credits in this concentration.

Applied Mathematics Concentration

The Applied Mathematics concentration prepares students for careers as applied mathematicians working in business, government, and industry. It is recommended that students supplement the core mathematical program with courses in their chosen application area, for example, engineering, public health, finance, electronics, or geology. Course requirements emphasize mathematical foundations as well as the application of mathematics in other disciplines. In particular, students receive training in numerical analysis, mathematical modeling, statistics, and computing, as well as a solid preparation for further study.

A minimum grade of C is required in all mathematics, statistics, and computer science courses which are required for graduation.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	
MATH 192	First Year Seminar in Mathematical Sciences	1	
STAT 192	First Year Seminar in Mathematical Sciences	1	
	Arts and Humanities ¹	6	3B
	Global and Cultural Awareness ²	3	3E
	Historical Perspectives ³	3	3D
	Social and Behavioral Sciences ⁴	3	3C
	Electives ⁵	2-3	
	TOTAL	30-31	
SOPHOMORE			
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 301 ^P	Introduction to Combinatorial Theory	3	
MATH 369 ^P	Linear Algebra	3	4A
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
STAT 315 ^P	Statistics for Engineers and Scientists	3	

Select one course from the following:

Course	Title	Cr	AUCC
STAT 321 ^P	Elementary Probabilistic-Stochastic Modeling	3	
STAT 340 ^P	Multiple Regression Analysis	3	
STAT 350 ^P	Design of Experiments	3	
	Introductory programming ⁶	4	
	TOTAL	30	

JUNIOR

JTC 300 ^P	Professional and Technical Communication	3	2
MATH 345 ^P	Differential Equations	4	
MATH 450 ^P	Introduction to Numerical Analysis I	3	
MATH 451 ^P	Introduction to Numerical Analysis II	3	
	Biological and Physical Sciences ⁷	3	3A
	Mathematics sciences ⁸	3	
	Related area ⁹	6	
	Electives ⁵	7	
	TOTAL	32	

SENIOR

MATH 317 ^P	Advanced Calculus of One Variable	4	4B
<i>Select one pair from the following:</i>			
MATH 332 ^P	Partial Differential Equations	3	
MATH 417 ^P	Advanced Calculus I	3	
OR			
MATH 360 ^P	Mathematics of Information Security	3	
MATH 460 ^P	Information and Coding Theory	3	
MATH 435 ^P	Projects in Applied Mathematics	3	4C
	Mathematical sciences ⁸	3	
	Related area ⁹	6	
	Electives ⁵	5-6	
	TOTAL	27-28	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from the list in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3E in the AUCC.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select from the list of courses in category 3C in the AUCC.

⁵ Enough elective credits must be selected to bring the program total to a minimum of 120 credits with a minimum of 42 upper-division credits.

⁶ Students must take either CS 160 (4 credits) or CS 155 and CS 156 plus two of the following courses: CS 157, MATH 151, MATH 152, and/or MATH 158/CS 158.

⁷ Select from the list of courses (in a department other than Physics) in category 3A in the AUCC.

⁸ Select from upper-division MATH, CS, STAT courses, except those ending in -80 to -99.

⁹ A coherent set of courses outside the Mathematics Department in which mathematics is applied, approved by the concentration coordinator.

Computational Mathematics Concentration

The Computational Mathematics concentration prepares students both for graduate work in mathematics and careers in industry. It is similar to the Applied Mathematics concentration, however, the course work in this concentration emphasizes the use of numerical methods in applied mathematics.

A minimum grade of C is required in all mathematics, statistics, and computer science courses which are required for graduation.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	

Course	Title	Cr	AUCC
MATH 192	First Year Seminar in Mathematical Sciences	1	
STAT 192	First Year Seminar in Mathematical Sciences	1	
	Arts and Humanities ¹	6	3B
	Global and Cultural Awareness ²	3	3E
	Historical Perspectives ³	3	3D
	Social and Behavioral Sciences ⁴	3	3C
	Electives	2	
	TOTAL	30	
SOPHOMORE			
CS 160 ^P	Foundations in Programming	4	
CS 161 ^P	Object-Oriented Problem Solving	4	
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 331 ^P	Introduction to Mathematical Modeling	3	
MATH 369 ^P	Linear Algebra	3	4A
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
STAT 315 ^P	Statistics for Engineers and Scientists	3	
	TOTAL	31	
JUNIOR			
CS 200 ^P	Algorithms and Data Structures	4	
JTC 300 ^P	Professional and Technical Communication	3	2
MATH 332 ^P	Partial Differential Equations	3	
MATH 345 ^P	Differential Equations	4	
MATH 450 ^P	Introduction to Numerical Analysis I	3	
MATH 451 ^P	Introduction to Numerical Analysis II	3	
STAT 321 ^P	Elementary Probabilistic-Stochastic Modeling	3	
	Biological and Physical Sciences ⁵	3-5	3A
	Electives ⁶	3	
	TOTAL	29-31	
SENIOR			
MATH 317 ^P	Advanced Calculus of One Variable	4	4B
<i>Select one course from the following:</i>			
MATH 417 ^P	Advanced Calculus I	3	
MATH 419 ^P	Introduction to Complex Variables	3	
MATH 460 ^P	Information and Coding Theory	3	
MATH 435 ^P	Projects in Applied Mathematics	3	4C
	Electives ⁶	18-20	
	TOTAL	28-30	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from the list in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3E in the AUCC.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select from the list of courses in category 3C in the AUCC.

⁵ Select additional course(s) from the list of courses (in a department other than Physics) in category 3A in the AUCC.

⁶ Select enough elective credits to bring program total to a minimum of 120 credits with a minimum of 42 upper-division credits.

General Mathematics Concentration

General Mathematics is a liberal arts program designed to provide a solid foundation in mathematics with the flexibility to explore and develop expertise in other academic fields. Because of its flexibility, this concentration is well suited for students who want to combine mathematics with such fields as business, law, computer science, or statistics.

A minimum grade of C is required in all mathematics, statistics, and computer science courses which are required for graduation.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	
MATH 192	First Year Seminar in Mathematical Sciences	1	
STAT 192	First Year Seminar in Mathematical Sciences	1	
	Arts and Humanities ¹	6	3B
	Global and Cultural Awareness ²	3	3E
	Historical Perspectives ³	3	3D
	Social and Behavioral Sciences ⁴	3	3C
	Elective ⁵	2-3	
	TOTAL	30-31	

Course	Title	Cr	AUCC
SOPHOMORE			
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 369 ^P	Linear Algebra	3	4A
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
STAT 315 ^P	Statistics for Engineers and Scientists	3	
OR			
STAT 303 ^P	Introduction to Communication Principles	3	
	Additional communication ⁶	3	2A or 2B
	Introductory programming ⁷	4	
	Mathematical Sciences Electives ^{8,9}	3	
	TOTAL	30	

Course	Title	Cr	AUCC
JUNIOR			
MATH 317 ^P	Advanced Calculus of One Variable ^{9,10}	4	4B
OR			
MATH 417 ^P	Advanced Calculus I ^{9,10}	3	4B, 4C
<i>Select one of the following courses:¹⁰</i>			
MATH 360 ^P	Mathematics of Information Security ⁹	3	
MATH 366 ^P	Introduction to Abstract Algebra ⁹	3	
MATH 466 ^P	Abstract Algebra I ⁹	3	4C
	Biological and Physical Sciences ¹¹	3	3A
	Mathematical Sciences Electives ^{8,9}	3	
	Electives ⁵	17	
	TOTAL	29-30	

Course	Title	Cr	AUCC
SENIOR			
<i>Select one of the following:</i>			
MATH 417 ^P	Advanced Calculus I ⁹	3	
MATH 418 ^P	Advanced Calculus II ⁹	3	
MATH 466 ^P	Abstract Algebra I	3	4C
MATH 467 ^P	Abstract Algebra II ⁹	3	
	Mathematical Sciences Electives ^{8,9}	12	
	Electives ⁵	15	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ Select two courses from the list in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses..

² Select from the list of courses in category 3E in the AUCC.

³ Select from the list of course in category 3D in the AUCC.

⁴ Select from the list of courses in category 3C in the AUCC.

⁵ Enough elective credits must be selected to bring the program total to 120 credits with a minimum of 12 upper division credits.

⁶ Select from the list of courses in category 2A or 2B in the AUCC. First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (category 2B).

⁷ Students must take either CS 160 (4 credits), or take 4 credits including CS 155 and CS 156, plus two of the following one-credit courses: CS 157, MATH 151, MATH 152, and/or MATH 158/CS 158.

⁸ Select 18 credits from upper division (300-400 level) MATH, CS, or STAT courses, except those courses ending in -80 to -99. At least 9 of the 18 credits must be from upper division MATH courses.

⁹ At least 12 credits of ALL upper division MATH courses must be at the 400-level or above.

¹⁰ These courses are in addition to the 18 credits of Mathematical Sciences Electives required in footnote 8, and may not be used to fulfill the Mathematical Sciences Electives requirement.

¹¹ Select a non-physics course from category 3A in the AUCC.

Mathematics Education Concentration

Mathematics Education is designed to prepare students for a secondary teaching certificate in mathematics and for the study and development of educational theory and techniques. Students take a strong mathematics core, including a proof-oriented advanced calculus course.

Students interested in pursuing a teaching license through Colorado State University may refer to the School for Teacher Education and Principal Preparation (STEPP), College of Applied Human Sciences, section in this catalog for general information. Detailed information about the STEPP program and licensure requirements are available on the program's Web site (www.stepp.cahs.colostate.edu) or in room 111 of the Education Building.

A minimum grade of C is required in all mathematics, statistics, and computer science courses which are required for graduation.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
MATH 192	First Year Seminar in Mathematical Sciences	1	
STAT 192	First Year Seminar in Mathematical Sciences	1	
	Arts and Humanities ¹	6	3B
	Global and Cultural Awareness ²	3	3E
	Historical Perspectives ³	3	3D
	Electives ⁴	5	
	TOTAL	30	
SOPHOMORE			
CS 160 ^P	Foundations in Programming	4	
	OR⁵		
CS 155	Introduction to Unix	1	
CS 156 ^P	Introduction to C Programming I	1	
	<i>AND Select at least two of the following for a total of 4 credits:</i>		
CS 157 ^P	Introduction to C Programming II	1	
CS 158 ^{P/}	Mathematical Algorithms in C	1	
MATH 158 ^P	Mathematical Algorithms in Matlab I	1	
MATH 151 ^P	Mathematical Algorithms in Maple	1	
MATH 152 ^P	Mathematical Algorithms in Maple	1	
EDUC 275 ^P	Schooling in the United States	3	3C
EDUC 340 ^P	Literacy and the Learner	3	
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 230 ^P	Discrete Mathematics for Educators	3	
PH 141 ^P	Physics for Scientists and Engineers I ⁶	5	3A
STAT 315 ^P	Statistics for Engineers and Scientists	3	
	Advanced Writing ⁷	3	2
	Biological and Physical Sciences ⁵	4	3A
	TOTAL	32	
JUNIOR			
EDUC 331 ^P	Educational Technology and Assessment	2	
EDUC 350 ^P	Instruction I-Individualization/Management	3	
EDUC 386 ^P	Practicum-Instruction I	1	
EDUC 464 ^P	Methods and Materials in Teaching Mathematics	4	
MATH 317 ^P	Advanced Calculus of One Variable	4	4B
MATH 366 ^P	Introduction to Abstract Algebra	3	
MATH 369 ^P	Linear Algebra	3	4A
MATH 470 ^P	Euclidean and Non-Euclidean Geometry	3	
	Additional Biological and Physical Sciences ⁵	4	3A
	Mathematical sciences elective ⁸	3	
	TOTAL	29	
SENIOR			

Course	Title	Cr	AUCC
EDUC 450 ^P	Instruction II-Standards and Assessment	4	
EDUC 485B ^P	Student Teaching-Secondary	11	
EDUC 486E ^P	Practicum-Instruction II	1	
EDUC 493A ^P	Seminar-Professional Relations	1	
MATH 425 ^P	History of Mathematics	3	4C
	Electives ⁴	8	
	TOTAL	28	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from the list in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses..

² Select from the list of courses in category 3E in the AUCC.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Enough elective credits need to be selected to bring program total to 120 credits with a minimum of 42 upper-division credits.

⁵ Students must take either CS 160 (4 credits) or CS 155 and CS 156 plus two of the following courses: CS 157, MATH 151, MATH 152, and/or MATH 158/CS 158.

⁶ Students in this major must take a minimum of 13 credits from at least two subject codes, selected from category 3A, Biological and Physical Sciences, in the AUCC. At least one course must include a laboratory.

⁷ Select one course from the list of courses in category 2 of the AUCC.

⁸ Select from STAT 420, STAT 430, or upper-division mathematics courses except MATH 315 and those ending in -80 to -99.

Mathematics of Information Concentration

The Mathematics of Information concentration prepares students for graduate study and/or an interdisciplinary career in information/communication technology where mathematics, computer science, and electrical engineering are interwoven. Students in this concentration receive training in cryptology, both source and channel coding theory, related courses in the companion fields, as well as the other core science and mathematics courses.

A minimum grade of C is required in all mathematics, statistics, and computer science courses which are required for graduation.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
CS 155	Introduction to Unix	1	
CS 156	Introduction to C Programming I	1	
ECE 103 ^P	DC Circuit Analysis	3	
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	
MATH 192	First-Year Seminar in Mathematical Sciences	1	
STAT 192	First-Year Seminar in Mathematical Sciences	1	
	Arts and Humanities ¹	3	3B
	Global and Cultural Awareness ²	3	3E
	Historical Perspectives ³	3	3D
	Social and Behavioral Sciences ⁴	3	3C
	TOTAL	30	
SOPHOMORE			
ECE 202 ^P	Circuit Theory Applications	4	
JTC 300 ^P	Professional and Technical Communication	3	2
MATH 151 ^P	Mathematical Algorithms in Matlab	1	
MATH 152 ^P	Mathematical Algorithms in Maple	1	
MATH 158 ^{P/}	Mathematical Algorithms in C	1	
CS 158 ^P	Mathematical Algorithms in C	1	
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 345 ^P	Differential Equations	4	
MATH 369 ^P	Linear Algebra	3	4A
STAT 315 ^P	Statistics for Engineers and Scientists	3	
	Arts and Humanities ¹	3	3B

Course	Title	Cr	AUCC
	Electives ⁵	3	
	TOTAL	30	
JUNIOR			
ECE 311 ^P	Linear System Analysis I ⁶	3	
MATH 301 ^P	Introduction to Combinatorial Theory	3	
MATH 317 ^P	Advanced Calculus of One Variable	4	4B
MATH 360 ^P	Mathematics of Information Security	3	
	Biological/physical science ⁷	7	3A
	Electrical engineering/mathematical science elective ⁸	3	
	Electives ⁵	7	
	TOTAL	30	
SENIOR			
ECE 312 ^P	Linear System Analysis II	3	
MATH 460 ^P	Information and Coding Theory	3	4C
<i>Select one of the following:</i>			
STAT 303 ^P / ECE 303 ^P	Introduction to Communications	3	
STAT 321 ^P	Elementary Probabilistic-Stochastic Modeling	3	
STAT 340 ^P	Multiple Regression Analysis	3	
	Electrical engineering/mathematical science electives ⁸	9	
	Electives ⁵	12	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3E in the AUCC.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select from the list of courses in category 3C in the AUCC.

⁵ Enough elective credits need to be selected to bring the program total to 120 credits with a minimum of 42 upper-division credits.

⁶ Students in this concentration may need to obtain a prerequisite override from the appropriate department to enroll in this course.

⁷ Select two courses from the list of courses in category 3A in the AUCC. One course must include a lab. Courses must be selected from two different prefixes.

⁸ Select a total of 12 credits from (A) and (B), with 6 or more coming from (A): (A) upper-division mathematics courses except those ending in -80 to -99; (B) upper-division ECE, CS, MATH, or STAT courses, except those ending in -80 to -99..)

Statistics Concentration

Statistics provides the reasoning and the methods for producing and understanding data; it is the science of learning from data. It includes designing experiments or sampling surveys for the collection of data, collecting the information, evaluating it, drawing conclusions, and presenting the results. Statisticians work with people from other professional backgrounds to solve practical problems. Statisticians can provide crucial guidance in determining what information is reliable and which predictions can be trusted. This diversity of application is an exciting aspect of the field, and is one reason for continuing strong demand for well-trained statisticians.

A minimum grade of C is required in all mathematics, statistics, and computer science courses which are required for graduation.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B

Course	Title	Cr	AUCC
MATH 192	First Year Seminar in Mathematical Sciences	1	
STAT 192	First Year Seminar in Mathematical Sciences	1	
	Global and Cultural Awareness ¹	3	3E
	Historical Perspectives ²	3	3D
	Electives ³	9	
	TOTAL	28	
SOPHOMORE			
JTC 300 ^P	Professional and Technical Communication	3	2
MATH 261 ^P	Calculus for Physical Scientists III	4	
<i>Select one course from the following:</i>			
STAT 301 ^P	Introduction to Statistical Methods	3	
STAT 307/ ERHS 307 ^P	Introduction to Biostatistics	3	
STAT 315 ^P	Statistics for Engineers and Scientists	3	
	Biological and Physical Sciences ⁴	7	3A
	Introductory programming ⁵	4	
	Electives ³	9	
	TOTAL	30	

JUNIOR

MATH 317 ^P	Advanced Calculus of One Variable	4	
<i>Select one course from the following:</i>			
STAT 305 ^P	Sampling Techniques	3	
STAT 321 ^P	Elementary Probabilistic-Stochastic Modeling	3	
STAT 460 ^P	Applied Multivariate Analysis	3	
STAT 340 ^P	Multiple Regression Analysis	3	
STAT 350 ^P	Design of Experiments	3	
	Arts and Humanities ⁶	6	3B
	Social and Behavioral Sciences ⁷	3	3C
	Upper division CS/MATH/STAT electives ⁸	6	
	Electives ³	3	
	TOTAL	31	

SENIOR

MATH 369 ^P	Linear Algebra	3	
STAT 372 ^P	Data Analysis Management Tools	3	
STAT 420 ^P	Probability and Mathematical Statistics I	3	
STAT 430 ^P	Probability and Mathematical Statistics II	3	4A
STAT 472 ^P	Statistical Consulting	3	4A,4B, 4C
	Upper division CS/MATH/STAT elective ⁸	3	
	Electives ³	13	
	TOTAL	31	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3E in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3D in the AUCC.

³ Select enough elective credits to bring the program total to a minimum of 120 credits with a minimum of 42 upper-division credits.

⁴ Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

⁵ Students must take either CS 160 (4 credits) or CS 155 and CS 156 plus two of the following courses: CS 157, MATH 151, MATH 152, and/or MATH 158/CS 158.

⁶ Select two courses from the list in category 3B in the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses..

⁷ Select from the list of course in category 3C in the AUCC.

⁸ Upper-division computer science, mathematics, or statistics courses (excluding courses ending in -80 to -99).

Minor in Mathematics

The Mathematics Department offers a minor in Mathematics for those students who wish to acquire a more extensive knowledge of mathematical sciences in

support of their personal interests or of their major area of study.

A minimum grade of C is required in all mathematics, statistics, and computer science courses required for the minor in mathematics.

Course	Title	Cr
<i>Select one pair of courses from the following:</i>		
MATH 155 ^P	Calculus for Biological Scientists I*	4
MATH 255 ^P	Calculus for Biological Scientists II*	4
OR		
MATH 160 ^P	Calculus for Physical Scientists I*	4
MATH 161 ^P	Calculus for Physical Scientists II*	4
	Upper-division mathematics ^{1*}	9
	Electives in computer science, mathematics, or statistics* ²	6-7

PROGRAM TOTAL = 23 credits minimum without prerequisites

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required because of prerequisites.

¹ Courses ending in -80 and -99 cannot be used to satisfy upper-division requirements. A minimum grade of C is required in all mathematics, statistics, and computer science courses required for the minor in mathematics.

² Choose from MATH 229 or MATH 261 or upper-division courses in mathematics, statistics, or computer science. At least 3 credits must be from the upper-division courses.

Minor in Mathematical Biology

A minimum grade of C is required in all mathematics, statistics, and computer science courses including all MATH, STAT, or CS joint-listed courses required for the minor in mathematical biology.

Course	Title	Cr
<i>Select one pair of courses from the following:</i>		
MATH 155 ^P	Calculus for Biological Scientists I ¹	4
MATH 255 ^P	Calculus for Biological Scientists II ¹	4
OR		
MATH 160 ^P	Calculus for Physical Scientists I ¹	4
MATH 161 ^P	Calculus for Physical Scientists II ¹	4
MATH 369 ^P	Linear Algebra	3
STAT 307 ^P	Introduction to Biostatistics ¹	3
OR		
STAT 315 ^P	Statistics for Engineers and Scientists ¹	3
MATH 348 ^{P/}	Theory of Population and Evolutionary	4
BZ 348 ^P	Ecology	4
MATH 455 ^P	Mathematics in Biology and Medicine ¹	3

PROGRAM TOTAL = a minimum of 21 credits²

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ Additional course work may be required because of prerequisites.

² A minimum grade of C is required in all mathematics and statistics courses.

Graduate Programs in Mathematics

The department offers the Master of Science and Doctor of Philosophy degrees with areas of study in pure and applied mathematics. Students interested in graduate work should refer to the *Graduate and Professional Bulletin* at graduateschool.colostate.edu/current-students/bulletin.aspx and the department's website, www.math.colostate.edu/.

DEPARTMENT OF PHYSICS

Office in Engineering Building, Room 124
(970) 491-6206

www.physics.colostate.edu/

Professor John Harton, Chair

Major in Physics

Physics is the study of motion, matter, and energy. It is the most fundamental of sciences, and provides the essential underpinning for chemistry, biology, astronomy and geology. Physicists probe the structure of atomic nuclei, study exotic states of matter that occur at ultra-low temperatures, and develop theories that predict the origin and destiny of the universe. Physics has practical applications to a wide variety of tasks such as fabricating very large scale integrated circuits, producing high efficiency solar cells, and developing nanomachines, high-power lasers, and scanners for imaging activity within the human brain. Fundamental research in physics has led to many important inventions, including the transistor, the computer, the flat panel display, and the cell phone.

The Physics major begins with an emphasis on fundamentals in the basic sciences and mathematics to provide students with a broad foundation. Subsequent course work is designed to develop analytical and experimental abilities that allow students to solve problems involving the technical applications of physics. The curriculum includes courses on classical mechanics, modern physics, quantum mechanics, electricity and magnetism, and thermodynamics. A strong liberal arts program rounds out the major and provides educational breadth. Two concentrations are offered: physics and applied physics.

Learning Outcomes

Graduates will:

- Obtain a solid background in experimental physics and basic theoretical physics and will be able to work in a variety of technological or problem-oriented fields.
- Have the contemporary skills and knowledge necessary for entry-level positions in the field, or for admission to graduate or professional schools.
- Be able to apply a range of physical and mathematical tools to a diverse set of physical problems encountered in the real world. They will be

able to use a variety of laboratory techniques, critically interpret experimental results, and design appropriate new experiments.

- Have the ability to critically evaluate and solve a variety of physical problems, and to present their analysis and results to colleagues in both written and oral form.

Potential Occupations

Almost all Physics majors are able to find work after graduation in an occupation related to physics. Physicists find employment in industry in electronics, computers, medical technology, engineering-related fields, quality control, and sales. Others teach high school physics. Physics graduates possess excellent math skills that are useful in business and finance as well. Those earning graduate degrees can work in college teaching and at industrial, government, and academic research labs. Participation in undergraduate research is strongly encouraged since it enhances practical training and expands employment opportunities. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

Career opportunities include, but are not limited to: research physicist, health physicist, nuclear medical technologist, pollution control technician, environmental health technician, air pollution analyst, hydrologist, laser technician, high school physics teacher, scientific illustrator, crime laboratory analyst, patent examiner, quality control technician, spectroscopist, photo-optics technician, data processing systems analyst, computer programmer, motors and controls tester, engineering supplies sales representative, electronics and/or communications equipment representative, precision instruments sales representative, and technical writer.

Applied Physics Concentration

The Applied Physics concentration combines fundamental course work in physics with a selection of courses in a related discipline. Seven options are available. The electronics, semiconductors, and optics option, and the materials and fluids option are designed for students interested in rapidly changing technology or in areas that overlap the boundaries of traditional engineering disciplines. The computers option provides the background needed for the application of modern computer technology to problems in physics, the development of new types of computers, and jobs in computer programming. The chemical physics option combines thorough knowledge of both chemistry and physics, which is useful in such interdisciplinary areas as materials science, surface science, and studies of molecular systems. The medical physics option and the biophysics option prepare students for further study in

health physics, a field in increasing demand, as advances in fundamental physics are applied to medical research and practice. The geophysics option prepares students for fields such as geothermal energy and vulcanology.

Majors must achieve a minimum grade of C- in all specific courses listed in the Core Program for freshman and sophomore years, in CO 301B and CO 300, in all Colorado State physics, mathematics, and technical elective courses which are used to meet requirements for the degree.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
CS 155	Introduction to Unix	1	
CS 156 ^P	Introduction to C Programming I	1	
CS 157 ^P	Introduction to C Programming II	1	
MATH 160 ^P	Calculus for Physical Scientists I ¹	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Elective	6	
	TOTAL	30	
SOPHOMORE			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	
PH 245 ^P	Introduction to Electronics	3	
PH 314 ^P	Introduction to Modern Physics	4	
PH 315 ^P	Modern Physics Laboratory	2	
	Arts and Humanities ²	3	3B
	Social and Behavioral Sciences ³	3	3C
	Elective	2	
	TOTAL	30	
JUNIOR			
CO 301 ^B	Writing in the Disciplines-Science	3	2
PH 341 ^P	Mechanics	4	
PH 351 ^P	Electricity and Magnetism	4	
PH 353 ^P	Optics and Waves	4	
PH 361 ^P	Physical Thermodynamics	3	
	Arts and Humanities ²	3	3B
	Global and Cultural Awareness ⁴	3	3E
	Historical Perspectives ⁵	3	3D
	Electives	3	
	TOTAL	30	
SENIOR			
PH 425 ^P	Advanced Physics Laboratory	2	4C
PH 451 ^P	Introductory Quantum Mechanics I	3	4A, 4B
PH 492 ^P	Seminar	1	4C
	Technical electives ⁶	18	
	Electives ⁷	6	
	TOTAL	30	
PROGRAM TOTAL = 120 credits⁶			

NOTE: Majors must achieve a minimum grade of C- in all specific courses listed in the Core Program for freshman and sophomore years, in CO 301B or CO 300, in all Colorado State physics and mathematics, and in all technical elective courses which are used to meet requirements for the degree.

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ MATH 117, MATH 118, MATH 124, MATH 125, and MATH 126 are considered review courses by the Department of Physics, and are not included in the major, but may be taken as electives.

² Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 3C in the AUCC.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select from the list of courses in category 3D in the AUCC.

⁶ For this concentration, 18 credits of technical electives must be selected from the departmental list.

⁷ Enough elective credits must be selected to bring the minimum number of credits to 120, with a minimum of 42 upper-division credits.

Physics Concentration

The undergraduate concentration in Physics provides a broad background in physics that serves as a base for later specialization, either in graduate school or on the job. It is designed for those seeking greater insight into physics and an introduction to more advanced topics and methods. Students who obtain a degree in Physics with the Physics concentration are prepared for a career in industry or government, or for advanced study at the graduate level.

Majors must achieve a minimum grade of C- in all specific courses listed in the Core Program for freshman and sophomore years, in CO 301B and CO 300, in all Colorado State physics, mathematics, and technical elective courses which are used to meet requirements for the degree.

Course	Title	Cr	AUCC
FRESHMAN			
CO 150 ^P	College Composition	3	1A
CS 155	Introduction to Unix	1	
CS 156 ^P	Introduction to C Programming I	1	
CS 157 ^P	Introduction to C Programming II	1	
MATH 160 ^P	Calculus for Physical Scientists I ¹	4	1B
MATH 161 ^P	Calculus for Physical Scientists II	4	1B
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Elective	6	
	TOTAL	30	
SOPHOMORE			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
MATH 261 ^P	Calculus for Physical Scientists III	4	
MATH 340 ^P	Introduction to Ordinary Differential Equations	4	
PH 245 ^P	Introduction to Electronics	3	
PH 314 ^P	Introduction to Modern Physics	4	
PH 315 ^P	Modern Physics Laboratory	2	
	Arts and Humanities ²	3	3B
	Social and Behavioral Sciences ³	3	3C
	Elective	2	
	TOTAL	30	
JUNIOR			
CO 301B ^P	Writing in the Disciplines-Science	3	2
PH 341 ^P	Mechanics	4	
PH 351 ^P	Electricity and Magnetism	4	
PH 353 ^P	Optics and Waves	4	
PH 361 ^P	Physical Thermodynamics	3	
	Arts and Humanities ²	3	3B
	Global and Cultural Awareness ⁴	3	3E
	Historical Perspectives ⁵	3	3D
	Electives	3	
	TOTAL	30	
SENIOR			
PH 425 ^P	Advanced Physics Laboratory	2	4C
PH 451 ^P	Introductory Quantum Mechanics I	3	4A, 4B
PH 492 ^P	Seminar	1	4C
	Technical electives ⁶	18	
	Electives ⁷	6	
	TOTAL	30	
PROGRAM TOTAL = 120 credits⁶			

NOTE: Majors must achieve a minimum grade of C- in all specific courses listed in the Core Program for freshman and sophomore years, in CO 301B or CO 300, in all Colorado State physics and mathematics, and in all technical elective courses which are used to meet requirements for the degree.

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ MATH 117, MATH 118, MATH 124, MATH 125, and MATH 126 are considered review courses by the Department of Physics, and are not included in the major, but may be taken as electives.

² Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

³ Select from the list of courses in category 3C in the AUCC.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select from the list of courses in category 3D in the AUCC.

⁶ For this concentration, 18 credits of technical electives must be selected from the departmental list.

⁷ Enough elective credits must be selected to bring the minimum number of credits to 120, with a minimum of 42 upper-division credits.

Minor in Physics

Most technical fields require some background in physics. A minor in Physics could provide students with an increased understanding of the foundations of their chosen major. For students majoring in Computer Science and Mathematics, a minor in Physics provides experience in applying the skills acquired in their major to concrete physical problems.

A minimum grade of C- is required in all physics courses required for the minor in physics.

Course	Title	Cr
LOWER DIVISION		
PH 141 ^P	Physics for Scientists and Engineers I*	5
PH 142 ^P	Physics for Scientists and Engineers II*	5
	TOTAL	10
UPPER DIVISION		
PH 314 ^P	Introduction to Modern Physics*	4
<i>Select a minimum of 8 credits from the following, including at least five credits of PH courses:</i>		
AA 301 ^P	Astrophysics I*	5
AA 302 ^P	Astrophysics II*	5
AA 303 ^P	Astrophysics III*	5
PH 315 ^P	Modern Physics Laboratory	2
PH 341 ^P	Mechanics*	4
PH 351 ^P	Electricity and Magnetism*	4
PH 353 ^P	Optics and Waves*	4
PH 361 ^P	Physical Thermodynamics*	3
PH 425 ^P	Advanced Physics Laboratory*	2
PH 451 ^P	Introductory Quantum Mechanics I*	3
PH 452 ^P	Introductory Quantum Mechanics II*	3
PH 462 ^P	Statistical Physics*	3
	TOTAL	12

PROGRAM TOTAL = 22 credits without prerequisites

Any substitutions need approval of the key adviser.

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required because of prerequisites.

Graduate Programs in Physics

Graduate programs with area studies in Physics and Applied Physics lead to Master of Science and Doctor of Philosophy degrees. Students interested in graduate work should refer to the *Graduate and Professional Bulletin* at graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, www.physics.colostate.edu.

DEPARTMENT OF PSYCHOLOGY

Office in Behavioral Sciences Building, Room 201

(970) 491-3799

www.colostate.edu/Depts/Psychology

Professor Kurt Kraiger, Chair

Major in Psychology

Psychology is one of the most popular and versatile majors. The major emphasizes a strong background in the natural sciences including mathematics, biology, chemistry, human physiology, and statistics; the Arts and Humanities; social sciences; writing and research; and history.

A large complement of electives enables students to take a second major or minor in a field of interest and orient toward one or a combination of four goals: 1) students can use a Psychology degree as a background for careers outside psychology, with electives providing instruction in particular fields of interest; 2) a Psychology degree can lead to careers in business, industry, government, education, and professions such as law and medicine; 3) students can graduate with a combination of courses and experiences to qualify for semiprofessional jobs in psychological settings or closely related fields; and 4) students can acquire qualifications for entry into graduate study in Psychology. Graduate programs offer general training followed by specialization. Advanced degrees are a prerequisite for professional careers in psychology.

Learning Outcomes

Students will:

- Demonstrate understanding of the basic theories, principles, and laws of behavior
- Demonstrate knowledge of psychological principles and concepts across several basic psychological content areas
- Engage in analytical and critical thinking, and demonstrate knowledge and appreciation of the scientific methods used in psychological research

Potential Occupations

A B.S. degree in Psychology prepares students for a variety of career opportunities. Because of the strong science and liberal arts orientation, students develop a number of important skills required in a broad range of occupations. Skills such as written and oral

communication, cooperation, analytical and critical thinking, plus a strong background in sciences and the liberal arts demonstrate versatility and an ability to pursue a variety of career paths. Participating in paid or volunteer work, internships, study abroad and experiential education opportunities are highly recommended, as it will enhance a student's employment opportunities.

Possible career opportunities include, but are not limited to: human services worker, case worker, mental health services worker, probation officer, community relations officer, educator; occupational therapist (with advanced degree), program developer/administrator, human resources administrator, labor relations representative, compensation and benefits administrator, public relations specialist/special events administrator, advertising producer/writer, account services representative, media representative, market researcher, government program administrator, business manager, buying agent, sales representative, real estate broker, lawyer (with advanced degree), or physician (with advanced degree).

General Psychology Concentration

Students must have a C or better in each: PSY 100; PSY 210; PSY 250; PSY 252; PSY 401; and the three lecture-lab pairings in psychology.

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 107 ^P	Fundamentals of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
CO 150 ^P	College Composition	3	1A
CS 110	Personal Computing	4	
LIFE 102 ^P	Attributes of Living Systems	4	3A
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
PSY 100	General Psychology	3	3C
PSY 192	Psychology Freshman Seminar	1	
PSY 252 ^P	Mind, Brain, and Behavior	3	
	Arts and Humanities ¹	3	3B
	TOTAL	29	

SOPHOMORE			
<i>Select one course from the following:</i>			
PHIL 100	Appreciation of Philosophy	3	
PHIL 110	Logic and Critical Thinking	3	
PHIL 120	History and Philosophy of Scientific Thought	3	
PHIL 205 ^P	Introduction to Ethics	3	
PHIL 210 ^P	Introduction to Formal Logic	3	
PSY 210 ^P	Psychology of the Individual in Context	3	
PSY 250 ^P	Research Methods in Psychology	4	
SPCM 200	Public Speaking	3	
	Arts and Humanities ¹	3	3B
	Global and Cultural Awareness ²	3	3E
	Historical Perspectives ³	3	3D
	Social and Behavioral Sciences ⁴	3	3C
	Electives	5	
	TOTAL	30	

JUNIOR			
<i>Select two pairs of courses from the following:</i>			
PSY 315 ^P	Social Psychology	3	4B
PSY 317 ^P	Social Psychology Laboratory	2	4A
OR			
PSY 340 ^P	Organizational Psychology	3	4B

Course	Title	Cr	AUCC
PSY 341 ^P	Organizational Psychology Laboratory	1	4A
OR			
PSY 370 ^P	Psychological Measurement and Testing	3	4B
PSY 371 ^P	Psychological Measurement and Testing Laboratory	1	4A
OR			
PSY 440 ^P	Industrial Psychology	3	4B
PSY 441 ^P	Industrial Psychology Laboratory	1	4A
OR			
PSY 452 ^P	Cognitive Psychology	3	4B
PSY 453 ^P	Cognitive Psychology Laboratory	2	4A
OR			
PSY 454 ^P	Biological Psychology	3	4B
PSY 455 ^P	Biological Psychology Laboratory	2	4A
OR			
PSY 456 ^P	Sensation and Perception	3	4B
PSY 457 ^P	Sensation and Perception Laboratory	2	4A
OR			
PSY 458 ^P	Cognitive Neuroscience	3	4B
PSY 459 ^P	Cognitive Neuroscience Laboratory	2	4A
STAT 311 ^P	Statistics for Behavioral Sciences I	3	
STAT 312 ^P	Statistics for Behavioral Sciences II	3	
	Upper-division psychology Electives	3	
	TOTAL	11-13	
		30	
SENIOR			
BMS 300 ^P	Principles of Human Physiology	4	
CO 300 ^P	Writing Arguments	3	2
PSY 401 ^P	History and Systems of Psychology	3	4C
	Psychology lecture-lab pair ⁵	4-5	
	Upper-division psychology Electives ⁶	3	
	TOTAL	13-14	
		31	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses..

² Select from the list of courses in category 3E in the AUCC.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select any course in category 3C in the AUCC except PSY 100.

⁵ Select one lecture-lab pair not already taken from list in the junior year.

⁶ Enough elective credits must be selected to bring program total to 120 credits with a minimum of 42 upper-division credits.

Industrial/Organizational Concentration

The Industrial/Organizational Concentration prepares students for either moving into the workforce with a bachelor's degree or pursuing graduate education in Industrial/Organizational Psychology. Students in the I/O Concentration will take seminars that focus on psychology in the work place including, but not limited, to topics in leadership, fairness, justice, and work motivation. Students are strongly encouraged to participate in experiential education opportunities, such as internships, to enhance their marketability in the workforce and research assistantships to strengthen their graduate school applications.

Students must have a C or better in each: PSY 100; PSY 210; PSY 250; PSY 252; PSY 401; and the three lecture-lab pairings in psychology.

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 107 ^P	Fundamentals of Chemistry	4	3A

Course	Title	Cr	AUCC
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
CO 150 ^P	College Composition	3	1A
CS 110	Personal Computing	4	
LIFE 102 ^P	Attributes of Living Systems	4	3A
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
PSY 100	General Psychology	3	3C
PSY 192	Psychology Freshman Seminar	1	
PSY 252 ^P	Mind, Brain, and Behavior	3	
	Arts and Humanities ¹	3	3B
	TOTAL	29	

SOPHOMORE

Course	Title	Cr	AUCC
<i>Select one course from the following:</i>			
PHIL 100	Appreciation of Philosophy	3	
PHIL 110	Logic and Critical Thinking	3	
PHIL 120	History and Philosophy of Scientific Thought	3	
PHIL 205 ^P	Introduction to Ethics	3	
PHIL 210 ^P	Introduction to Formal Logic	3	
PSY 210 ^P	Psychology of the Individual in Context	3	
PSY 250 ^P	Research Methods in Psychology	4	
PSY 296	Group Study ²	1	
STAT 311 ^P	Statistics for Behavioral Sciences I	3	
	Arts and Humanities ¹	3	3B
	Global and Cultural Awareness ³	3	3E
	Historical Perspectives ⁴	3	3D
	Social and Behavioral Sciences ⁵	3	3C
	Electives	4	
	TOTAL	30	

JUNIOR

Course	Title	Cr	AUCC
<i>Select two pairs of courses from the following:</i>			
PSY 340 ^P	Organizational Psychology	3	4B
PSY 341 ^P	Organizational Psychology Laboratory	1	4A
OR			
PSY 370 ^P	Psychological Measurement and Testing	3	4B
PSY 371 ^P	Psychological Measurement and Testing Laboratory	1	4A
OR			
PSY 440 ^P	Industrial Psychology	3	4B
PSY 441 ^P	Industrial Psychology Laboratory	1	4A
PSY 492D ^P	Seminar: Industrial/Organizational Psychology ⁶	3	
PSY 492D ^P	Seminar: Industrial/Organizational Psychology ⁶	3	
SPCM 200	Public Speaking	3	2A
STAT 312 ^P	Statistics for Behavioral Sciences II	3	
	Elective(s)	10	
	TOTAL	30	

SENIOR

Course	Title	Cr	AUCC
BMS 300 ^P	Principles of Human Physiology	4	
CO 300 ^P	Writing Arguments	3	2B
PSY 401 ^P	History and Systems of Psychology	3	4C
<i>Select six credits from the following:</i>			
PSY 310 ^P	Basic Counseling Skills	3	
PSY 315 ^P	Social Psychology	3	
PSY 325 ^P	Psychology of Personality	3	
PSY 452 ^P	Cognitive Psychology	3	
PSY 492D ^P	Seminar: Industrial/Organizational Psychology ⁶	3	
PSY 492D ^P	Seminar: Industrial/Organizational Psychology ⁶	3	
PSY 495	Independent Study ²	1-3	
PSY 496	Group Study ²	1-3	
PSY 498	Research ²	1-3	
PSY 499	Thesis ²	1-3	
	Psychology lecture-lab pairing ⁷	4	
	Elective ⁸	11	
	TOTAL	31	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499.

³ Select from the list of courses in category 3E in the AUCC.

⁴ Select from the list of courses in category 3D in the AUCC.

⁵ Select any course in category 3C in the AUCC except PSY 100.

⁶ Students must complete at least two 3-credit industrial/organizational psychology seminars, PSY 492D. Content changes from semester to semester and the course may be taken for credit multiple times.

⁷ Select lecture-lab pair not taken from list in the junior year.

⁸ Enough elective credits must be selected to bring the program total to 120 credits with a minimum of 42 upper-division credits.

Mind, Brain, and Behavior Concentration

The Mind, Brain and Behavior Concentration prepare students to be more competitive candidates for graduate programs in cognitive psychology, cognitive neuroscience, behavioral neuroscience, and sensation and perception. This concentration allows students to develop a stronger science and quantitative background. Students are exposed to areas of faculty research and are encouraged to become undergraduate research assistants. Many psychology students who are pre-med choose this concentration.

Students must have a C or better in each: PSY 100; PSY 210; PSY 250; PSY 252; PSY 401; and the three lecture-lab pairings in psychology.

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 107 ^P	Fundamental of Chemistry	4	3A
CHEM 108 ^P	Fundamentals of Chemistry Laboratory	1	3A
CO 150 ^P	College Composition	3	1A
CS 110	Personal Computing	4	
LIFE 102 ^P	Attributes of Living Systems	4	3A
MATH 117 ^P	College Algebra in Context I	1	1B
MATH 118 ^P	College Algebra in Context II	1	1B
MATH 124 ^P	Logarithmic and Exponential Function	1	1B
PSY 100	General Psychology	3	
PSY 192	Psychology Freshman Seminar	1	
PSY 252 ^P	Mind, Brain, and Behavior	3	
	Arts and humanities ¹	3	3B
	TOTAL	29	

SOPHOMORE

MATH 125 ^P	Numerical Trigonometry	1	
MATH 126 ^P	Analytic Trigonometry	1	
<i>Select one course from the following:</i>			
PHIL 100	Appreciation of Philosophy	3	
PHIL 110	Logic and Critical Thinking	3	
PHIL 120	History and Philosophy of Scientific Thought	3	
PHIL 205 ^P	Introduction to Ethics	3	
PHIL 210 ^P	Introduction to Formal Logic	3	
PSY 210 ^P	Psychology of Differences	3	
PSY 250 ^P	Research Methods in Psychology	4	
PSY 296	Group Study	1	
	Arts and humanities ¹	3	3B
	Global and cultural awareness ²	3	3E
	Historical perspectives ³	3	3D
	Social/behavioral sciences ⁴	3	3C
	Electives	6	
	TOTAL	31	

JUNIOR

BMS 300	Principles of Human Physiology	4	
<i>Select two pairs of courses from the following:</i>			

Course	Title	Cr	AUCC
PSY 452 ^P	Cognitive Psychology	3	4B
PSY 453 ^P	Cognitive Psychology Laboratory	2	4A
OR			
PSY 454 ^P	Biological Psychology	3	4B
PSY 455 ^P	Biological Psychology Laboratory	2	4A
OR			
PSY 456 ^P	Sensation and Perception	3	4B
PSY 457 ^P	Sensation and Perception Laboratory	2	4A
OR			
PSY 458 ^P	Cognitive Neuroscience	3	4B
PSY 459 ^P	Cognitive Neuroscience Laboratory	2	4A
SPCM 200	Public Speaking	3	
STAT 311 ^P	Statistics for Behavioral Sciences I	3	
STAT 312 ^P	Statistics for Behavioral Sciences II	3	
	Upper division psychology	3	
	Electives	4	
	TOTAL	30	

SENIOR

<i>Select one course from the following:</i>			
BMS 301 ^P	Human Gross Anatomy	5	
BMS 325 ^P	Cellular Neurobiology	3	
BMS 330 ^P	Microscopic Anatomy	4	
BMS 345 ^P	Functional Neuroanatomy	4	
BMS 430 ^P	Endocrinology	3	
BMS 450 ^P	Pharmacology	3	
CO 300	Writing Arguments	3	2
PSY 352	Psychology of Learning	3	
PSY 401 ^P	History and Systems of Psychology	3	4C
	Psychology lecture-lab pair ⁵	5	
	Quantitative elective ⁶	3-4	
	Electives ⁷	7-10	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3E in the AUCC.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select any course in category 3C in the AUCC except PSY 100.

⁵ Select one lecture-lab pair not already taken from the list in the junior year.

⁶ Take one additional mathematics or statistics course excluding MATH 130, MATH 133, MATH 135, STAT 201, and STAT 204. The honors course PSY 350 will count for this elective.

⁷ Enough elective credits must be taken to bring the program total to 120 credits with a minimum of 42 upper-division credits.

Graduate Programs in Psychology

The department offers graduate programs leading to Master of Science and Doctor of Philosophy degrees. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, www.colostate.edu/Depts/Psychology.

DEPARTMENT OF STATISTICS

Office in Statistics Building, Room 102
(970) 491-5269
www.stat.colostate.edu

Professor Jean Opsomer, Chair
Professor F. Jay Breidt, Associate Chair

The Department of Statistics does not offer an undergraduate major, though instructional programs in the department serve a number of undergraduate majors and graduate programs across the University.

Students interested in pursuing an undergraduate program in statistics are invited to consider the statistics concentration in the Department of Mathematics.

Minor in Applied Statistics

Students must select at least 21 credits from the list of required course below and elective courses from a list provided in the Department of Statistics. At least 15 credits must be in courses offered by the Department of Statistics and at least 12 credits must be upper division. Any deviation must be proposed in writing by the student and approved by the undergraduate adviser in statistics or the chair of the department.

A minimum grade of C must be achieved in all statistics courses (STAT prefix and joint-listed) required for the minor in applied statistics.

Course	Title	Cr
<i>Select one course from the following:</i>		
STAT 301 ^P	Introduction to Statistical Methods*	3
STAT 307 ^P	Introduction to Biostatistics*	3
STAT 311 ^P	Statistics for Behavioral Sciences I*	3
STAT 315 ^P	Statistics for Engineers and Scientists*	3
<i>Select one course from the following:</i>		
STAT 305 ^P	Sampling Techniques	3
STAT 312 ^P	Statistics for Behavioral Sciences II	3
STAT 350 ^P	Design of Experiments	3
STAT 340 ^P	Multiple Regression Analysis	3
STAT 372 ^P	Data Analysis Tools	3
STAT 472 ^P	Statistical Consulting	3
	Electives ¹	6

PROGRAM TOTAL = 21 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional coursework may be required because of prerequisites.

¹ Electives approved by the undergraduate adviser in statistics or the department chair.

Minor in Statistics

The minor in Statistics is designed for students taking math calculus coursework. Students must select at least 21 credits from the list of required courses below and elective courses from a list provided in the Department of

Statistics. A minimum grade of C must be achieved in all statistics courses required for the minor. At least 12 credits must be in courses offered by the Statistics Department and at least 12 credits must be upper division. Any deviations must be proposed in writing by the student and approved by the undergraduate adviser in statistics or the chair of the department.

A minimum grade of C must be achieved in all statistics courses (STAT prefix and joint-listed) required for the minor in statistics.

Course	Title	Cr
Students in the biological and social sciences who are interested in applications of statistical methods should take STAT 301 (or STAT 307 or STAT 311) and STAT 321. Students in the physical sciences who are interested in applications of statistical methods should take STAT 311 and STAT 321. Students interested in statistical theory should take STAT 420 and STAT 430.		
STAT 321 ^P	Elementary Probabilistic-Stochastic Modeling*	3
OR		
STAT 420 ^P	Probability and Mathematical Statistics I*	3
<i>Select one course from the following:</i>		
STAT 301	Introduction to Statistical Methods*	3
STAT 307 ^P	Introduction to Biostatistics*	3
STAT 311 ^P	Statistics for Behavioral Sciences I*	3
STAT 315 ^P	Statistics for Engineers and Scientists*	3
<i>Select one course from the following:</i>		
STAT 305 ^P	Sampling Techniques	3
STAT 430 ^P	Probability and Mathematical Statistics II	3
STAT 460 ^P	Applied Multivariate Analysis	3
STAT 340 ^P	Multiple Regression Analysis*	3
STAT 350 ^P	Design of Experiments	3
	Electives*	6
	TOTAL	21

PROGRAM TOTAL = 21 credits without prerequisites

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required because of prerequisites.

Graduate Programs in Statistics

The department offers graduate programs leading to a Master of Applied Statistics, Master of Science and Doctor of Philosophy degrees. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, www.stat.colostate.edu.

Colorado State University reserves the right at any time, without notice, to change, modify, or cancel any course, program, procedure, policy, financial requirement, or disciplinary arrangement set forth in this catalog whenever, in its sole discretion, it determines such action to be appropriate. Furthermore, Colorado State will not be responsible for any failure to present or complete any course or program or to perform any other activity, function, or obligation mentioned in this catalog. Since changes may occur at any time, students must check the relevant website (as noted throughout various chapters in this catalog).

College of Veterinary Medicine and Biomedical Sciences

Office in Anatomy-Zoology Building, Room W102
(970) 491-7051

www.cvmbs.colostate.edu

Professor Lance Perryman, Dean
Professor Kenneth Blehm, Associate Dean for Undergraduate Education
Professor Peter W. Hellyer, Associate Dean for Professional Veterinary Medicine
Professor Susan VandeWoude, Associate Dean for Graduate Education and Research
Associate Professor Sherry Stewart, Assistant Dean for DVM Admissions and Student Affairs

UNDERGRADUATE MAJORS

Biomedical Sciences
Environmental Health
Microbiology

UNDERGRADUATE MINORS

Biomedical Sciences
Environmental Health
Microbiology

COLLEGE PROGRAMS

A concern for health and the diseases of animals and humans provides the unifying theme for the undergraduate, professional, and graduate programs of the College of Veterinary Medicine and Biomedical Sciences. The College combines teaching, research, and public service activities in basic biomedical disciplines such as anatomy, neurobiology, physiology, microbiology, pathology, and radiological health sciences, with applied disciplines such as clinical veterinary medicine and surgery, diagnostic imaging, radiology, clinical laboratory sciences, epidemiology, and environmental health sciences. Graduates of the College in either the veterinary sciences or the biomedical sciences serve society in the broadest sense – they represent the concept that there is but “one medicine” with human and animal health intimately interrelated.

Major Courses of Study

The College of Veterinary Medicine and Biomedical Sciences offers undergraduate, professional, and graduate courses of study. There are three undergraduate programs leading to the Bachelor of Science with majors in biomedical sciences, environmental health, and microbiology. The Bachelor of Science degree requires a minimum of 120 credits with a minimum of 42 credits in upper-division courses. The four-year professional veterinary medical program leads to the Doctor of Veterinary Medicine degree; students in this program typically complete a baccalaureate degree prior to program admission. Graduate studies in each of the four departments of the college lead to Master of Science and Doctor of Philosophy degrees.

Study Abroad

Study abroad programs are available to students in the College of Veterinary Medicine and Biomedical Sciences. Because the knowledge of at least one other culture is valuable in understanding our own, students are strongly encouraged to take a semester or longer to study outside the United States as part of their overall program. Students interested in study abroad should plan far in advance by discussing opportunities with their academic adviser and by visiting the Office of International Programs in Laurel Hall, www.studyabroad.colostate.edu.

Continuing Education

The College of Veterinary Medicine and Biomedical Sciences supports the veterinary profession by offering continuing education courses that enable practicing veterinarians to obtain new medical information and meet the Colorado Veterinary Practice Act's continuing education requirements for re-licensure. The College shares responsibility for continuing education and maintains close liaison with the American Veterinary Medical Association (AVMA), the Colorado Veterinary Medical Association (CVMA), the Colorado Board of

Veterinary Medicine, and the Western Interstate Commission for Higher Education (WICHE).

Graduate Programs

Programs leading to the Master of Science and Doctor of Philosophy degrees are offered in all departments of the College.

Students with Bachelor of Science or Doctor of Veterinary Medicine degrees or well-qualified students who are currently pursuing veterinary medicine degrees, are eligible to study for advanced degrees in the Departments of Biomedical Sciences; Clinical Sciences; Environmental and Radiological Health Sciences; and Microbiology, Immunology, and Pathology.

The College of Veterinary Medicine and Biomedical Sciences (CVMBBS) and the College of Business have created a combined five-year program of study that can result in earning both the master of business administration degree and Doctor of Veterinary Medicine degree. Applicants to the Professional Veterinary Medical (DVM) program are encouraged to consider extending their veterinary education to include a one-year start to an M.B.A. degree. After successfully completing the first year of the M.B.A. program, students will be guaranteed admission to the first year of the DVM program and will be expected to complete the remaining M.B.A. course requirements concurrently with the first two years of the PVM curriculum. A recent national study of the veterinary profession indicated that traditional scientific skills and knowledge might not be sufficient to capitalize on future economic opportunities. This program was undertaken to improve training of our students in veterinary practice management and business skills.

There is a national need for veterinarians who can serve as the bridge between research and all aspects of animal health and welfare. The College has developed a 7-year DVM/PhD program that will integrate the DVM and PhD training regimens to provide a dual degree to selected candidates. Numerous outstanding research opportunities exist in diverse areas: cancer biology, infectious disease, neurosciences, reproductive biology, epidemiology, orthopedic sciences, environmental health, and toxicology to complement the DVM training program. The typical DVM/PhD program would be basic graduate study and laboratory rotations (year 1); first two years of DVM training plus electives and graduate work (years 2 and 3); exclusive research work in the PhD program (years 4 and 5); and completion of the DVM training (years 6 and 7).

Combining the expertise from public/environmental health and veterinary medicine and partnering with the *Colorado School of Public Health* [//publichealth.ucdenver.edu/](http://publichealth.ucdenver.edu/), the college has created a

five-year DVM/MPH program which will provide specialty training in veterinary medicine and public health. Students spend the first year in the MPH program, years 2 and 3 jointly in the DVM and MPH programs, and then years 4 and 5 focusing on completing the DVM requirements. Given the threats to public health from zoonotic diseases that naturally occur or are purposely caused, this degree allows the graduate to bring a unique skill set to bear on an issue of significant public impact.

For detailed information about graduate programs, refer to the individual departments or write to the department concerned. See also the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx.

INTERDEPARTMENTAL PROGRAM

Doctor of Veterinary Medicine

A four-year professional program in veterinary medicine (Professional Veterinary Medicine or DVM) is offered annually to approximately 138 students. Because the number of applicants exceeds the number of students who can be admitted to any class, the members of the Admissions Committee for the College of Veterinary Medicine and Biomedical Sciences carefully evaluate each applicant to recommend those best qualified. Information concerning the academic program which leads to the Doctor of Veterinary Medicine (D.V.M.) degree may be found in the *Graduate and Professional Bulletin* or at: www.cvmbbs.colostate.edu/ns/students/future_students/dvm_degree_program.aspx.

The full course of study requires four years beyond completion of the pre-veterinary requirements. While exceptional students may complete pre-veterinary requirements in two to three years and then be accepted into the Professional Veterinary Medicine Program; it is much more common that students complete a baccalaureate degree followed by four years in the professional program.

Pre-Veterinary Training for the Professional Veterinary Medicine Program

Students may take their preprofessional (pre-veterinary) training at any accredited institution whether these courses are part of a regularly offered baccalaureate program or whether the courses are taken as “stand alone” choices independent of a degree program.

However, courses must be substantially equivalent in subject content and level as offered for pre-veterinary students at Colorado State.

Inquiries regarding equivalent or substitute courses that may be taken SPECIFICALLY to meet pre-veterinary preparation requirements should be directed to the Office of the Dean, Assistant Dean for Admissions, Professional Veterinary Medicine, Campus Delivery 1601, Fort Collins, CO 80523-1601. There is also a format for requests "Prerequisite Substitute Course Request" given at www.cvmbs.colostate.edu/ns/docs/students/dvm_prep.pdf which can be submitted to the Assistant Dean through the email address of DVMAdmissions@colostate.edu.

While Colorado State students meeting the pre-veterinary requirements as an integral part of a degree program will take a higher number of credits, the minimum course requirements for admission to the Professional Veterinary Medicine program, exclusive of electives, are:

Arts, Humanities, Behavioral and Social Sciences – at least 12 semester credits. (the required credits for English composition explicit in most programs of study as all university requirements - see category that follows -do not fulfill these requirements.)

Biological Sciences – at least three semester credits in genetics and a laboratory associated with a biological science course.

Chemistry – at least three semester credits in biochemistry (requiring organic chemistry as a prerequisite) and a laboratory associated with a chemistry course.

English Composition – at least three semester credits.

Physics – at least four semester credits with laboratory.

Statistics – at least three semester credits (upper-division course preferred).

Additional courses that are not required, but highly recommended, are anatomy, cell biology, developmental biology, histology, microbiology, nutrition, physiology, and computer science. These courses will enhance the student's preparation for the Professional Veterinary Medicine program.

The pre-veterinary requirement includes the previous categories and credits plus additional credits to total 60 semester credits that must be completed prior to admission to the Professional Veterinary Medicine program. The clear majority of students will complete the pre-veterinary requirements as part of a baccalaureate program. Exceptional students may apply for admission to

the Professional Veterinary Medicine program when only the pre-veterinary requirements are met.

Students who wish to pursue pre-professional veterinary medicine training (sufficient to meet minimum requirements to apply to the Colorado State Professional Veterinary Medicine Program) through courses offered at Colorado State as part of their undergraduate degree program will find detailed information at: www.cvmbs.colostate.edu/cvmbs/PreprofessionalCourses.htm.

Food Animal Veterinary Career Incentive Program

There are many vacancies and numerous career opportunities in all sectors of private food animal practice including mixed animal practice, and specialty practices in dairy cattle, beef cow-calf, beef feedlots, sheep, and swine. There are also many opportunities in public practice including food safety and inspection, communicable disease management, and regulatory veterinary medicine. Many practitioners and producers have found it difficult to recruit new graduates into food and fiber animal practice, especially in rural communities. Reduced veterinary participation in food and fiber production animal medicine may contribute to increased vulnerability of livestock industries to emerging infectious diseases, exotic and zoonotic diseases, public health risks from food safety and quality problems, lowered public confidence in animal agricultural products as well as threats to the national economy. Thus, the overarching goal of the Food Animal Veterinary Career Incentive Program (FAVCIP) is to create a sustainable source of future veterinarians for underserved disciplines and geographic regions central to the future of safe and successful food and fiber animal production. This program includes a plan of academic work, experience, and mentoring that encompasses undergraduate and veterinary medical education and meets specific needs of animal agriculture through a cooperative venture of the College of Veterinary Medicine and Biomedical Sciences and the Department of Animal Sciences in the College of Agricultural Sciences. Additional options to proceed to veterinary school focusing on food and fiber animal production are described within the FAVCIP literature.

Undergraduate students with a strong interest in discipline will be encouraged to follow the FAVCIP curriculum and program requirements as they complete their Bachelor of Science in animal science at Colorado State University (see www.cvmbs.colostate.edu)

[/cvmbms/FoodAnimalVetCareerIncentiveProgram.pdf](http://cvmbms/FoodAnimalVetCareerIncentiveProgram.pdf).

DEPARTMENT OF BIOMEDICAL SCIENCES

Office in Physiology Building, Room 102
www.cvmbms.colostate.edu/bms

Professor Colin Clay, Head

Major in Biomedical Sciences

An undergraduate degree in biomedical sciences prepares students for a wide variety of opportunities which have a basis in cellular and molecular biology, human/animal anatomy and physiology. Students will have opportunities to engage in coursework and laboratory work if warranted which concentrate on specialty areas in endocrinology, pharmacology, neurophysiology, reproductive physiology, and cardiopulmonary physiology. The curriculum will prepare graduates for admission to medical or veterinary schools, schools of physical therapy and physician assistant programs, optometry, pharmacy, and dentistry. The program will also prepare students for graduate studies in the biomedical sciences as well as for employment in a variety of innovative and developing fields in biotechnology.

The basic science curriculum meets requirements for entrance into professional schools. The curriculum permits students to select university offered and major-related electives which fit with the educational objectives of students. Experiential learning opportunities consisting of laboratory research experiences, teaching experiences in selected courses, and internships with biotechnology firms (primarily summer) will be available for students seeking such opportunities. These opportunities will be designed with the student's career goals as the focus.

Learning Outcomes

Students will:

- Obtain a solid background in anatomy and physiology and be able to integrate knowledge from the molecular to the systemic level
- Demonstrate strong writing and oral communication skills
- Develop scientific hypotheses and experiments to test them
- Work effectively in groups
- Demonstrate effective organization, leadership, and laboratory skills

- Think critically and logically

Potential Occupations

A Bachelor of Science degree in biomedical sciences will provide students with many opportunities for further study or employment in the broad area of biomedical sciences. The coursework is designed to prepare students for health-related graduate and professional programs. Post-graduate opportunities will include additional studies in specialty areas of physiology such as neuroscience, reproductive endocrinology, cardiopulmonary and pathophysiology. Employment opportunities can be found in government at the local, state, and national levels; research in a variety of settings such as university, industry, and private laboratories; education; administration and management; and industry such as biotechnology, pharmaceuticals, and medical devices. Students will be exposed to skill sets which are necessary in a competitive, ever changing job market.

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A
LIFE 102 ^P	Attributes of Living Systems	4	3A
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
OR			
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
	Arts/humanities ¹	6	3B
	Social/behavioral sciences ²	3	3C
	TOTAL	29	
SOPHOMORE			
BMS 302 ^P	Laboratory in Principles of Physiology	2	
BMS 360 ^P	Fundamentals of Physiology	4	
<i>Select one set from the following:</i>			
CHEM 341 ^P	Modern Organic Chemistry I	3	
CHEM 343 ^P	Modern Organic Chemistry II	3	
CHEM 344 ^P	Modern Organic Chemistry Laboratory	2	
OR			
CHEM 345 ^P	Organic Chemistry I	4	
CHEM 346 ^P	Organic Chemistry II	4	
LIFE 201B ^P	Introductory Genetics-Molecular	3	
LIFE 210 ^P	Introductory Eukaryotic Cell Biology	3	
LIFE 212 ^P	Introductory Cell Biology Laboratory	2	
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			
STAT 307 ^P	Introduction to Biostatistics	3	
	Additional communication ³	3	2B
	TOTAL	28	
JUNIOR			
BC 351 ^P	Principles of Biochemistry	4	
<i>Select one course from the following:</i>			
BMS 301 ^P	Human Gross Anatomy	5	
BMS 305 ^P	Domestic Animal Gross Anatomy	4	
BMS 330 ^P	Microscopic Anatomy	4	
MIP 300 ^P	General Microbiology	3	
MIP 302 ^P	General Microbiology Laboratory	2	
PH 121 ^P	General Physics I	5	
PH 122 ^P	General Physics II	5	
	Global and cultural awareness ⁴	3	3E
	Historical perspectives ⁵	3	3D
	Electives ⁶	2	
	TOTAL	31-32	
SENIOR			

Course	Title	Cr	AUCC
BMS 460 ^P	Essentials of Pathophysiology	4	4A, 4B, 4C
BMS 492 ^P	Seminar-Pathophysiology of Disease	1	4A, 4C
	Major related electives ⁷	15	
	Free electives ⁸	11-12	
	TOTAL	31-32	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select two courses from the list in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3C in the AUCC.

³ Select any advanced writing course listed in category 2B of the AUCC.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select from the list of courses in category 3D in the AUCC.

⁶ Free electives to complete degree program as chosen by student and adviser.

⁷ Major related elective approved by BMS key adviser (15 credits from approved lists at department).

⁸ Free electives to complete degree program at student's discretion. Enough upper division (300- and 400-level) credits must be taken to bring total number of upper division credits to 42.

Minor in Biomedical Sciences

The minor in biomedical sciences provides students with a useful complement to majors in biological science, zoology, health and exercise science, animal science, psychology, and other biomedical science areas. The program offers a variety of courses which serve to broaden the background of students pursuing professional careers in biomedical sciences, human and veterinary medicine, and a variety of health-related disciplines. Candidates begin the program with a course in either human or animal anatomy and physiology. The remainder of the required 21 credits is selected to complement the student's educational goals and interests.

Course	Title	Cr
REQUIRED COURSES		
BMS 300 ^{P*}	Principles of Human Physiology	4
OR		
BMS 360 ^{P*}	Fundamentals of Physiology	4
<i>Select one course from the following:</i>		
BMS 301 ^{P*}	Human Gross Anatomy ¹	5
BMS 305 ^{P*}	Domestic Animal Gross Anatomy ¹	4
BMS 330 ^P	Microscopic Anatomy ¹	4
<i>Select one course from the following:</i>		
BMS 325 ^P	Cellular Neurobiology ¹	3
BMS 345 ^P	Functional Neuroanatomy ¹	4
BMS 405 ^P	Nerve and Muscle-Toxins, Trauma, and Disease ¹	3
	TOTAL	11-13

ELECTIVE COURSES

BMS 200 ^P	Concepts in Human Anatomy and Physiology	1
BMS 301 ^P	Human Gross Anatomy	5
BMS 302 ^P	Laboratory in Principles of Physiology	2
BMS 305 ^{P*}	Domestic Animal Gross Anatomy	4
BMS 325 ^P	Cellular Neurobiology	3
BMS 330 ^P	Microscopic Anatomy	4
BMS 345 ^P	Functional Neuroanatomy	4
BMS 405 ^P	Nerve and Muscle-Toxins, Trauma, and Disease	3
BMS 384 ^P	Supervised College Teaching	Var
BMS 420 ^P	Cardiopulmonary Physiology	3
BMS 430 ^P	Endocrinology	3
BMS 450 ^P	Pharmacology	3
BMS 495	Independent Study	Var
BMS 531 ^P	Domestic Animal Dissection	3
BMS 575	Human Anatomy Dissection	4
BZ 310 ^{P*}	Cell Biology	4

Course	Title	Cr
BZ 311 ^P	Development Biology	4
	TOTAL	8-10

PROGRAM TOTAL = 21 credits without prerequisites

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ If these courses are not used as required courses, they may be used as elective courses.

*Additional course work may be required because of prerequisites.

Graduate Programs in Biomedical Sciences

Graduate programs lead to the Master of Science and Doctor of Philosophy degrees in biomedical science. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduate.school.colostate.edu/current-students/bulletin.aspx, and the department's website, www.cvmb.colostate.edu/bms.

DEPARTMENT OF CLINICAL SCIENCES

Office in Veterinary Teaching Hospital, 300 West Drake Road, Room A201
(970) 297-1274
www.cvmb.colostate.edu/clinsci

Professor D. Paul Lunn, Head

The Department of Clinical Sciences is involved in training veterinary students and graduate students. For the veterinary student curriculum, students are instructed in the diagnosis, medical and surgical treatment, and prevention and management of domestic and exotic animal diseases. Through field service clinical experience, students receive on-the-farm training in livestock herd health management and production medicine. Our major clinical training center is the Veterinary Teaching Hospital which operates state-of-the-art primary and referral services in all areas of small animal medicine and surgery, equine and food animal clinical care.

No undergraduate major is offered.

Graduate Programs in Clinical Sciences

Graduate programs offered in the department lead to Master of Science or Doctor of Philosophy degrees. Particular research focus areas within the department include epidemiology, bone and joint diseases, cancer

biology, cardiac biology, regenerative medicine, and infectious diseases of equines and cats.

The department also offers a three-year combined master's degree and residency program in large and small animal surgery, anesthesiology, cardiology, internal medicine, neurology, oncology, ophthalmology, and emergency and critical care medicine. These training programs partially fulfill requirements for board certification in these specialties. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, www.cvmb.colostate.edu/clinsci.

DEPARTMENT OF ENVIRONMENTAL AND RADIOLOGICAL HEALTH SCIENCES

Office in Environmental Health Building, Room 122
(970) 491-7038

www.cvmb.colostate.edu/erhs/

Professor Jac Nickoloff, Department Head

Major in Environmental Health

An environmental health degree prepares students for employment by public sector environmental agencies, private industry, academic institutions, as well as graduate study in medicine, veterinary medicine, and related biomedical and health fields. The basic science requirements for the major will meet all admission requirements for accredited medical and veterinary medical schools in North America. Free and major-related electives can be utilized to meet the unique requirements of a particular professional training program. The degree program is fully accredited by the standards of the National Environmental Health Science and Protection Accreditation Council. Before taking environmental health classes, students will study sciences including biology, physics, chemistry, calculus, and statistics, and then using all these basic sciences as tools to solve problems. Students are involved in actual and simulated field projects with data gathering and analysis, characterization of environmental health problems, evaluation of alternative solutions, and presentation of results in written and oral formats.

Many undergraduates will spend summers on internships working in a variety of environmental health professions or research projects. Additionally, all will complete a professional internship for academic credit with a private

sector company, environmental health agency, or research entity (public or private).

Learning Outcomes

Students will:

- Effectively communicate the health consequences of actions, behaviors, or environmental degradation to the public, political community, legal experts, or the media
- Demonstrate critical thinking and problem solving abilities for environmental issues as an individual and as a member of a problem solving team
- Integrate knowledge in social, physical, and biological sciences to evaluate environmental issues
- Apply knowledge of scientific methods to evaluate compliance with environmental health standards and assess risks to workers and the public

Potential Occupations

Career opportunities include, but are not limited to: environmental health specialist, public health specialist, industrial hygienist, toxicologist, epidemiologist, health, education, air and water pollution specialist, hazardous and solid waste specialist, or health and safety specialist.

Course	Title	Cr	AUCC
FRESHMAN			
Select one set from the following:			
LIFE 103 ^P	Biology of Organisms and Plants	4	3A
OR			
LIFE 210 ^P	Introductory Eukaryotic Cell Biology	3	
LIFE 212 ^P	Introductory Cell Biology Laboratory	2	
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A
ERHS 220 ^P	Environmental Health	3	
LIFE 102 ^P	Attributes of Living Systems	4	3A
	Arts/humanities ¹	3	3B
	Social/behavioral sciences ²	3	3C
	Historical perspectives ³	3	3D
	TOTAL	32-33	
SOPHOMORE			
ERHS 230 ^P	Environmental Health Field Methods	3	
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
PH 121 ^P	General Physics I	5	3A
PH 122 ^P	General Physics II	5	3A
STAT 307 ^P	Introduction to Biostatistics	3	
	Additional communication ⁴	3	2A or 2B
	Arts/humanities ¹	3	3B
	Global and cultural awareness ⁵	3	3E
	TOTAL	29	
JUNIOR			
BMS 300 ^P	Principles of Human Physiology	4	
Select one set from the following:			
CHEM 341 ^P	Modern Organic Chemistry I	3	
CHEM 343 ^P	Modern Organic Chemistry II	3	

Course	Title	Cr	AUCC
CHEM 344 ^P	Modern Organic Chemistry Laboratory	2	
OR			
CHEM 345 ^P	Organic Chemistry I	4	
CHEM 346 ^P	Organic Chemistry II	4	
ERHS 300 ^P	Introduction to Radiation Biology	3	
ERHS 320 ^P	Environmental Health Water Quality	3	4A
ERHS 332 ^P	Principles of Epidemiology	3	
ERHS 350 ^P	Industrial Hygiene and Air	3	
ERHS 492	Environmental Health Seminar	1	
MIP 300 ^P	General Microbiology	3	
MIP 302 ^P	General Microbiology Laboratory	2	
TOTAL		30	
SENIOR			
BC 351 ^P	Principles of Biochemistry	4	
ERHS 410 ^P	Environmental Health Waste Management	3	4B
ERHS 446 ^P	Environmental Toxicology	3	
ERHS 487	Internship-Environmental Health Program electives ⁶	7	4C
TOTAL		11-12	
TOTAL		28-29	

PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

² Select from the list of courses in category 3C in the AUCC.

³ Select from the list of courses in category 3D of the AUCC.

⁴ Select from the list of courses in category 2A or 2B in the AUCC. First-time students entering a college or university on or after July 1, 2008, must take and advanced writing course (category 2B).

⁵ Select from the list of courses in category 3E in the AUCC.

⁶ Must be related to major and approved by an ERHS key adviser.

Minor in Environmental Health

A minor in Environmental Health will benefit majors in the biosciences interested in career options in public health, private sector environmental health and safety, sustainability or graduate school.

Course	Title	Cr
REQUIRED CORE COURSES		
ERHS 220 ^P	Environmental Health	3
ERHS 320 ^P	Environmental Health Water Quality	3
ERHS 332 ^P	Principles of Epidemiology ¹	3
OR		
ERHS 446 ^P	Environmental Toxicology ¹	3
TOTAL		9
DEPARTMENT COURSES²		
<i>Select at least 6 credits from the following:</i>		
ERHS 230 ^P	Environmental Health Field Methods	3
ERHS 300 ^P	Introduction to Radiation Biology	3
ERHS 332 ^P	Principles of Epidemiology ¹	3
ERHS 350 ^P	Industrial Hygiene and Air	3
ERHS 405 ^P	Fundamentals of Ergonomics	2
ERHS 410 ^P	Environmental Health Waste Management	3
ERHS 430 ^P	Human Disease and the Environment	3
ERHS 446 ^P	Environmental Toxicology ¹	3
ERHS 448 ^P	Environmental Contaminants: Exposure and Fate	3
Electives ³		0-6
TOTAL		12

PROGRAM TOTAL = 21credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/front/courses-of-instruction.aspx> to see the course prerequisites.

¹ ERHS 332 or ERHS 446 may be used as a department course if not selected as core course.

² Select 12 credits minimum to include at least 6 credits of upper division ERHS courses.

³ Select from department list of approved courses up to 6 credits.

Graduate Programs in Environmental and Radiological Health Sciences

The department offers graduate programs leading to Master of Science and Doctor of Philosophy degrees in environmental health and radiological health sciences. Areas of emphasis in environmental health include epidemiology, occupational health, industrial hygiene, ergonomics, and environmental toxicology. Areas of emphasis in radiological health include cancer biology, cellular and molecular radiobiology, radiation oncology, radiation protection/health physics, radiochemistry, radioecology, and veterinary radiology. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx, and the department's website, www.cvmb.colostate.edu/erhs/.

DEPARTMENT OF MICROBIOLOGY, IMMUNOLOGY, AND PATHOLOGY

Office in Microbiology Building, Room B116
(970) 491-6136

www.cvmb.colostate.edu/mip/

Professor Gregg Dean, Department Head

Professor Herbert P. Schweizer, Associate Department Head and Associate Program Director, RMRCE

Associate Professor Susan M. Deines, Associate Head for Undergraduate Education

Associate Professor Gary Mason, Associate Head for PVM and Clinical Service

Associate Professor Sandra Quackenbush, Associate Head for Graduate Education

Major in Microbiology

Microbiology is the study of organisms, many of which are too small to be seen with the naked eye, including fungi, protists, and bacteria, and acellular agents such as viruses and prions. Microbiology emerged as a distinct science in the late nineteenth century, with the discovery that microorganisms are the cause of many infectious diseases, and that they play essential roles in the ecosystem and in industrial processes. Much work in this field is directed toward

the cure, control, or eradication of disease in humans and animals. Genetically engineered microorganisms can also be used for the production of improved foods and new medicines, as well as for removing toxic wastes and spills from the environment. More recently, some microbes have received considerable attention as potential agents of bioterrorism and biowarfare, and consequently much work is being done to counter such threats.

Microbiology majors acquire knowledge and laboratory skill in the structure, physiology, genetics, pathogenicity, ecology, and taxonomy of microorganisms. Required courses in biological sciences, chemistry, physics, and mathematics support the major. Microbiology is an ideal major for students who are preparing for direct entry into a career, certification programs in medical technology/clinical laboratory science, graduate studies in various biological sciences, as well as professional veterinary or human medical programs.

The majority of our undergraduates choose to take advantage of the opportunity to do research with a member of our faculty, many of whom are world-renowned leaders in their fields. Students are an essential component of our research program; many have been accepted as presenters at conferences and have been awarded grants and fellowships based on their work as student researchers.

Learning Outcomes

Students will demonstrate:

- Analysis of data and testing of theories
- Effective writing and speaking skills
- Critical thinking and problem solving skills
- Ability to work well both independently and with other scientists

Potential Occupations

Career opportunities in microbiology will continue to grow because microbiology is at the center of complex issues facing our world today, as well as at the forefront of incredible innovation and development. Employment is driven by continued demand in numerous sub-disciplines.

Microbiology majors are employed in research laboratories operated by government agencies (such as the CDC, FDA, public health departments, universities, and the military), in private industry (such as pharmaceutical, food, beverage, and medical device manufacturers), in clinical labs and in technical sales. The level of education and the area of specialization determine employment opportunities. Part time laboratory work, internships, and cooperative education opportunities are highly

recommended and will enhance a graduate's entry into permanent full time employment.

Roughly half of our graduates obtain microbiology related careers upon completion of their bachelor's degree; the remainder choose to continue their education at the graduate, technical and/or professional level.

Course	Title	Cr	AUCC
FRESHMAN			
CHEM 111 ^P	General Chemistry I	4	3A
CHEM 112 ^P	General Chemistry Laboratory I	1	3A
CHEM 113 ^P	General Chemistry II	3	
CHEM 114 ^P	General Chemistry Laboratory II	1	
CO 150 ^P	College Composition	3	1A
LIFE 102 ^P	Attributes of Living Systems	4	3A
MATH 155 ^P	Calculus for Biological Scientists I	4	1B
OR			
MATH 160 ^P	Calculus for Physical Scientists I	4	1B
	Additional communication ¹	3	2A or 2B
	Biology elective ²	3-5	
	Microbiology elective ³	2	
	TOTAL	28-30	
SOPHOMORE			
CHEM 341 ^P	Modern Organic Chemistry I	3	
CHEM 343 ^P	Modern Organic Chemistry II	3	
CHEM 344 ^P	Modern Organic Chemistry Laboratory	2	
MIP 300 ^P	General Microbiology	3	
MIP 302 ^P	General Microbiology Laboratory	2	
MIP 342 ^P	Immunology	4	
STAT 301 ^P	Introduction to Statistical Methods	3	
OR			
STAT 307 ^P	Introduction to Biostatistics	3	
	Arts/humanities ⁴	3	3B
	Electives	6	
	TOTAL	29	
JUNIOR			
BC 351 ^P	Principles of Biochemistry	4	
MIP 351 ^P	Medical Bacteriology	3	4B
<i>Select one pair from the following:</i>			
PH 121 ^P	General Physics I	5	3A
PH 122 ^P	General Physics II	5	3A
OR			
PH 141 ^P	Physics for Scientists and Engineers I	5	3A
PH 142 ^P	Physics for Scientists and Engineers II	5	3A
	Historical perspectives ³	3	3D
	Microbiology electives ³	5	
	Electives	4	
	TOTAL	29	
SENIOR			
<i>Select one course from the following:</i>			
MIP 400A ^P	Capstone in Microbiology-Medical Microbiology	2	4C
MIP 400B ^P	Capstone in Microbiology-Biotechnology	2	4C
MIP 400C ^P	Capstone in Microbiology-Immunology	2	4C
MIP 400D ^P	Capstone in Microbiology-Microbial Diversity/Ecology	2	4C
MIP 400E ^P	Capstone in Microbiology-Microbial Genetics	2	4C
MIP 400F ^P	Capstone in Microbiology-Virology	2	4C
MIP 400G ^P	Capstone in Microbiology-Service Learning	2	4C
MIP 498 ^P	Research	2-3	4C
MIP 420 ^P	Medical and Molecular Virology	4	4A
MIP 443 ^P	Microbial Physiology	4	4A
MIP 450 ^P	Microbial Genetics	3	
	Arts/humanities ⁴	3	3B
	Global and cultural awareness ⁶	3	3E
	Social/behavioral sciences ⁷	3	3C
	Microbiology electives ³	5	
	Electives ³	5-7	
	TOTAL	33-34	

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
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PROGRAM TOTAL = 120 credits

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

¹ Select from the list of courses in category 2A or 2B in the All-University Core Curriculum (AUCC). First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course.

² Select three to five credits from approved list in department.

³ Select from approved list in department. Two chosen courses must be formal MIP courses with a laboratory component.

⁴ Select from the list of courses in category 3B in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from intermediate (L* 200 and L* 201) foreign language courses.

⁵ Select from the list of courses in category 3D in the AUCC.

⁶ Select from the list of courses in category 3E in the AUCC.

⁷ Select from the list of courses in category 3C in the AUCC.

⁸ Student may take 5-7 elective credits depending upon earlier biology or biochemistry choices to yield a 120 credit program.

Minor in Microbiology

A minor in microbiology will be of considerable benefit to students majoring in biological science, natural science, food science, biochemistry, some fields of engineering, and other science-related fields.

<u>Course</u>	<u>Title</u>	<u>Cr</u>
---------------	--------------	-----------

UPPER DIVISION

MIP 300 ^{*P}	General Microbiology	3
MIP 302 ^P	General Microbiology Laboratory	2
MIP 342 ^{*P}	Immunology	4

A total of 12 credits must be selected from the following lists.

<i>Select at least one course from each of the following pairs:</i>		
MIP 351 ^P	Medical Bacteriology	3
OR		
MIP 420 ^P	Medical and Molecular Virology	4
MIP 443 ^{*P}	Microbial Physiology	4
OR		
MIP 450 ^{*P}	Microbial Genetics	3
<i>Select 4-6 credits, including one laboratory course, from the following:</i>		
MIP 275	Microcomputing Applications in Microbiology	2
MIP 334 ^P	Food Microbiology	3
MIP 343 ^P	Immunology Laboratory	2
MIP 350 ^P	Microbial Diversity	3
MIP 351 ^P	Medical Bacteriology	3
MIP 352 ^P	Medical Bacteriology Laboratory	3

<u>Course</u>	<u>Title</u>	<u>Cr</u>
MIP 420 ^P	Medical and Molecular Virology	4
MIP 425 ^P	Virology and Cell Culture Laboratory	2
MIP 432 ^P	Microbial Ecology	4
MIP 436 ^P	Industrial Microbiology	4
MIP 443 ^{*P}	Microbial Physiology	4
MIP 450 ^{*P}	Microbial Genetics	3
MIP 462 ^{*P}	Parasitology and Vector Biology	5
BZ 462 ^{*P}		
BI 462 ^{*P}		
MIP 498 ^P	Research	Var

PROGRAM TOTAL = 21 credits without prerequisites

^P This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

*Additional course work may be required because of prerequisites.

Students may also elect to complete course work in several interdisciplinary minors, including biotechnology, food science/safety, and molecular biology.

Microbiology courses can be selected on the basis of students' specialized interest in biomedical, environment, industrial (biotechnology), or food microbiology.

Graduate Programs in Microbiology, Immunology and Pathology

The department offers graduate programs leading to Master of Science, Doctor of Philosophy, and combined Doctor of Veterinary Medicine/Doctor of Philosophy degrees. A description of these programs may be found on the departmental Web site or in the *Graduate and Professional Bulletin*, graduateschool.colostate.edu/current-students/bulletin.aspx.

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Key to Courses of Instruction

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KEY TO COURSES OF INSTRUCTION

1 2 3 4 5 6 7
 | | | | | | |
 +*CO 150 03(3-0-0). College Composition. (GT-CO2, AUCC 1A) F, S, SS.

8
 |
 Prerequisite: SAT critical reading score of 600 or above or ACT English score of 26 or above or composition placement/challenge exam (score of 3, 4, or 5) or CO 130. (For students registered at CSU prior to Fall 2008, SAT verbal score of 500 or above or ACT English score of 20 or above.)

Expository and argumentative writing emphasizing purpose and audience; writing and reading processes; development of ideas; coherence; effective style. (S, NT-O)

9 10

Refer to the sections below for an explanation of each numbered item.

1. Course Symbols

The following symbols are used in front of the course number to provide additional information concerning the course offering.

- Offered in odd years (e.g., 2013).
- * Offered in even years (e.g., 2012).
- + Certain field trips are a required part of this course and incur additional expense to the student. See also the Financial Services for Students section in this catalog.

2. Course Subject Codes

Courses offered by colleges, departments, or units are indicated by the following course subject codes.

Accounting..... ACT
 Adult Education..... EDAE
 Aerospace Studies (Air Force ROTC)..... AS

Agricultural and Resource Economics AREC
 Agricultural Education AGED
 Agriculture AGRI
 American Sign Language LSGN
 American Studies AMST
 Anatomy and Neurobiology (see Biomedical Sciences)
 BMS
 Animal Science ANEQ
 Anthropology ANTH
 Apparel and Merchandising AM
 Applied Human Sciences AHS
 Applied Statistics STAA
 Arabic..... LARA
 Art ART
 Arts Leadership, Entrepreneurship, Advocacy.....LEAP
 Astronomy..... AA
 Atmospheric Science..... ATS
 Bioagricultural Sciences and Pest Management.....BSPM
 Biochemistry and Molecular Biology..... BC
 Biological Science (see also Life Science).....BZ or LIFE
 Biomedical Engineering..... BIOM
 Biomedical Sciences BMS
 Biotechnology BTEC
 Botany BZ
 Business
 AccountingACT
 Computer Information Systems..... CIS
 Finance FIN
 GeneralBUS
 Management.....MGT
 Management Science..... QNT
 MarketingMKT
 Real Estate..... REL
 Career and Technical Education..... EDCT
 Cell and Molecular Biology CM
 Chemical and Biological Engineering.....CBE
 Chemistry CHEM
 Chinese..... LCHI
 Civil and Environmental Engineering CIVE
 Clinical Sciences..... VS
 Communication Studies SPCM
 Community College Education EDCL
 Composition CO
 Computer Engineering (see Electrical and Computer Engineering) ECE
 Computer Information Systems..... CIS
 Computer ScienceCS
 Computing Technology..... CT
 Conservation Biology (see Fish, Wildlife, and Conservation Biology) FW
 Construction Management CON
 Consumer and Family Studies (see Family and

Consumer Sciences).....	FACS	French	LFRE
Counseling and Career Development Education	EDCO	General Business.....	BUS
Dance.....	D	Geography.....	GR
Design and Merchandising	DM	Geology (see Geosciences).....	GEOL
Ecology.....	ECOL	Geosciences	GEOL
Economics	ECON	German.....	LGER
Ecosystem Science and Sustainability	ESS	Global Environmental Sustainability	GES
Education.....	EDUC	Graduate School.....	GRAD
Adult.....	EDAE	Greek.....	LGRK
Career and Technical	EDCT	Health and Exercise Science	HES
Community College.....	EDCL	Higher Education	EDHE
Counseling and Career Development.....	EDCO	History.....	HIST
Higher	EDHE	Home Economics (see Family and	
Licensure	EDUC	Consumer Sciences).....	FACS
Organization Performance and Change	EDOD	Honors.....	HONR
Research Methods.....	EDRM	Horticulture.....	HORT
Vocational (see Career and Technical Education) ..	EDCT	Hospitality (Restaurant/Resort) Management	RRM
Electrical and Computer Engineering.....	ECE	Human Development and Family Studies	HDFS
Engineering.....	ENGR	Human Sciences (see Applied Human Sciences)	AHS
Atmospheric Science	ATS	Interior Design	INTD
Biomedical.....	BIOM	International Education	IE
Chemical and Biological.....	CBE	International Studies	INST
Civil.....	CIVE	Intra-University	IU
Electrical and Computer	ECE	Italian	LITA
Engineering Science	EGSC	Japanese	LJPN
Environmental.....	ENVE	Journalism and Technical Communication	JTC
Mechanical.....	MECH	Key Academic Community	KEY
Engineering Science	EGSC	Korean.....	LKOR
English.....	E	Landscape Architecture.....	LAND
English for Academic Purposes.....	EAP	Languages and Literatures, Foreign	LGEN
Entomology (see Bioagricultural Sciences and Pest		Latin	LLAT
Management).....	BSPM	Liberal Arts	LB
Environmental and Radiological Health Sciences	ERHS	Library Information.....	LI
Environmental Engineering	ENVE	Licensure/Education.....	EDUC
Environmental Health (see Environmental and		Life Science.....	LIFE
Radiological Health Sciences	ERHS	Management.....	MGT
Equine Science (see Animal Science).....	ANEQ	Management Science.....	QNT
Ethnic Studies.....	ETST	Marketing.....	MKT
Exercise Science, Health and.....	HES	Mathematics.....	MATH
Family and Consumer Sciences	FACS	Mechanical Engineering.....	MECH
Family Studies	HDFS	Microbiology, Immunology, and Pathology.....	MIP
Finance	FIN	Military Science (Army ROTC)	MLSC
Fire and Emergency Services Administration.....	FESA	Music.....	MU
Fish, Wildlife, and Conservation Biology	FW	Natural Resource Recreation and Tourism.....	NRRT
Food Science and Human Nutrition.....	FSHN	Natural Resources	NR
Food Technology.....	FTEC	Natural Sciences.....	NSCI
Foreign Languages and Literatures.....	LGEN	Neurobiology	NB
American Sign Language.....	LSGN	Nutrition.....	FSHN
Arabic	LARA	Occupational Therapy	OT
Chinese	LCHI	Pathology (see Microbiology, Immunology,	
French.....	LFRE	and Pathology)	MIP
General courses.....	LGEN	Performance and Change Education	EDOD
German	LGER	Performing Arts.....	PF
Greek	LGRK	Philosophy.....	PHIL
Italian	LITA	Physical Education (see Health and Exercise Science) ..	HES
Japanese.....	LJPN	Physics	PH
Korean	LKOR	Physiology (see Biomedical Sciences)	BMS
Latin.....	LLAT	Plant Disease (see Bioagricultural Sciences and Pest	
Russian	LRUS	Management).....	BSPM
Spanish	LSPA	Political Science.....	POLS
Forest Sciences, Forestry	F	Psychology.....	PSY

Radiological Health Sciences (see Environmental and Radiological Health Sciences)	ERHS
Rangeland Ecosystem Science	RS
Real Estate	REL
Restaurant/Resort (Hospitality) Management	RRM
Russian	LRUS
Sign Language, American	LSGN
Social Work	SOWK
Sociology	SOC
Soil and Crop Sciences	SOCR
Speech Communication (see Communication Studies)SPCM	
Statistics	STAT
Statistics, Applied	STAA
Study Abroad	SA
Technical Journalism	JTC
Theatre	TH
Veterinary Medicine	VM
Vocational Education (see Career and Technical Education)	EDCT
Watershed Science	WR
Weed Science (see Bioagricultural Sciences and Pest Management)	BSPM
Wildlife Biology (see Fish, Wildlife, and Conservation Biology)	FW
Women's Studies	WS
Zoology	BZ

3. Course Numbering

Course numbering is based on the content level of material presented in a course.

- 100-299 Courses primarily for freshman and sophomore students.
- 300-499 Courses primarily for junior and senior students. Acceptable for graduate credit for students holding bachelor's degrees when approved by the student's graduate committee.
- 500-599 Courses primarily for students enrolled in master's-level degree programs or equivalents. Qualified junior and senior students may enroll.
- 600-699 Courses primarily for students enrolled in master's-level programs or equivalents. Under-graduate students may not enroll to satisfy undergraduate degree requirements.
- 700-799 Courses primarily for students enrolled in Ph.D.-level programs or equivalents and professional veterinary medicine courses. Under-graduate students may not enroll.

4. Clock Hour Distribution And Credits

The distribution of credit for lecture-laboratory-discussion or recitation class periods per semester is as follows: in the example 04(2-2-1), the figure outside the parentheses indicates the number of credits assigned to this class. Inside the parentheses, the first figure indicates the number of clock hours spent in lectures each week, the second figure indicates the number of clock hours spent in laboratory each week, and the third figure indicates the number of clock hours spent in discussion, recitation, seminar, or online/other course format each week.

VARIABLE CREDIT COURSES

VAR indicates variable credit with no specific minimum credit or no maximum credit indicated. Varies 1-18 credits.

Var[3-9] indicates variable credit with minimum credit and maximum credit limitations per term. The course listing may indicate other credit limitations.

5. State Guaranteed Transfer (GT-subcode)

By legislation, lower-division Colorado State University courses in categories 1-3 of the All-University Core Curriculum must be submitted to and approved by the Colorado Commission on Higher Education (CCHE) as general education courses guaranteed to transfer among all public higher education institutions within the state. The subcode refers to the specific statewide general education category the course fulfills. For a complete listing of the courses approved statewide, visit the CCHE web site at higher.ed.colorado.gov/Academics/Transfers/gtPathways/curriculum.html.

6. All-University Core Curriculum Category (i.e., AUCC 1A)

This notation identifies which, if any, of the AUCC categories (1-3) the course fulfills.

Students are strongly advised to see if their preferred program of study has particular recommendations for satisfying All-University Core Curriculum requirements.

The AUCC categories are:

- 1 *Basic Competencies*
 - 1A Written Communication
 - 1B Mathematics
- 2 *Advanced Writing*
- 3 *Foundations and Perspectives*
 - 3A Biological/Physical Sciences
 - 3B Arts/Humanities
 - 3C Social/Behavioral Sciences
 - 3D Historical Perspectives
 - 3E Global and Cultural Awareness
- 4 *Depth and Integration*
 - 4A Using Competencies
 - 4B Building upon Foundations and Perspectives
 - 4C Capstone

Category 4 courses are specific to each major and do not carry an AUCC designation in the Courses of Instruction. See each major for its category 4 courses.

7. Term

- F Taught fall semester
- S Taught spring semester
- SS Taught summer session

The term or terms listed are those which the course could be scheduled to be offered during the terms indicated. Since the frequency of class offerings is determined by the department in accordance with program needs, students should consult the official, applicable on-line class schedule (available on RAMweb) for courses to be offered in a given term.

The following types of courses do not always indicate term; they will be offered when there is sufficient demand: -86, Practicum; -87, Internship; -90, -91, Workshop; -92, -93, Seminar; -94, -95, Independent Study; -96, -97, Group Study; -98, Research; and -99, Thesis or Dissertation.

8. Prerequisites

Current prerequisites for a course may be found in the courses of instruction section of the General Catalog.

Students must meet all course prerequisites prior to registration for a specific class, or acquire the instructor's permission through an override.

Permission of the instructor for a student to attend a class is implied when the student has met specified prerequisites. All prerequisites may be considered to have been met if a student presents evidence of credit earned in equivalent courses or if knowledge equivalent to the prerequisites indicated is demonstrated.

Academic prerequisites notwithstanding, a department may limit the enrollment in a class; classes may be limited to a specified number of students, to students of particular majors, or to students of particular class levels.

In the listing in the catalog, only the most recent version of a course number is shown as a prerequisite.

9. Course Fees (\$)

Certain courses carry a special fee which is assessed at the time a student registers for the course. For a list of current course fees, refer to www.provost.colostate.edu/files/course_fee/SCFComprehensiveListFY12.pdf.

Certain courses carry a variable fee which is assessed each student enrolled in the course based on expenses that fluctuate, e.g., expendable materials. These fees may vary by student and/or by term within the fee range specified at www.provost.colostate.edu/files/course_fee/SCFComprehensiveListFY12.pdf.

10. Nontraditional Course Offering (NT-O, B, C, T, and/or V)

NT indicates the course has been approved to be offered in a nontraditional format, usually as a distance course (on-line, blended, telecourse or streaming videotape/DVD) through the Division of Continuing Education or other distance learning venue on campus, or as a correspondence or self-paced course. Students are encouraged to contact the department offering the course or the Division of Continuing Education about course availability for a particular term.

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Key to Courses of Instruction

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KEY TO COURSES OF INSTRUCTION

1 2 3 4 5 6 7
 | | | | | | |
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8
 |
 Prerequisite: SAT critical reading score of 600 or above or ACT English score of 26 or above or composition placement/challenge exam (score of 3, 4, or 5) or CO 130. (For students registered at CSU prior to Fall 2008, SAT verbal score of 500 or above or ACT English score of 20 or above.)

Expository and argumentative writing emphasizing purpose and audience; writing and reading processes; development of ideas; coherence; effective style. (S, NT-O)

| |
 9 10

Refer to the sections below for an explanation of each numbered item.

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 BMS
 Animal Science ANEQ
 Anthropology ANTH
 Apparel and Merchandising AM
 Applied Human Sciences AHS
 Applied Statistics STAA
 Arabic..... LARA
 Art ART
 Arts Leadership, Entrepreneurship, Advocacy.....LEAP
 Astronomy..... AA
 Atmospheric Science..... ATS
 Bioagricultural Sciences and Pest Management.....BSPM
 Biochemistry and Molecular Biology..... BC
 Biological Science (see also Life Science).....BZ or LIFE
 Biomedical Engineering..... BIOM
 Biomedical Sciences BMS
 Biotechnology BTEC
 Botany BZ
 Business
 AccountingACT
 Computer Information Systems..... CIS
 Finance FIN
 GeneralBUS
 Management.....MGT
 Management Science..... QNT
 MarketingMKT
 Real Estate..... REL
 Career and Technical Education..... EDCT
 Cell and Molecular Biology CM
 Chemical and Biological Engineering.....CBE
 Chemistry CHEM
 Chinese..... LCHI
 Civil and Environmental Engineering CIVE
 Clinical Sciences..... VS
 Communication Studies SPCM
 Community College Education EDCL
 Composition CO
 Computer Engineering (see Electrical and Computer Engineering) ECE
 Computer Information Systems..... CIS
 Computer ScienceCS
 Computing Technology..... CT
 Conservation Biology (see Fish, Wildlife, and Conservation Biology) FW
 Construction Management CON
 Consumer and Family Studies (see Family and

Consumer Sciences).....	FACS	French	LFRE
Counseling and Career Development Education	EDCO	General Business.....	BUS
Dance.....	D	Geography.....	GR
Design and Merchandising	DM	Geology (see Geosciences).....	GEOL
Ecology.....	ECOL	Geosciences	GEOL
Economics	ECON	German.....	LGER
Ecosystem Science and Sustainability	ESS	Global Environmental Sustainability	GES
Education.....	EDUC	Graduate School.....	GRAD
Adult.....	EDAE	Greek.....	LGRK
Career and Technical	EDCT	Health and Exercise Science	HES
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Mechanical.....	MECH	Key Academic Community	KEY
Engineering Science	EGSC	Korean.....	LKOR
English.....	E	Landscape Architecture.....	LAND
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Japanese.....	LJPN	Physics	PH
Korean	LKOR	Physiology (see Biomedical Sciences)	BMS
Latin.....	LLAT	Plant Disease (see Bioagricultural Sciences and Pest	
Russian	LRUS	Management).....	BSPM
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Forest Sciences, Forestry	F	Psychology.....	PSY

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Rangeland Ecosystem Science	RS
Real Estate	REL
Restaurant/Resort (Hospitality) Management	RRM
Russian	LRUS
Sign Language, American	LSGN
Social Work	SOWK
Sociology	SOC
Soil and Crop Sciences	SOCR
Speech Communication (see Communication Studies)SPCM	
Statistics	STAT
Statistics, Applied	STAA
Study Abroad	SA
Technical Journalism	JTC
Theatre	TH
Veterinary Medicine	VM
Vocational Education (see Career and Technical Education)	EDCT
Watershed Science	WR
Weed Science (see Bioagricultural Sciences and Pest Management)	BSPM
Wildlife Biology (see Fish, Wildlife, and Conservation Biology)	FW
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 - 3A Biological/Physical Sciences
 - 3B Arts/Humanities
 - 3C Social/Behavioral Sciences
 - 3D Historical Perspectives
 - 3E Global and Cultural Awareness
- 4 *Depth and Integration*
 - 4A Using Competencies
 - 4B Building upon Foundations and Perspectives
 - 4C Capstone

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7. Term

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- SS Taught summer session

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Current prerequisites for a course may be found in the courses of instruction section of the General Catalog.

Students must meet all course prerequisites prior to registration for a specific class, or acquire the instructor's permission through an override.

Permission of the instructor for a student to attend a class is implied when the student has met specified prerequisites. All prerequisites may be considered to have been met if a student presents evidence of credit earned in equivalent courses or if knowledge equivalent to the prerequisites indicated is demonstrated.

Academic prerequisites notwithstanding, a department may limit the enrollment in a class; classes may be limited to a specified number of students, to students of particular majors, or to students of particular class levels.

In the listing in the catalog, only the most recent version of a course number is shown as a prerequisite.

9. Course Fees (\$)

Certain courses carry a special fee which is assessed at the time a student registers for the course. For a list of current course fees, refer to www.provost.colostate.edu/files/course_fee/SCFComprehensiveListFY12.pdf.

Certain courses carry a variable fee which is assessed each student enrolled in the course based on expenses that fluctuate, e.g., expendable materials. These fees may vary by student and/or by term within the fee range specified at www.provost.colostate.edu/files/course_fee/SCFComprehensiveListFY12.pdf.

10. Nontraditional Course Offering (NT-O, B, C, T, and/or V)

NT indicates the course has been approved to be offered in a nontraditional format, usually as a distance course (on-line, blended, telecourse or streaming videotape/DVD) through the Division of Continuing Education or other distance learning venue on campus, or as a correspondence or self-paced course. Students are encouraged to contact the department offering the course or the Division of Continuing Education about course availability for a particular term.

Colorado State University reserves the right at any time, without notice, to change, modify, or cancel any course, program, procedure, policy, financial requirement, or disciplinary arrangement set forth in this catalog whenever, in its sole discretion, it determines such action to be appropriate. Furthermore, Colorado State will not be responsible for any failure to present or complete any course or program or to perform any other activity, function, or obligation mentioned in this catalog. Since changes may occur at any time, students must check the relevant website (as noted throughout various chapters in this catalog).

ASTRONOMY COURSES

Department of Physics

College of Natural Sciences

AA 100 03(3-0-0). Introduction to Astronomy. (GT-SC2, AUCC 3A). F, S, SS.

Description of the various objects found in the heavens as well as the principles and techniques employed in investigations of these objects.

AA 101 01(0-2-0). Astronomy Laboratory. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: AA 100 or concurrent registration.

Observations of the various objects found in the heavens with 5-inch reflecting telescopes.

AA 150 03(2-3-0). Observational Astronomy. SS.

Astronomical objects in the night and day sky; observation with 16-inch telescope.

°**AA 301 05(4-2-0). Astrophysics I.** F. Prerequisite: MATH 124; MATH 126; PH 110 or PH 121 or PH 141.

Celestial mechanics, earth-moon systems, planets and satellites, interplanetary medium, origin of solar system.

°**AA 302 05(4-2-0). Astrophysics II.** S. Prerequisite: MATH 124; MATH 126; PH 110 or PH 121 or PH 141.

Properties of sun and stars, variable stars, binary and multiple star systems, star clusters, interstellar medium, stellar evolution.

***AA 303 05(4-2-0). Astrophysics III.** F. Prerequisite: MATH 124; MATH 126; PH 110 or PH 121 or PH 141.

Properties of the Milky Way, galaxies, quasars and related objects; special and general relativity; cosmology.

AA 495 Var [1-6]. Independent Study in Astrophysics. Prerequisite: Written consent of instructor.

ACCOUNTING COURSES

Department of Accounting

College of Business

ACT 205 03(3-0-0). Fundamentals of Accounting. F, S, SS. For nonbusiness majors. Credit not allowed for both ACT 205 and ACT 210.

Understanding of financial statements to support financial and managerial decision making. (NT-O)

ACT 210 03(3-0-0). Introduction to Financial Accounting. F, S, SS. Prerequisite: BUS 100 or HONR 192 or KEY 192. Credit not allowed for both ACT 210 and ACT 205.

Use of accounting information by decision makers; development of the basic accounting model, and issues concerning income and cash flows.

ACT 220 03(3-0-0). Introduction to Managerial Accounting. F, S, SS. Prerequisite: ACT 205 or ACT 210; BUS 150 or concurrent registration or CS 110 or concurrent registration.

Use of accounting information in internal decision making.

ACT 310 03(3-0-0). Financial Statement Analysis. F, S. Prerequisite: ACT 220. For business majors. Credit not allowed for both ACT 310 and ACT 311.

Analysis of balance sheet and income statement accounts.

ACT 311 03(3-0-0). Intermediate Accounting I. F. Prerequisite: ACT 205 with grade of B- or better or ACT 210 with grade of B- or better; ACT 220 with grade of B- or better. Credit not allowed for both ACT 311 and ACT 310.

Asset and liability accounting.

ACT 312 03(3-0-0). Intermediate Accounting II. F, S. Prerequisite: ACT 311 with a C or better.

Equity structure of corporations; analysis and interpretation of accounting data.

ACT 321 03(3-0-0). Cost Management. F. Prerequisite: ACT 220.

Utilizing budgetary and cost accounting information for planning, controlling, and decision-making.

ACT 330 03(3-0-0). Introduction to Taxation. F, S. Prerequisite: ACT 205 or ACT 210.

Introduction to U.S. taxation, with emphasis on federal income tax; impact of taxation on business decisions.

ACT 350 03(3-0-0). Accounting Information Systems. F, S. Prerequisite: ACT 220; ACT 321.

Design, administration and control of accounting information systems; use of accounting systems software.

ACT 411 03(3-0-0). Advanced Accounting. F, S. Prerequisite: ACT 312.

Accounting for branches and subsidiaries, partnerships, and business combinations. Accounting for multinational business transactions.

ACT 421 03(3-0-0). Management Control Systems. S. Prerequisite: ACT 220.

Business transaction cycles. Laws and regulations regarding responsibility for internal control. Performance measurement systems and controllership.

ACT 430 03(3-0-0). Income Tax Accounting. F, S. Prerequisite: ACT 330.

Basic structure of federal income tax law; impact of taxes on decision making; social security taxes.

ACT 431 03(3-0-0). Corporate Taxation. F. Prerequisite: ACT 220;

ACT 330.

Federal income tax principles pertaining to formation and operation of corporate entities.

ACT 441 03(3-0-0). Auditing Practices. F, S. Prerequisite: ACT 312; ACT 350.

Environment, professional standards, and practices involved in auditing financial statements and performance of other assurance services.

ACT 442 03(3-0-0). International Accounting. SS. Prerequisite: ACT 220. Credit not allowed for both ACT 442 and ACT 642.

International accounting issues facing multi-national enterprises.

ACT 487 Var. Internship.

Supervised work experience in public, industry, or governmental accounting.

ACT 495 Var. Independent Study.

ACT 496 Var. Group Study.

ACT 498 Var [1-3]. Research.

ACT 501 03(3-0-0). Accounting for Global Sustainable Enterprise. F. Prerequisite: Admission to GSSE program.

Basics of U.S. and international financial reporting; accounting issues of not-for-profit enterprises; budgeting; managerial decision making.

ACT 511 03(3-0-0). Advanced Accounting I. F. Prerequisite: ACT 312.

Accounting for business combinations and consolidations in corporate restructuring and alternative organizational forms.

ACT 540 03(3-0-0). Professional Ethics and Responsibilities. S. Prerequisite: ACT 311.

Ethical practice of professional accounting.

ACT 541 03(3-0-0). Forensic Accounting and Fraud Auditing. S. Prerequisite: ACT 441; graduate standing.

Professional practices for addressing the related areas of forensic accounting and fraud. (NT-O)

ACT 550 03(3-0-0). Electronic Commerce Accounting Issues. F. Prerequisite: ACT 350.

Best practices for technology use in organizational accounting processes, including advanced skills in spreadsheet and database technologies.

ACT 561 03(3-0-0). Legal and Regulatory Issues in Accounting. F, S. Prerequisite: BUS 205 or BUS 260; graduate standing or written consent of instructor.

Contracts, ownership, bankruptcy (debtor/creditor relationship), formation of business entities, regulation of accounting profession. (NT-V)

ACT 570 03(3-0-0). Government and Nonprofit. F. Prerequisite: ACT 441 or concurrent registration; graduate standing or written consent of instructor.

Theory and practical application of accounting principles and auditing standards to governmental entities and not-for-profit organizations. (NT-V)

ACT 600 03(3-0-0). Accounting for Managers. F. Prerequisite: Admission to a master's program in business.

Cost management, budgeting, profitability analysis, and decision making.

ACT 601A-B 03(3-0-0). Professional Practice.

Management of accounting practice; professional ethics and regulation; research techniques. A) Taxation. F. Prerequisite: ACT 330.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC-*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

(NT-O) **B) Auditing.** S. Prerequisite: ACT 612. (NT-O)

ACT 612 03(3-0-0). Contemporary Financial Accounting Issues. F. Prerequisite: ACT 312.

Historical development of accounting; controversial issues involved in calculations and disclosure of enterprise periodic income. (NT-O)

ACT 622 03(3-0-0). Advanced Cost and Managerial Accounting. S. Prerequisite: ACT 321.

Contributions of cost accounting to decision making and planning. (NT-O)

ACT 630 03(3-0-0). Tax and Accounting Research. F. Prerequisite: ACT 220.

Research aspects of professional accounting and tax practices; development of oral and written communication skills.

ACT 631 03(3-0-0). Corporate Taxation. F. Prerequisite: ACT 220; ACT 330.

Federal income tax principles pertaining to formation and operation of corporate entities. (NT-V)

ACT 633 03(3-0-0). Flow-Through Entities. S. Prerequisite: ACT 220.

Federal income tax principles and problems pertaining to flow-through entities. (NT-V)

ACT 635 03(3-0-0). State and Local Taxation. F. Prerequisite: ACT 220.

Tax planning and compliance issues for entities doing business in multijurisdictional locales. (NT-O)

ACT 636 03(3-0-0). Taxation of Corporations and Shareholders. SS. Prerequisite: ACT 220.

Federal income tax principles and problems relating to reorganization, consolidation, and termination of corporations. (NT-V)

ACT 639 03(3-0-0). Special Topics in Taxation. S. Prerequisite: ACT 601A; ACT 631.

Taxation of not-for-profit entities; international tax issues; other contemporary topics. (NT-O)

ACT 641 03(3-0-0). Contemporary Auditing. F. Prerequisite: ACT 441.

Seminar exploring various facets of the assurance services environment. (NT-V)

ACT 642 03(3-0-0). International Accounting. SS. Prerequisite: ACT 220. Credit not allowed for both ACT 642 and ACT 442.

Preparation for work with multinational companies in coordinating operations to adhere to global regulations and customs. (NT-O)

ACT 650 03(3-0-0). Advanced Accounting Information Systems. F. Prerequisite: ACT 350.

Research and review of best practices for technology in organizational accounting processes, including advanced skills in spreadsheets and databases.

ACT 679A-B 03(3-0-0). Capstone Seminar. F, S, SS.

Final project integrating material from prior courses. **A) Taxation.** Prerequisite: ACT 601A; ACT 631. (NT-O) **B) Financial accounting.** Prerequisite: ACT 601B. (NT-O)

ACT 695 Var. Independent Study.

ACT 696 Var. Group Study.

AGRICULTURAL EDUCATION COURSES

*Department of Agricultural and Resource
Economics
College of Agricultural Sciences*

AGED 241 02(1-2-0). Plumbing and Electrical Applications in Ag Ed. F, S, SS.

Development of technical competencies for educators relating to plumbing and electrical applications in secondary agricultural education classrooms.

AGED 244 02(1-2-0). Small Gas Engine Repair and Maintenance. F, S, SS.

Offered only off-campus. (NT)

AGED 487 Var[1-6]. Internship.

AGED 495 Var[1-6]. Independent Study.

AGED 496 Var[1-12]. Group Study.

AGRICULTURE COURSES

Nondepartmental

College of Agricultural Sciences

AGRI 116/IE 116 03(2-0-1). Plants and Civilizations. (GT-SS3, AUCC 3E). F, S. Credit not allowed for both AGRI 116 and IE 116.

Plant origins and their relationships with cultures/civilizations as food, spices, perfumes, and medicines and in art, religion, wars, slavery, etc.

AGRI 140 03(0-0-3). Technology in Agriculture. F, S, SS.

Computer concepts and terminology. PC operating systems, Web tools, e-mail, presentation technology, word processing, spreadsheet, and database. (NT-O)

AGRI 192 01(0-0-1). Orientation to Agricultural Systems. F, S.

Freshman inquiry course in agriculture. Information and skills necessary to succeed in majors in the agricultural sciences.

AGRI 270/IE 270 03(3-0-0). World Interdependence-Population and Food. (GT-SS3, AUCC 3E). S. Credit not allowed for both AGRI 270 and IE 270.

Survey of world population and food; emphasis on understanding the problems and opportunities in a world context.

AGRI 292 01(1-0-0). Transfer Seminar. F, S. Prerequisite: Transfer student.

The university and its resources, college success skills, careers in the various disciplines of agriculture; current issues in agriculture.

AGRI 300 02(2-0-0). Issues in Agriculture. F. Credit not allowed for both AGRI 300 and AGRI 500.

Scientific, technical, cultural, and social issues facing agriculture, and their interrelationships. (NT-O)

AGRI 320A-F 01(0-2-0). Computer Applications in Agriculture. S. Prerequisite: AGRI 140 or BUS 150 or CS 110.

A) Optimization. B) Data base. (NT-O) C) Communications. (NT-O) D) Project management. (NT-O) E) Spreadsheets. (NT-O) F) Presentation technology. (NT-O)

AGRI 330/PHIL 330 03(3-0-0). Agricultural Ethics. S. Credit not allowed for both AGRI 330 and PHIL 330.

Basic concepts in ethics and their application to agriculture.

+AGRI 383/NR 383 02(0-2-1). U.S. Travel-Integrated Resource Management. S. Credit not allowed for both AGRI 383 and NR 383.

Evaluation of integrated ranch management decision alternatives in conjunction with professional resource managers. Required field trips.(\$)

AGRI 374 01(0-0-1). Professional Development Seminar. F, S, SS. Prerequisite: Junior or senior standing.

Assess personal workplace skills and strengths, including teamwork and decision-making, for use in career planning.

AGRI 465 03. Pesticide Management. F, S, SS. Offered as correspondence course only.

Reasons for and safe correct pesticide use. (NT-C)

AGRI 466 01. Management of On-Farm Stored Grain. F, S, SS. Offered as correspondence course only.

Basic principles of grain storage and management strategies for insects and fungi; chemical controls and safe pesticide use. (NT-C)

AGRI 467 02. Management and Control of Wood-Destroying Pests. F, S, SS. Offered as correspondence course only.

Wood-destroying agents; wood preservative chemicals and treatment; industry regulations; labels; safety; environmental concerns. (NT-C)

AGRI 468 03. Management and Control of Turfgrass Pests. F, S, SS. Offered as correspondence course only.

Classification of turfgrass pests; pest management, control; environmental concerns, industry regulations; safety, skill in pesticide applications. (NT-C)

AGRI 487A-B Var [1-12]. Internship. F, S, SS. Prerequisite: None. No more than a total of 12 credits allowed for AGRI 487.

A) Domestic. (NT-O) B) International. (NT-O)

AGRI 492 Var [1-3]. Seminar.

AGRI 495 Var [1-12]. Independent Study.

AGRI 496A-B Var [1-12]. Group Study.

A) General. B) Agricultural ambassadors.

AGRI 500 03(2-0-1). Advanced Issues in Agriculture. F. Credit not allowed for both AGRI 500 and AGRI 300.

Scientific, technical, cultural, and social issues facing agriculture, and their interrelationships. (NT-O)

***AGRI 545 02(2-0-0). Plant Tissue Culture.** F. Prerequisite: BZ 440.

Theory, technology, and techniques of cell, organ, tissue, and protoplast culture of plants.

AGRI 546 03(3-0-0). Principles of Cooperative Extension. F, S, SS.

Traditional and contemporary delivery systems of Cooperative Extension emphasizing structures of nonformal education. (NT-C/O)

AGRI 547 04(2-0-2). Delivery of Cooperative Extension Programs. S. Prerequisite: Written consent of instructor.

Methods, techniques, and procedures in planning, implementation, and delivery of Cooperative Extension programs. (NT-C/V/O)

AGRI 562/SOC 562 03(2-0-1). Sociology of Food Systems and Agriculture. F, S. Prerequisite: SOC 100 or SOC 105. Credit not allowed for both AGRI 562 and SOC 562.

How agricultural choices generate intended and unintended consequences for human communities and the natural environment.

***AGRI 570/*VS 570 02(2-0-0). Issues in Animal Agriculture.** F.

Credit not allowed for both AGRI 570 and VS 570.

Issues that have a major impact on the direction of changes in animal agriculture.

AGRI 587A-B Var [1-12]. Internship. F, S, SS. No more than a total of 12 credits allowed for AGRI 587.

A) Domestic. (NT-O) B) International. (NT-O)

+AGRI 601/ENGR 601 03(2-2-0). Bioenergy Technology. F.

Science and engineering aspects of bioenergy production, including plant biology, fermentation, and biofuel properties. Required field trips.

AGRI 630 03(3-0-0). Integrated Decision Making/Management Skills. F.

Motivation for management, decision making, introduction to systems, information management, introduction to statistics. (NT-O)

AGRI 631 03(3-0-0). Building the Business. F, S.

Skills required to organize and implement a modern business enterprise with focus on land-based operations. (NT-O)

AGRI 632 03(2-2-0). Managing for Ecosystem Sustainability. F, S.

Impacts of ecological processes, use of mechanism-based understanding, and tools used to manage the ecosystem for sustainability. (NT-O)

AGRI 633 03(2-2-0). Understanding and Managing Animal Resource.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

F, S.

Evaluating nutritional requirements of a variety of animals, how and why requirements vary according to level of production. (NT-O)

AGRI 634 03(2-2-0). Animal Production Systems. F, S.

Developing animal management systems for a variety of animal species in a forage-based environment. (NT-O)

+AGRI 635 03(3-0-0). Integrated Forage Management. F.S.

Development of management plans that integrate diverse forage resources including native rangeland and cultivated forages. Required field trips. (NT-O)

AGRI 636 03(3-0-0). Analyzing and Managing the Business. F, S.

Assimilating, preparing, and analyzing records; reading financial statements to manage a land-based business. (NT-O)

AGRI 637 03(3-0-0). Understanding Policy and Emerging Issues. F, S.

Origination, purpose, and policy effects of policy on land-based enterprises; policy effects on management decisions. (NT-O)

+AGRI 638 03(3-0-0). Ecosystem Services on Agricultural Lands. F, S.

Within an economics framework, explores the unique management challenges involved in a modern, diversified agricultural operation. Required field trips. (NT-O)

AGRI 639 03(3-0-0). Products to Profit. F, S.,

Marketing all aspects of the enterprise, beginning with land and forage resource and tracking all revenue generation. (NT-O)

AGRI 640 03(3-0-0). Integrated Resource Management Plan. F, S.

Formulation of an optimal land management plan for a specific site based on specific goals and objectives. (NT-O)

AGRI 684 Var [1-2]. Supervised College Teaching. Maximum of 4 credits allowed in course.

AGRI 692 01(0-0-1). Seminar.

AGRI 695 Var [1-12]. Independent Study. F, S, SS. (NT-O)

AGRI 698 Var [1-6]. Research. (NT-O)

APPLIED HUMAN SCIENCES COURSES

Nondepartmental

College of Applied Human Sciences

AHS 192 02(0-0-2). Applied Human Sciences First Year Seminar. F, S, SS.

Concepts and topics integral to applied human sciences; development of community; enhancement of reading, critical thinking, and communication skills.

AHS 201 03(3-0-0). Perspectives in Gerontology. F, S. Prerequisite: HDFS 101 or PSY 100 or SOC 100.

Using multidisciplinary perspectives to explore a variety of issues in human aging; emphasis on applied gerontology. (NT-O)

AHS 300 03(3-0-0). Research in Applied Professions. F, S, SS.

Application of social science research methodology to applied professions including problem formulation, research design, and data collection.

AHS 426 03(3-0-0). Responsible Promotion of Food and Apparel. F. Offered as online course only.

Socially responsible decision-making and regulatory processes in the advertising and promotion of food, apparel, and related products. (NT-O)

AHS 484 02(0-0-2). Supervised College Teaching. F, S, SS. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

AHS 487 Var [1-16]. Internship in Human Services. Prerequisite: Written consent of instructor.

Application of skills learned in interdisciplinary program or major to a variety of human service settings.

AHS 490 Var [1-5]. Workshop.

AHS 492 Var [1-5]. Seminar.

AHS 495 Var [1-5]. Independent Study.

AHS 590 Var [1-5]. Workshop.

AHS 668 03(3-0-0). Program Design, Implementation and Evaluation. F, S. Offered only as online course as part of the Great Plains Interactive Distance Education Alliance.

Principles and methods of program design, implementation, and outcome. (NT-O)

AHS 692 Var [1-5]. Seminar.

AHS 695 Var [1-5]. Independent Study.

AHS 697 Var [1-6]. Group Study. Offered as an online course only. (NT-O)

APPAREL AND MERCHANDISING COURSES

Department of Design and Merchandising College of Applied Human Sciences

AM 101 03(3-0-0). Fashion Industries. F, S, SS.

Development, organization, and trends of domestic and foreign fashion industries. (NT-O)

AM 110 03(2-2-0). Apparel and Merchandising Digital Technology. F, S. Prerequisite: None.

Introduction to computer technologies used in apparel and merchandising industries.

AM 130 03(3-0-0). Design Foundation-Apparel and Merchandising. F, S.

Impact of elements and principles of design on apparel and merchandising within 20th century art. (NT-O)

AM 143 04(2-4-0). Introduction to Apparel Design. S. Prerequisite: Acceptance into the Apparel Design and Production program concentration.

Apparel and garment-pattern development, construction, quality; skill development in technical drawing and rendering. (\$)

AM 240 03(0-6-0). Computer-Aided Apparel Design. S. Prerequisite: AM 143; portfolio review.

Apparel design using the computer to generate drawings for fabric, graphic logo, and apparel. (\$)

AM 241 03(1-4-0). Apparel Production. F. Prerequisite: AM 143; MATH 117 with a B or better; MATH 118 with a B or better; MATH 124 with a B or better; portfolio review.

Production processes of sewn textile products, flat pattern, pattern grading, marker making, and writing specifications. (\$)

AM 243 03(3-0-0). Adobe Photoshop for Textile Design. F, S, SS. Offered as online course only.

Textile design using Adobe Photoshop to generate drawings for surface and structural textile design. (NT-O)

AM 244 03(1-4-0). Illustration for Apparel Design. F. Prerequisite: AM 143; portfolio review. Credit not allowed for both AM 244 and AM 343.

Illustration skills using traditional media/CAD applications and analysis of visual communication.

AM 250 03(3-0-0). Clothing, Adornment and Human Behavior. (GT-SS3, AUCC 3E). F, S.

Psychological, sociological, and cultural factors influencing clothing and adornment.

AM 270 03(3-0-0). Merchandising Processes. S. Prerequisite: AM 101 with a C- or better; AM 130 with a C- or better; DM 120 with a C- or better; MATH 117 with a B or better; MATH 118 with a B or better; MATH 124 with a B or better.

Forecasting, planning, evaluating, and presenting merchandise lines to meet target market demands. (NT-O)

AM 290 Var. Workshop.

AM 321 03(3-0-0). Advanced Textiles. S. Prerequisite: DM 120.

Textile product serviceability; effect of fiber structure on properties and performance; new developments.

AM 330 03(3-0-0). Textile and Apparel Economics. F. Prerequisite: AM 270 with a C- or better; DM 120 with a C- or better; DM 272 with a C- or better; AREC 202 with a C- or better or ECON 202 with a C- or better.

Manufacture of textile and apparel products; structure of the industries; international trade and consumption.

AM 341 03(1-4-0). Computer-Aided Apparel Production. S. Prerequisite: AM 241.

Computer-aided design technology used in apparel sketching, pattern drafting, grading, and marker making. (\$)

AM 342 03(0-6-0). Computer-Aided Textile Design. F. Prerequisite: AM 110.

Computer-aided technology and multicultural research used to create repeat fabric designs; fabric printing using silkscreen. (\$)

AM 344 03(3-0-0). Adobe Illustrator for Apparel Designers. F, S, SS. Prerequisite: AM 243 or concurrent registration. Offered only through the Division of Continuing Education.

Apparel design using Adobe Illustrator to generate drawings for garment technical sketching, fashion illustration, and graphic logos. (NT-O)

AM 345 03(0-6-0). Draping Design. S. Prerequisite: AM 241.

Apparel designing through basic draping techniques. (\$)

AM 363 03(3-0-0). Historic Costume. S.

Influence of social, political, and economic conditions on costume of predynastic Egypt to present time.

AM 364 03(3-0-0). History of Fashion Designers/Manufacturers. F, S, SS. Offered as online course only.

Fashion designers and manufacturers who established the field and their contemporaries. (NT-O)

AM 366 03(3-0-0). Merchandising Promotion. F. Prerequisite: AM 270 or MKT 300 or MKT 305.

Activities used to influence sale of merchandise and services; to promote trends and ideas.

AM 370 03(3-0-0). Fashion Trend Analysis and Forecasting. F, S. Prerequisite: AM 270.

Fashion trend analysis and forecasting between markets and products; the direction of fashion.

AM 371 04(3-2-0). Merchandising Systems. F, S. Prerequisite: ACT 205 or ACT 210; AM 270 with a C- or better.

Business mathematics and current practices related to acquisition, negotiation, distribution, and sale of merchandise.

AM 375 03(2-2-0). Product Design and Development. F, S. Prerequisite: DM 272; AM 270.

Product design and development for apparel and other soft goods through industry-driven projects. (\$)

AM 384 Var [1-3]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

AM 421 03(1-4-0). Textile Analysis. F. Prerequisite: DM 120.

Performance evaluation of selected fabrics through standard testing procedures; individual projects. (\$)

***AM 430 03(3-0-0). International Retailing.** S. Prerequisite: AM 330; DM 360/MKT 360.

Application of retail principles to analyze the internationalization process of retailing.

AM 446 03(1-4-0). Apparel Design and Production. F. Prerequisite: AM 341; AM 342.

Computer-aided design technology used in apparel sketching, pattern drafting, grading and marker making; final portfolio preparation and review. (\$)

°AM 450 03(3-0-0). Social-Psychological Aspects of Clothing. S. Prerequisite: AM 250; PSY 100 or SOC 100.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Psychological and social factors influencing clothing and its effect on others.

AM 460 03(3-0-0). Historic Textiles. F.

Historic development of textiles from a global perspective, focusing on textiles produced by diverse cultures.

°AM 466 03(2-2-0). Retail Environment Design and Planning. S.
Prerequisite: AM 130; AM 270.

Application of design/merchandising principles to retail selling environments, including traditional store design/layout, direct mail, and websites.

AM 479 03(3-0-0). Merchandising Policies and Strategies. F. S.
Prerequisite: AM 270; AM 330; AM 366; AM 371; DM 360/MKT 360.

Examination of merchandising environment as influenced by its structure, and economic, legal, demographic, and psychographic trends.

AM 495A-D Var [1-3]. Independent Study.

A) Merchandising. B) Apparel design and production. (\$) D) Textiles and clothing. (\$)

AM 496A-D Var. Group Study.

A) Merchandising. B) Apparel design. C) Apparel production. D) Textiles and clothing.

AM 500 01(1-0-0). Apparel Supply Chains/Social Responsibility. F.
Offered as online course only.

Challenges for social responsibility in the context of the structure, relationships, and long-standing practice of the apparel industry. (NT-O)

AM 501 01(1-0-0). Apparel Consumers and Social Responsibility. S.
Offered as online course only.

Role of consumers in improving working conditions, labor standards, and environmental stewardship in apparel factories worldwide. (NT-O)

AM 502 01(1-0-0). Initiatives for Apparel Labor Compliance. F.
Offered as online course only.

Effectiveness of current initiatives for improving working conditions and labor standards in factories around the world. (NT-O)

AM 503 01(1-0-0). Sustaining Global Apparel Supply Chains. S.
Offered as online course only.

Responsibility for sustaining economic/social development in the global apparel industry; historical perspective and current issues. (NT-O)

AM 504 01(1-0-0). Apparel Worker-Centric Social Responsibility. F.
Offered as online course only.

Rights of workers and obstacles in meeting and methods for assuring worker rights, including freedom of association. (NT-O)

AM 505 01(1-0-0). Socially Responsible Apparel: Global Policy. S.
Offered as online course only.

Political and profit interests that influence socially responsible decisions and policy for the global textile and apparel industry. (NT-O)

AM 506 01(1-0-0). Culture and Work in the Apparel Industry. F.
Offered as online course only.

Cultural characteristics, employment/work practices and social responsibility; practices that reflect the effects of culture on business practices. (NT-O)

AM 507 01(1-0-0). Redesigning Green Apparel. S. Offered as online course only.

Challenges to environmental stewardship in the design, sourcing, and packaging of apparel, textiles, and footwear products. (NT-O)

AM 508 01(1-0-0). Producing Environmentally Responsible Apparel. F.

Offered as online course only.

Environmentally responsible apparel production and practices as philosophy, process, and competitive business strategy. (NT-O)

AM 509 01(1-0-0). Corporate Culture-Socially Responsible Apparel. S.
Offered as online course only.

Importance of leadership, role of inspirational leadership, and opportunities for making a difference are explored, analyzed, and applied. (NT-O)

***AM 525 03(1-2-1). Application of Textile Technology to Design. S.**
Prerequisites: AM 321 or AM 421.

Advanced study of textile technology in apparel, merchandising and interior design; recent advances in the field.

***AM 546 03(1-2-1). Theoretical Apparel Design Solutions. F.**

Applications of theoretical frameworks and computer-aided design techniques for the development of wearable and fiber art. (\$)

***AM 550 03(0-0-3). Appearance, Self, and Society. S.** Prerequisite: AM 450 or six credits in psychology and/or sociology.

Analysis of social science theories and concepts as they apply to appearance and dress research.

°AM 572 03(0-0-3). Merchandising Theories and Strategies. S.
Prerequisite: Graduate student standing.

Theoretical perspective on the design and development of merchandising strategies for U.S. and global production, distribution, and consumption.

AM 590B Var. Workshop-Apparel.

AMERICAN STUDIES COURSES

Department of English

College of Liberal Arts

AMST 100 03(3-0-0). Self/Community in American Culture, 1600-1877.
(GT-AH2, AUCC 3D). F.

Meaning and development of American culture, 1600-1877, through themes of self and community, in art, politics, society, and religion.

AMST 101 03(3-0-0). Self/Community in American Culture Since 1877.
(GT-AH2, AUCC 3D). S.

Meaning and development of American culture since 1877, through themes of self and community, in art, politics, society, and religion.

AMST 300/E 300 03(3-0-0). American Lives-Methods in American Studies. F, S. Prerequisite: AMST 100; AMST 101. Credit not allowed for both AMST 300 and E 300.

Methods and changing approaches of American studies since 1950s using autobiography as organizing theme.

AMST 492 03(3-0-0). Seminar in American Studies. Prerequisite: AMST 300/E 300.

AMST 495 Var [1-3]. Independent Study in American Studies.
Prerequisite: Written consent of instructor.

Individually guided studies in interdisciplinary work in American culture.

AMST 499 03. Thesis in American Studies. Prerequisite: AMST 492.

ANIMAL SCIENCE COURSES

Department of Animal Sciences

College of Agricultural Sciences

ANEQ 100 03(3-0-0). History of Food Animal Agriculture. S. Prerequisite: Non-Animal Science majors with a freshman or sophomore standing.

History of animal agriculture; understanding of modern agricultural systems.

+ANEQ 101 03(3-0-0). Food Animal Science. F, S.

Development, organization, trends, and management of the livestock industry; emphasis on applying science to the production of food and fiber. (\$)

+ANEQ 102 04(3-2-0). Introduction to Equine Science. F.

Equine physiology, production systems and management systems as it pertains to the equine industry and management. (\$)

ANEQ 201A-B 02(0-4-0). Preparation of Horses for Competition. F, S.

Prerequisite: Written consent of instructor.

Development of skills to prepare and present horses in competitions aimed at enhancing their value. **A)** Western. (\$) **B)** English. (\$)

ANEQ 202 01(1-0-0). Safety in Horse Handling. F.

Horse handling safety skills. (\$)

ANEQ 203 02(1-2-0). Equine Management. S. Prerequisite: ANEQ 102.

Equine management and care techniques with hands-on experience. (\$)

ANEQ 220 02(2-0-0). Feeds and Feeding. F, S. Prerequisite: ANEQ 101 or ANEQ 102.

Advantages and limitations of feedstuffs; nutrients and their functions; and feed practices for all physiological stages of livestock.

ANEQ 230 03(3-0-0). Farm Animal Anatomy and Physiology. F, S.

Prerequisite: Three credits of 100-level LIFE.

Basic concepts of farm animal anatomy and physiology; emphasis on growth, digestion, and reproduction.

ANEQ 249 01(0-2-0). Introduction to the Trail Riding Industry. F, S.

Prerequisite: Written consent of instructor.

Emphasis on horse care, regulations, first aid, health, training, and hosting a trail ride. (\$)

ANEQ 250 03(1-4-0). Live Animal and Carcass Evaluation. F, S.

Prerequisite: ANEQ 101 or ANEQ 102.

Growth, development, and value-determining characteristics of market animals. (\$)

ANEQ 286 02(1-2-0). Livestock Practicum. F, S. Prerequisite: ANEQ 101 or ANEQ 102.

Livestock breed and terminology; classification of feedstuffs; livestock handling and care; basic animal management techniques, hands-on experience. (\$)

ANEQ 292 01(1-0-0). Equine Industry Seminar. S. Prerequisite: ANEQ 102. May be offered as a partial semester course.

Overview of the equine industry and industry careers. (NT-B)

ANEQ 300A-W. Topics in Animal Sciences. F, S.

A) Livestock handling 01(1-0-0). **B)** /BSPM 300. Livestock entomology 01(1-0-0). Prerequisite: 3 credits of BZ or LIFE at the 100-level. Credit not allowed for both ANEQ 300B and BSPM 300. **E)** Family ranching 01(1-0-0). Prerequisite: ANEQ 101 or ANEQ 102. **L)** Quality Assurance 02(2-0-0). Prerequisite: ANEQ 101 or ANEQ 102. **N)** Seed-stock merchandising 02(2-0-0). **F)** Prerequisite: Junior or senior standing. Overview of beef seedstock industry, including hands-on selection,

management, and marketing of cattle. Course required to apply for seedstock team. **+R)** Calves and Calf Care 02(1-2-0). Prerequisite: ANEQ 310; ANEQ 478. Required field trips. (\$) **T)** Event, fair, and show management 01(1-0-0). Prerequisite: ANEQ 101 or ANEQ 102. Credit not allowed for both ANEQ 300T and ANEQ 358. **U)** Seedstock sale management 02(2-0-0). Prerequisite: ANEQ 300N. **S)** **W)** Equine manure management 01(1-0-0). **S)** Prerequisite: ANEQ 101 or ANEQ 102.

ANEQ 310 03(3-0-0). Animal Reproduction. F, S, SS. Prerequisite: ANEQ 230 or BMS 300.

Anatomy and physiology of the reproductive system; causes of reproductive failure in farm animals; methods of improving reproductive performance. (NT-O)

ANEQ 312 02(1-2-0). Animal Ultrasonography. F. Prerequisite: ANEQ 230; ANEQ 310.

Fundamentals and application of using ultrasound in farm animals; basic reproductive technologies; utilizing ultrasound as a management tool. (\$)

ANEQ 315 02(1-2-0). Equine Behavior. S. Prerequisite: ANEQ 102; sophomore or higher standing.

Equine behaviors related to training and learning.

+ANEQ 320 04(3-3-0). Principles of Animal Nutrition. F, S. Prerequisite: ANEQ 230 or BMS 300 or BMS 360; 3 credits 100-level chemistry.

Understanding of nutrients and nutrient function required to support animal life through all physiological states. Required field trips. (\$)

ANEQ 322 02(2-0-0). Pet Nutrition. F, S, SS. Prerequisite: ANEQ 320; ANEQ 345; FSHN 350. Offered as correspondence course or online course only.

Nutrients, nutrient requirements, feeding practices, food sources and management for companion animals (dogs, cats, birds, fish, reptiles, etc.). (NT-C/O)

ANEQ 323 02(2-0-0). Zoo Nutrition. F, S, SS. Prerequisite: ANEQ 320; ANEQ 345; FSHN 350. Offered as correspondence course or online course only.

Unique nutritional requirements of mammalian, avian, and reptile captive wild animals; management protocols needed. (NT-C/O)

ANEQ 325 02(2-0-0). Equine Exercise Physiology. S. Prerequisite: ANEQ 230 or BMS 300.

Overview of the main aspects of equine exercise physiology. (\$)

ANEQ 330 03(3-0-0). Principles of Animal Breeding. S. Prerequisite: BZ 350 or SOCR 330; 3 credits of 200- to 300- level statistics.

Genetic principles underlying animal improvement; elementary population genetics; heritability; selection response; mating systems; DNA markers.

ANEQ 334 02(2-0-0). Principles of Equine Genetics. S. Prerequisite: ANEQ 102; SOCR 330 or BZ 350 or MIP 450; STAT 301 or STAT 307 or STAT 315.

Principles of breeding and genetic improvement of horses, including qualitative and quantitative traits.

ANEQ 340 03(0-6-0). Horse Training and Sale Preparation I. F. Prerequisite: Written consent of instructor.

Practical training skills using a yearling or two year old: in-hand, restraint, ground driving, longeing, first rides, stable management. (\$)

ANEQ 341 03(0-6-0). Horse Training and Sale Preparation II. S. Prerequisite: ANEQ 340.

Skills in training for specific riding maneuvers, conditioning, fitting for sale. Additional time outside of class required on weekends.(\$)

ANEQ 344 04(3-2-0). Principles of Equine Reproduction. F. Prerequisite: ANEQ 102; ANEQ 230 or BMS 300.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Principles of reproduction and reproductive management of the mare and stallion. (\$)

ANEQ 345 03(3-0-0). Principles of Nutrition: Equine Applications. F, S. Prerequisite: ANEQ 102; ANEQ 230 or BMS 300; three credits 100-level chemistry; three credits of mathematics.

Principles of nutrition; application in feeding horses in different physiological states to promote health and well-being. (NT-O)

ANEQ 346 04(3-2-0). Equine Disease Management. F. Prerequisite: ANEQ 230 or BMS 300.

Normal and abnormal body structures and functions of major systems of the horse. Recognition of main diseases, causes, prevention and treatments. (\$)

ANEQ 348 02(1-2-0). Equine Training Techniques. S. Prerequisite: ANEQ 315.

Training techniques in multiple riding disciplines.

ANEQ 349 02(1-2-0). Packing and Outfitting. F, S. Prerequisite: ANEQ 102; written consent of instructor.

Business aspects of outfitting/packing the horse; hitches, knots, horse care; planning pack trips, setting up camp. Overnight pack trip. (\$)

ANEQ 351 02(1-2-0). Techniques in Therapeutic Riding. F, S. Prerequisite: ANEQ 102.

Equine assisted activities: therapeutic horseback riding, hippotherapy, driving/vaulting, mental health treatments, programs for youth at risk. (\$)

¹**ANEQ 352 02(0-4-0). Introduction to Horse Evaluation.** S. Prerequisite: ANEQ 102.

Criteria and techniques for evaluation of horses; development of logical decision processes for establishing comparative value.

¹**ANEQ 353 03(0-6-0). Advanced Horse Evaluation.** F. Prerequisite: ANEQ 352.

Advanced criteria/techniques for horse evaluation; logical decision process development to establish comparative value; intercollegiate competition.

¹**ANEQ 354 03(0-6-0). Introduction to Livestock Evaluation.** F. Prerequisite: ANEQ 101.

Criteria and techniques for evaluation of livestock; development of logical decision processes for establishing comparative value.

¹**ANEQ 355 01(0-9-0). Advanced Livestock Evaluation.** F, S. Prerequisite: ANEQ 354. Course may be taken twice for a maximum of 2 credits.

Advanced criteria and techniques for evaluation of livestock; establishing comparative value; participating in intercollegiate competition.

¹**ANEQ 356 03(0-6-0). Introduction to Dairy Evaluation.** S.

Criteria and techniques for evaluation of dairy cattle; development of logical decision processes for establishing comparative value.

¹**ANEQ 357 02(0-4-0). Advanced Dairy Evaluation.** F. Prerequisite: ANEQ 356.

Advanced criteria and techniques for evaluation of dairy cattle; establishing comparative value; participating in intercollegiate competition.

ANEQ 358 02(2-0-0). Equine Event and Sales Management. F. Prerequisite: ANEQ 102. Credit not allowed for both ANEQ 358 and ANEQ 300T.

Skills necessary to produce, organize, and promote equine related

events. (\$)

ANEQ 359 02(0-4-0). Equine Sales Management II. S. Prerequisite: ANEQ 358; written consent of instructor.

Emphasizes skills necessary to host and evaluate an equine sale.

ANEQ 360 03(3-0-0). Principles of Meat Science. F. Prerequisite: Three credits 100-level chemistry.

Structure, composition, and biology of muscle and associated tissues; wholesomeness, nutritive value, and palatability of beef, pork, and lamb.

¹**ANEQ 361 03(0-6-0). Introduction to Meat Product Evaluation.** F.

Criteria and techniques for evaluation of meat products; development of logical decision processes for establishing comparative value.

¹**ANEQ 362 01(0-4-0). Advanced Meat Production Evaluation.** F, S. Prerequisite: ANEQ 361. Course may be taken twice for a maximum of 2 credits.

Criteria and techniques for evaluation of meat products; establishing comparative value; participating in intercollegiate competition.

¹**ANEQ 363 01(0-2-0). Introduction to Wool and Fiber Evaluation.** F.

Criteria and techniques for evaluation of wool; development of logical decision processes for establishing comparative value.

¹**ANEQ 364 01(0-2-0). Advanced Wool and Fiber Evaluation.** S. Prerequisite: ANEQ 363.

Criteria and techniques for evaluation of wool; establishing comparative value; participating in intercollegiate competition.

¹**ANEQ 384 Var [1-5]. Supervised College Teaching.** F, S, SS. Prerequisite: Written consent of instructor. Maximum of 6 credits allowed in course. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

ANEQ 386A-C. Equine Practicum.

A) Equine training and management 02(1-2-0). Prerequisite: ANEQ 102.

B) Equine reproductive management 02(1-2-0). Prerequisite: ANEQ 344. (\$) C) Equine farrier management 01(0-2-0). Prerequisite: ANEQ 102. (\$)

ANEQ 440 03(3-0-0). Equine Industry and Issues. F, S. Prerequisite: Any two of the following: ANEQ 334, ANEQ 344, ANEQ 345, ANEQ 346.

For students planning a career in the horse industry; management of facilities, production systems, personnel, marketing, and biological systems.

ANEQ 441 02(2-0-0). Integrated Equine Science. F, SS. Prerequisite: ANEQ 334; ANEQ 345; ANEQ 346.

Describe, understand, and integrate the newest scientific principles in equine sciences with equine management.

ANEQ 442 02(0-4-0). Riding Instructor Training. F, S. Prerequisite: ANEQ 102; written consent of instructor..

Teaching techniques; theory; handling of large mounted groups, beginner through advanced levels. (\$)

⁺**ANEQ 443 02(1-2-0). Applied Equine Nutrition.** S. Prerequisite: ANEQ 345.

Applying principles of nutrition to feeding horses in different physiological states in an effort to promote their health and well-being. Required field trips.

⁺**ANEQ 444 02(2-0-0). Equine Business Management.** S, SS. Prerequisite: ANEQ 440.

"Real life" equine industry experience and the ins and outs of managing an equine facility/business. Field trips required.

ANEQ 445 02(1-3-0). Foaling Management. S. Prerequisite: ANEQ 344 or PVM sophomore status.

¹For Animal Science and Equine Science majors, a maximum of five credits is allowed for ANEQ 350A-E, ANEQ 352, ANEQ 353, ANEQ 354, ANEQ 355, ANEQ 356, ANEQ 357, ANEQ 361, ANEQ 362, ANEQ 363, and ANEQ 364. A maximum of 12 credits is allowed for any combination of the following: ANEQ 350A-E, ANEQ 352, ANEQ 353, ANEQ 354, ANEQ 355, ANEQ 356, ANEQ 357, ANEQ 361, ANEQ 362, ANEQ 363, ANEQ 364, ANEQ 384, ANEQ 487, ANEQ 495, and ANEQ 496.

^oAlternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Management of the foaling mare and newborn foal; monitoring techniques, preventative and emergency care procedures. (\$)

***ANEQ 448/*SOCR 448 03(2-2-0). Livestock Manure Management and Environment.** F. Prerequisite: Three credits 100-level chemistry. Credit allowed for only one of the following courses: ANEQ 448, ANEQ 548, SOCR 448, SOCR 548.

Manure management; maximizing benefits to soils and crops; minimizing air and water quality hazards; complying with regulations.

ANEQ 460 02(2-0-0). Meat Safety. F. Prerequisite: Three credits 100-level chemistry.

Meat safety; food born pathogens; hazard analysis critical control points (HACCP) and total quality management (TQM) practices.

ANEQ 470 04(3-2-0). Meat Processing Systems. F. Prerequisite: ANEQ 360; senior standing.

Advanced understanding of the manufacturing, packaging, distribution, storage, and cooking of meat products. (\$)

ANEQ 472 03(2-2-0). Sheep Systems. S. Prerequisite: Senior status.

Sheep production under farm and ranch conditions; breeds, breeding, nutrition, reproduction, and management systems.

ANEQ 473 03(2-3-0). Dairy Systems. F. Prerequisite: ANEQ 230 or BMS 300; ANEQ 310; ANEQ 320; Senior status.

Integration of nutrition, genetics, physiology, and economics for management decisions of dairy farm operations and production and marketing of milk.

ANEQ 474 03(2-2-0). Swine Systems. S. Prerequisite: Senior status.

Production of purebred and commercial swine; breeds, breeding, feeding, marketing, and management. (\$)

ANEQ 475 02(2-0-0). Travel Abroad-Animal Agriculture. F, S, SS. Prerequisite: Written consent of instructor.

Onsite evaluation of international animal agriculture systems with emphasis on production, marketing, and management.

ANEQ 476 03(3-0-0). Feedlot Systems. S. Prerequisite: Senior status.

Feedlot facilities; nutrition; procurement, merchandising, handling, processing cattle; health care; custom feeding; managerial duties.

ANEQ 478 03(2-2-0). Beef Systems. F. Prerequisite: Senior status.

Beef production as related to consumer through seedstock segments. Major emphasis on cow-calf management. (\$)

¹**ANEQ 487 Var. Internship.** Prerequisite: Written consent of instructor. Maximum of 6 credits allowed in course.

¹**ANEQ 495 Var. Independent Study.** Prerequisite: Written consent of instructor. Maximum of 6 credits allowed in course.

¹**ANEQ 496 Var [1-5]. Group Study.** Prerequisite: Written consent of instructor. Maximum of 6 credits allowed in course.

ANEQ 500 Var [1-6]. Recent Developments. SS. Prerequisite: Graduate status.

Recent developments in animal science, avian science, and food technology. (\$)

ANEQ 510 04(3-2-0). Bovine Reproduction Management. F. Prerequisite: ANEQ 310.

Role of reproduction in economic efficiency of cattle production

systems. Causes of delayed breeding and nonpregnancy, abortion and perinatal mortality. (\$)

***ANEQ 520 03(3-0-0). Applied Comparative Nutrition.** F. Prerequisite: ANEQ 320 or FSHN 550 and FSHN 551.

Comparative digestion strategies and mechanisms of nutrient utilization for terrestrial vertebrates: livestock, pets, wildlife, and zoo animal models.

ANEQ 522 03(3-0-0). Animal Metabolism. F. Prerequisite: CHEM 245 and CHEM 246 or CHEM 346.

Nutrient digestion, absorption, transport and metabolism in monogastric and ruminant domestic species as affected by physiological changes.

***ANEQ 548/*SOCR 548 04(2-2-1). Issues in Manure Management.** F. Prerequisite: Three credits 100-level chemistry. Credit allowed for only one of the following courses: ANEQ 448, ANEQ 548, SOCR 448, SOCR 548.

Manure management practices maximizing benefits to soils and crops while minimizing hazards to air and water quality and complying with regulations.

ANEQ 550A-B 02(1-2-0). Basic Research Surgery.

Basic principles and techniques of animal surgery to meet ACUC requirements for experimental procedures. **A) Farm animal.** F. Prerequisite: ANEQ 230 or BMS 300 or BMS305; junior, senior, or graduate status. (\$) **B) Rodent.** S. Prerequisite: ANEQ 230 or BMS 230 or BMS 300 or BMS 305 or VS 333; junior, senior, or graduate status. (\$)

ANEQ 551 02(1-2-0). Field Necropsy. F, S. Prerequisite: ANEQ 230 or BMS 300; ANEQ 346 or MIP 315A-B or VS 300; junior or senior status.

Field necropsy techniques for collection of animal tissues for submission to a diagnostic laboratory. (\$)

ANEQ 565 03(3-0-0). Interpreting Animal Science Research. S. Prerequisite: ANEQ 101 or ANEQ 102; 3 credits statistics.

Designing, conducting, analyzing, and reporting of animal science research.

ANEQ 567 02(2-0-0). HACCP Meat Safety. S. Prerequisite: ANEQ 460.

Control of health problems in meat products through hazard analysis critical control point (HACCP) and total quality management (TQM) practices.

^o**ANEQ 575 03(2-2-0). Computational Biology in Animal Breeding.** F. Prerequisite: Graduate standing.

Numerical analysis and use of computers to solve problems in animal improvement.

ANEQ 587 Var [1-9]. Internship. Prerequisite: Written consent of instructor.

^o**ANEQ 610 02(2-0-0). Hormonal Regulation of Growth.** S. Prerequisite: BMS 501.

Cellular and molecular regulation of animal growth by hormones and growth factors.

***ANEQ 621 03(3-0-0). Vitamin and Mineral Metabolism.** S. Prerequisite: Graduate status.

Vitamin and mineral metabolism in domestic animals.

***ANEQ 631 03(2-0-1). Selection Index Theory.** S. Prerequisite: Graduate status.

Quantitative methods for genetic evaluation: selection index theory and introduction to best linear unbiased prediction.

ANEQ 660 01(1-0-0). Topics in Meat Safety. F, S. Prerequisite: ANEQ 567.

Topics of current concern in meat safety.

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^oAlternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

°ANEQ 676 03(1-4-0). **Molecular Approaches to Food Safety.** F. Prerequisite: MIP 300 or MIP 334.

Molecular subtyping, tracking, and control; molecular ecology and evolution of food-borne pathogens; molecular pathogenesis of food-borne diseases. (\$)

ANEQ 699 Var. Thesis. Prerequisite: Written consent of instructor.

°ANEQ 720 03(3-0-0). **Nutritional Energetics.** F. Prerequisite: Graduate status.

Dietary energy use to meet animal requirements for maintenance, growth, pregnancy, and lactation; environmental, nutritional, and physiological effects.

°ANEQ 725 03(3-0-0). **Rumen Metabolism.** S. Prerequisite: Graduate status.

Microbial degradation, transformation, and synthesis of ingested nutrients, feed particle passage kinetics in the rumen.

°ANEQ 730 03(3-0-0). **Advances in Cattle Breeding.** S. Prerequisite: Graduate status.

Literature and research methods in beef cattle breeding.

°ANEQ 731 03(3-0-0). **Advanced Genetic Prediction.** S. Prerequisite: ANEQ 575; graduate standing.

Models and methods for prediction of genetic merit in livestock population.

ANEQ 784 Var. Supervised College Teaching. F, S, SS. Prerequisite: Graduate status; written consent of instructor.

ANEQ 792A-F 01(0-0-1). Seminar. Prerequisite: Graduate status.

A) General. B) Breeding/genetics. C) Physiology. D) Meat sciences. E) Nutrition. F) Livestock Management Systems.

ANEQ 795 Var. Independent Study. Prerequisite: Graduate status; written consent of instructor.

ANEQ 799 Var. Dissertation. Prerequisite: Graduate status; written consent of instructor.

ANTHROPOLOGY COURSES

Department of Anthropology *College of Liberal Arts*

ANTH 100 03(3-0-0). Introductory Cultural Anthropology. (GT-SS3, AUCC 3C). F, S.

Human societies and their cultural settings; variation in beliefs, social customs, and technologies; human differences in anthropological terms. (NT-O)

ANTH 120 03(3-0-0). Human Origins and Variation. (GT-SC2, AUCC 3A). F, S.

Mechanisms of evolution; genetics. Living primate biology, behavior, and history. Human evolutionary history. Human variation and adaptation. (NT-O)

ANTH 121 01(0-2-0). Human Origins and Variation Laboratory. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: ANTH 120 or concurrent registration.

Labs demonstrating genetic and evolutionary processes, comparative skeletal anatomy, human evolution through fossil casts, and modern human variation. (NT-O) (\$)

ANTH 140 03(3-0-0). Introduction to Prehistory. (GT-HII, AUCC 3D). F, S, SS.

Origins of human society from the Stone Age to urban civilization using architecture, art, tools, and other material remains. (NT-O)

ANTH 200 03(3-0-0). Cultures and the Global System. (GT-SS3, AUCC 3E). F, S.

Analyze diversity, cultural responses, and adaptations of smaller-scale societies to emerging global trends. (NT-O)

ANTH 260 02(1-2-0). Introduction to Field Archaeology. F, S, SS. Prerequisite: ANTH 140.

Field methods including map preparation and interpretation, site location and recording, site excavation, and stratigraphy.

ANTH 295 Var [1-3]. Independent Study.

***ANTH 310 03(3-0-0). Peoples and Cultures of Africa.** S. Prerequisite: ANTH 100.

Sub-Saharan life styles including marriage and family, traditional government, religion and magic, ecology and economy, art, music, and literature.

°ANTH 312 03(3-0-0). Modern Indian Culture and Society. S. Prerequisite: ANTH 100 or ANTH 200.

Anthropological contributions to the understanding of contemporary India.

***ANTH 314 03(3-0-0). Southeast Asian Cultures and Societies.** S. Prerequisite: ANTH 100 or ANTH 200.

Colonial and post-colonial cultures, globalization processes, and changing ethnic and gender identities in Southeast Asian societies.

***ANTH 318/*ETST 318 03(3-0-0). Peoples and Cultures of the Southwest.** F, S. Prerequisite: ANTH 100. Credit not allowed for both ANTH 318 and ETST 318.

Analyze development of cultures of the American Southwest; colonialism, migration, political incorporation, and socioeconomic processes. (NT-O)

ANTH 319/ETST 319 03(3-0-0). Latin American Peasantries. F, S. Credit not allowed for both ANTH 319 and ETST 319. Prerequisite: (ANTH 100; ANTH 200) or ETST 100.

Sociocultural, economic, and political responses of Latin American peasantries to poverty and global processes.

°ANTH 322 03(3-0-0). Religion, Culture, and Mind. F. Prerequisite: ANTH 100 or ANTH 200.

Major anthropological theories and descriptions of religious beliefs and practices. Intersection of religion, culture, and human psychology.

ANTH 324 03(3-0-0). Folk Religion. S.

European folk beliefs and their carry-over into America; ghosts, vampires, trolls, elves, saints, rituals, witchcraft, sorcery, folk cures.

°ANTH 329 03(3-0-0). Cultural Change. F. Prerequisite: ANTH 100 or ANTH 200.

Cultural change and effects of directed global forces; colonial origins of underdevelopment on small-scale societies.

***ANTH 330 03(3-0-0). Human Ecology.** F. Prerequisite: ANTH 100 or ANTH 200; ANTH 120 or BZ 101 or LAND 220/LIFE 220.

Roles of technology, economics, social organization, and ideology in human adaptations to and survival in natural and cultural environments.

ANTH 334 04(3-2-0) Narrative Traditions and Social Experience. S. Prerequisite: ANTH 100 or ANTH 200 or E 140 or SOC 100.

Relationship between narrative traditions and social contexts of their creation.

ANTH 335 03(3-0-0). Language and Culture. F, S.

Human language and primate communication, nonverbal channels, sociolinguistics, and language change.

°ANTH 338 03(3-0-0). Gender and Anthropology. S. Prerequisite: ANTH 100 or ANTH 200.

Theory, themes, and debates in anthropological gender studies, ethnographic survey of women and men cross-culturally. (NT-O)

ANTH 340 03(3-0-0). Medical Anthropology. F. Prerequisite: ANTH 100 or ANTH 200.

Cultural adaptation to disease; non-Western theories of health and disease: categories, causes, cures; learned roles of patients and healers.

°ANTH 350 03(3-0-0). Archaeology of North America. S. Prerequisite: ANTH 140.

Native American life, tools, architecture, religion, food-getting from cultures of 12,000 years ago or earlier until European contact.

***ANTH 351 03(3-0-0). Archaeology of Europe and Africa.** S. Prerequisite: ANTH 140.

Human culture, tools, art, religion, social life, subsistence, and paleoecology from 4 million B.C. to 1200 B.C. in the Old World.

ANTH 352 03(3-0-0). Geoarchaeology. S. Prerequisite: ANTH 140.

Analytical techniques, concepts, and field methodologies from the earth sciences to better understand the archaeological record.

ANTH 359 03(2-0-1). Colorado Prehistory. F.

Human behavioral responses to environmental diversity, cultural adaptation, Pleistocene and Recent climates, anthropogenic environmental change.

ANTH 360 03(2-2-0). Archaeological Investigation. S. Prerequisite: ANTH 140.

Investigation of the archaeological record, how the record was formed, and how archaeological data are analyzed and interpreted.

ANTH 370 03(3-0-0). Primate Behavior and Ecology. S. Prerequisite: ANTH 120 or BZ 101.

Behavioral patterns, ecological relationships, and communication of nonhuman primates.

ANTH 372 03(2-2-0). Human Osteology. F. Prerequisite: ANTH 120 or BZ 101 or BZ 110 or LIFE 102.

Human bones and teeth in a review of functional human evolution.

ANTH 373 03(3-0-0). Human Evolution. S. Prerequisite: ANTH 120 or BZ 110.

Current topics and debates in human evolution concentrating on biocultural changes in the human lineage.

***ANTH 374 03(2-0-1). Human Biological Variation.** S. Prerequisite: ANTH 120 or BZ 101 or BZ 110 or LIFE 102.

Biological diversity of human populations; history of development of race concept.

***ANTH 375 03(3-0-0). Evolution of Primate Behavior.** F. Prerequisite: ANTH 120 or BZ 110 or LIFE 102.

Primate behavior from an evolutionary perspective, drawing on a variety of studies of humans, primates, and mammals.

ANTH 376 03(2-0-1). Evolution of Human Adaptation. F. Prerequisite: ANTH 120 or BZ 110 or LIFE 102.

Unique characteristics of humans: bipedalism, encephalization, dentition, birth process, an attenuated period of development.

ANTH 400 03(3-0-0). History of Anthropological Theory. F. Prerequisite: ANTH 100 or ANTH 200; ANTH 120; ANTH 121; ANTH 140; senior status.

Anthropological theory from its beginnings in 19th century through recent developments in the latter half of the 20th century.

ANTH 411 03(0-0-3). Indians of South America. F, S, SS. Prerequisite: ANTH 100 or ANTH 200 or ANTH 413 or ANTH 414/ETST 414.

Ethnographic and cultural characteristics of South American indigenous groups and the current critical issues they face. (NT-O)

ANTH 412 03(3-0-0). Indians of North America. F, S, SS. Prerequisite: ANTH 100 or ANTH 200 or ANTH 413 or ANTH 414/ETST 414.

Native American peoples, their cultural variation across the continent, and cultural encounters with colonial expansion. (NT-O)

ANTH 413 03(3-0-0). Indigenous Peoples Today. F. Prerequisite: ANTH 200 or ANTH 412 or ANTH 414/ETST 414.

Contemporary cultural and social issues of indigenous peoples around the globe, including North and South American Indians and Australian Aborigines.

°ANTH 414/°ETST 414 03(3-0-0). Development in Indian Country. F. Credit not allowed for both ANTH 414 and ETST 414.

Critical examination of history, public policy, and tribal strategies for economic development and natural resource management in Indian Country.

ANTH 415 03(3-0-0). Indigenous Ecologies and the Modern World. F, S, SS.

Impact of the modern world on indigenous peoples' relationship to their environments and natural resources. (NT-O)

***ANTH 422/*SOC 422 03(3-0-0). Comparative Legal Systems.** S. Prerequisite: ANTH 100 or SOC 100. Credit not allowed for both ANTH 422 and SOC 422.

Traditional approaches to law, competing concepts of law in the global system, and experiences of minorities in state legal systems.

°ANTH 423 03(3-0-0). Ethnopsychiatry and Spiritual Healing. S. Prerequisite: ANTH 100 or ANTH 200.

Psychiatric systems and mental health within their cultural contexts. Indigenous systems of healing. Religious influences on health and healing.

ANTH 438 03(0-0-3). Approaches to Community-Based Development. F, S, SS. Prerequisite: ANTH 100 or ANTH 200.

Explores the structure and practice of community development globally, engaging in critical analysis of different approaches and their impact. (NT-O)

ANTH 439 03(0-0-3). Community Mobilization. F, S, SS. Prerequisite:

ANTH 100 or ANTH 200.

Structural, social, and psychological barriers that inhibit cooperation and collective action. (NT-O)

°ANTH 440 03(3-0-0). Theory in Cultural Anthropology. F, S. Prerequisite: ANTH 100 or ANTH 200.

Theoretical paradigms used to explain culture including evolutionary, functional, ecological, political economy, postmodernism, and hegemony.

°ANTH 441 03(3-0-0). Method in Cultural Anthropology. F. Prerequisite: ANTH 100 or ANTH 200.

Methodological orientations and research techniques. Ethnographic and cross-cultural approaches including quantitative and formal models.

ANTH 442 Var[3-8]. Ethnographic Field School. SS. Prerequisite: ANTH 100 or ANTH 200 or 9 credits in ANTH coursework.

Directed fieldwork with American Indian communities; methodology, protocols, and social relations of ethnographic field research.

ANTH 443 03(0-6-0). Ethnographic Field Methods. S. Prerequisite: ANTH 100 or ANTH 200.

Directed experiential preparation for applied ethnographic field methods and research questions.

ANTH 444 03(3-0-0). Cultures of Virtual Worlds: Research Methods. S. Prerequisite: ANTH 100 or ANTH 200; junior or senior standing.

Methodologies and directed research related to virtual worlds and internet and gaming communities.

ANTH 445 03(3-0-0). Psychological Anthropology. S. Prerequisite: ANTH 100 or ANTH 200; PSY 100.

Cross-cultural exploration of the human mind by studying the ideas, desires, and practices of peoples in various settings.

ANTH 446 03(3-0-0). New Orleans and the Caribbean. F. Prerequisite: ANTH 100 or ANTH 200.

New Orleans and the Caribbean connections through colonization, slavery, modernity, legacies of race, gender, and class, the expressive arts.

ANTH 447 03(0-0-3). Gender Equity in Development. F, S, SS. Prerequisite: ANTH 100 or ANTH 200.

Various forms of women's power, and potentials for disempowerment within the context of international development. (NT-O)

ANTH 448 03(0-0-3). Development and Empowerment. F, S, SS. Prerequisite: ANTH 100 or ANTH 200.

Development as an economic process of wealth accumulation, as well as a socio-political process of empowerment. (NT-O)

ANTH 449 03(3-0-0). Participatory Monitoring and Evaluation. F, S, SS. Prerequisite: ANTH 100 or ANTH 200.

Participatory methods in the monitoring and evaluation of development projects, where multiple stakeholders are involved in the process. (NT-O)

ANTH 450 03(0-0-3). Hunter-Gatherer Ecology. S. Prerequisite: ANTH 100; ANTH 120; ANTH 121; ANTH 140.

Development of anthropological method and theory; study of contemporary and prehistoric foraging peoples.

°ANTH 451 03(3-0-0). Andean Archaeology and Ethnohistory. S. Prerequisite: ANTH 100 or ANTH 140.

Prehistory and colonial experiences of native Andean peoples.

ANTH 452 03(3-0-0). Archaeology of Mesoamerica. F. Prerequisite: ANTH 140.

Ancient cultures and civilizations in Middle America.

ANTH 453 03(3-0-0). Impacts on Ancient Environments. S. Prerequisite: ANTH 140.

Major issues and case studies in the archaeology of ancient human societies and their environmental impacts.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

***ANTH 455 03(3-0-0). Great Plains Archaeology.** F. Prerequisite: ANTH 140.

Prehistoric people on Great Plains from earliest hunter-gatherers to historic contact; cultural responses to changing conditions.

***+ANTH 456 03(3-0-0). Archaeology and the Public.** S. Prerequisite: ANTH 140; 3 additional credits of archaeology.

Applied archaeology in public settings, including publication, museum display, education, the illicit artifact trade, and other ethical issues. Required field trips.

°ANTH 457 03(2-2-0). Lithic Technology. F. Prerequisite: ANTH 140.

Method and theory behind production, use, and discard of stone tools by prehistoric peoples. Hands-on application in laboratory setting.

+ANTH 460 Var [3-8]. Field Class in Archaeology. SS. Prerequisite: Written consent of instructor.

Directed fieldwork in local archaeology, site survey, and excavation; recovery, preservation, cataloging, analysis of artifactual and skeletal materials. (\$)

ANTH 461 03(0-0-3). Anthropological Report Preparation. F. Prerequisite ANTH 460; written consent of instructor.

Producing written and oral presentations for anthropological research, employment, or graduate work. Grant writing and manuscript preparation.

°ANTH 465 03(2-2-0). Zooarchaeology. S. Prerequisite: ANTH 120; ANTH 140.

Analysis of animal bones from archaeological sites to develop interpretations of past human behavior.

ANTH 469 03(0-0-3). Archeology Seminar in Mesopotamian Prehistory. F, S, SS. Prerequisite: 6 credits of anthropology.

Origins of human society from the stone age to urban civilizations using architecture, art, tools, and other material remains. (NT-O)

ANTH 470 04(2-4-0). Paleontology Field School. SS. Prerequisite: ANTH 120 or BZ 110 or LIFE 104.

Field methods in fossil excavation, preservation, and curation; the evolution of the primate order. (\$)

ANTH 472 03(3-0-0). Human Biology. S. Prerequisite: ANTH 120 or BZ 110 or LIFE 102.

Human biological responses to environmental conditions and constraints including diet, nutrition, disease, climate, culture change, and urbanization.

***ANTH 473 03(2-0-1). The Neandertals.** S. Prerequisite: ANTH 120 or BZ 110; ANTH 372 or ANTH 373 or ANTH 374 or ANTH 375 or ANTH 376.

Socio-historical foundations of questions regarding Neandertal paleobiology and culture and the Neandertal role in the evolution of Homo sapiens.

ANTH 475 03(3-0-0). Methods of Analysis in Paleoanthropology. F. Prerequisite: ANTH 373.

Practical discussion of techniques used to reconstruct dietary and locomotor behavior and evolutionary relationships in human fossil remains.

°ANTH 478/°HIST 478 03(3-0-0). Heritage Resource Management. S. Prerequisite: Junior standing. Credit not allowed for both ANTH 478 and HIST 478.

Cultural resource laws and policy; practices commonly employed in management and preservation of these diverse resources.

ANTH 479/IE 479 03(3-0-0). International Development Theory and Practice. F. Prerequisite: Junior or senior standing. Credit not allowed for both ANTH 479 and IE 479.

Contemporary issues in international community and economic development, with practical and theoretical analysis from interdisciplinary

perspectives.

ANTH 484 Var [1-5]. Supervised College Teaching. F, S. Prerequisite: Written consent of instructor. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

ANTH 486 Var [1-6]. Practicum.

Application of anthropological methods under actual project conditions.

ANTH 487 Var[1-9]. Internship. F, S, SS. Prerequisite: 9 credits of anthropology.

Academic-based work experience with selected organizations or agencies. Supervised application of anthropological principles.

ANTH 492A-B 03(0-0-3). Seminar. Prerequisite: Six credits of anthropology.

A) Archaeology. B) Biological anthropology.

ANTH 493 01(0-0-1). Capstone Seminar. F, S. Prerequisite: Concurrent registration in a 4A course (see department list).

Linkages between anthropological subfields and how professional anthropologists approach issues.

ANTH 495 Var [1-3]. Independent Study.

ANTH 496 Var [1-3]. Group Study.

ANTH 500 03(3-0-0). Development of Anthropological Theory. F. Prerequisite: Undergraduates must have written consent of instructor.

Contemporary development of anthropological thought.

ANTH 513/ETST 513 03(3-0-0). Capitalism and Global Ethnic Conflicts. S. Prerequisite: ANTH 200 or ETST 100. Credit not allowed for both ANTH 513 and ETST 513.

Causes of global ethnic conflicts with emphasis on resource competition, capitalist development schemes, and role of the state.

ANTH 515 03(3-0-0). Culture and Environment. F. Prerequisite: Graduate standing.

Theoretical accounts of societies' variable relationships to their environments; indigenous peoples' interactions with nature in context of modernity.

°ANTH 520 03(3-0-0). Women, Health, and Culture. S. Prerequisite: Graduate standing.

Women's experiences and interpretations of their health; cultural, political, and economic forces affecting women's health.

***ANTH 521 03(3-0-0). Gender, Sexuality, and Culture.** S. Prerequisite: Graduate standing.

Gender and sexuality cross-culturally; theory, cultural constructions, colonialism, class, race, ethnicity, health, violence.

ANTH 528 03(0-0-3). Economic Anthropology. S. Prerequisite: Nine credits in anthropology.

Theoretical approaches to the cultural context of economic activity.

ANTH 529 03(0-0-3). Anthropology and Sustainable Development. F. Prerequisite: Nine credits in anthropology.

Global development goals, poverty and hunger, environmental sustainability, education, and equity.

°ANTH 530 03(3-0-0). Human-Environment Interactions. F. Prerequisite: Nine credits in anthropology.

Paradigms and concepts in ecological anthropology with an emphasis on adaptation and resilience.

ANTH 532 03(0-0-3). The Culture of Disaster. S. Prerequisite: Graduate student standing.

Study of how the human impacts of disaster and the process of recovery are shaped by cultural as well as structural realities.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

***ANTH 535 03(0-0-3). Globalization and Culture Change.** F. Prerequisite: Nine credits in anthropology.

Evolving paradigms and patterns of globalization and international development; cultural responses--resistance, dependency, fragmented identities.

°**ANTH 539 03(3-0-0). Anthropology of Modernity.** F.

Critical examination of the institutions, values, and processes which constitute the modern world. Impact of modern forces on "traditional" peoples.

***ANTH 540 03(0-0-3). Medical Anthropology.** S. Prerequisite: Graduate standing.

Cultural and biocultural approaches to health, illness, and the body; theory and application in medical anthropology.

***ANTH 541 03(1-0-2). Seminar in Archaeological Method.** S. Prerequisite: Nine credits in anthropology.

Methods of archaeological recovery and interpretation, and process of archaeological analysis and reporting.

°**ANTH 542 03(1-0-2). Seminar in Archaeological Theory.** S. Prerequisite: Nine credits in anthropology.

Theories of recovery, reconstruction, and interpretation of the archaeological record.

ANTH 544 03(1-0-2). Anthropological Method and Theory. F, S. Prerequisite: Nine credits of anthropology.

Current trends of research in archaeology; cultural and physical anthropology.

°**ANTH 545 03(3-0-0). Culture and Mental Health: Theory and Method.** S. Prerequisite: Nine credits in anthropology.

Anthropological contributions to the cross-cultural study of mental health; indigenous peoples' health and healing; integration of theory and method.

***ANTH 546 03(3-0-0). Culture, Mind, and Cognitive Science.** S. Prerequisite: Graduate standing.

Anthropological contributions to cognitive science. Culture, mind, and social context. Theory building and practical applications.

***ANTH 547 04(3-2-0). Mind, Medicine, and Culture.** S. Prerequisite: Graduate standing.

Cultural-psychological influences on health and healing; mind-body medicine; complementary and alternative medicine; indigenous and spiritual healing.

ANTH 550A-C 03(0-0-3). Regional Prehistory.

A) Great Plains prehistory. F. Prerequisite: ANTH 350. B) Great Basin prehistory. °S. Prerequisite: ANTH 350. C) Southwestern. *S. Prerequisite: Nine credits in anthropology.

°**ANTH 551 03(3-0-0). Historical Archaeology.** S. Prerequisite: Graduate standing.

Theory, methods, and issues in historical archaeology.

***ANTH 553 03(0-0-3). Archaeology of Complex Societies.** S. Prerequisite: Graduate standing.

Issues in development and organization of complex societies with emphasis on the Americas.

°**ANTH 554/NR 554 03(2-2-0). Ecological and Social Agent-based Modeling.** S. Prerequisite: Junior or senior standing. Credit not allowed for both ANTH 554 and NR 554.

Exploring the use and making of agent-based models featuring interacting individuals in ecological and social simulation, with examples and projects.

***ANTH 555 03(0-0-3). Paleoindian Archaeology.** F. Prerequisite: ANTH 140.

Archaeology of the Americas during late Pleistocene/early Holocene; background and development of contemporary models.

ANTH 570 03(0-0-3). Contemporary Issues-Biological Anthropology. F. Prerequisite: Six credits in biological anthropology.

Theory and applications in biological anthropology focusing on syntheses and interpretations of human biology, variation, adaptability, and evolution.

***ANTH 571 03(3-0-0). Anthropology and Global Health.** F. Prerequisite: Graduate standing.

Global health concerns and problems including poverty, urbanization, malnutrition, diet, war and refugees, climate, and environment.

°**ANTH 572 03(0-0-3). Human Origins.** S. Prerequisite: Graduate standing.

Major trends in human evolution through use of detailed case studies and regionally focused primary research.

***ANTH 573 03(3-0-0). Paleoclimate and Human Evolution.** S. Prerequisite: Graduate Standing.

Methods used to reconstruct past environments and understand the effects of past climate on the major trends of human evolution.

ANTH 643 03(0-6-0). Advanced Ethnographic Field Methods. S.

Development of applied field methods and research questions for graduate-level ethnographic field research.

+ANTH 660 Var [2-10]. Field Archaeology. F, SS. Prerequisite: ANTH 460 or two seasons field experience.

Field application of nondestructive survey methods, advanced cartographic and excavation methods, project supervision skills. (\$)

°**ANTH 679/IE 679 03(3-0-0). Applications of International Development.** F, S. Prerequisite: Graduate standing. Credit not allowed for both ANTH 679 and IE 679.

In-depth interdisciplinary analysis of theoretical and practical issues in implementing economic and community-based international development programs.

ANTH 684 Var. Supervised College Teaching.

ANTH 686 Var. Practicum-Field Archaeology.

Direction of anthropological fieldwork under professional supervision.

ANTH 692 03(0-0-3). Seminar.

Current trends of research in archaeology; cultural and physical anthropology.

ANTH 695 Var. Independent Study.

ANTH 696 Var [1-3]. Group Study-Anthropological Theory.

Intensive analysis of selected topics and theories in anthropology, both historical and contemporary.

ANTH 699 Var. Thesis.

AGRICULTURAL AND RESOURCE ECONOMICS COURSES

Department of Agricultural and Resource Economics *College of Agricultural Sciences*

AREC 202 03(3-0-0). Agricultural and Resource Economics. (GT-SS1, AUCC 3C). F, S. Prerequisite: MATH 117 or concurrent registration or MATH 118 or MATH 124 or MATH 125 or MATH 126 or MATH 141 or MATH 155 or MATH 160. Credit not allowed for both AREC 202 and ECON 202.

Introduction to decision-making by consumers, firms, and government, and resulting allocation of resources through markets.

AREC 205 03(2-2-0). Farm and Ranch Management. F. Prerequisite: AREC 202 or ECON 202.

Application of economic concepts and management functions to production, financial, and marketing decisions involved in farm or ranch business.

AREC 240/ECON 240 03(3-0-0). Issues in Environmental Economics. (GT-SS1, AUCC 3C). F, S. Credit not allowed for both AREC 240 and ECON 240.

Discussion and economic analysis of current environmental issues with special emphasis on the impact of economic growth. (NT-C)

AREC 305 03(2-2-0). Agricultural and Resource Enterprise Analysis. F, S. Prerequisite: AGRI 140 or BUS 150 or CIS 120; AREC 202 or ECON 202.

Use of records in agricultural and resource enterprise management; analytical methods, budgets, and planning techniques for improved decision making. (NT-O)

AREC 310 03(3-0-0). Agricultural Marketing. F, S, SS. Prerequisite: AREC 202 or ECON 202.

Market structure, behavior, and performance including futures market and market games theory. (NT-O)

AREC 311 03(3-0-0). Agricultural and Resource Product Marketing. F. Prerequisite: AREC 202 or ECON 202.

Theory and practice of marketing differentiated agricultural products and natural resource amenities with focus on strategies and market trends.

AREC 328 03(3-0-0). Small Agribusiness Management. F. Prerequisite: AREC 202 or ECON 202.

Apply business principles to small agribusinesses and cooperatives.

AREC 335/ECON 335 03(3-0-0). Introduction to Econometrics. F, S. Prerequisite: ECON 204; MATH 141 or MATH 155 or MATH 160; STAT 201 or STAT 204 or STAT 301 or STAT 307. Credit not allowed for both AREC 335 and ECON 335.

Estimating statistical regression models of economic relationships; treatment of special problems that may arise in analysis of economic data.

AREC 340/ECON 340 03(3-0-0). Introduction: Economics of Natural Resources. S. Prerequisite: AREC 202 or ECON 202. Credit not allowed for both AREC 340 and ECON 340.

Concepts, theories, institutions; analytical methods for economic evaluation of alternative resource use patterns and land use plans.

AREC 342 03(3-0-0). Water Law, Policy, and Institutions. F.

Legal water issues within the context of historical, social and economic development with emphasis on the southwestern United States. (NT-O)

AREC 346/ECON 346 03(3-0-0). Economics of Outdoor Recreation. F. Prerequisite: AREC 202 or ECON 202. Credit not allowed for both AREC 346 and ECON 346.

Benefit-cost framework in public planning for outdoor recreation, pricing problems, projecting demand, and regional economic development.

AREC 375 03(3-0-0). Agricultural Law. F, S. Prerequisite: Junior standing.

Laws, regulations, case decisions affecting ranching and farming in the Rocky Mountain area.

AREC 405 03(2-2-0). Agricultural Production Management. S. Prerequisite: AREC 305.

Economic principles of agricultural production decisions with linear programming analysis of production choices and farm planning.

+AREC 408 03(3-0-0). Agricultural Finance. S. Prerequisite: AREC 305.

Monetary affairs of agribusiness and agricultural production emphasizing credit institutions and procurement, investment, and management. (NT-O)

AREC 412 03(3-0-0). Agricultural Commodities Marketing. F. Prerequisite: AREC 310.

Agricultural marketing and agribusiness principles applied to current marketing problems relating to livestock and field and horticultural crops. (\$, NT-O)

AREC 415 03(3-0-0). International Agricultural Trade. F. Prerequisite: AREC 310; ECON 204.

Agricultural trade patterns and institutions; trade theory with applications to agriculture. Current issues in agricultural trade.

AREC 428 03(3-0-0). Agricultural Business Management. F, S. Prerequisite: AREC 305; AREC 310; senior standing.

Economic analysis, organization, and management practices of agriculture and food industries studied through simulation, case study, computer labs. (NT-O)

AREC 442 03(3-0-0). Water Resource Economics. S. Prerequisite: AREC 342; ECON 306 or concurrent registration. Credit not allowed for both AREC 442 and AREC 542.

An in-depth exploration of the role of economics in water resource planning.

AREC 460 03(3-0-0). Economics of World Agriculture. S. Prerequisite: AREC 202 or ECON 202.

Relationships between nations affecting agricultural growth and productivity, food security, and human welfare.

AREC 478 03(3-0-0). Agricultural Policy. F, S. Prerequisite: AREC 202 or ECON 202 or AREC 240/ECON 240.

Formulation and administration of public policies affecting agricultural industries and rural areas in the United States. (NT-O)

AREC 484 Var [1-5]. Supervised College Teaching. F, S. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

AREC 487 Var. Internship.

AREC 495 Var. Independent Study.

AREC 496 Var. Group Study.

AREC 505 03(3-0-0). Agricultural Production Economics. F. Prerequisite: AREC 405 or ECON 306; MATH 141.

Empirical applications of production economic theory for use of inputs and allocation of resources in agricultural, natural resource sectors.

AREC 508 03(3-0-0). Financial Management in Agriculture. S. Prerequisite: AREC 408.

Systematic approach to understanding and applying financial

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management in farm businesses.

AREC 510 03(3-0-0). Agricultural Product Marketing. F. Prerequisite: AREC 310; AREC 335/ECON 335.

Marketing techniques, industrial organization/competition for agricultural products in U.S. domestic, international trade, and developing country markets.

AREC 530 03(3-0-0). Agricultural Price Analysis. S.

Agricultural commodity prices related to neoclassical economics; current literature emphasizing management problems.

AREC 535/ECON 535 03(3-0-0). Applied Econometrics. F. Prerequisite: AREC 335/ECON 335; ECON 304 or ECON 306. Credit not allowed for both AREC 535 and ECON 535.

Econometric techniques applied to testing and quantification of theoretical economic relationships drawn from both microeconomics, macroeconomics.

AREC 540/ECON 540 03(3-0-0). Economics of Natural Resources. F. Prerequisite: AREC 340/ECON 340; MATH 141. Credit not allowed for both AREC 540 and ECON 540.

Public natural resources policy, effect on resource use in private sector, optimal pricing of minerals, timber and fisheries, public project analysis.

AREC 541/ECON 541 03(3-0-0). Environmental Economics. S. Prerequisite: ECON 306. Credit not allowed for both AREC 541 and ECON 541.

Economics of environmental policy; partial equilibrium and general equilibrium model; pollution; natural environments; population and economic growth.

AREC 542 04(3-2-0). Applied Advanced Water Resource Economics. S. Prerequisites: AREC 342; ECON 306; MATH 141 or MATH 155 or MATH 160; STAT 301. Credit not allowed for both AREC 442 and AREC 542.

Theory and application of economics in water resource planning.

AREC 547 03(3-0-0). Public Lands Planning and Management. S. Prerequisite: AREC 202 or ECON 202.

Principles and techniques used by federal land management agencies including Forest Service, Park Service, Fish and Wildlife Service, and BLM.

AREC 563/ECON 563 03(3-0-0). Regional Economics-Theory, Methods, and Issues. F. Prerequisite: ECON 306; ECON 501 or concurrent registration. Credit not allowed for both AREC 563 and ECON 563.

Tools and methods of regional economics, including supply, demand, and externality analyses. Applications to current urban and regional policy issues.

AREC 566/SOC 566 03(3-0-0). Contemporary Issues of Developing Countries. S. Prerequisite: Two or more courses in AREC or ECON or SOC. Credit not allowed for both AREC 566 and SOC 566.

Social, economic, and technological factors in developing countries.

AREC 570/ECON 530 03(3-0-0). Methodology of Economic Research. F. Prerequisite: ECON 304; ECON 306. Credit not allowed for both AREC 570 and ECON 530.

Philosophical foundations of science and research. Concepts and skills for planning, performing, reporting, and evaluating economic research.

AREC 572 03(3-0-0). Social Benefit Cost Analysis. F. Prerequisite: ECON 306.

Theory, application of concepts relating to social benefit cost analysis of public projects, policies intended to promote social welfare, economic growth.

AREC 635/ECON 635 03(3-0-0). Econometric Theory I. F. Prerequisite: AREC 535/ECON 535; ECON 501 or concurrent registration. Credit not allowed for both AREC 635 and ECON 635.

Theory of mathematical statistics and classical linear regression model in context of economic application.

AREC 660 03(3-0-0). Economics of Agricultural Development. S. Prerequisite: AREC 460.

Developments in agriculture related to food supply and economic growth in developing countries.

AREC 678 03(3-0-0). Agricultural and Resource Policy. F. Prerequisite: ECON 306; MATH 141.

Evaluate and analyze economic theory, applications and public incentives related to government policies for agriculture and natural resources.

AREC 695 Var. Independent Study.

AREC 699 Var. Thesis.

AREC 735/ECON 735 03(3-0-0). Econometric Theory II. S. Prerequisite: AREC 635/ECON 635. Credit not allowed for both AREC 735 and ECON 735.

Model building, estimation and testing, using both microanalytic models and aggregate models of the economy.

AREC 740 03(3-0-0). Advanced Resource and Environmental Economics. F. Prerequisite: AREC 540 or ECON 540; AREC 541 or ECON 541; AREC 635 or ECON 635; ECON 706.

Advanced theory, methods, and literature of natural resource and environmental economics, including dynamic programming and non-market valuation.

AREC 784 Var [1-3]. Supervised College Teaching. F, S, SS.

AREC 792A-C Var. Seminar.

A) Agricultural. B) International. C) Resources.

AREC 795 Var. Independent Study.

AREC 799 Var. Dissertation.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ART COURSES

Department of Art College of Liberal Arts

ART 100 03(3-0-0). Introduction to the Visual Arts. (GT-AH1, AUCC 3B). F, S, SS.

Exploration of the development of visual arts.

ART 101 03(0-6-0). Visual Form. F, S, SS.

Two- and three-dimensional design to develop visual awareness and insight into structure and organization of visual arts.

ART 105 01(1-0-0). Issues and Practices in Art. F, S.

Current issues, practices, and resources in the visual arts; integration of unified vocabulary in various art disciplines.

ART 106D 03(0-6-0). Art Studio-Fibers. F, S, SS.

ART 110 03(3-0-0). Art History I. F.

The arts of ancient cultures and civilizations.

ART 111 03(3-0-0). Art History II. S. Prerequisite: ART 110.

Medieval through early modern art history.

***ART 112 03(3-0-0). History of Asian Art.** F.

Arts of China, Japan, and India.

°**ART 113 03(3-0-0). Native Art Survey.** F.

Visual arts of native peoples of North America, Africa, and Oceania.

ART 135 03(0-6-0). Introduction to Drawing. F, S, SS.

Elements of artistic freehand drawing emphasizing experimentation with wide variety of media.

ART 136 03(0-6-0). Introduction to Figure Drawing. F, S, SS.

Prerequisite: ART 135.

Human form as basis for self-expression through various drawing media. (\$)

ART 160 03(0-6-0). Two-Dimensional Visual Fundamentals. F, S.

Concepts of organization and color theory structured for understanding and manipulation of two-dimensional space. (\$)

ART 170 03(0-6-0). Three-Dimensional Visual Fundamentals. F, S.

Understanding and manipulating three-dimensional form and space; use of materials and tools.

+**ART 208/ETST 208 03(3-0-0). Native American Art and Material Culture.** S. Credit not allowed for both ART 208 and ETST 208.

Traditional arts and material culture of the indigenous peoples of North America.

ART 212 03(3-0-0). Art History III. F, S. Prerequisite: ART 111.

Modern to contemporary art history.

ART 230 03(0-6-0). Photo Image Making I. F, S. Prerequisite: ART 111; ART 136; ART 160; ART 170.

Photographic imagery as an art medium; exploration of silver-based (film) materials. (\$)

ART 235 03(0-6-0). Intermediate Drawing I. F, S, SS. Prerequisite: ART 136.

Drawing using models and various still life material. (\$)

ART 240 03(0-6-0). Pottery I. F, S. Prerequisite: ART 111; ART 136; ART 160; ART 170.

Basic techniques of studio ceramics and wheel throwing; exploration of

expressive potential in pottery. (\$)

ART 245 03(0-6-0). Metalsmithing and Jewelry I. F, S. Prerequisite: ART 111; ART 136; ART 160; ART 170.

Basic metal techniques; forming and construction; surface treatment and finishing processes; behavior and mechanical properties of metals. (\$)

ART 250 03(0-6-0). Fibers I. F, S. Prerequisite: ART 110; ART 135; ART 160 or ART 170.

Fibers and fabric as expressive media; weaving and basic fiber structures; fabric painting and surface techniques. (\$)

ART 255 03(0-6-0). Introduction to Graphic Design. F, S. Prerequisite: ART 111; ART 136; ART 160; ART 170; 2.55. G.P.A. or better.

Problems emphasizing typography, layout, symbols, illustration, and package design. (\$)

ART 260 03(0-6-0). Painting I. F, S. Prerequisite: ART 111; ART 136; ART 160; ART 170.

Basic oil painting procedures, techniques, and concepts. (\$)

ART 265 03(0-6-0). Printmaking I-Intaglio and Relief. F, S. Prerequisite: ART 110; ART 135; ART 160 or ART 170.

Problems in composition utilizing basic techniques and principles of printmaking processes. (\$)

ART 270 03(0-6-0). Sculpture I. F, S. Prerequisite: ART 111; ART 136; ART 160; ART 170.

Introduction to sculptural techniques and concepts. (\$)

ART 295A-K Var [1-4]. Independent Study.

A) Painting. B) Printmaking. C) Sculpture. (\$) D) Fibers. E) Metalsmithing and jewelry. (\$) F) Drawing. G) Graphic design. H) Art ART 212.

American art from 17th century to 1945.

ART 311 03(3-0-0). Art of Africa. F. Prerequisite: ART 212.

History of the art of Africa.

***ART 312 03(3-0-0). History of Pre-Columbian Art.** F. Prerequisite: ART 212.

History of the art of Central and South America.

°**ART 314 03(3-0-0). Women in Art History.** S. Prerequisite: ART 212.

Women as artists in history of art and women's media in art.

ART 315 03(3-0-0). United States Art 1945-1980. S. Prerequisite: ART 212.

Visual art in the United States since 1945.

ART 316 03(3-0-0). Art of the Pacific. S. Prerequisite: ART 212.

Arts of Australia, Indonesia, Melanesia, Micronesia, and Polynesia.

°**ART 319 03(3-0-0). History of Graphic Design.** F. Prerequisite: ART 212.

History of graphic design emphasizing 19th- and 20th-century work.

ART 321A-C Var [3-5]. Travel Abroad-Studio Workshop in Italy. SS.

Exploration of studio techniques in Italy. A) Drawing. Prerequisite: ART 135. B) Photo image making. Prerequisite: ART 230 or portfolio review; written consent of instructor. C) Fibers. Prerequisite: ART 250 or portfolio review; written consent of instructor. D) Sculpture. Var[3-5] Prerequisite: ART 270.

ART 325 03(3-0-0). Concepts in Art Education. S. Prerequisite: EDUC 275; admission to teacher licensure.

Artistic learning in children, adolescents, adults, and special populations.

ART 326 04(0-8-0). Art Education Studio. F, S. Prerequisite: EDUC 275; admission to teacher licensure.

Art areas required for teacher licensure as indicated by individual

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

student needs. (\$)

ART 330 04(0-8-0). Photo Image Making II. F, S. Prerequisite: ART 230 or portfolio review.

Studio course designed to develop the growth of photographic expression. (\$)

ART 331 04(0-8-0). Photo Image Making III. F, S. Prerequisite: ART 330.

Studio course designed to further growth of concept, materials in photographic expression as an art medium. (\$)

ART 335 04(0-8-0). Intermediate Drawing II. F, S, SS. Prerequisite: ART 235. May be taken 3 times for credit.

Assigned and independent drawing projects; use of traditional and non-traditional materials. (\$)

ART 336 04(0-8-0). Intermediate Drawing III. F, S. Prerequisite: ART 335.

Assigned and independent drawing projects; art theory and criticism; readings and written assignments. (\$)

ART 340 04(0-8-0). Pottery II. F, S, SS. Prerequisite: ART 240.

Studio ceramic and wheel throwing techniques; surface treatment, kiln firing, clay and glaze formulation. (\$)

ART 341 04(0-8-0). Pottery III. S. Prerequisite: ART 340.

Form and surface exploration; supportive ceramic technologies; expression in historical pottery. (\$)

ART 345 04(0-8-0). Metalsmithing and Jewelry II. F, S. Prerequisite: ART 245.

Raising and casting techniques in combination with construction; metal spinning. (\$)

ART 346 04(0-8-0). Metalsmithing and Jewelry III. F, S. Prerequisite: ART 245.

Forging and enameling techniques on nonferrous and ferrous metals; stone setting. (\$)

ART 350 04(0-8-0). Fibers II. F, S. Prerequisite: ART 250.

Intermediate fiber structures and fabric and surface design; dyes and pigments; continued investigation of fibers and fabric as expressive media.. (\$)

ART 351 04(0-8-0). Fibers III. F, S. Prerequisite: ART 250.

Investigation of fibers and fabric as expressive media; research in historic textiles. (\$)

ART 355 04(0-8-0). Typography and Design Systems. F. Prerequisite: ART 255.

Emphasis on typographic solutions for advertising, corporate identity, packaging, and publication design. (\$)

ART 356 04(0-8-0). Illustration. S. Prerequisite: ART 255; 6 credits in drawing.

Problems emphasizing media, experimental techniques, and compositions. (\$)

ART 357 04(0-8-0). Interactive Media. F. Prerequisite: ART 255 or ART 256.

Technical, conceptual, and historic aspects of creating interactive electronic media.

ART 358 04(0-8-0). Experimental Video. F. Prerequisite: ART 255 or ART 256.

History, theory, application of experimental video and digital special effects, animation and video techniques as they apply to experimental video.

ART 360 04(0-8-0). Painting II. F. Prerequisite: ART 260.

Techniques and concepts inherent in acrylic and other water-based media. (\$)

ART 361 04(0-8-0). Painting III. S. Prerequisite: ART 235; ART 260.

Compositions and techniques in oil and/or acrylic emphasizing the human figure. (\$)

ART 365 04(0-8-0). Printmaking II-Lithography. F, S. Prerequisite: ART 136.

Preparation, processing, and printing techniques in stone and metal plate lithography. (\$)

ART 366 04(0-8-0). Printmaking III-Studio Workshop. F, S. Prerequisite: ART 365.

Advanced intaglio, relief, planographic, and stencil processes in the workshop; continued emphasis on individual creative growth. (\$)

ART 370 04(0-8-0). Sculpture II. F. Prerequisite: ART 270.

Additive, subtractive, and related techniques. (\$)

ART 371 04(0-8-0). Sculpture III. S. Prerequisite: ART 270.

Casting in metal. (\$)

ART 375 03(0-6-0). Figure Modeling and Drawing. F. Prerequisite: ART 270. Maximum of 9 credits allowed in course.

Studio course based on observation of the human figure in sculpture and drawing. (\$)

ART 384 Var [1-4]. Supervised College Teaching. F, S. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Supervised assistance in instruction.

^o**ART 410 03(3-0-0). Greek Art.** F. Prerequisite: ART 212.

Aegean and Greek architecture, painting, and sculpture.

ART 411 03(3-0-0). History of Medieval Art. S. Prerequisite: ART 212.

Early Christian, Byzantine, Islamic, Romanesque, and Gothic visual art forms.

ART 412 03(3-0-0). History of Renaissance Art. S. Prerequisite: ART 212.

Architecture, sculpture, painting, and minor arts, 1300 to 1600.

ART 414 03(3-0-0). History of Baroque and Rococo Art. S. Prerequisite: ART 212.

17th- and 18th-century visual arts.

^{*}**ART 415 03(3-0-0). History of 19th-Century European Art.** F. Prerequisite: ART 212.

Architecture, sculpture, painting, and other arts in Europe, 1780 to 1900.

^o**ART 416 03(3-0-0). History of European Art, 1900 to 1945.** S. Prerequisite: ART 212.

Visual arts in Europe, 1900 to 1945.

^{*}**ART 417 03(3-0-0). Roman Art.** S. Prerequisite: ART 212.

Roman sculpture, painting, and architecture.

ART 418 03(2-0-1). Contemporary Artists and Art Critics. F, S.

Prerequisite: ART 315.

Critical study of contemporary artists and art criticism.

ART 419 03(3-0-0). Historiography and Methodology of Art History. F. Prerequisite: Written consent of instructor.

Historiography/methodology/research methods in art history.

ART 420 Var [3-5]. Travel Abroad-Art History in Italy. SS. Prerequisite: ART 212.

Art historical study of painting, sculpture, and architecture in Italy.

ART 430 04(0-8-0). Advanced Photo Image Making I. F, S. Prerequisite:

^oAlternate year offering (odd); ^{*} Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ART 331.

Advanced problems in use of photo image making as an art medium. (\$)

ART 431 04(0-8-0). Advanced Photo Image Making II. F, S. Prerequisite: ART 430.

Studio course to refine individual directions and professional goals in photography as an art medium. (\$)

ART 435 04(0-8-0). Advanced Drawing I. F, S, SS. Prerequisite: ART 336.

Independent projects and identification of personal artistic direction; research in art-related topics. (\$)

ART 436 04(0-8-0). Advanced Drawing II. F, S, SS. Prerequisite: ART 435.

Capstone course; production of professional exhibition-quality work. (\$)

ART 440 04(0-8-0). Pottery IV. F. Prerequisite: ART 341.

Advanced individual research in pottery form and expression; supportive technology; expression in contemporary American pottery. (\$)

ART 441 04(0-8-0). Pottery V. S. Prerequisite: ART 440.

Advanced individual research in pottery form and expression of personal subject matter; supportive technology. (\$)

ART 445 04(0-8-0). Metalsmithing and Jewelry IV. F, S. Prerequisite: ART 345; ART 346.

Chasing and repousse techniques in two- and three-dimension; inlay, engraving, and etching techniques. (\$)

ART 446 04(0-8-0). Metalsmithing and Jewelry V. S. Prerequisite: ART 345; ART 346.

Advanced techniques: granulation, electroforming, photoetching, makume, niello; ferrous metals techniques. (\$)

ART 450 04(0-8-0). Fibers IV. F, S. Prerequisite: ART 350; ART 351. Maximum of 8 credits allowed in course.

Advanced studio problems in expressive use of fibers and fabric. (\$)

ART 451 04(0-8-0). Fibers V. F, S. Prerequisite: ART 351 or ART 450. Maximum of 8 credits allowed in course.

Advanced studio problems in the expressive use of fibers and fabric. (\$)

ART 455 04(0-8-0). Advanced Typography and Design Systems. F. Prerequisite: ART 355. Maximum of 8 credits allowed in course.

Two- and three-dimensional solutions for advertising, corporate identity, packaging, and publication design. (\$)

ART 456 04(0-8-0). Advanced Illustration. S. Prerequisite: ART 356. Maximum of 8 credits allowed in course.

Projects in editorial and reportorial illustration emphasizing techniques applied to solving problems in advanced composition. (\$)

ART 457 04(0-8-0). Advanced Interactive Media. F, S, SS. Prerequisite: ART 255 or ART 256; ART 357.

Technical, conceptual, and historic aspects of creating interactive electronic media.

ART 458 01(0-8-0). Advanced Experimental Video. F. Prerequisite: ART 255 or ART 256; ART 358.

Advanced experimental video and visual effects.

ART 460 04(0-8-0). Advanced Painting I. F. Prerequisite: ART 360; ART 361. Maximum of 8 credits allowed in course.

Advanced composition and exploration of individual creative expression. (\$)

ART 461 04(0-8-0). Advanced Painting II. S. Prerequisite: ART 460. Maximum of 8 credits allowed in course.

Continuation in direction of individual creative expression. (\$)

ART 465 04(0-8-0). Printmaking IV-Studio Workshop. F, S. Prerequisite: ART 366.

Advanced printmaking workshop; intaglio, relief, planographic, and stencil; continued emphasis on individual creative growth. (\$)

ART 466 04(0-8-0). Printmaking V-Studio Workshop. F, S. Prerequisite: ART 465. Maximum of 8 credits allowed in course.

Advanced printmaking concepts in studio and research problems. (\$)

ART 470 04(0-8-0). Sculpture IV. F, S. Prerequisite: ART 370; ART 371. Maximum of 12 credits allowed in course.

Development of individual expression using sculptural techniques. (\$)

ART 471 04(0-8-0). Sculpture V. F, S. Prerequisite: ART 470. Maximum of 8 credits allowed in course.

Advanced expression using sculptural techniques. (\$)

ART 487 Var [1-4] Internship.

Supervised work experience in an approved location.

ART 492A-B 03(0-0-3). Seminar.

A) Art history. Prerequisite: ART 212. **B)** Art education. Prerequisite: Concurrent registration in ART 326.

ART 495A-L Var [1-4]. Independent Study. Maximum of 8 credits allowed per subtopic.

A) Painting **B)** Printmaking. (\$) **C)** Sculpture. (\$) **D)** Fibers. (\$) **E)** Metalsmithing and jewelry. (\$) **F)** Drawing. **G)** Graphic design. **H)** Art history. **I)** Art education. **J)** Pottery. (\$) **K)** Photo image making. Prerequisite: ART 330. (\$)

ART 496A-L Var [1-4]. Group Study. Maximum of 8 credits allowed per subtopic.

A) Painting. **B)** Printmaking. (\$) **C)** Sculpture. (\$) **D)** Fibers. (\$) **E)** Metalsmithing and jewelry. (\$) **F)** Drawing. **G)** Graphic design. **H)** Art history. Prerequisite: ART 212. **I)** Art education. **J)** Pottery. (\$) **K)** Photo image making. (\$)

ART 510A-Q 03(3-0-0). Advanced Study in Art History. F, S. Prerequisite: Written consent of instructor.

A) American art. **B)** African art. **C)** Pre-Columbian art. **E)** United States art since 1945. **F)** Greek art. **G)** Medieval art. **H)** Renaissance art. **I)** Baroque and rococo art. **J)** 19th-century European art. **K)** 20th-century European art. **M)** Roman art. **N)** Graphic design. **O)** Women in art. **P)** Pacific art. **Q)** Contemporary Artists and Art Critics.

***ART 514 03(0-0-3). Contemporary American Art Critics and Artists.** S. Prerequisite: ART 510E.

Issues in contemporary American art are explored through the work of critics and artists who visit through the Critic and Artist Residency Series.

ART 515 03(0-0-3). Seminar-Contemporary Art Theory. F. Prerequisite: ART 510E.

Relationship between critical theory and the visual arts; how artists and critics apply theory in their work.

ART 575A-G Var [1-15]. Studio Problems. F, S, SS. Prerequisite: Acceptance into MFA program in art.

A) Painting. **B)** Printmaking. (\$) **C)** Sculpture. (\$) **D)** Fibers. (\$) **E)** Metalsmithing and jewelry. (\$) **F)** Drawing. **G)** Graphic design.

ART 592 03(0-0-3). Art History Seminar. Prerequisite: Twenty-one credits of art history.

ART 675A-G Var [1-15]. Studio Problems. F, S, SS. Prerequisite: Ten credits of ART 575 in one concentration.

A) Painting. **B)** Printmaking. (\$) **C)** Sculpture. (\$) **D)** Fibers. (\$) **E)** Metalsmithing and jewelry. (\$) **F)** Drawing. **G)** Graphic design.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ART 684 Var. Supervised College Teaching.

ART 695A-H Var. Independent Study.

A) Painting. B) Printmaking. (\$) C) Sculpture. (\$) D) Fibers. (\$) E) Metalsmithing and jewelry. (\$) F) Drawing. G) Graphic design. H) Art history.

ART 696A-H Var. Group Study.

A) Painting. B) Printmaking. C) Sculpture. D) Fibers. E) Metalsmithing and jewelry. F) Drawing. G) Graphic design. H) Art history. I) Multiple Media.

ART 699A-G Var. Thesis. Prerequisite: Twelve credits in studio area of concentration.

A) Painting. B) Printmaking. (\$) C) Sculpture. (\$) D) Fibers. (\$) E) Metalsmithing and jewelry. (\$) F) Drawing. G) Graphic design.

AEROSPACE STUDIES COURSES

Department of Aerospace Studies

Office of Provost and Executive Vice President

AS 101 01(1-0-0). Foundations of the Air Force I. F.

Air Force opportunities, benefits; emphasis on officership, customs, and communicative skills, group problem solving.

AS 102 01(1-0-0). Foundations of the Air Force II. S.

Organizational structure and missions of Air Force organizations; emphasis on leadership, military history, and communicative skills.

AS 196 01(0-2-0). Aerospace Studies Group Study I. F, S.

Leadership Group Study is mandatory for students who are members of ROTC or are eligible to pursue a commission as determined by the Professor of Aerospace Studies.

AS 201 01(1-0-0). Evolution of Air and Space Power I. F.

History of the development of air power and air doctrine from Wright brothers to present emphasizing role of air power; communications skills emphasized.

AS 202 01(1-0-0). Evolution of Air and Space Power II. S.

History of air power from World War II to present examining role of air power in Berlin Airlift, Korean War, Mideast, and Vietnam War.

AS 296 01(0-2-0). Aerospace Studies Group Study II. F, S.

Leadership Group Study is mandatory for students who are members of ROTC or are eligible to pursue a commission as determined by the Professor of Aerospace Studies.

AS 301 03(3-0-0). Air Force Leadership Studies I. F.

Leadership and quality management fundamentals, officer professional knowledge, ethics, and values; communication skills heavily emphasized.

AS 302 03(3-0-0). Air Force Leadership Studies II. S.

Officer professional development, emphasizing leadership, management fundamentals, knowledge, evaluation systems, ethics, and communication skills.

AS 333 02(2-0-0). Operational Air Force Writing. S. Prerequisite: CO 150.

Common writing practices and procedures encountered by junior officers in the Air Force. Emphasizes proper writing content as well as form.

AS 396 01(0-2-0). Aerospace Studies Group Study III. F, S. Prerequisite: AS 296.

Concept of leadership; relationship between leadership and management; importance of leadership in the operation and success of any organization.

AS 401 03(3-0-0). National Security Affairs/Active Duty I. F.

Evolution and formulation of U.S. defense policy and strategy, regional conflict studies, Air Force roles and missions.

AS 402 03(3-0-0). National Security Affairs/Active Duty II. S.

Professionalism, military justice system, military ethics, commissioning essentials, and emphasis on communication skills.

AS 495 Var[1-3]. Independent Study. F, S. Prerequisite: AS 202.

AS 496 01(0-2-0). Aerospace Studies Group Study IV. F, S. Prerequisite: AS 396.

Concept of leadership; relationship between leadership and management; importance of leadership in the operation and success of any organization.

ATMOSPHERIC SCIENCE COURSES

Department of Atmospheric Science

College of Engineering

ATS 150 03(3-0-0). Science of Global Climate Change. S.

Physical basis of climate change. Energy budget of the earth, the greenhouse effect, carbon cycle, paleoclimate, projections of 21st-century climate.

ATS 300 02(2-0-0). Climate of Colorado. S.

Fundamentals of climate and climate changes; seasonal and regional Colorado climate regimes; types and availability of climate information.

ATS 350 02(2-0-0). Introduction to Weather and Climate. F, S.

Behavior of atmosphere and its influence upon human's activities.

ATS 351 01(0-3-0). Introduction to Weather and Climate Laboratory. F, S. Prerequisite: ATS 350 or concurrent registration.

Actual weather data, visualization of meteorological phenomena, in-depth discussion of current environmental issues.

ATS 495 Var. Independent Study.

ATS 540 02(0-6-0). Daily Weather Laboratory I. F. Prerequisite: Concurrent registration in ATS 601.

Synoptic analysis; cyclones, anticyclones, fronts, associated weather; long waves in the westerlies; upper troughs, ridges, basic currents; weather phenomena.

ATS 541 02(1-3-0). Daily Weather Laboratory II. S. Prerequisite: ATS 540.

Synoptic computation of cyclone and anticyclone movement, circulation, and intensity changes; mesoscale weather phenomena; precipitation processes.

°ATS 555 03(3-0-0). Air Pollution. S. Prerequisite: CHEM 113, MATH 261 or MATH 340; PH 122 or PH 142.

Nature, ambient concentrations, sources, sinks, and physiological activities of pollutants; meteorology; legislation; social and economic factors.

ATS 560 02(1-3-0). Air Pollution Measurement. F. Prerequisite: CHEM 114.

Examination and application of techniques for air pollution measurement. Includes sampling and analysis of gases, aerosols, and precipitation.

ATS 601 03(3-0-0). Atmospheric Dynamics I. F. Prerequisite: MATH 261; MATH 530.

Momentum, continuity equations; circulation, vorticity, thermodynamics; boundary layer; synoptic scale motions in midlatitudes.

ATS 602 02(2-0-0). Atmospheric Dynamics II. S. Prerequisite: ATS 601.

Sound waves, gravity waves, Rossby waves; numerical weather prediction; baroclinic instability; general circulation; tropical dynamics.

°ATS 604 03(3-0-0). Atmospheric Modeling. F. Prerequisite: ATS 601.

Design of numerical models of the atmosphere; applications to current problems. Emphasis on practical understanding of relevant numerical methods.

ATS 605 03(3-0-0). General Circulation of the Atmosphere. S. Prerequisite: ATS 602 or concurrent registration.

Observations and theory of the general circulation of the atmosphere, with emphasis on understanding physical mechanisms.

ATS 606 03(3-0-0). Introduction to Climate. F. Prerequisite: MATH 261; MATH 530.

Exchange of energy, water, and momentum through the atmosphere,

surface, vegetation, oceans. Paleoclimate, climate change, variability, and feedbacks.

ATS 610 03(3-0-0). Physical Oceanography. F.

Foundations of ocean circulation theory and the general circulation of the oceans using observational data and rotating tank experiments.

ATS 620 03(3-0-0). Thermodynamics and Cloud Physics. F. Prerequisite: MATH 340; PH 142.

Equilibrium thermodynamics, cloud microphysics, cloud dynamics, precipitation formation, and cloud electrification.

ATS 621 02(2-0-0). Atmospheric Chemistry. F. Prerequisite: CHEM 114; MATH 340; PH 142.

Overview of chemical kinetics and equilibria; sources and sinks of pollutants; photochemistry and smog formation; aqueous-phase chemistry; acid rain.

ATS 622 03(3-0-0). Atmospheric Radiation. S. Prerequisite: ATS 620.

Terrestrial, solar radiation propagation in the atmosphere; radiative components in energy budgets, weather systems, climate studies; remote sensing.

***ATS 623 02(2-0-0). Atmospheric Boundary Layer.** F. Prerequisite: ATS 601 or concurrent registration.

Equations for shallow atmospheric motions; thermal instability of a fluid layer; atmospheric turbulence; flow stability; 1-D mixed layer models.

ATS 631 02(1-3-0). Introduction to Atmospheric Aerosols. S.

Physical, chemical and microphysical characteristics of atmospheric particulate matter; measurement principles and techniques.

ATS 650 02(2-0-0). Measurement Systems and Theory. F. Prerequisite: PH 142; STAT 301.

Surface and upper air measurement systems; theory and system response, sensor design; automated data collection, analysis and display systems.

°ATS 652 02(2-0-0). Atmospheric Remote Sensing. F. Prerequisite: ATS 622.

Concepts of electromagnetic and acoustic wave propagation; active and passive remote sensing techniques including radar, lidar, thermal emission systems.

ATS 655 03(3-0-0). Objective Analysis in Atmospheric Sciences. S. Prerequisite: MATH 530.

Objective analysis of geophysical data: general statistics; matrix methods; time series analysis. Emphasis on applications to real-world data.

ATS 695 Var. Independent Study.

ATS 699A-T Var. Thesis.

A) Atmospheric dynamics. **B)** Land-atmosphere interactions. **C)** Chemistry-Climate Interactions. **D)** Weather Systems. **E)** Remote sensing. **F)** Ocean-Atmosphere Interactions. **G)** General circulation. **H)** Meteorological instruments. **I)** Atmospheric chemistry. **J)** Atmospheric radiation. **K)** Dynamic meteorology. **L)** Satellite applications. **M)** Mesoscale meteorology. **N)** Dynamics and physics of clouds. **O)** Mesoscale modeling. **P)** Radiation theory. **Q)** Radar meteorology. **R)** Aerosol and cloud chemistry. **S)** Climate dynamics. **T)** Oceanography.

***ATS 703 02(2-0-0). Numerical Weather Prediction.** F. Prerequisite: ATS 602.

Quasi-geostrophic approximation; barotropic, baroclinic, primitive equation, and general circulation models; numerical methods.

°ATS 704 02(2-0-0). Large-Scale Atmospheric Dynamics. F. Prerequisite: ATS 602.

Quasi-static, quasi-geostrophic equations; planetary waves; geostrophic adjustment; barotropic, baroclinic instability; frontogenesis; tropical cyclones.

°ATS 707 03(2-0-1). Atmospheric Waves and Vortices. F. Prerequisite:

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ATS 605.

Atmospheric wave motions and embedded vortices spanning mountain waves to large-scale Rossby waves and critical layers.

ATS 708 03(3-0-0). Middle Atmospheric Dynamics. S. Prerequisite: ATS 605.

Dynamics of the stratosphere and mesosphere with emphasis on the lower and middle stratosphere.

***ATS 710 03(3-0-0). Geophysical Vortices.** F. Prerequisite: ATS 602.

Observational, experimental, and theoretical aspects of geophysical vortices, such as hurricanes, polar lows, tornadoes, and dust devils.

***ATS 711 02(2-0-0). Microclimate.** F. Prerequisite: ATS 623; MATH 340.

Momentum, heat, water, and trace gas fluxes near the earth's surface, including fluxes between the atmosphere and the land/ocean/ice surfaces.

°ATS 712 03(3-0-0). Dynamics of Clouds. S. Prerequisite: ATS 623.

General theory of cloud dynamics; parameterization of microphysics and radiation; models of fog, stratocumuli, cumulonimbi, and orographic clouds.

°ATS 715 02(2-0-0). Atmospheric Oxidation Processes. F. Prerequisite: ATS 621.

Atmospheric hydrocarbon and nitrogen oxide reactions; aqueous phase scavenging and reactions; chemical pathways in the atmosphere.

ATS 716 02(1-2-0). Air Quality Characterization. S. Prerequisite: ATS 555 or ATS 621; ATS 560.

Planning, executing, and reporting on a measurement campaign to characterize local air quality.

°ATS 721 03(3-0-0). Theoretical Topics in Radiative Transfer. F. Prerequisite: ATS 622.

Physics of atmospheric radiation; theoretical techniques used to show radiation transfer equation.

°ATS 722 03(2-0-1). Atmospheric Radiation and Energetics. S. Prerequisite: ATS 622.

Radiative transfer in the atmosphere; implications on remote sensing and energetics.

°ATS 724 02(2-0-0). Cloud Microphysics. S. Prerequisite: ATS 621.

Theories and observations of nucleation; cloud droplet spectra broadening; precipitation growth and breakup; ice multiplication; cloud electrification.

***ATS 730 03(3-0-0). Mesoscale Modeling.** F. Prerequisite: ATS 602; ATS 623.

Development of basic equations used in mesoscale models and methodology of solution.

°ATS 735 03(3-0-0). Mesoscale Dynamics. F. Prerequisite: ATS 602.

Analysis of physical and dynamical processes that initiate, maintain, and modulate atmospheric mesoscale phenomena.

***ATS 737 03(3-0-0). Satellite Observation of Atmosphere and Earth.** S. Prerequisite: ATS 622; ATS 652.

Satellite measurements; basic orbits and observing systems; applications of remote sensing and imaging to investigations of atmospheric processes.

°ATS 741 03(3-0-0). Radar Meteorology. S. Prerequisite: ATS 652.

Radar systems; radar equation and applications; multiple Doppler observation and processing; radar studies of mesoscale systems.

***ATS 742 02(2-0-0). Tropical Meteorology.** S. Prerequisite: ATS 601; ATS 602; ATS 606.

Tropical atmosphere, monsoons, intraseasonal variability, hurricanes, theory of tropical convection and the large-scale circulation.

°ATS 743 03(3-0-0). Interactions of the Ocean and Atmosphere. S. Prerequisite: ATS 602.

Ocean-atmosphere interactions in observations, theory, and models. Time mean atmosphere-ocean circulations through climate variability and change.

***ATS 745 03(3-0-0). Atmospheric General Circulation Modeling.** S. Prerequisite: ATS 602; ATS 605.

Current problems in modeling of the general circulation of the atmosphere

***ATS 750 03(3-0-0). Climate Dynamics: Atmospheric Variability.** F. Prerequisite: ATS 605; ATS 655.

Analysis and interpretation of large-scale patterns of climate variability and observed climate change.

***ATS 753 03(3-0-0). Global Hydrologic Cycle.** S. Prerequisite: ATS 601; ATS 622 or ATS 652.

Hydrologic cycle; moisture transport and air-ground exchange; water budgets of meteorological phenomena; climatology of atmospheric water.

***ATS 755 03(3-0-0). Topics in Climate Research.** F. Prerequisite: ATS 606.

Current topics in climate research.

°ATS 760 02(2-0-0). Global Carbon Cycle. S. Prerequisite: ATS 606.

Exchanges of CO₂ between the atmosphere, the land surface, and oceans. Biogeochemical processes. Micrometeorological and inverse flux estimation.

°ATS 762 02(2-0-0). Biosphere-Chemistry-Climate Interactions. S. Prerequisite: ATS 621.

Explore the sensitivity of the climate system to atmospheric chemical composition with emphasis on connections to biospheric processes and feedbacks.

***ATS 765 03(3-0-0). Climate Dynamics: Ocean Variability.** F. Prerequisite: ATS 606.

Climate variability on time scales of years to millennia with focus on the role of the ocean circulation. Approach through dynamical systems theory.

***ATS 770 03(3-0-0). Ocean Modeling.** F. Prerequisite: ATS 601.

Conceptual and numerical ocean models and their application to current problems in climate science and biogeochemical cycles.

°ATS 772 02(2-0-0). Aerosol Chemistry. F. Prerequisite: CHEM 114; MATH 161; PH 122 or PH 142.

Physics and chemistry of atmospheric aerosols including composition, surface properties, size, interaction with radiation sources, sinks.

ATS 784 Var. Supervised College Teaching. F, S, SS.

ATS 786 Var. Practicum.

ATS 795 Var. Independent Study.

ATS 796 Var. Group Study.

ATS 799A-T Var. Dissertation.

A) Atmospheric dynamics. **B)** Land-atmosphere interactions. **C)** Chemistry-Climate Interactions. **D)** Weather Systems. **E)** Remote sensing. **F)** Ocean-Atmosphere Interactions. **G)** General circulation. **I)** Atmospheric chemistry. **K)** Dynamic meteorology. **L)** Satellite applications. **M)** Mesoscale meteorology. **N)** Dynamics and physics of clouds. **O)** Mesoscale modeling. **P)** Radiation theory. **Q)** Radar meteorology. **R)** Aerosol and cloud chemistry. **S)** Climate dynamics. **T)** Oceanography.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

BIOCHEMISTRY AND MOLECULAR BIOLOGY COURSES

Department of Biochemistry and Molecular Biology College of Natural Sciences

BC 192 02(1-0-1). Biochemistry Freshman Seminar. F.

Introduction to curriculum and career options for biochemistry majors.

BC 295 Var [1-3]. Introductory Independent Study. F, S, SS. Prerequisite: CHEM 112 or concurrent registration; LIFE 102.

Apply principles and knowledge being learned in first and second year life sciences and chemistry courses.

BC 351 04(4-0-0). Principles of Biochemistry. F, S, SS. Prerequisite: BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 341 or CHEM 345. For majors in biological sciences, engineering, and preprofessional students in the health sciences.

Structure and function of biological molecules; biocatalysis; metabolism and energy transduction; gene expression. (NT-O)

BC 401 03(3-0-0). Comprehensive Biochemistry I. F. Prerequisite: CHEM 245 or CHEM 343 or concurrent registration or CHEM 346 or concurrent registration; MATH 155 or MATH 160.

Macromolecular structure and dynamics; membranes; enzymes; bioenergetics.

BC 403 03(3-0-0). Comprehensive Biochemistry II. S. Prerequisite: CHEM 245 or CHEM 341 or CHEM 345.

Metabolic pathways and their regulation; cellular biochemistry.

BC 404 02(0-6-0). Comprehensive Biochemistry Laboratory. F, S. Prerequisite: BC 401 or concurrent registration; CHEM 246 or CHEM 344 or CHEM 346; LIFE 203; LIFE 212.

Experimental approaches to studying macromolecules, metabolism, and gene expression. (S)

BC 405 01(0-0-1). Comprehensive Biochemistry II—Honors Recitation. S. Prerequisite: Concurrent registration in BC 403—Honors section. For students participating in the Honors program.

Read and discuss current literature related to material presented in BC 403.

BC 411 04(3-0-1). Physical Biochemistry. F. Prerequisite: BC 401; CHEM 113; MATH 161 or MATH 255.

Thermodynamics; reaction rates quantum chemistry; spectroscopy; macromolecular folding and interactions; ligand binding; enzyme kinetics; membranes.

BC 441 01(0-1.5-.5). 3D Molecular Models for Biochemistry. F. Prerequisite: BC 401 or concurrent registration.

Computer instruction to construct 3D models of proteins and nucleic acids using leading software.

BC 463 03(3-0-0). Molecular Genetics. F. Prerequisite: BC 351 with a C or better, or BC 401 with a C or better or concurrent registration; BZ 350 with a C or better or LIFE 201B with a C or better. Credit not allowed for both BC 463 and BC 563.

Molecular basis of gene structure, replication, repair, recombination, and expression.

BC 464 01(0-0-1). Molecular Genetics Recitation. F. Prerequisite: BC 351 or concurrent registration or BC 401 or concurrent registration; concurrent registration in BC 463; LIFE 201B.

Methods used to study the molecular basis of gene structure, replication, repair, recombination, and expression.

BC 465 03(3-0-0). Molecular Regulation of Cell Function. S. Prerequisite: BC 403 or concurrent registration or BC 351; LIFE 210.

Credit not allowed for both BC 465 and BC 565.

Molecular regulation of cell organization, membrane formation, organelle biogenesis, cell communication, shape and motility, growth, aging, and death.

BC 467 03(3-0-0). Biochemistry of Disease. S. Prerequisite: BC 401.

Biochemical basis of specific human diseases.

BC 475 03(0-6-1). Mentored Research. F, S, SS. Prerequisite: BC 404. Maximum of 9 credits allowed in course.

Plan and conduct mentored research with weekly discussion of progress, presentation at all-university symposium, and submission of written report.

BC 484 Var. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Assist in teaching selected courses in biochemistry and molecular biology.

BC 487A-B Var. Internship.

A) Prerequisite: BC 401; BC 403; BC 404; cumulative GPA of 2.000. Work experience with an approved preceptor outside of a university laboratory environment. **B)** International. Prerequisite: BC 401; BC 463; BC 495 (one credit in lab of CSU mentor); selection by department committee. Research in foreign host laboratory in contact with CSU mentor.

BC 493 01(0-0-1). Senior Seminar. F, S. Prerequisite: BC 401 or concurrent registration.

Critical analysis of selected literature in biochemistry and molecular biology.

BC 495 Var. Independent Study. Prerequisite: Minimum cumulative GPA of 3.000.

BC 496 Var. Group Study.

Faculty-directed exploration of areas of special interest in biochemistry and molecular biology.

BC 498 Var [1-6]. Research.

Supervised laboratory research in biochemistry and molecular biology.

BC 499A-E 03(0-0-3). Thesis.

A) Laboratory research-based thesis. **B)** Literature-based thesis. Prerequisite: BC 493 or concurrent registration. **C)** Literature-based Health and Med. Sci. Prerequisite: BC 493 or concurrent registration. **D)** Literature-based in Pre-Pharmacy. Prerequisite: BC 493 or concurrent registration. **E)** Literature-based in Neurobiochemistry. Prerequisite: BC 493 or concurrent registration.

BC 511 04(3-0-1). Structural Biology I. F. Prerequisite: BC 401 or concurrent registration.

Structural principles of biological macromolecules and techniques of structural analysis.

BC 512 01(1-0-0). Principles of Macromolecular Structure. F. Prerequisite: BC 411 or concurrent registration.

Physical interactions controlling folding and solution behavior of biological macromolecules, including proteins, nucleic acids, and membranes.

BC 513 01(1-0-0). Enzymology. S. Prerequisite: BC 403.

Kinetic methods, mechanism, and regulation of enzyme catalysis.

BC 517 02(2-0-0). Metabolism. F. Prerequisite: BC 351 or BC 403.

Design and regulation of metabolic pathways.

BC 563 04(3-0-1). Molecular Genetics. F. Prerequisite: BC 401; LIFE 201B. Credit not allowed for both BC 563 and BC 463.

Mechanisms of replication, transcription, processing, translation, and

packaging of genetic material, emphasizing original literature and methods.
BC 565 04(3-0-1). Molecular Regulation of Cell Function. S.
Prerequisite: BC 403 or concurrent registration or BC 351; LIFE 210.
Credit not allowed for both BC 565 and BC 465.

Molecular regulation of cell organization, membrane formation, organelle biogenesis, cell communication, shape and motility, growth, aging, and death.

BC 571 01(1-0-0). Quantitative Biochemistry. S. Prerequisite: BC 511 or concurrent registration.

Introduction to statistics, error analysis, and curve fitting of biochemical data with a focus on practical examples.

BC 589 02(1-2-0). Current Trends in Molecular Biosciences. SS.
Prerequisite: B.S. or B.A. in biology or chemistry; secondary school teaching certification. Offered only through Division of Continuing Education.

Biochemical and molecular biological foundations of molecular genetics/genetic engineering; molecular analysis of genes. (NT)

***BC 601 01(1-0-0). Responsible Conduct in Biochemistry.** S.

Design of experiments; error and fraud, publishing/grant application submission, scientific misconduct, classic examples of fraud, case studies.

BC 611 02(2-0-0). Structural Biology II. S. Prerequisite: BC 511.

Structure and interactions of biological macromolecules related to function.

BC 663 02(2-0-0). Gene Expression. S. Prerequisite: BC 563.

Eukaryotic transcription mechanisms with emphasis on methods of study and regulatory mechanisms.

BC 665A-B 02(2-0-0). Advanced Topics in Cellular Regulation. S.
Prerequisite: BC 565.

A) Microscopic Methods. Analysis of cell behavior, function and regulation using microscopic methods. B) Modern Methods. Modern methods in cell biology.

BC 695 Var. Independent Study.

BC 698 Var. Research.

BC 699 Var. Thesis.

BC 701 01(1-0-0). Grant Proposal Writing and Reviewing. F.
Prerequisite: BC 403; BC 511 or concurrent registration; BC 563 or concurrent registration.

Didactic and hands-on experience with locating funding sources, writing effective grant proposals and the review process in the bio-molecular sciences.

BC 711A-F 01(1-0-0). Advanced Topics in Structural Biology. F, S.
Prerequisite: BC 511; BC 611.

A) Protein structure and function. B) Membrane proteins. C) Protein-DNA interactions. D) Biomolecular spectroscopy. E) Biomolecular NMR. F) Macromolecular X-ray crystallography.

BC 763A-C 01(1-0-0). Advanced Molecular Genetics Topics. F, S.
Prerequisite: BC 663 or concurrent registration.

A) Chromatin and transcription. B) Transcriptional control; co-activators and corepressors. C) Concepts and techniques of genetic analyses.

BC 784 Var [1-3]. Supervised College Teaching.

BC 793 01(0-0-1). Seminar.

BC 795 Var. Independent Study.

BC 796 Var [1-5]. Group Study.

BC 798 Var. Research.

BC 799 Var. Dissertation.

BIOLOGICAL SCIENCE COURSES

Life Sciences Committee

Provost and Executive Vice President's Office

[Beginning in Fall Semester 2008, the BIO courses have been moved to BZ (BIO 310 and BIO 311), LIFE (BIO 320), or dropped.

BIO 220 changed to LAND 220/LIFE 220, effective FA07.

BIO 384 was dropped effective FA08.

BIO 310 and BIO 311 changed to BZ 310 and BZ 311, effective FA08.

BIO 221 dropped effective FA08.

BIO 320 changed to LIFE 320, effective FA08.]

BIOMEDICAL ENGINEERING COURSES

Nondepartmental

College of Engineering

BIOM 101 03(3-0-0). Introduction to Biomedical Engineering. F.

Basic principles, fundamentals in biomedical engineering including molecular, cellular and physiological principles and major areas such as biomechanics.

BIOM 300 04(1-4-1). Problem-Based Learning Biomedical Engr Lab.

S. Prerequisite: BIOM 101; MATH 340.

Group problem-based learning approach to problems spanning all core areas of biomedical engineering.

BIOM 306/BTEC 306 04(3-2-0). Bioprocess Engineering. S.

Prerequisite: CHEM 107 or CHEM 111; PH 121 or PH 141. Credit not allowed for both BIOM 306 and BTEC 306.

Material, energy balances; fluid flow, heat exchange, mass transfer; application to operations in food, fermentation, other bioprocess industries.

BIOM 330 03(3-0-0). Transport Phenomena in Biomedical Engineering. S. Prerequisite: BIOM 300; BMS 300; CBE 332 or MECH 344.

Engineering models of active and passive mechanisms of momentum, heat, and mass transport, in mammalian cells, tissues, and organ systems.

BIOM 400 03(3-0-0). Kinetics of Biomolecular and Cellular Systems. F.

Prerequisite: BIOM 330 or CBE 320.

In-depth analysis of the systems approach to biology and biological engineering at the molecular and the cellular scales.

BIOM 441 03(3-0-0). Biomechanics and Biomaterials. F. Prerequisite:

BMS 300; MECH 324 or concurrent registration; MECH 331 or concurrent registration.

Principles of biomechanics, biofluids, and biomaterials.

BIOM 470/MECH 470 03(3-0-0). Biomedical Engineering. F.

Prerequisite: MATH 155 or MATH 160; PH 141. Credit not allowed for both BIOM 470 and MECH 470.

Engineering application in human/animal physiology, diagnosis of disease, treatment, rehabilitation, human genome manipulation.

BIOM 476A-B. Biomedical Clinical Practicum. F, S, SS. Prerequisite:

BMS 300; BIOM 470/MECH 470.

Biomedical lab work or exposure to the hospital/clinical environment.

A) 02(1-3-0). B) 04(1-6-0).

BIOM 486A-B 04(0-0-10). Biomedical Design Practicum. F, S, SS.

A) Capstone Design I. Prerequisite: BIOM 300; BIOM 330 or BIOM 441 or ECE 441. B) Capstone Design II. Prerequisite: BIOM 300; BIOM 330 or BIOM 441 or ECE 441; BIOM 486A.

BIOM 495 Var[1-6]. Independent Study. F, S, SS.

BIOM 504/CBE 504 03(3-0-0). Fundamentals of Biochemical Engineering. F. Prerequisite:

BIOM 306/BTEC 306 or CBE 320 or concurrent registration; MATH 255 or MATH 340; MIP 300. Credit not allowed for both BIOM 504 and CBE 504.

Application of chemical engineering principles to enzyme kinetics, fermentation and cell culture, product purification, and bioprocess design.

BIOM 522/CBE 522 03(2-2-0). Bioseparation Processes. F.

Prerequisite: CBE 331. Credit not allowed for both BIOM 522 and CBE 522.

Analysis of processes to recover and purify fermentation products.

***BIOM 525/*MECH 525 03(3-0-0). Cell and Tissue Engineering.** S.

Prerequisite: BC 351 or BMS 300 or BMS 500 or BZ 310 or NB 501.

Credit allowed for only one of the following: BIOM 525, CBE 525, and

MECH 525.

Cell and tissue engineering concepts and techniques with emphasis on cellular response, cell adhesion kinetics, and tissue engineering design. (\$) (NT-O)

BIOM 526/ECE 526 03(3-0-0). Biological Physics. S. Prerequisite:

MATH 340 or MATH 345; PH122 or PH142.

Credit not allowed for both BIOM 526 and ECE 526.

Mathematical and physical modeling of biological systems. Mass transport in cellular environments. Electrical/mechanical properties of biomolecules.

BIOM 531/MECH 531 03(3-0-0). Materials Engineering. S.

Prerequisite: MECH 331 or MECH 431.

Selection of structural engineering materials by properties, processing, and economics; materials for biomedical and biotechnology applications. (NT-O)

BIOM 532/MECH 532 03(3-0-0). Material Issues in Mechanical Design. F. Prerequisite: MECH 331. Credit not allowed for both BIOM

532 and MECH 532.

Failure mechanisms from materials viewpoint with emphasis on use in design. Fracture, creep, fatigue and corrosion. (NT-O)

BIOM 533/ECE 533. 03(2-3-0). Biomolecular Tools for Engineers. F.

Prerequisite: BMS 300 or MIP 300. Credit not allowed for both BIOM 533 and ECE 533.

Theoretical and practical aspects of biomolecular laboratory tools—PCR, cloning, sequencing, single-molecule optical techniques and live-cell imaging. (\$) (S)

***BIOM 537/ECE 537 03(3-0-0). Biomedical Signal Processing.** S.

Prerequisite: MATH 340 or ECE 311 or STAT 303. Credit not allowed for both BIOM 537 and ECE 537.

Measuring, manipulating, and interpreting biomedical signals.

BIOM 543/CBE 543 03(3-0-0). Membranes for Biotechnology and Biomedicine. F. Prerequisite:

CHEM 341; CHEM 343; or CBE 310. Credit not allowed for both BIOM 543 and CBE 543.

Polymeric membrane formation, modification, module design and applications to bioseparation and biomedical separations and tissue engineering. (NT-O)

BIOM 570/MECH 570 03(3-0-0). Bioengineering. S. Prerequisite:

MECH 307; MECH 324. Credit not allowed for both BIOM 570 and MECH 570.

Physiological and medical systems analysis using engineering methods including mechanics, fluid dynamics, control, electronics, and signal processing. (NT-O)

BIOM 573/MECH 573 03(3-0-0). Structure and Function of Biomaterials. S. Prerequisite:

MECH 331. Credit not allowed for both BIOM 573 and MECH 573.

Structure-function relationships of natural biomaterials; application to analysis of biomimetic materials and biomaterials used in medical devices. (NT-O)

BIOM 586A-B. Biomedical Clinical Practicum. F, S, SS. Prerequisite:

BIOM 570/MECH 570; BMS 300 or BMS 500. A) 02(1-3-0). B) 04(1-6-0).

Graduate-level activity, such as biomedical research or design of a new medical device, for exposure to the hospital/clinical environment.

BIOM 592 Var[1-3]. Seminar. F, S. Prerequisite: None.

Student and research faculty presentations, guest and invited extramural speakers. (NT-O)

°BIOM 671/MECH 671 03(3-0-0). Orthopedic Tissue Biomechanics. F.

Prerequisite: CIVE 560. Credit not allowed for both BIOM 671 and MECH 671 or for BIOM 671/MECH 671 and BIOM 571/MECH 571.

Linear elastic, finite deformation, and viscoelastic theories applied to the

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

mechanical behavior of orthopedic tissues (bone, tendon, cartilage).

BIOM 684 Var. Supervised College Teaching. Maximum of 6 credits allowed in course; may not be used to satisfy degree requirements requiring bioengineering courses.

BIOM 695 Var. Independent Study.

BIOM 699 Var. Thesis.

BIOM 784 Var [1-6]. Supervised College Teaching.

BIOM 786 Var. Practicum-Laboratory Rotations.

BIOM 795 Var [1-6]. Independent Study.

BIOM 798 Var [1-6]. Research-Laboratory Rotation

BIOM 799 Var. Dissertation.

BIOMEDICAL SCIENCES

Department of Biomedical Sciences College of Veterinary Medicine and Biomedical Sciences

BMS 120 02(2-0-0). Human Health and Disease. F, S, SS.

Function of the human body in health and disease; exercises for decision making related to health.

BMS 122 02(2-0-0). Drugs and the Human Body. F, S.

Drugs effect on body functions. Implications of drug use in society.

BMS 124 03(3-0-0). Sexuality and Health. F, S.

Basic concepts of human reproduction, contraception, pregnancy, abortion, and venereal disease; their relationship to health.

BMS 192 01(0-0-1). First Year Seminar in Biomedical Sciences. F.

The university and its resources, college survival skills, careers in the biomedical sciences; current issues in health and biotechnology.

BMS 200 01(0-0-1). Concepts in Human Anatomy and Physiology. F, S.
Prerequisite: Concurrent registration in BMS 300.

Basic concepts in the anatomy and physiology of the human body.

BMS 230 03(3-0-0). Animal Anatomy and Physiology. S. Prerequisite: CHEM 107; LIFE 102. Credit not allowed for BMS 230 and BS 231, BMS 305, or VS 333.

Comparative systemic anatomy and physiology of farm animals.

BMS 260 03(2-0-1). Biomedical Sciences. S. Prerequisite: LIFE 102.

Opportunities and challenges in biomedical sciences; business of science, ethics, model systems, cellular and systemic physiology.

BMS 300 04(4-0-0). Principles of Human Physiology. F, S, SS.
Prerequisite: BZ 101 or BZ 110 or LIFE 102; CHEM 103 or CHEM 107 or CHEM 111.

Physiology of humans. (NT-O)

BMS 301 05(3-2-1). Human Gross Anatomy. F, S, SS. Prerequisite: BZ 110 or LIFE 102.

Structure and function of the human body. Study of prosected human cadavers; clinical applications; living anatomy. (\$)

BMS 302 02(1-3-0). Laboratory in Principles of Physiology. F, S.
Prerequisite: BMS 300 or concurrent registration or BMS 360 or concurrent registration.

Basic physiology lab exercises. (\$)

BMS 305 04(3-3-0). Domestic Animal Gross Anatomy. S. Prerequisite: BZ 110 or LIFE 102. Credit not allowed for both BMS 305 and VS 333.

Comparative gross anatomy of domestic carnivores, ruminants, and horses. (\$)

BMS 325 03(3-0-0). Cellular Neurobiology. F. Prerequisite: BMS 300 or BMS 360.

Cellular and molecular bases of nervous system function and behavior.

BMS 326 03(3-0-0). Neural Integration and Behavior. S. Prerequisite: BMS 300; BMS 325.

Functional organization of the nervous system; cellular mechanisms of integration of information to organize simple and complex behaviors.

BMS 330 04(3-3-0). Microscopic Anatomy. S. Prerequisite: BMS 300 or BMS 360. Credit not allowed for both BMS 330 and VS 331.

Microscopic anatomy of mammalian tissue.

BMS 345 04(3-2-0). Functional Neuroanatomy. S. Prerequisite: BMS

300 or BMS 360.

Functional systems and circuits of the human brain and spinal cord. (\$)

BMS 360 04(4-0-0). Fundamentals of Physiology. S. Prerequisite: BZ 110 or LIFE 102; CHEM 245 or concurrent registration or CHEM 345 or concurrent registration.

Cell, tissue, and organ function related to integrated whole body function.

BMS 384 Var [1-5]. Supervised College Teaching. Prerequisite: BMS 300 or BMS 360. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Supervision by and work with graduate teaching assistants in small group learning sessions involving students enrolled in BMS 300.

BMS 405 03(3-0-0). Nerve and Muscle-Toxins, Trauma and Disease. S. Prerequisite: BMS 325 or BMS 345.

Structure, composition, function of nerves and muscles, etiology of genetic and autoimmune neuromuscular diseases, alteration by toxins and nerve gas.

BMS 410 03(3-0-0). Physiological Responses to the Environment. S. Prerequisite: BMS 300 or BMS 360.

Acute and chronic physiological responses to various environmental factors.

BMS 420 03(3-0-0). Cardiopulmonary Physiology. F. Prerequisite: BMS 300 or BMS 360.

Normal and pathophysiology of cardiovascular and pulmonary systems.

BMS 430 03(3-0-0). Endocrinology. F. Prerequisite: BMS 300 or BMS 360.

Physiology of the glands of internal secretion.

BMS 450 03(3-0-0). Pharmacology. S. Prerequisite: BMS 300 or BMS 360.

Pharmacologic principles, absorption, distribution, metabolism, excretion, side effects, and actions of drugs.

BMS 460 04(4-0-0). Essentials of Pathophysiology. F. Prerequisite: BMS 300 or BMS 360; concurrent registration in BMS 492; biomedical sciences majors only.

Integration of different facets of mechanisms underlying health and disease.

BMS 487 Var [1-6]. Internship. Prerequisite: Written consent of department.

Work/research experience with an approved preceptor outside of a university laboratory.

BMS 492 01(0-0-1). Seminar-Pathophysiology of Disease. F. Prerequisite: Concurrent enrollment in BMS 460.

Capstone seminar in biomedical sciences.

BMS 495 Var. Independent Study.

BMS 496 Var [1-3]. Group Study. F, S. Prerequisite: BMS 301 or concurrent registration OR BMS 305 or concurrent registration OR BMS 360 or concurrent registration.

Faculty-supervised investigation of areas of special interest in anatomy and physiology.

BMS 498 Var [1-3]. Research. Prerequisite: BMS 300 or BMS 360.

Faculty-directed research in biomedical sciences.

BMS 500 04(4-0-0). Mammalian Physiology I. F. Prerequisite: BMS 300 or BMS 360. Credit not allowed for both BMS 500 and NB 501.

Cell physiology of nerve, skeletal, cardiac and smooth muscle with an emphasis on how cellular functions integrate into systems behavior.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

(NT-O)

BMS 501 04(4-0-0). Mammalian Physiology II. S. Prerequisite: BMS 300 or BMS 360.

Respiratory, renal, digestive, endocrine, metabolic, and reproductive function.

BMS 503/NB 503 03(3-0-0). Developmental Neurobiology. S. Prerequisite: One college-level course in each: biology, biochemistry, physics, calculus. Credit not allowed for both BMS 503 and NB 503.

Molecular mechanisms involved in development of nervous system including differentiation, growth, pathfinding, and synaptogenesis.

BMS 505/NB 505 03(3-0-0). Neuronal Circuits, Systems, and Behavior. S. Prerequisite: BMS 325 or BMS 500 or NB 501. Credit not allowed for both BMS 505 and NB 505.

Anatomical and physiological organization of the nervous system.

BMS 531 03(0--9-0). Domestic Animal Dissection. S. Prerequisite: BMS 305.

Dissection of domestic animals. (\$)

BMS 545 05(3-4-0). Neuroanatomy. S. Prerequisite: Written consent of instructor.

Nervous system structure and function presented from a systems perspective; applied and comparative aspects are emphasized. (\$)

BMS 550 03(2-0-1). Electron Microscopy-TEM, SEM, and X-ray. S. For biologists and materials scientists.

Theory and demonstration of transmission and scanning electron microscopy and X-ray microanalysis.

***BMS 560 03(2-0-1). Theory and Practice of Animal Biotechnology.** S.

Principles of molecular technology and applications to animal and human populations, including transgenic technology and gene therapy.

BMS 575 04(0-8-0). Human Anatomy Dissection. F.

Regional approach to human gross anatomy through laboratory dissection of human cadaver. (\$)

BMS 610A-B 01(1-0-0). Managing a Career in Science. F.

A) Survival skills for coursework (M.S.). Prerequisite: Written consent of instructor. B) Survival skills for research (M.S. and Ph.D.).

BMS 619 02(0-0-2). Advanced Human Gross Anatomy. F. Prerequisite: Written consent of instructor.

Clinical application of human anatomy through case-based study.

°BMS 620 03(3-0-0). Cardiovascular Physiology. S. Prerequisite: BMS 420 or BMS 500.

Physiology and biophysics of the circulatory system.

***BMS 625 03(3-0-0). Pulmonary Physiology.** S. Prerequisite: BMS 420 or BMS 501.

Structure, function, and pathophysiology of respiratory system.

°BMS 631 02(2-0-0). Mechanisms of Hormone Action. F. Prerequisite: BMS 430 or BMS 501.

Synthesis, secretion, and mechanisms of action of hormones.

°BMS 632 02(2-0-0). Metabolic Endocrinology. F. Prerequisite: BMS 631.

Endocrine regulation of metabolic homeostasis; effects of exercise or pregnancy.

BMS 633 02(0-0-2). Domestic Animal Anatomy-Case Discussions. S. Prerequisite: Concurrent registration in BMS 531.

Clinical case discussions utilized in advanced understanding of domestic animal anatomy and physiology.

***BMS 640 04(4-0-0). Reproductive Physiology and Endocrinology.** F. Prerequisite: BMS 501.

Reproductive physiology and endocrinology of vertebrate animals.

***BMS 642 01(0-3-0). Research Techniques for Gametes and Embryos.** S. Prerequisite: BMS 640.

Collection, storage, evaluation, in vitro manipulation, and replacement of sperm, oocytes, embryos, and other reproductive tissues.

BMS 650 01(0-3-0). Transmission EM Laboratory. S. Prerequisite: BMS 550.

Operation of transmission electron microscope; preparation of samples; interpretation of images.

BMS 652 01(0-3-0). Scanning EM Laboratory. S, SS. Prerequisite: BMS 550.

Operation of scanning electron microscope; preparation of samples; interpretation of images.

BMS 660/NB 660 01(1-0-0). Seizures, Neurodegeneration, and Epilepsy. F. Prerequisite: BMS 325 or NB 505. Credit not allowed for both BMS 660 and NB 660.

Analyzes molecular, cellular and network mechanisms underlying seizures and responsible for epilepsy.

BMS 672A-B. Advanced Topics in Electron Microanalysis.

A) Freeze fracture 02(1-3-0). SS. Prerequisite: BMS 650. B) X-ray microanalysis 01(0-3-0). SS. Prerequisite: BMS 652.

BMS 684 Var. Supervised College Teaching.

BMS 692 01(0-0-1). Seminar-Classics in Neurosciences. Prerequisite: Admission to graduate program.

Review of classic papers in the neurosciences.

BMS 695A-F Var. Independent Study.

A) Developmental anatomy. B) Microscopic anatomy. C) Neuroanatomy. D) Radiographic anatomy. E) Surgical anatomy. F) Gross anatomy.

BMS 696 Var[1-3]. Group Study-Neurosciences. F.

Current topics in neuroscience; how to evaluate scientific presentations.

BMS 699 Var. Thesis.

***BMS 740 03(3-0-0). Metabolism.** F. Prerequisite: BMS 501.

Applied pathophysiology of disorders of carbohydrate, lipid, protein, fluid, and electrolyte metabolism.

BMS 784 Var. Supervised College Teaching.

BMS 792A-C Var [1-5]. Seminar.

A) Biomedical sciences. B) Neurophysiology. C) Reproductive physiology.

BMS 795A-E Var. Independent Study.

A) Endocrinology. B) Neurophysiology. C) Cell physiology. D) Cardiopulmonary physiology. E) Reproductive physiology.

BMS 796A-C Var. Group Study.

A) Neurophysiology. B) Cardiopulmonary physiology. C) Reproductive physiology.

BMS 799 Var. Dissertation.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

BIOAGRICULTURAL SCIENCES AND PEST MANAGEMENT COURSES

Department of Bioagricultural Sciences and Pest Management *College of Agricultural Sciences*

BSPM 102 03(3-0-0). Insects, Science, and Society. (GT-SC2, AUCC 3A). F, S.

How insects develop, behave, and affect human activity. What every student should know about the most diverse life form on Earth.

BSPM 201 03(3-0-0). Weed Management and Control. F, S. Offered only through the Division of Continuing Education.

Basic overview of weeds and weed control. (NT-O)

BSPM 300/ANEQ 300B 01(1-0-0). Topics in Livestock Entomology. S. Prerequisite: 3 credits of BZ or LIFE at the 100-level.. Credit not allowed for both BSPM 300 and ANEQ 300B.

Identification, biology, and management of insect, tick, and mite pests.

BSPM 302 02(2-0-0). Applied and General Entomology. F.

Biology and management of insects.

BSPM 303A-C. Entomology Laboratory. F. Prerequisite: BSPM 302 or concurrent registration.

Biology and recognition of insects. **A)** General 02(0-4-0). (\$) **B)** Horticultural 01(0-2-0). ***C)** Agricultural 01(0-2-0).

+BSPM 308 03(2-3-0). Ecology and Management of Weeds. F. Prerequisite: BZ 120 or LIFE 103; CHEM 107 or CHEM 111.

Classification, characteristics; weed biology and ecology; control by cultural, mechanical, chemical, and biological means; successional management. Field trips required.

***BSPM 310 03(3-0-0). Understanding Pesticides.** S. Prerequisite: Three credits 100-level BZ or CHEM.

Identification, properties, use, labeling, environmental interactions, and application of major classes of pesticides.

BSPM 350 02(1-2-0). Science Illustration. S. Prerequisite: None.

Fundamentals of science illustration emphasizing observational and drawing skills.

BSPM 361 03(2-2-0). Elements of Plant Pathology. S. Prerequisite: BZ 104 or BZ 120 or HORT 100 or LIFE 102.

Diseases of economic plants. (\$)

+BSPM 365 04(3-3-0). Integrated Tree Health Management. F. Prerequisite: BZ 120 or LIFE 102.

Insects and diseases in forest and urban ecosystems. Effects, diagnosis, prevention, and interactions. (\$)

BSPM 384 Var [1-3]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

°BSPM 423 03(1-4-0). Evolution and Classification of Insects. F. Credit not allowed for both BSPM 423 and BSPM 523.

Major groups of insects, living and fossil; major evolutionary trends in structure and behavior.

***BSPM 424/*BZ 424 03(3-0-0). Principles of Systematic Zoology.** S. Prerequisite: BZ 110 and BZ 111 or LIFE 103. Credit not allowed for both BSPM 424 and BZ 424.

Principles and methods of classification, zoological nomenclature, taxonomic decisions regarding species and higher categories.

BSPM 445 04(2-4-0). Aquatic Insects. F. Prerequisite: BZ 111 or LIFE 103.

Biology and recognition of major orders and families of aquatic insects; a collection is required. (\$)

***BSPM 450 03(3-0-0). Molecular Plant-Microbe Interactions.** S. Prerequisite: Three credits BZ; BZ 346 or SOCR 330. Credit not allowed for both BSPM 450 and BSPM 550.

Principles of plant-microbe/insect interactions, physiological and molecular aspects of plant defense, genomics approaches to study plant defense.

°BSPM 451 03(3-0-0). Integrated Pest Management. S. Prerequisite: BSPM 302 or BSPM 308 or BSPM 361.

Concepts of integrated pest management and the strategies and tactics employed in the application of these concepts.

BSPM 462/MIP 462/BZ 462 05(3-4-0). Parasitology and Vector Biology. F. Prerequisite: BZ 110 or LIFE 103; BZ 212 or LIFE 206 or MIP 302. Credit allowed for only one of the following: BSPM 462, MIP 462, BZ 462.

Protozoa, helminthes, and insects and related arthropods of medical importance; systematic, epidemiology, host damage and control. (\$)

BSPM 487 Var. Internship.

BSPM 492 Var [1-3]. Seminar.

BSPM 495 Var [1-3]. Independent Study.

BSPM 496 Var [1-3]. Group Study.

BSPM 502A-G 01. Topics in Plant Pathology.

°A) Plant viruses 01(1-0-0). F. Prerequisite: Three credits 300- or 400-level BIO or BSPM or BZ or LIFE. **°B)** Plant bacteriology 01(1-0-0). F. Prerequisite: Three credits 300- or 400-level BIO or BSPM or BZ or LIFE. ***F)** Plant disease epidemiology. 01(1-0-0). F. Prerequisite BSPM 361.

°BSPM 507 03(3-0-0). Insect Behavior. S.

Behavior of insects and related arthropods with special attention to social behavior.

°BSPM 508 03(3-0-0). Environmental Fate of Pesticides. S. Prerequisite: BZ 440 or CHEM 245 or SOCR 240.

Processes that affect fate of pesticides and their metabolites in the environment with emphasis on soil and water.

***BSPM 509 03(3-0-0). Herbicide Selectivity and Action.** F. Prerequisite: BSPM 308; BZ 440.

Selectivity of major photosynthetic and growth inhibitor herbicides based on herbicide transport, metabolism, and mode of action.

°BSPM 510 03(3-0-0). Insect-Plant Disease Relationships. F. Prerequisite: BSPM 302 or BSPM 361.

Relationships between insects and various plant pathogens as they affect survival and transmissions of pathogens.

***BSPM 520/*BZ 520 03 (3-0-0). Advanced Systematics.** S. Prerequisite: BSPM 424/BZ 424 or BZ 325. Credit not allowed for both BSPM 520 and BZ 520.

Theory and practice of modern systematics.

***BSPM 521 03(3-0-0). Forest Health Issues.** F.

Current topics related to forest and shade tree health from ecosystems to tree defense physiology.

°BSPM 523 04(1-4-1). Advanced Evolution/Classification of Insects. F. Credit not allowed for both BSPM 523 and BSPM 423.

Major groups of insects, living and fossil; major evolutionary trends in

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structure and behavior.

***BSPM 525 03(3-0-0). Insect Physiology.** S. Prerequisite: BSPM 302.
Principles of insect function.

°BSPM 526/°BZ 526 03(3-0-0). Evolutionary Ecology. F. Prerequisite BZ 320 or LAND 220/LIFE 220. Credit not allowed for both BSPM 526 and BZ 526.

Adaptation to abiotic and biotic environments; how current ecological processes interact with evolutionary history.

°BSPM 528 03(3-0-0). Invasive Plants/Weeds: Ecosystems to Molecules. S. Prerequisite: BZ 120; LAND 220/LIFE 220 or LIFE 320; LIFE 102 or LIFE 103.

Contributions of disciplines of weed science and invasion ecology to understanding the biology, ecology and management of “problem plants.”

BSPM 530/SOCR 530 01(1-0-0). Scientific Writing. S. Credit not allowed for both BSPM 530 and SOCR 530.

Skills necessary to prepare complete scientific journal articles including writing, editing, and literature searching and assessment.

BSPM 540 03(3-0-0). Understanding Genomes. F.

Harnessing genome information and related –omics level technologies for use in answering biological questions.

***BSPM 550 03(3-0-0). Molecular Plant-Microbe Interactions.** S. Prerequisite: Three credits BZ; BZ 346 or SOCR 330. Credit not allowed for both BSPM 550 and BSPM 450.

Principles of plant-microbe interactions, physiological and molecular aspects of plant defense, genomic approaches to study plant defense.

°BSPM 551 04(3-0-1). Advanced Integrated Pest Management. S. Prerequisite: BSPM 302 or BSPM 308 or BSPM 361.

Concepts of integrated pest management and the strategies and tactics employed in the practical application of these concepts.

°BSPM 555 03(1-4-0). Immature Insects. S. Prerequisite: BSPM 303A or BSPM 303B or BSPM 303C.

Characteristics of immature forms of orders and families of insects emphasizing those important to humans.

***BSPM 556 03(3-0-0). Biological Control of Plant and Insects.** F. Prerequisite: BZ 120 or LIFE 103; LIFE 320 or LAND 220/LIFE 220.

Management of insect pests of plants and weeds using biological control agents such as insects, bacteria, viruses, and fungi.

***BSPM 570 03(3-0-0). Chemical Ecology.** S.

Chemical interactions among animals, plants, fungi, and microorganisms.

***BSPM 571 01(0-2-0). Techniques in Chemical Ecology.** S.

Practical experience with chemical techniques for separation, analysis, and synthesis of natural products together with biological assays for activity.

***BSPM 575/*BZ 575 03(3-0-0). Molecular and Genomic Evolution.** S. Prerequisite: BZ 220; BZ 350. Credit not allowed for both BSPM 575 and BZ 575.

Molecular biological mechanisms of evolutionary change: mutation; selection; gene expression/regulation; changes in whole-genome architecture.

BSPM 576/MIP 576 03(3-0-0). Bioinformatics. F, S. Prerequisite: BC 463 or BZ 310 or BZ 350 or CM 501 or CS 155 or ERHS 332 or MIP 275 or MIP 300 or MIP 450 or STAT 307. Credit not allowed for both BSPM 576 and MIP 576.

Technical computing across platforms using bioinformatics tools in molecular analyses.

BSPM 584 Var [1-3]. Supervised College Teaching.

BSPM 587 Var. Internship.

BSPM 592 Var [1-3]. Seminar. F, S.

Major questions and theory pertinent to understanding current and relevant science topics.

BSPM 594 Var [1-3]. Independent Study.

BSPM 596 Var [1-3]. Group Study.

BSPM 698 Var. Research.

BSPM 699 Var. Thesis.

BSPM 710/CM 710 03(0-4-1). Techniques in Molecular Biology and Genetics. S. Prerequisite: BC 463 or BZ 346 or BZ 350 or MIP 450 or SOCR 330. Credit not allowed for both BSPM 710 and CM 710.

Genetic manipulation of bacteria, bacteriophage, and yeast including experiments in molecular cloning and gene expression.

°BSPM 740/°SOCR 740 03(3-0-0). Plant Molecular Genetics. F. Prerequisite: BC 351; SOCR 330. Credit not allowed for both BSPM 740 and SOCR 740.

Advances in study of organization and function of nuclear and organellar genomes, gene expression in higher plants, and plant-microbe interactions.

BSPM 784 Var [1-3]. Supervised College Teaching.

BSPM 787 Var. Internship.

BSPM 792 Var [1-2]. Seminar.

BSPM 794 Var [1-3]. Independent Study.

BSPM 798 Var. Research.

BSPM 799 Var. Dissertation.

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BIOTECHNOLOGY COURSES

Nondepartmental

College of Veterinary Medicine and Biomedical Sciences

BTEC 306/BIOM 306 04(3-2-0). Bioprocess Engineering. S.
Prerequisite: CHEM 107 or CHEM 111; PH 121 or PH 141. Credit not allowed for both BTEC 306 and BIOM 306.

Material, energy balances; fluid flow, heat exchange, mass transfer; application to operations in food, fermentation, other bioprocess industries.

BTEC 499 Var [1-3]. Biotechnology Thesis. Prerequisite: Twelve credits from biotechnology core; approval of program coordinator.

BUSINESS COURSES – GENERAL

Nondepartmental College of Business

BUS 100 01(1-0-0). Introduction to Business. F, S.

Overview of functional areas of business: accounting, finance, information systems, management, marketing, and international business.

BUS 150 03(3-0-0). Business Computing Concepts and Applications. F, S, SS.

System hardware, operating environments, and software applications. (NT-O)

BUS 205 03(3-0-0). Legal and Ethical Issues in Business. F, S, SS. Credit not allowed for both BUS 205 and BUS 260.

Ethical, legal and regulatory issues in the U.S. business environment. (NT-O)

BUS 260 03(3-0-0). Social-Ethical-Regulatory Issues in Business. F, S, SS. Prerequisite: BUS 100 or HONR 192 or KEY 192. Credit not allowed for both BUS 260 and BUS 205.

Legal issues, business ethics, corporate responsibility, and the business interface within the U.S. regulatory and business environment.

BUS 300 03(3-0-0). Business Writing and Communication. (GT-CO3, AUCC 2B) F, S, SS. Prerequisite: BUS 100 or HONR 192 or Key 192; CO 150 or HONR 193.

Advanced writing for business using recursive process and appropriate means given audience and message purpose. Preparation, presentation of reports.

BUS 350 03(3-0-0). Travel Abroad-International Comparative Management. SS. Prerequisite: Six credits of business courses.

Travel tour of European business to compare and contrast their business strategies to those of U.S. firms.

BUS 405A-C 03(3-0-0). Contemporary Business Topics. F, S. Prerequisite: Any 2 of FIN 305, MGT 305, MKT 305. For non-business majors only.

A) Entrepreneurship. (NT-O) B) International business. C) Business information management.

BUS 425 03(3-0-0). Starting and Managing Your Own Business. F. Prerequisite: Written consent of instructor.

Business aspects of starting and managing your own small enterprise.

BUS 479 03(3-0-0). Strategic Management. F, S, SS. Prerequisite: FIN 300 or FIN 305; MGT 301; MGT 305 or MGT 320; MKT 300 or MKT 305.

An integration of various business subject areas in terms of top-level policy and decision making.

BUS 495 Var. Independent Study.

BUS 496 Var. Group Study.

BUS 505 03(3-0-0). Legal and Ethical Environment of Business. S. Prerequisite: Admission to a master's program in business.

Legal and regulatory issues impacting business operation. Ethical and social responsibility concepts applied to business setting.

BUS 601 02(2-0-0). Quantitative Business Analysis. S. Prerequisite: Course in basic descriptive and inferential statistics.

Uses and management of information; decision tools and concepts; quality control. (NT-V)

BUS 604/STAT 604 02(2-0-0). Managerial Statistics. F. Prerequisite: Admission to the MBA Program. Credit not allowed for both BUS 604 and STAT 604.

Introduction to statistical thinking and methods used to support

managerial-decision making. (NT-V)

BUS 615 04(4-0-0). Accounting Systems. F.

Financial, managerial accounting information systems. Use of accounting information for purposes of management decision making, planning, and control. (NT-V)

BUS 616 02(2-0-0). Financial Reporting and Analysis. S, SS. Prerequisite: BUS 615.

Tools and techniques for analysis of financial reports of public companies. (NT-V)

BUS 620 02(2-0-0). Leadership and Teams. F.

Ethical leadership and team dynamics; basic models of motivation utilized by leaders. (NT-V)

BUS 621 02(2-0-0). Strategic Decision Making. F.

Key decision concepts, processes and tools that help managers formulate and implement competitive strategy. (NT-V)

BUS 625 02(2-0-0). Organizational Communication. S.

Improving understanding and application of managerial communication skills and negotiation tools and their implications for effective management. (NT-V)

BUS 626 02(2-0-0). Managing Human Capital. S. Prerequisite:

Admission to a graduate program in Business.

Management of human capital for competitive advantage and superior results. (NT-V)

BUS 630 02(2-0-0). Information Management. S. Prerequisite: BUS 615.

Role and value of information in business functions; risks and rewards of enterprise information; fundamentals of information storage and retrieval. (NT-V)

BUS 631 02(2-0-0). Strategic Uses of Information Technology. F, S. Prerequisite: BUS 630 or concurrent registration.

Strategic and tactical uses of information technology in the global business environment. (NT-V)

BUS 635 02(2-0-0). Business Economics for the World Market. F, S. Prerequisite: BUS 601 or BUS 604/STAT 604; BUS 615.

Application of economic principles to current business problems within context of global marketplace. (NT-V)

BUS 640 02(2-0-0). Financial Principles and Practice. F, S. Prerequisite: BUS 601 or BUS 604/STAT 604.

Financial environment; tools and techniques of corporate financial decision making. (NT-V)

BUS 641 02(2-0-0). Financial Markets and Investments. F, S. Prerequisite: BUS 640 or concurrent registration.

Operating of financial markets, techniques for security valuation, and portfolio management. (NT-V)

BUS 645 02(2-0-0). Enterprise Electronic Business Strategies. S. Prerequisite: BUS 630.

Technology for electronic commerce; regulation and strategies for competitive usage. (NT-V)

BUS 650 02(2-0-0). Supply Chain Management. S. Prerequisite: BUS 601 or BUS 604/STAT 604; BUS 630.

Value-driven supply chain principles, design and management of supply chains, and supply chain management software and applications. (NT-V)

BUS 655 02(2-0-0). Marketing Management. F. Prerequisite: BUS 635.

Examines processes of customer value creation (e.g., product development, communications, distribution) and value capture (e.g. pricing). (NT-V)

BUS 656 02(2-0-0). Marketing Strategy and Planning. F. Prerequisite: BUS 616; BUS 640; BUS 655.

Basic marketing strategy analysis, formulation, evaluation and

implementation concepts and tools. (NT-V)

BUS 660 02(2-0-0). Ethical, Legal, and Regulatory Issues. S.
Prerequisite: BUS 615.

Legal, regulatory, societal and ethical issues encountered by business professionals; analytical skills for making judgments. (NT-V)

BUS 662 02(2-0-0). International Business. F, S, SS. Prerequisite: BUS 635; BUS 641; BUS 650.

Role of government regulations and how international firms affected; cultural aspects of business, global marketing, finance, management. (NT-V)

BUS 665 04(4-0-0). MBA Capstone. S. Prerequisite: BUS 641; BUS 650; BUS 656.

To integrate business disciplines through strategic thinking and experiential learning. (NT-V)

BUS 669 03(3-0-0). Sustainable Enterprise Funding and Evaluation. F.
Prerequisite: BUS 601; FIN 601; MGT 668.

Funding sustainable enterprises. Grant writing, venture philanthropy, angel investors, and venture capital. Project development, evaluation, execution.

BUS 678 03(3-0-0). Business Research. F. Prerequisite: QNT 270.

Techniques for designing, conducting, and evaluating business research.

BUS 686 Var. Practicum. Prerequisite: Written consent of instructor.

BUS 687 Var. Internship. Prerequisite: Written consent of instructor.

BUS 690A-H Var[1-6]. Contemporary Issues in Business. F, S, SS.
Prerequisite: Admission to a College of Business graduate program.

Current issues in business, featuring business and community leaders.

A) Contemporary Issues in Business. **B)** Grad Tutorials. **C)** Info Systems. **D)** Accounting. **E)** Global Enterprise. **F)** Finance. **G)** Government. **H)** Mgmt Practices. (NT-O/T/V)

BUS 695 Var. Independent Study.

BUS 696 Var. Group Study. Prerequisite: Written consent of instructor.

BUS 699 Var. Thesis.

BOTANY/ZOOLOGY COURSES

Department of Biology

College of Natural Sciences

BZ 100 03. Introduction to Biology. F, S, SS. Offered as telecourse only.

Basic concepts in biology, including genetics, the human body, and interactions with their environment. (NT-T)

BZ 101 03(3-0-0). Humans and Other Animals. (GT-SC2, AUCC 3A). F, S. Credit not allowed for students who have already taken BZ 110 or LIFE 102 or LIFE 103.

Characteristics of animals, their evolution and diversity; humans considered as an animal. (NT-O)

BZ 104 03(3-0-0). Basic Concepts of Plant Life. (GT-SC2, AUCC 3A). F, S. For non-science and physical science majors. Credit not allowed for students who have already taken BZ 120 or LIFE 102 or LIFE 103.

Broad concepts of biology with major emphasis on plant life.

BZ 105 01(0-2-0). Basic Concepts of Plant Life Laboratory. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: BZ 104 or concurrent registration.

Modern biology exercises including viruses, Monera, Protista, fungi, plants, genetics, physiology, and ecology. (\$)

BZ 110 03(3-0-0). Principles of Animal Biology. (GT-SC1, AUCC 3A). F, S, SS.

General features (body form, physiology, life history, ecology) and evolutionary relationships of major phyla of animals.

BZ 111 01(0-3-0). Animal Biology Laboratory. (GT-SC2, AUCC 3A). F, S, SS. Prerequisite: BZ 110 or concurrent registration.

Laboratory exercises demonstrating major features of animal biology and major phyla of animals. (\$)

BZ 120 04(3-3-0). Principles of Plant Biology. (GT-SC2, AUCC 3A). F, S.

Diversity of relationships of plants and their structural and functional characteristics. (\$)

BZ 212 04(3-3-0). Animal Biology-Invertebrates. F. Prerequisite: BZ 110; BZ 111 or LIFE 103.

General biology of invertebrates; their characteristics, classification, and adaptations. (\$)

+BZ 214 04(3-3-0). Animal Biology—Vertebrates. S. Prerequisite: BZ 110; BZ 111 or LIFE 103.

General biology of vertebrates; their characteristics, classification, and adaptations. Field trips required. (\$)

BZ 220 03(3-0-0). Introduction to Evolution. F, S, SS. Prerequisite: BZ 110; BZ 111 or BZ 120 or LIFE 103.

Fundamental concepts in evolutionary biology.

BZ 223 03(2-2-0). Plant Identification. F, SS. Prerequisite: BZ 120 or LIFE 103.

Relationships and identification of flowering plants.

BZ 300 03(3-0-0). Animal Behavior. S, SS. Prerequisite: BZ 110 and (BZ 111 or LIFE 103).

Principles of ethology, behaviors of nonhuman animals emphasizing their adaptive significance and phylogenetic relationships.

***BZ 301 02(0-4-0). Animal Behavior Laboratory.** S. Prerequisite: BZ 300 or concurrent registration.

Laboratory experiments in animal behavior; demonstrations and independent investigations.

°BZ 302 03(2-2-0). Poisonous Plants. F. Prerequisite: BZ 120 or LIFE 103.

Identification and toxic properties of certain plants; animal reactions to more important ones.

BZ 310 04(3-3-0). Cell Biology. F, S, SS. Prerequisite: BZ 110 or BZ 120 or LIFE 103; CHEM 245 with a C or better or CHEM 345 with a C or better.

Structure and function of cells emphasizing molecular mechanisms. Communication, metabolism, motility, genetics, growth, reproduction. (\$)

BZ 311 04(3-2-0). Developmental Biology. S, SS. Prerequisite: BZ 310.

Developmental aspects of growth and differentiation stressed in higher plants and animals. (\$)

°BZ 315 03(2-0-1). Marine Ecology. F. Prerequisite: BZ 110; BZ 111; BZ 120 or LIFE 103; CHEM 245 or CHEM 345.

Marine organisms, habitats, and communities.

***BZ 321 03(1-4-0). Aquatic Vascular Plants.** F. Prerequisite: BZ 223 or BZ 325.

Taxonomic relationships and identification of aquatic vascular plants.

***BZ 325 04(3-2-0) Plant Systematics.** S. Prerequisite: BZ 220.

Principles and contemporary methods of classification of plants, and the application of modern phylogenetic theory in comparative biology.

BZ 329 03(2-2-0). Herpetology. S. Prerequisite: BZ 214.

Biology of amphibians and reptiles.

BZ 330 03(2-2-0). Mammalogy. F. Prerequisite: BZ 110; BZ 111 or LIFE 103.

Evolution, classification, and biology of mammals; practice in identifying and preparing specimens. (\$)

***BZ 331 04(2-4-0). Developmental Plant Anatomy.** F. Prerequisite: BZ 120 or LIFE 103; BZ 350 or concurrent registration; CHEM 245 or CHEM 346.

Structure of plant cells, tissues, and organs as they develop.

***BZ 332 04(3-2-0). Introductory Phycology.** F. Prerequisite: BZ 120 or LIFE 102.

Morphology, ultrastructure, physiology, ecology, and phylogeny of freshwater and marine algae.

BZ 333 04(2-4-0). Introductory Mycology. F. Prerequisite: BZ 120 or LIFE 103.

Groups of fungi including classification, structure, morphogenesis, phylogeny, and genetics and reproduction.

+BZ 335 03(2-3-0). Ornithology. S. Prerequisite: BZ 110; BZ 111 or LIFE 103.

Biology of birds, especially behavior, ecology, and identification in the laboratory and field. (\$)

°BZ 338 04(2-4-0). Comparative Morphology of Vascular Plants. S. Prerequisite: BZ 120 or LIFE 103.

Origin, evolution, structure, and reproduction of the vascular plants, including comparative study of organs occurring in each group.

BZ 346 03(3-0-0). Population and Evolutionary Genetics. F. Prerequisite: BZ 220; MATH 155; STAT 301 or STAT 307.

Evolutionary theories and history; heredity mechanisms that are basis for variation, evolution, and biological communication between generations.

BZ 348/MATH 348 04(3-3-0). Theory of Population and Evolutionary Ecology. F. Prerequisite: MATH 155 or MATH 160. Credit allowed for only one of the following: BZ 348, BZ 548, MATH 348.

Principles and methods for building, analyzing, and interpreting mathematical models of ecological and evolutionary problems in biology.

BZ 349 03(3-0-0). Tropical Ecology and Evolution. F. Prerequisite: BZ 220.

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Broad introduction to terrestrial and aquatic tropical biodiversity and the ecological and evolutionary processes that generate and maintain it.

BZ 350 04(3-0-1). Molecular and General Genetics. F, S, SS. Prerequisite: BZ 110 or BZ 120 or LIFE 102; STAT 201 or concurrent registration or STAT 301 or concurrent registration or STAT 307 or concurrent registration. Primarily for students in biological sciences.

Mendelian, molecular, and population genetics emphasizing the molecular basis of genetics.

BZ 353/NR 353 03(3-0-0). Global Change Ecology, Impacts and Mitigation. S. Prerequisite: LAND 220/LIFE 220 or LIFE 320. Credit not allowed for both BZ 353 and NR 353.

Ecological impacts of human-induced global change, and the strategies that can/are being used to adapt to and mitigate these impacts.

BZ 384 Var [1-5]. Supervised College Teaching. F, S. Prerequisite: 3.000 overall GPA; written consent of instructor; grade of A in course with which student assists. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

BZ 401 03(3-0-0). Comparative Animal Physiology. S. Prerequisite: BZ 214.

Physiological mechanisms of digestion, metabolism, osmoregulation, excretion, circulation, and respiration in vertebrate and invertebrate animals.

BZ 402 04(3-3-0). Molecular Cytogenetics. S. Prerequisite: BZ 310 or concurrent registration or LIFE 210 or concurrent registration; BZ 350 or concurrent registration or LIFE 201A or concurrent registration or LIFE 201B or concurrent registration or SOCR 330 or concurrent registration.

Structure, function, and behavior of chromosomes during interphase, mitosis, and meiosis.

°BZ 403 03(3-0-0). Comparative Endocrinology. F. Prerequisite: BZ 310.

Comparison of endocrine molecules, responses, and control mechanisms in vertebrates and invertebrates emphasizing molecular aspects.

***BZ 420 03(3-0-0). Evolutionary Medicine.** F. Prerequisite: BZ 220.

Integration of evolutionary biology with behavior, genetics, and ecology to understand health and disease.

***BZ 424/*BSPM 424 03(3-0-0). Principles of Systematic Zoology.** S. Prerequisite: BZ 110; BZ 111 or LIFE 103. Credit not allowed for both BZ 424 and BSPM 424.

Principles and methods of classification, zoological nomenclature, taxonomic decisions regarding species and higher categories.

***BZ 425 03(3-0-0). Molecular Ecology.** F. Prerequisite: BZ 220; BZ 350; STAT 301 or STAT 307. Credit not allowed for both BZ 425 and BZ 525.

Introduction to molecular genetic markers for questions in ecology, evolution, behavior and conservation.

***BZ 433 03(3-0-0). Behavioral Genetics.** S. Prerequisite: BZ 350 or LIFE 201A or LIFE 201B or SOCR 330.

Genetics of behavioral characteristics in animals.

BZ 440 03(3-0-0). Plant Physiology. S. Prerequisite: BZ 120 or LIFE 103.

Functions and activities of plants.

BZ 441 02(0-2-1). Plant Physiology Laboratory. S. Prerequisite: BZ 440 or concurrent registration.

Laboratory applications of plant physiology principles.

BZ 450 04(3-2-0). Plant Ecology. S. Prerequisite: LIFE 103 or BZ 120.

Relation of plants to their environment.

BZ 455 03(3-0-0). Human Heredity and Birth Defects. S. Prerequisite: BZ 110 and BZ 111 or LIFE 103.

Human heredity and its individual and social implications; causes of congenital defects.

BZ 462/MIP 462/BSPM 462 05(3-4-0). Parasitology and Vector Biology. F. Prerequisite: BZ 110 or LIFE 103; BZ 212 or LIFE 206 or MIP 302. Credit allowed for only one of the following: BZ 462, BSPM 462, MIP 462.

Protozoa, helminths, and insects and related arthropods of medical importance; systematics, epidemiology, host damage and control. (\$)

°BZ 471 03(3-0-0). Stream Biology and Ecology. F. Prerequisite: LAND 220/LIFE 220 or LIFE 320.

Biology and ecology of running waters.

+°BZ 472 01(0-3-0). Stream Biology and Ecology Laboratory. F. Prerequisite: BZ 471 or concurrent registration.

Field sampling and laboratory analysis of habitats, biota, and ecological relationships in running waters. (\$)

+*BZ 474 03(2-2-0). Limnology. F. Prerequisite: LAND 220/LIFE 220 or LIFE 320.

Biology, chemistry, and physics of lakes including limnological methods. (\$)

***BZ 476 03(3-0-0). Topics in Advanced Genetics.** F. Prerequisite: BZ 350 or LIFE 201A or LIFE 201B or SOCR 330.

Advanced topics in model genetic systems including molecular and developmental genetics.

BZ 479/VS 479 03(3-0-0). Biology and Behavior of Dogs. F, S. Prerequisite: BZ 110 or LIFE 103. Credit not allowed for both BZ 479 and VS 479.

Interactions of physiology, neurobiology, and genetics on behavior of domestic dogs, and how evolution and domestication influence behavioral traits. (NT-O)

BZ 487 Var [1-12]. Internship.

Supervised work-related research experience in laboratory or field setting with consultation and approval of a regular faculty member.

BZ 492A-G Var [1-3]. Seminar.

A) Behavior. B) Ecology. C) Genetics. D) Ornithology. E) Herpetology. F) Evolution. G) Departmental.

BZ 495 Var [1-3]. Independent Study. Maximum of 7 credits allowed in course.

BZ 498 Var [1-6]. Laboratory or Field Research. Prerequisite: Written consent of research mentor.

Supervised lab or field research in biology, botany, or zoology.

°BZ 505 03(3-0-0). Cognitive Ecology. F. Prerequisite: BZ 300.

The evolutionary ecology of information processing and decision-making.

°BZ 510 03(3-0-0). Zoophysiological Ecology. S. Prerequisite: BMS 300 or BMS 360 or BZ 401; LAND 220/LIFE 220 or LIFE 320.

Concepts, principles, and examples of adaptive physiological strategies used by animals.

***BZ 515 03(3-0-0). Physiological Ecology of Marine Vertebrates.** S. Prerequisite: BZ 214; BZ 330; BC 351 or BC 401 or BMS 300 or BZ 401.

Physiological adaptations of vertebrates to different marine environments.

***BZ 520/*BSPM 520 03 (3-0-0). Advanced Systematics.** S. Prerequisite: BSPM 424/BZ 424 or BZ 325. Credit not allowed for both BZ 520 and BSPM 520.

Theory and practice of modern systematics.

***BZ 525 04(3-0-1). Molecular Ecology.** F. Prerequisite: BZ 220; BZ 350; STAT 301 or STAT 307. Credit not allowed for both BZ 525 and BZ 425.

Molecular genetic markers for questions in ecology, evolution, behavior

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and conservation.

°BZ 526/°BSPM 526 03(3-0-0). Evolutionary Ecology. F. Prerequisite: LAND 220/LIFE 220 or LIFE 320. Credit not allowed for both BZ 526 and BSPM 526.

Adaptation to abiotic and biotic environments; how current ecological processes interact with evolutionary history.

***BZ 530 02(2-0-0). Ecological Plant Morphology.** S. Prerequisite: BZ 220; BZ 450 or LIFE 320.

Adaptive significance and evolution of plant form and structure.

°BZ 535 03(3-0-0). Behavioral Ecology. S. Prerequisite: BZ 220; graduate standing or written consent of instructor.

Evolutionary and theoretical perspectives in animal behavior using examples from model empirical systems; emphasis on decision rules and social behavior.

***BZ 537 03(2-2-0). Topics in Mycology.** S. Prerequisite: BZ 333.

Features common to all fungi; trends in structure, function, and behavior.

***BZ 540 02(2-0-0). Translocation in Plants.** S. Prerequisite: BZ 331; BZ 440.

Transport of sugars, organic and inorganic ions, water, and hormones across membranes and through vascular systems of plants.

BZ 544 02(2-0-0). Presenting Research in Biology. F. Prerequisite: Written consent of instructor.

Procedures for preparing and presenting results of biological research in scientific journals and at professional meetings.

BZ 548 04(3-3-0). Theory of Population and Evolutionary Ecology. F. Prerequisite: MATH 155 or MATH 160. Credit allowed for only one of the following: BZ 548, BZ 348, MATH 348.

Principles and methods for building, analyzing, and interpreting mathematical models of ecological and evolutionary problems in biology; research module.

°BZ 555 03(3-0-0). Reproductive Biology of Higher Plants. S. Prerequisite: BZ 310 or LIFE 210; BZ 350 or LIFE 201A or LIFE 201B or SOCR 330.

Reproductive processes influencing evolution in higher plant groups.

BZ 561 03(3-0-0). Landscape Ecology. F. Prerequisite: LIFE 320; STAT 301 or STAT 307; written consent of instructor.

Concepts, methods, and models for examining spatial patterns and processes of natural and managed landscapes and their effects on ecological dynamics.

***BZ 570 03(3-0-0). Molecular Aspects of Plant Development.** S. Prerequisite: BC 463 or BZ 350 or MIP 450 or SOCR 330.

Various aspects of plant development at the molecular level.

°BZ 572 03(3-0-0). Phytoremediation. F. Prerequisite: BZ 120 or LIFE 103.

Environmental cleanup using plants.

***BZ 575/BSPM 575 03(3-0-0). Molecular and Genomic Evolution.** S. Prerequisite: BZ 220; BZ 350. Credit not allowed for both BZ 575 and BSPM 575.

Molecular biological mechanisms of evolutionary change: mutation selection; gene expression/regulation; changes in whole-genome architecture.

BZ 577/MIP 577 02(0-4-0). Computer Analysis in Population Genetics. F. Prerequisite: BZ 578/MIP 578 or concurrent registration. Credit not allowed for both BZ 577 and MIP 577.

Computational and statistical techniques and practical exercises in discrete and quantitative genetics.

BZ 578/MIP 578 04(3-0-1). Genetics of Natural Populations. F. Prerequisite: BZ 350 or LIFE 201A or LIFE 201B or SOCR 330; STAT

201 or STAT 301 or STAT 307. Credit not allowed for both BZ 578 and MIP 578.

Theoretical and empirical aspects of the genetics of natural populations; current molecular techniques and statistical analysis.

BZ 584 Var [1-3]. Supervised College Teaching. Maximum of 6 credits allowed in course.

BZ 587A-B Var [1-6]. Internship. Prerequisite: Written consent of instructor.

A) General. B) Herbarium.

BZ 594 Var [1-3]. Independent Study.

***BZ 642 03(3-0-0). Plant Metabolism.** F. Prerequisite: BC 351; BZ 440. Biosyntheses and transformations of important plant metabolites.

BZ 692A-H Var [1-3]. Seminar.

A) Behavior. C) Ecology. D) Genetics. E) Ornithology. G) Evolution. H) Departmental.

BZ 695 Var [1-3]. Independent Study.

BZ 698 Var. Research.

BZ 699 Var. Thesis.

BZ 784 Var [1-3]. Supervised College Teaching. Maximum of 6 credits allowed in course.

BZ 792 01(0-0-1). Seminar.

BZ 795 Var [1-3]. Independent Study.

BZ 798 Var. Research.

BZ 799 Var. Dissertation.

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CHEMICAL AND BIOLOGICAL ENGINEERING COURSES

Department of Chemical and Biological Engineering College of Engineering

CBE 101 03(2-2-0). Chemical and Biological Engineering I. F.

Engineering design and problem solving; technical presentation skills; basic computer programming.

CBE 102 03(2-2-0). Chemical and Biological Engineering II. S. Prerequisite: CBE 101.

Applications of engineering design and problem solving; computer programming to solve engineering problems; team project.

CBE 201 03(3-0-0). Material and Energy Balances. F. Prerequisite: CBE 102 or MATH 151 or concurrent registration in MATH 151; CHEM 111; LIFE 102 or concurrent registration; PH 141.

Principles of chemistry, physics, and mathematics applied to development of material and energy balances; illustration of concepts.

CBE 210 03(3-0-0). Thermodynamic Process Analysis. S. Prerequisite: CBE 201; MATH 261 or concurrent registration.

Thermodynamic fundamentals and applications to ideal and non-ideal mixtures, power cycles, and chemical equilibria.

CBE 310 03(3-0-0). Molecular Concepts and Applications. F. Prerequisite: CBE 210; MATH 340.

Application of modern molecular theory to chemical and biological engineering programs in thermodynamics, chemical kinetics, and transport phenomena.

CBE 320 03(3-0-0). Chemical and Biological Reactor Design. S. Prerequisite: CBE 310; CBE 330.

Mechanisms and rates of chemical reactions; design of homogeneous and heterogeneous reactors; biological reactions and reactors.

CBE 330 03(3-0-0). Process Simulation. F. Prerequisite: CBE 210; MATH 340.

Analysis of chemical and biological engineering problems by numerical simulation.

CBE 331 03(3-0-0). Momentum Transfer and Mechanical Separations. F. Prerequisite: CBE 210 or MECH 237; MATH 340.

Fluid properties; conservation equations; compressible and incompressible flow; pumping and metering; mixing; separation of fluid-solid mixtures.

CBE 332 03(3-0-0). Heat and Mass Transfer Fundamentals. F. Prerequisite: CBE 310; CBE 330; CBE 331.

Thermal processes; steady and unsteady conduction; convective heat transfer; radiation; heat exchanger design; mass transfer by diffusion and convection.

CBE 333 02(0-5-0). Chemical and Biological Engineering Lab I. S. Prerequisite: CBE 332 or concurrent registration.

Laboratory experiments involving material balances, thermodynamics, and momentum and heat transfer. Data analysis; written and oral reports. (\$)

CBE 406 03(3-0-0). Introduction to Transport Phenomena. F. Prerequisite: CBE 332.

Fundamental treatment of momentum and mass transport processes; dimensional analysis for parameter identification and order of magnitude estimation.

CBE 430 03(3-0-0). Process Control and Instrumentation. S.

Prerequisite: CBE 320; CBE 442.

Measurement and control of process variables; transient chemical and biological processes; feedback, feedforward, and computer control concepts.

CBE 439/CIVE 439 03(2-3-0). Environmental Engineering Chemical Concepts. F. Prerequisite: CHEM 113; MATH 340. Credit not allowed for both CBE 439 and CIVE 439.

Application of chemical principles to environmental engineering problems.

CBE 442 04(4-0-0). Separation Processes. F. Prerequisite: CBE 332.

Analysis of chemical and biological separations based on thermodynamics, diffusion, and convective mass transfer; design of separations equipment.

CBE 443 02(0-5-0). Chemical and Biological Engineering Lab II. F. Prerequisite: CBE 442 or concurrent registration.

Laboratory experiments involving advanced chemical and biological engineering concepts. Data analysis; written and oral reports. (\$)

CBE 451 03(3-0-0). Chemical and Biological Engineering Design I. F. Prerequisite: CBE 320; CBE 442 or concurrent registration.

Chemical and biological process synthesis and simulation; engineering economics principles.

CBE 452 03(2-2-0). Chemical and Biological Engineering Design II. S. Prerequisite: CBE 451.

Projects requiring students to design a chemical and/or biological process with cost estimation and constraint analysis; written and oral reports.

CBE 493 01(0-0-1). Professional Development Seminar. F.

Topics in engineering professional development, including ethics, role of engineers in society, and life-long learning.

CBE 495 Var. Independent Study.

CBE 496 Var. Group Study.

CBE 501 03(3-0-0). Chemical Engineering Thermodynamics. F. Prerequisite: CBE 210; MATH 340.

Definition, correlation, and estimation of thermodynamic properties; nonideal chemical and physical equilibria.

CBE 502 03(3-0-0). Advanced Reactor Design. F. Prerequisite: CBE 320; CBE 332.

Nonideal flow and tracers, reactions and diffusion, evaluation of complex kinetics, stability of reactors. Biochemical reactor examples. (NT-V)

CBE 503 03(3-0-0). Transport Phenomena Fundamentals. S. Prerequisite: CBE 406.

General topics in transport phenomena; analytical and numerical solutions of laminar flows; perturbation techniques; coupled transport.

CBE 504/BIOM 504 03(3-0-0). Fundamentals of Biochemical Engineering. F. Prerequisite: BIOM 306/BTEC 306 or concurrent registration or CBE 320 or concurrent registration; MATH 255 or MATH 340; MIP 300. Credit not allowed for both CBE 504 and BIOM 504.

Application of chemical engineering principles to enzyme kinetics, fermentation and cell culture, product purification, and bioprocess design.

°CBE 505 01(0-3-0). Biochemical Engineering Laboratory. F. Prerequisite: CBE 504/BIOM 504 or concurrent registration.

Fermentation technology, bioprocess control, and protein purification.

CBE 514 03(3-0-0). Polymer Science and Engineering. S. Prerequisite: CHEM 343 or CHEM 346; or CHEM 474 or CBE 310.

Fundamentals of polymer science: synthesis, characterization, processing of polymers. Physical properties of polymers; rheology of melts and

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solutions.

CBE 521 03(3-0-0). Mathematical Modeling for Chemical Engineers. F. Prerequisite: MATH 340.

Application of mathematical models to analysis and design of chemical reactors and separation processes.

CBE 522/BIOM 522 03(2-2-0). Bioseparation Processes. F. Prerequisite: CBE 331. Credit not allowed for both CBE 522 and BIOM 522.

Analysis of processes used to recover and purify fermentation products.

°CBE 524 0 1(1-0-0). Bioremediation. F. Prerequisite: CBE 540/CIVE 540.

Use of biotechnology for site remediation. Biodegradation, bioreactor design, and in situ bioremediation. (NT-V)

CBE 540/CIVE 540 03(3-0-0). Advanced Biological Wastewater Processing. S. Prerequisite: CIVE 438/ENVE 438 or CBE 320. Credit not allowed for both CBE 540 and CIVE 540.

Fundamentals of environmental biotechnology: environmental microbiology, microbial kinetics, basic reactor design, wastewater treatment.

CBE 543/BIOM 543 03(3-0-0). Membranes for Biotechnology and Biomedicine. F. Prerequisite: CHEM 343; CBE 310. Credit not allowed for both CBE 543 and BIOM 543.

Polymeric membrane formation, modification, module design and applications to bioseparation and biomedical separations and tissue engineering. (NT-O)

°CBE 613 03(3-0-0). Advanced Transport Phenomena. F. Prerequisite: ATS 601 or CBE 503 or CIVE 502;MATH 530.

Fundamental studies of multi-component mass, energy, and momentum transport, with applications in advanced materials, biomedical and biochemical systems.

CBE 621 03(3-0-0). Advanced Process Control. F. Prerequisite: CBE 430.

Application of modern control theory to chemical processes. Computer control aspects emphasized.

***CBE 660 03(3-0-0). System and Parameter Identification.** S. Prerequisite: Graduate standing.

Principles and methods for selecting the most appropriate equations, and properties within those equations, to mathematically simulate physical phenomena.

CBE 693 Var. Seminar I.

CBE 695 Var. Independent Study.

CBE 699 Var. Thesis.

CBE 707 01(1-0-0). Advanced Topics in Biochemical Engineering. F. Advanced biochemical engineering topics.

CBE 793 Var. Seminar II.

CBE 795 Var. Independent Study.

CBE 799 Var. Dissertation.

CHEMISTRY COURSES

Department of Chemistry College of Natural Sciences

CHEM 103 03(3-0-0). Chemistry in Context. (GT-SC2, AUCC 3A). F, S, SS. For students who do not plan to take additional courses in chemistry.

Chemistry, chemical principles from more conceptual, less mathematical perspective; how chemical substances, chemical reactions affect our daily lives. (NT-O)

CHEM 104 01(0-2-0). Chemistry in Context Laboratory. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: CHEM 103 or concurrent registration.

Laboratory applications of principles covered in CHEM 103. (\$)

CHEM 107 04(4-0-0). Fundamentals of Chemistry. (GT-SC2, AUCC 3A). F, S, SS. Prerequisite: (MATH 117 or placement out of MATH 117) or MATH 141 or MATH 155 or MATH 160 or MATH 161 or MATH 229 or MATH 261 or concurrent registration in MATH 141 or MATH 155 or MATH 160 or MATH 161 or MATH 229 or MATH 261. For students in science-related programs requiring one semester of general chemistry. Quantitative reasoning but with less focus on mathematical calculations than CHEM 111/CHEM 113. Credit allowed for only one of the following: CHEM 107, CHEM 111, and CHEM 117.

Atomic/molecular theory, gases, liquids, solids, solutions, acid/base and oxidation/reduction reactions, kinetics, selected topics.

CHEM 108 01(0-2-0). Fundamentals of Chemistry Laboratory. (GT-SC2, AUCC 3A). F, S, SS. Prerequisite: CHEM 107 or concurrent registration. Credit not allowed for both CHEM 108 and CHEM 112.

Laboratory applications of principles presented in CHEM 107. (\$)

CHEM 111 04(3-0-1). General Chemistry I. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: (MATH 118 or placement out of MATH 118) or MATH 141 or MATH 155 or MATH 160 or MATH 161 or MATH 229 or MATH 261. Intended for science majors. Students should complete the sequence: CHEM 111, CHEM 112, CHEM 113 and CHEM 114. Credit allowed for only one of the following: CHEM 107, CHEM 111, or CHEM 117.

Fundamental aspects of chemistry and chemical principles; emphasis on structure, bonding, and stoichiometry.

CHEM 112 01(0-3-0). General Chemistry Laboratory I. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: CHEM 111 or concurrent registration or CHEM 117 or concurrent registration. Credit not allowed for both CHEM 112 and CHEM 108.

Laboratory applications of principles covered in CHEM 111. (\$)

CHEM 113 03(3-0-0). General Chemistry II. F, S, SS.

Prerequisite: CHEM 107 or CHEM 111 or CHEM 117; (MATH 124 or placement out of MATH 124) or MATH 141 or MATH 155 or MATH 160 or MATH 161 or MATH 229 or MATH 261 or concurrent registration in MATH 141 or MATH 155 or MATH 160 or MATH 161 or MATH 229 or MATH 261.

Acid/base equilibria, kinetics, thermodynamics, solubility, oxidation-reduction reactions, electrochemistry, selected topics.

CHEM 114 01(0-3-0). General Chemistry Laboratory II. F, S, SS. Prerequisite: CHEM 112; CHEM 113 or concurrent registration.

Laboratory applications of principles covered in CHEM 113. (\$)

CHEM 117 03(3-0-0). General Chemistry I for Chemistry Majors. F. Prerequisite: Concurrent registration in CHEM 192; (MATH 118 or placement out of MATH 118) or MATH 141 or MATH 155 or MATH 160 or MATH 161 or MATH 229 or MATH 261. Credit allowed for only one of the following: CHEM 107, CHEM 111, or CHEM 117.

Fundamental aspects of chemistry and chemical principles with an emphasis placed on atomic and molecular structure, bonding, and stoichiometry.

CHEM 192 01(0-0-1). Introductory Seminar in Chemistry. F. Prerequisite: Concurrent registration in CHEM 117.

Small group discussions of aspects of chemistry.

CHEM 245 04(4-0-0). Fundamentals of Organic Chemistry. F, S, SS. Prerequisite: CHEM 107 or CHEM 113. Credit allowed for only one of the following: CHEM 245, CHEM 341, and CHEM 345. Intended for students in science-related programs requiring one semester of organic chemistry.

Nomenclature, structure, bonding, reactions, mechanisms, synthesis, stereochemistry of organic compounds.

CHEM 246 01(0-3-0). Fundamentals of Organic Chemistry Laboratory. F, S. Prerequisite: CHEM 108 or CHEM 112 or CHEM 114; CHEM 245 or concurrent registration. Credit not allowed for students who have already taken CHEM 344.

Laboratory applications of principles presented in CHEM 245. (\$)

CHEM 261 03(3-0-0). Fundamentals of Inorganic Chemistry. S. Prerequisite: CHEM 113 or concurrent registration.

Preparation, structures, properties, and reactions of chemical elements and inorganic compounds; periodic trends, organizing principles; applications.

CHEM 301 03(1-4-0). Advanced Scientific Writing--Chemistry. (AUCC 2B). S. Prerequisite: CO 150; CHEM 334 or CHEM 345 or a 300-level science laboratory course with written approval of instructor.

Advanced scientific writing using the read-analyze-write approach and scientific poster preparation and presentation.

***CHEM 311 03(3-0-0). Introduction to Nanoscale Science.** S. Prerequisite: CHEM 113; CHEM 343 or CHEM 346.

Synthesis, characterization, and applications of nanoscale materials.

CHEM 334 01(0-3-0). Quantitative Analysis Laboratory. F, S. Prerequisite: CHEM 114; CHEM 335 or concurrent registration. Credit not allowed for both CHEM 334 and CHEM 332.

Laboratory applications of principles presented in CHEM 335. (\$)

CHEM 335 03(3-0-0). Introduction to Analytical Chemistry. F, S. Prerequisite: CHEM 113 with a C or better; CHEM 334 or concurrent registration. Credit not allowed for both CHEM 335 and CHEM 331.

Modern and classical applications and methods in analytical chemistry including statistical, kinetic, spectroscopic, and chromatographic analysis.

CHEM 341 03(3-0-0). Modern Organic Chemistry I. F, S, SS. Prerequisite: CHEM 113. Credit allowed for only one of the following: CHEM 245, CHEM 341, and CHEM 345.

Structures, nomenclature, dynamics, spectroscopy, and reactions of organic molecules.

CHEM 343 03(3-0-0). Modern Organic Chemistry II. F, S, SS. Prerequisite: CHEM 245 or CHEM 341 or CHEM 345. Credit not allowed for both CHEM 343 and CHEM 346.

Continued studies of reactions and mechanisms of organic molecules and biological chemistry.

CHEM 344 02(0-6-0). Modern Organic Chemistry Laboratory. F, S, SS. Prerequisite: CHEM 113; CHEM 114. Intended for science majors. Credit not allowed for both CHEM 344 and CHEM 246.

Laboratory applications of modern organic chemistry. (\$)

CHEM 345 04(3-3-0). Organic Chemistry I. F, S. Prerequisite: CHEM 113; CHEM 114. Intended for science majors. Students should plan to complete the sequence CHEM 345, CHEM 346. Credit allowed for only one of the following: CHEM 245, CHEM 341, and CHEM 345.

Structure, nomenclature, dynamics, spectroscopy, reactions of organic molecules. Laboratory applications of principles presented in lecture. (\$)

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CHEM 346 04(3-3-0). Organic Chemistry II. F, S. Prerequisite: CHEM 345. Credit not allowed for both CHEM 343 and CHEM 346. Intended for science majors. Students should plan to complete the sequence CHEM 345, CHEM 346.

Continue studies of reactions and mechanisms of organic molecules. Laboratory applications of principles presented in lecture. (\$)

CHEM 384 Var [1-3]. Supervised College Teaching. Prerequisite: Twenty credits in chemistry; written consent of department head. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements. Maximum of 12 credits for any combination of CHEM 384, CHEM 487, CHEM 495, CHEM 498.

CHEM 431 04(3-3-0). Instrumental Analysis. F. Prerequisite: CHEM 334; CBE 310 or concurrent registration or CHEM 474 or concurrent registration.

Instrumental methods of chemical analysis. (\$)

CHEM 433 03(2-3-0). Clinical Chemistry. S. Prerequisite: CHEM 334; BC 351 or BC 401.

Principles and methodology of clinical chemistry. Laboratory experience in methodology and method development. (\$)

CHEM 440 02(0-6-0). Advanced Organic Chemistry Laboratory. F. Prerequisite: CHEM 344 or CHEM 346.

Advanced techniques in organic synthesis, mechanisms of reactions, structure determination. (\$)

CHEM 461 03(3-0-0). Inorganic Chemistry. S. Prerequisite: CHEM 261; CHEM 472 or CHEM 474.

Concepts, models to explain structural, spectroscopic, magnetic, thermodynamic, and kinetic properties of inorganic compounds; symmetry, group theory.

CHEM 462 02(0-6-0). Inorganic Chemistry Laboratory. S. Prerequisite: CHEM 461 or concurrent registration.

Synthetic techniques and instrumental methods in inorganic chemistry. (\$)

CHEM 474 03(3-0-0). Physical Chemistry I. F. Prerequisite: CHEM 113; MATH 261; PH 142; concurrent registration in CHEM 475. Credit allowed for only one of the following: CHEM 471, CHEM 472, or CHEM 474.

Quantum chemistry; applications to bonding, molecular structure, and spectroscopy.

CHEM 475 01(0-3-0). Physical Chemistry Laboratory I. F. Prerequisite: CBE 333 or CHEM 334; CBE 310 or concurrent registration or CHEM 474 or concurrent registration.

Physicochemical experiments; emphasis on quantum mechanics/spectroscopy; interpretation/presentation of data; formal lab reports. (\$)

CHEM 476 03(3-0-0). Physical Chemistry II. S. Prerequisite: CHEM 474.

Statistical thermodynamics; applications to phase and chemical equilibria; kinetics.

CHEM 477 01(0-3-0). Physical Chemistry Laboratory II. S. Prerequisite: CHEM 475.

Physicochemical experiments; emphasis on thermodynamics/statistical mechanics/kinetics; interpretation/presentation of data; formal lab reports. (\$)

CHEM 487 Var. Internship. Prerequisite: CHEM 476. Maximum of 12 credits allowed for any combination of CHEM 384, CHEM 487, CHEM 495, CHEM 498.

Supervised work experience in approved off-campus chemical laboratory setting. Consultation with faculty adviser/instructor.

CHEM 493 02(0-0-2). Seminar. S. Prerequisite: CHEM 474.

Critical analyses of selected literature; develop presentation of technical topic; required oral presentation.

CHEM 495 Var [1-3]. Independent Study. Prerequisite: Nine credits in chemistry, written consent of laboratory mentor and department chair. Maximum of 12 credits for any combination of CHEM 384, CHEM 487, CHEM 495, CHEM 498.

Satisfactory completion of course requires a written report, an oral presentation at a research group meeting, or a poster presentation.

CHEM 498 Var [1-3]. Research. Prerequisite: Twenty credits in chemistry, written consent of research mentor and department chair. Maximum of 12 credits for any combination of CHEM 384, CHEM 487, CHEM 495, CHEM 498.

Supervised laboratory research in chemistry; written report consistent with ACS guidelines required.

CHEM 511 03(3-0-0). Solid State Chemistry. F. Prerequisite: CHEM 461; CHEM 476.

Physical and descriptive chemistry of solids including characterization and synthetic methods.

CHEM 515 03(3-0-0). Polymer Chemistry. F. Prerequisite: CHEM 346; CHEM 476.

Fundamentals of polymer chemistry: synthesis, characterization, physical properties.

CHEM 517 03(3-0-0). Chemistry of Electronic Materials. F. Prerequisite: CHEM 571 or concurrent registration.

Chemical aspects of preparation and processing of materials in electronic devices, "molecular electronics," and nanostructured materials.

CHEM 530A-F 01(1-0-0). Advanced Topics in Chemical Analysis. F. Prerequisite: CHEM 431 or concurrent registration.

A) Environmental chemical analysis. **B)** Absorption and emission spectroscopy. **C)** Bioanalytical chemistry. **D)** Statistical analysis in analytical chemistry. **E)** Mass spectrometry. **F)** Analysis of materials.

CHEM 532 03(3-0-0). Advanced Chemical Analysis II. S. Prerequisite: CHEM 431.

Advanced optics; instrumentation and methodology for analytical spectroscopy; computer applications.

CHEM 533 03(3-0-0). Chemical Separations. S. Prerequisite: CHEM 335; CHEM 431.

Fundamentals and applications of chemical separations.

CHEM 537 03(3-0-0). Electrochemical Methods. S. Prerequisite: CHEM 431

Theory and methods of electrochemistry; applications of modern electrochemical techniques.

CHEM 539A-C 01(1-0-0). Principles of NMR and MRI. S. Prerequisite: CHEM 474.

Modern experimental methods in inorganic chemistry. **A)** Basic NMR principles. **B)** NMR diffusion measurements-2D NMR and MRI. **C)** Advanced NMR and MRI techniques.

CHEM 541 03(3-0-0). Organic Spectroscopy. SS. Prerequisite: CHEM 440.

Organic structure determination by spectroscopic methods.

CHEM 543 03(3-0-0). Structure/Mechanisms in Organic Chemistry. F. Prerequisite: CHEM 346.

Structure including stereochemistry and conformational isomerism; reactivity and mechanisms in organic chemistry.

CHEM 545 03(3-0-0). Synthetic Organic Chemistry I. S. Prerequisite: CHEM 543.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Reactions and synthesis in organic chemistry.

CHEM 547 03(3-0-0). Physical Organic Chemistry. S. Prerequisite: CHEM 543.

Mechanisms, theory, kinetics, and thermodynamics.

CHEM 549 03(3-0-0). Synthetic Organic Chemistry II. F. Prerequisite: CHEM 545.

Modern synthetic methods. Strategies for total synthesis of natural products.

CHEM 550A 01(1-0-0). Materials Chemistry—Hard Materials. F. Prerequisite: CHEM 343 or CHEM 346; CHEM 461; CHEM 476.

Structure and bonding; crystallography; properties; synthesis; characterization of metals, semiconductors, and network solids.

CHEM 550B 01(1-0-0). Materials Chemistry—Soft Materials. F. Prerequisite: CHEM 343 or CHEM 346; CHEM 461; CHEM 476.

Structure and bonding, mechanisms, properties, applications, synthesis, characterization of polymers, complex fluids, and biomaterials.

CHEM 550C 01(1-0-0). Materials Chemistry—Nanomaterials. F. Prerequisite: CHEM 343 or CHEM 346; CHEM 461; CHEM 476.

Structure and bonding, synthesis, properties, characterization of carbon nanotubes, metal and semiconductor nanocrystals, and nanocomposites.

CHEM 551 03(3-0-0). Organometallic Chemistry. F, S. Prerequisite: CHEM 346.

Descriptive and mechanistic organometallic chemistry applied to homogeneous catalysis and organic synthesis.

CHEM 561 03(3-0-0). Inorganic Synthesis. F, S. Prerequisite: Written consent of instructor.

Chemistry of compounds of representative elements and transition metals.

CHEM 563A-F 01(1-0-0) Physical Methods in Inorganic Chemistry. F, S. Prerequisite: CHEM 461.

A) Group theory. B) Vibrational spectroscopy. C) Electronic structure and magnetism. D) Magnetic spectroscopies. E) Advanced nuclear magnetic resonance spectroscopy. F) Other structural methods.

***CHEM 565 03(3-0-0). Inorganic Mechanisms.** F. Prerequisite: CHEM 476.

Fundamental tools, key principles, selected classic case histories of inorganic and organometallic mechanistic chemistry, emphasizing kinetic methods.

***CHEM 566 03(3-0-0). Bioinorganic Chemistry.** S. Prerequisite: CHEM 461.

Biological-inorganic chemistry, including key principles, prototype systems, classic papers, and problems.

CHEM 567 01(1-0-0). Crystallographic Computation. F, S, SS. Prerequisite: CHEM 474.

Theory and practice of structural computations using single crystal X-ray diffraction data.

***CHEM 569 03(3-0-0). Chemical Crystallography.** S. Prerequisite: CHEM 474.

Theory and practice of determination of crystal and molecular structure by single crystal X-ray and neutron diffraction.

***CHEM 570 03(3-0-0). Chemical Bonding.** F. Prerequisite: CHEM 474 or CBE 310.

Electronic structure methods; chemical bonding models; intermolecular interactions.

°CHEM 571 03(3-0-0). Quantum Chemistry. F. Prerequisite: CHEM 474 or CBE 310.

Simple systems; symmetry; approximate methods; time dependent methods; molecular structures.

***CHEM 575 03(3-0-0). Chemical Thermodynamics.** F. Prerequisite: CHEM 476 or CBE 310.

Thermodynamic concepts and their applications to chemical problems.

°CHEM 576 03(3-0-0). Statistical Mechanics. S. Prerequisite: CHEM 476 or CBE 310.

Principles of statistical mechanics with application in the chemical sciences.

°CHEM 577 03(3-0-0). Surface Chemistry. S. Prerequisite: CHEM 476 or CBE 310.

Capillarity; interfacial thermodynamics, electrical aspects of surface chemistry, adsorbed layers.

°CHEM 579 03(3-0-0). Chemical Kinetics. F. Prerequisite: CHEM 476 or CBE 310.

Elementary reactions, unimolecular reactions, reactions in solution, gas phase ion chemistry, photochemistry, and kinetic modeling.

***CHEM 601 01(1-0-0). Responsible Conduct in Chemistry Research.** S.

Appropriate conduct in research, publishing, intellectual property decisions, job hunting, and negotiating; social responsibilities of scientists.

CHEM 641 02(2-0-0). Organic Reaction Mechanisms. S. Prerequisite: CHEM 545.

Organic reaction mechanisms, including using arrows to show electron movement; heterolytic, radical, and pericyclic reactions.

CHEM 651A-D Var [1-4]. Special Topics in Chemistry. F, S. Prerequisite: Written consent of instructor.

A) Analytical chemistry. B) Inorganic chemistry. C) Organic chemistry. D) Physical chemistry.

CHEM 695 Var [1-3]. Independent Study.

CHEM 698 Var[1-9]. Research. F, S, SS. Prerequisite: Graduate standing in chemistry.

Graduate research in chemistry for students who do not plan to write an M.S. thesis.

CHEM 699 Var [1-15]. Thesis.

CHEM 702 01(0-0-1). Independent Research Proposal. F, S. Prerequisite: Admission to Ph.D. candidacy.

Preparation, submission, and defense of an independent research proposal; creative and original thinking about research problems in modern chemistry.

CHEM 751 01(1-0-0). Methods of Chemistry Laboratory Instruction. F.

Basic materials, methods, and skill development related to teaching undergraduate chemistry laboratory courses.

CHEM 752 01(0-0-1). Advanced Methods of Chemistry Instruction. S. Prerequisite: CHEM 751.

Advanced materials, methods, and presentation skills development related to teaching undergraduate chemistry courses.

***CHEM 773 03(3-0-0). Atomic and Molecular Spectroscopy.** S. Prerequisite: CHEM 571.

Time-dependent methods; multiphoton and nonlinear spectroscopy; fundamentals of rotational, vibrational, electronic and magnetic resonance spectroscopy.

CHEM 784 Var [1-2]. Supervised College Teaching.

CHEM 793 01(0-0-1). Seminar.

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CHEM 795A-D Var [1-5]. Independent Study.

A) Inorganic chemistry. B) Analytical chemistry. C) Biological chemistry. D) Physical chemistry.

CHEM 799 Var [1-15]. Dissertation.

COMPUTER INFORMATION SYSTEMS COURSES

Department of Computer Information Systems College of Business

CIS 120 03(3-0-0). Business Programming Fundamentals. F, S. Credit not allowed for both CIS 120 and CIS 210.

File and operating systems for business application development. Business program development using a high-level programming language.

CIS 200 03(3-0-0). Business Information Systems. F, S, SS. Prerequisite: BUS 150 or CS 110 or AGRI 140.

Use of information technology (IT) to enable knowledge workers, support business processes, and grow the business.

CIS 210 03(3-0-0). Information Technology in Business. F, S, SS. Prerequisite: CIS 200 or concurrent registration. Credit not allowed for both CIS 210 and CIS 120.

Introduction to information systems: the IS profession; hardware, software, and programming; web and database applications; data analysis tools.

CIS 220 03(3-0-0). Object-Oriented Information Design. F, S, SS. Prerequisite: CIS 120. Credit not allowed for both CIS 220 and CIS 340.

Object-oriented information design and programming; design and manipulation of data structures.

CIS 240 03(3-0-0). Application Design and Development. F, S, SS. Prerequisite: CIS 210.

Software engineering methods including design, implementation, and testing using structured and event-driven techniques, logic, and data structures. (NT-O)

CIS 301 03(3-0-0). End User Computing. F, S, SS.

End user applications in a Graphical User Interface environment including spreadsheet, word processing, and presentation graphics; Internet concepts. (NT-O)

CIS 320 03(3-0-0). Project Management for Information Systems. F, S. Prerequisite: CIS 120 or CIS 210.

Project management concepts including work breakdown structure, estimating, scheduling, tools, and reports.

CIS 340 03(3-0-0). Advanced Application Design and Development. F, S. Prerequisite: CIS 240. Credit not allowed for both CIS 340 and CIS 220.

Design and construction of business applications using object-orientation and advanced data structures.

CIS 350 03(3-0-0). Operating Systems and Networks. F, S. Prerequisite: CIS 210.

Multiuser and network operating systems; basic networking concepts including security, transmission, performance, and topologies.

CIS 355 03(3-0-0). Business Database Systems. F, S. Prerequisite: CIS 120 or CIS 210.

Physical and logical design, implementation, and administration of databases. (NT-O)

CIS 360 03(3-0-0). Systems Analysis and Design. F, S. Prerequisite: CIS 240.

Traditional and cutting-edge systems analysis and design techniques, with emphasis on object-oriented approaches.

CIS 370 03(3-0-0). Business Intelligence. SS. Prerequisite: CIS 200; MKT 300.

Techniques and technologies for deriving business value from the integration, analysis, mining, and transformation of data.

CIS 400 03(3-0-0). Information Management in the Enterprise. F, S. Prerequisite: Any two of FIN 300, MGT 301, MGT 320, MKT 300.

Role of information in business functional areas; value of information in business; risks and rewards of enterprise information.

CIS 410 03(3-0-0). Web Application Development. F. Prerequisite: CIS 240; CIS 355.

Web development techniques and strategies including Active Server Pages using VBScript, JavaScript, ColdFusion; security, web design.

CIS 411 03(3-0-0). Enterprise Resource Planning Systems. S. Prerequisite: ACT 220; FIN 300 or FIN 305; MGT 305 or MGT 320; MKT 300 or MKT 305.

Introduction to enterprise resource planning (ERP) systems concepts, business processes impacted by ERP, systems and software integration.

CIS 412 03(3-0-0). Issues and Cases in Electronic Commerce. S. Prerequisite: CIS 355.

Business models for B2B or B2C e-commerce, technology infrastructure, electronic payment mechanisms, information privacy.

CIS 413 03(3-0-0). Advanced Networking and Security. F. Prerequisite: CIS 240; CIS 350.

Modern communication standards, protocol systems; network security, security policies, attack and protection mechanisms, legal and ethical issues.

CIS 455 03(3-0-0). Advanced Database Management. S. Prerequisite: CIS 355.

Advanced data management topics including performance tuning, concurrency control, security, object-oriented databases, and data warehousing.

CIS 460 03(3-0-0). Object-Oriented Systems. F. Prerequisite: CIS 355; CIS 360.

Object-oriented concepts, development methodologies, techniques, and languages.

CIS 462 03(3-0-0). Systems Development Project. F, S. Prerequisite: CIS 320; CIS 360.

Application of concepts, techniques, and tools used in analysis, design, and implementation of computer-based information systems in applied setting.

CIS 487 03(0-9-0). Internship.

Supervised and planned work experience paralleling concentration in industry.

CIS 492 03(3-0-0). Seminar. Prerequisite: CIS 460.

Current topics in computer-based information systems.

CIS 495 Var. Independent Study.

CIS 496B-E Var. Group Study.

B) Small business information systems. **C)** Communications and distributed systems. **D)** Information systems performance measurement. **E)** Current issues in business computing systems.

CIS 498 Var [1-3]. Research.

CIS 600 03(3-0-0). Information Technology and Project Management. F, SS. Prerequisite: Admission to one of the following programs: M.S. in Business, M.B.A., or systems engineering specialization in Master of Engineering.

Strategic role and management of information technology and software development projects. (NT-O/T/V)

CIS 601/MGT 601 03(3-0-0). Enterprise Computing and Systems Integration. F. Prerequisite: Admission to one of the following programs: M.S. in Business, M.B.A., or Systems Engineering specialization in Master

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of Engineering. Credit not allowed for both CIS 601 and MGT 601.

Integrated extended enterprise planning and execution systems concepts including ERP, CRM, SCM, MRPII, business processes, front/back office systems. (NT-O)

CIS 605 03(3-0-0). Business Visual Application Development. F. Prerequisite: Admission to one of the following programs: M.S. in Business, M.B.A., or Systems Engineering specialization in Master of Engineering.

Design, construction, and testing of business application systems including leading-edge visual, E-commerce languages and tools. (NT-O)

CIS 606 03(3-0-0). Application Software Infrastructure. F. Prerequisite: Admission to one of the following programs: M.S. in Business, M.B.A., or Systems Engineering specialization in Master of Engineering.

Design, construction, and testing of business application software infrastructure including hardware, operating software, and communications network. (NT-O)

CIS 610 03(3-0-0). Software Development Methodology. F. Prerequisite: Admission to one of the following programs: M.S. in Business, M.B.A., or systems engineering specialization in Master of Engineering.

Methods for all phases of software development focusing upon the establishment of economical software that is reliable and cross platform.(NT-O/T/V)

CIS 611 03(3-0-0). Object-Oriented Systems. S. Prerequisite: CIS 610; Admission to one of the following programs: MS in Business, MBA or Systems Engineering specialization in Master of Engineering.

Object-oriented and web-based software; object model describing classes; relationships to other objects, attributes, and operations. (NT-O)

CIS 620 03(3-0-0). IT Communications Infrastructure. S. Prerequisite: Admission to one of the following programs: MS in Business, MBA or Systems Engineering specialization in Master of Engineering .

Technical aspects of information communications, business considerations; wireless technology, architecture, and applications. (NT-O)

CIS 655 03(3-0-0). Business Database Systems. S. Prerequisite: Admission to one of the following programs: MS in Business, MBA or Systems Engineering specialization in Master of Engineering.

Database analysis, design, administration; data modeling; data sublanguages, query facilities; distributed database systems. (NT-O)

CIS 665 03(3-0-0). E-Business Application Technologies. S. Prerequisite: Admission to one of the following programs: MS in Business, MBA or Systems Engineering specialization in Master of Engineering.

Developing E-business (B2B and B2C) through construction and deployment. (NT-O)

CIS 695 Var. Independent Study.

CIS 696 Var. Group Study.

CIS 699 Var. Thesis.

CIVIL ENGINEERING COURSES

Department of Civil and Environmental Engineering

College of Engineering

CIVE 102 03(2-3-0). Introduction: Civil/Environmental Engineering. F.

Civil engineering profession, computer applications and programming related to civil engineering; introduction to surveying.

CIVE 103 03(2-2-0). Engineering Graphics and Computing. S.
Prerequisite: CIVE 102.

Introduction to the profession and academia; principles of civil engineering design; graphical, oral, and written communication; team projects.

CIVE 202 03(2-2-0). Numerical Modeling and Risk Analysis. F.
Prerequisite: CIVE 103; MATH 160 or concurrent registration.

Civil engineering systems, simulation and optimization techniques, statistical tools and their use in civil engineering, risk analysis.

CIVE 203 03(2-2-0). Engineering Systems and Decision Analysis. S.
Prerequisite: CIVE 202.

Civil engineering infrastructure systems, numerical and decision analysis techniques, applications of risk analysis.

CIVE 260 03(3-0-0). Engineering Mechanics-Statics. F, S. Prerequisite: MATH 160; PH 141 or concurrent registration.

Forces using vector notation; static equilibrium of rigid bodies; friction, virtual work, centroids, and moments of inertia.

CIVE 261 03(3-0-0). Engineering Mechanics-Dynamics. F, S.
Prerequisite: CIVE 260.

Kinematics and kinetics of particles and rigid bodies; concepts of work-energy and impulse-momentum; computer applications; vector notation.

CIVE 262 04(3-2-0). Engineering Mechanics. F. Prerequisite: MATH 161; PH 141.

Forces, static equilibrium, mass center, moments of inertia, kinematics and kinetics of particles and rigid bodies.

CIVE 300 04(3-3-0). Fluid Mechanics. F, S. Prerequisite: CIVE 261; MATH 340 or concurrent registration; MECH 237 or concurrent registration or MECH 337 or concurrent registration.

Fluid properties; statics, kinematics, and dynamics of fluid motion including viscous and gravitational effects.

CIVE 302 03(2-3-0). Evaluation of Civil Engineering Materials. F.
Prerequisite: CHEM 111; CIVE 203; CIVE 360.

Behavior and properties of construction materials, instrumentation, use of statistical tools, material standards, material selection, quality control.

CIVE 303 03(3-0-0). Infrastructure and Transportation Systems. S.
Prerequisite: CIVE 203.

Principles of infrastructure systems, transportation systems, applications of spatial data and GIS, project management and engineering economy.

CIVE 322/ENVE 322 03(3-0-0). Basic Hydrology. F, S. Prerequisite: CBE 331 or CIVE 300 or WR 416; CIVE 202 or STAT 301 or STAT 315.
Credit not allowed for both CIVE 322 and ENVE 322.

Hydrologic cycle, soil moisture, groundwater, runoff processes, water contamination, applications in water resources and environmental engineering.

CIVE 330 03(3-0-0). Ecological Engineering. S. Prerequisite: (BZ 110; BZ 111) or BZ 120 or LIFE 102; CHEM 113.

Principles of ecological engineering and design of sustainable ecosystems.

CIVE 350 03(2-3-0). Soil Engineering for Nonengineers. F, S.
Prerequisite: CON 359.

Concepts of soil mechanics and soil behavior, elementary application to compaction, seepage, earth pressure, foundations, and slopes.

CIVE 355 04(3-3-0). Introduction to Geotechnical Engineering. F, S.
Prerequisite: CIVE 360.

Soil behavior, stress-strain and strength properties, application to earth pressure, slope and foundation problems

CIVE 360 03(3-0-0). Mechanics of Solids. F, S. Prerequisite: CIVE 260 or CIVE 262.

Stresses and deformations in structural members and machine elements, combined stresses, stress transformation.

CIVE 363 01(0-3-0). Material Properties. F, S. Prerequisite: CIVE 360.

Mechanical properties of metals, woods, and plastics; testing techniques and standards.

CIVE 367 03(3-0-0). Structural Analysis. F, S. Prerequisite: CIVE 360.

Determination of actions in and deformations of determinate and indeterminate structures.

CIVE 390 Var [1-3]. Civil Engineering Student Projects Workshop. F, S.

CIVE 401 03(3-0-0). Hydraulic Engineering. S. Prerequisite: CIVE 300.

Basic principles of fluid mechanics applied to practical problems in hydraulic engineering.

CIVE 402 03(2-2-0). Senior Design Principles. F. Prerequisite: CIVE 300; CIVE 303 or CHEM 245..

Design of civil engineering systems, nontechnical and economic design considerations, project organization, design project development and presentation.

CIVE 403 03(2-2-0). Senior Project Design. S. Prerequisite: CIVE 402.

Design of civil engineering systems, nontechnical and economic design considerations; project organization, design project development and presentation. (\$)

CIVE 413 03(3-0-0). Environmental River Mechanics. S. Prerequisite: CIVE 300 or WR 416.

Fluvial geomorphology, river hydraulics, sediment transport, and river response with special emphasis on environmental aspects. (NT-O/V)

CIVE 423 03(3-0-0). Groundwater Engineering. S. Prerequisite: CBE 331 or CIVE 300 or WR 416.

Development of groundwater resources; origin, movement, distribution of water below ground surface.

CIVE 425 03(2-3-0). Soil and Water Engineering. S. Prerequisite: CBE 331 or CIVE 300 or SOCR 240.

Control of the soil-water-plant medium for optimum plant growth and environmental protection.

CIVE 437/ENVE 437 03(3-0-0). Wastewater Treatment Facility Design. S. Prerequisite: CIVE 300; CIVE 438/ENVE 438 or concurrent registration.

Credit not allowed for both CIVE 437 and ENVE 437.

Design concepts and principles for wastewater treatment systems and unit processes, principles of treatment plant operation.

CIVE 438/ENVE 438 03(3-0-0). Environmental Engineering Concepts. F, S. Prerequisite: CBE 331 or CIVE 300 or MECH 342; CHEM 113.
Credit not allowed for both CIVE 438 and ENVE 438.

Environmental engineering approaches to designing water supply, wastewater removal, and pollution control systems.

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CIVE 439/CBE 439 03(2-3-0). Environmental Engineering Chemical Concepts. F. Prerequisite: CHEM 113; MATH 340. Credit not allowed for both CIVE 439 and CBE 439.

Application of chemical principles to environmental engineering problems.

CIVE 440 03(3-0-0). Nonpoint Source Pollution. F. Prerequisite: CIVE 300 or CIVE 322/ENVE 322 or SOCR 240 or WR 416.

Principles, processes, impacts, and control of nonpoint source pollution of surface and groundwater. (NT-O)

CIVE 455 03(3-0-0). Applications in Geotechnical Engineering. F. Prerequisite CIVE 355.

Geotechnical engineering applications of earth retaining structures, foundations, dams and embankments, geosynthetics, waste containment systems.

CIVE 466 03(3-0-0). Design and Behavior of Steel Structures. S. Prerequisite: CIVE 367.

Loads acting on a structure; behavior and design of steel members, connections, and systems.

CIVE 467 03(3-0-0). Design of Reinforced Concrete Structures. F. Prerequisite: CIVE 367.

Design and behavior of reinforced concrete structural members.

CIVE 495 Var [1-3]. Independent Study.

CIVE 496 Var. Group Study.

CIVE 502 03(3-0-0). Fluid Mechanics. F. Prerequisite: CIVE 300.

Fundamental physical concepts of fluid mechanics; ideal and viscous fluid flows; boundary-layer concepts. (NT-V)

CIVE 504 03(3-0-0). Wind Engineering. F. Prerequisite: CIVE 300.

Influence of wind on humanity. Applications to structures, air pollution, wind energy, agricultural aerodynamics, snow movement, human comfort. (NT-V)

CIVE 506 03(3-0-0). Wind Effects on Structures. S. Prerequisite: CIVE 504.

Analysis of wind effects on buildings and structures; deterministic and probabilistic methods; aerodynamic loading and response; codes and standards.

CIVE 510 03(3-0-0). Applied Hydraulic System Design. F. Prerequisite: CIVE 401.

Operational management systems, data collection, real-time control, management modeling, rehabilitation and retrofit, maintenance.

CIVE 512 03(3-0-0). Irrigation Systems Design. F. Prerequisite: CIVE 322/ENVE 322 or CIVE 425.

Irrigation systems principles and design procedures for operation of sprinkler, trickle, and surface irrigation systems. (NT-O)

CIVE 514 03(3-0-0). Hydraulic Structures/Systems. F. Prerequisite: CIVE 401.

Analysis and design of hydraulic structures which make up components of water resource systems.

CIVE 516 03(3-0-0). Water Control and Measurement. S.

Flow regulation and measurement in gravity flow irrigation systems for efficient and equitable water distribution among users. (NT-O)

CIVE 517 03(3-0-0). Surface Irrigation Systems. F. Prerequisite: CIVE 425.

Design and evaluation of surface irrigation systems. Water measurements, conveyance and control structures, land forming.

CIVE 518 03(3-0-0). Sprinkler and Trickle Irrigation Systems. S.

Prerequisite: CIVE 300; CIVE 425.

Basic principles, design, and evaluation of pressurized irrigation systems.

CIVE 519 03(3-0-0). Irrigation Water Management. F. Prerequisite: CIVE 425.

Apply soil, plant, water, and atmospheric engineering principles to determine crop water need to sustain agricultural production and the environment. (NT-O)

CIVE 520 03(3-0-0). Physical Hydrology. F. Prerequisite: CIVE 322/ENVE 322.

Hydrologic, atmospheric processes in the water cycle; linear systems, hydrologic response; geomorphologic description of hydrologic processes, response. (NT-O)

***CIVE 521 03(2-3-0). Hydrometry.** F. Prerequisite: CIVE 322/ENVE 322.

Principles, methods, instruments, and equipment for measuring water quantity and water quality variables in nature.

CIVE 522 03(3-0-0). Engineering Hydrology. S. Prerequisite: CIVE 520.

Hydrologic design under uncertainty; conventional and remote sensing; design flows and storms; river routing; reservoir design; watershed models. (NT-O/V)

°CIVE 524/WR 524 03(2-2-0). Modeling Watershed Hydrology. S. Prerequisite: CIVE 322/ENVE 322 or WR 416; CIVE 202 or STAT 301 or STAT 315. Credit not allowed for both CIVE 524 and WR 524.

Development and application of watershed models: structure, calibration, evaluation, sensitivity analysis, simulation.

***CIVE 525 03(3-0-0). Water Engineering: International Development.** F. Prerequisite: CIVE 401 or CIVE 425 or CIVE 438/ENVE 438.

Planning and design of small-scale and low-cost drinking water, wastewater, and irrigation systems for rural communities in developing countries.

CIVE 531 03(3-0-0). Groundwater Hydrology. F. Prerequisite: CBE 331 or CIVE 300 or MECH 342.

Groundwater occurrence, distribution, movement, exploration and recharge, well hydraulics and design, interaction of ground and surface water.

CIVE 532 03(3-0-0). Wells and Pumps. S. Prerequisite: CIVE 423; CIVE 531 or GEOL 452; CHEM 111.

Well field hydraulics, well drilling methods, well design, aquifer test methods, pumping systems, well maintenance, storage/distribution systems.

CIVE 534 03(2-2-0). Applied and Environmental Molecular Biology. S. Prerequisite: CIVE 540.

Environmental microbiology and molecular biology tools used to investigate both natural systems and engineered processes. (\$))

CIVE 537 03(3-0-0). Residuals Management. S. Prerequisite: CIVE 300.

Planning and design for processing and disposal of residuals including solid wastes, sludges, hazardous wastes.

CIVE 538 03(3-0-0). Aqueous Chemistry. S. Prerequisite: CHEM 113; MATH 340.

Principles of solution chemistry applied to aquatic systems.

°CIVE 539 03(2-3-0). Water and Wastewater Analysis. F. Prerequisite: CHEM 113; MATH 340.

Chemical and biological methods of assessing water quality; significance of chemicals in aquatic systems.

CIVE 540/CBE 540 03(3-0-0). Advanced Biological Wastewater Processing. S. Prerequisite: CIVE 438/ENVE 438 or CBE 320. Credit not allowed for both CIVE 540 and CBE 540.

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Fundamentals of environmental biotechnology: environmental microbiology, microbial kinetics, basic reactor design, wastewater treatment.

CIVE 541 04(3-3-0). Environmental Unit Operations-Treatment-Design. S. Prerequisite: CIVE 439/CBE 439.

Reactor theory, filtration, adsorption, ion exchange, gas transfer, oxidation, membranes, biological reactors, disinfection.

°**CIVE 542 03(3-0-0). Water Quality Modeling.** S. Prerequisite: Two semesters of chemistry; one course in hydrology or water quality.

Chemical, physical, and biological processes defining surface water quality, construction and application of computer models for lakes and streams.

CIVE 544 03(3-0-0). Water Resources Planning and Management. F. Prerequisite: CIVE 322/ENVE 322.

Management and planning of natural and constructed water systems. Integrated management and case studies of water use and environmental resources. (NT-O)

CIVE 545 03(3-0-0). Management and Monitoring of Water Quality. F. Prerequisite: CIVE 322/ENVE 322 or WR 418.

Management activities, information needs, data analysis protocols, network design, case studies. (NT-O)

CIVE 546 03(2-2-0). Water Resource Systems Analysis. S. Prerequisite: CIVE 322/ENVE 322 or concurrent registration; ENGR 510 or concurrent registration or MATH 510 or concurrent registration.

Applications of systems analysis and optimization techniques in water resources planning and management. (NT-O)

CIVE 547/STAT 547 03(3-0-0). Statistics for Environmental Monitoring. S. Prerequisite: STAT 301. Credit not allowed for both CIVE 547 and STAT 547.

Applications of statistics in environmental pollution studies involving air, water, or soil monitoring; sampling designs; trend analysis; censored data. (NT-O)

CIVE 548 03(3-0-0). Irrigation Management for Water Quality. F. Prerequisite: CIVE 425.

Environmental impacts of irrigation; reduced environmental impact by improved design and management of irrigation; sustainability.

CIVE 549 03(3-0-0). Drainage and Wetlands Engineering. S. Prerequisite: CIVE 425.

Drainage and wetlands design for agricultural and natural resource applications. Water table modification for nonpoint sources pollution control.

CIVE 550 03(3-0-0). Foundation Engineering. F. Prerequisite: CIVE 355.

Mechanics and methodology of foundation engineering; selection and design of foundation systems on soft, firm, and expansive soils; special problems.

°**CIVE 553 03(3-0-0). Slope Stability and Retaining Structures.** S. Prerequisite: CIVE 355.

Slope stability theory and application, retaining walls, sheet-pile walls, braced excavations, geosynthetic uses.

***CIVE 556 03(3-0-0). Seepage and Earth Dams.** S. Prerequisite: CIVE 355.

Hydraulic conductivity measurements; seepage analysis and control; earth dam and embankment design; computer applications.

CIVE 558 03(3-0-0). Containment Systems for Waste Disposal. F. Prerequisite: CIVE 355.

Basic principles governing the design of containment systems used in waste disposal applications.

CIVE 560 03(3-0-0). Advanced Mechanics of Materials. F. Prerequisite: CIVE 360.

Analysis of stress and strain failure theory; selected topics in solid mechanics, plate analysis; introduction to elastic stability.

CIVE 562 03(3-0-0). Fundamentals of Vibrations. S. Prerequisite: CIVE 261; CIVE 360.

Free and forced vibrations of single, two, and multiple degree of freedom systems. Closed-form and numerical solutions.

CIVE 563 03(3-0-0). Structural Reliability: Theory, Application. S.

Theory of structural reliability as it relates to analysis, design, construction, and maintenance of structural and mechanical systems.

CIVE 565 03(3-0-0). Finite Element Method. S. Prerequisite: MATH 340.

Theory and application in elasticity, porous flow, heat conduction, and other engineering problems. (NT-V)

CIVE 566 03(3-0-0). Intermediate Structural Analysis. F. Prerequisite: CIVE 367.

Work and energy concepts, curved members and arches, matrix analysis of linear systems, numerical techniques.

CIVE 567 03(3-0-0). Advanced Concrete Design. S. Prerequisite: CIVE 467.

Behavior of reinforced and prestressed concrete members; development of design methods; behavior and design of slabs, shearwalls, and buildings.

CIVE 568 03(3-0-0). Design of Masonry and Wood Structures. S. Prerequisite: CIVE 466 or CIVE 467.

Behavior and design of structures and structural components constructed of masonry or engineered wood.

CIVE 569 03(3-0-0). Intermediate Design of Wood Structures. F. Prerequisite: CIVE 367; CON 432.

Characteristics of structural products and their consideration in design; behavior of glulam members, wood trusses, and other wood structural systems.

CIVE 571 03(3-0-0). Pipe System Engineering and Hydraulics. S. Prerequisite: CIVE 300.

Planning, design and management of water, wastewater, and industrial pipelines. Emphasis on flow and operation of water supply pipelines. (NT-O)

***CIVE 572 03(2-2-0). Analysis of Urban Water Systems.** F. Prerequisite: CIVE 300; CIVE 401.

Behavior and interaction of urban water distribution and collection systems; how system state and driving variables affect system performance.

°**CIVE 573 03(2-2-0). Urban Stormwater Management.** F. Prerequisite: CIVE 322/ENVE 322; CIVE 401.

Effects of urbanization on watershed hydrology and receiving waters; control practices to mitigate effects using mathematical models.

CIVE 574 03(3-0-0). Civil Engineering Project Management. F. Prerequisite: None.

Principles of civil engineering project management including proposals, contracts, scheduling, quality assurance, budgeting, and risk management.

CIVE 576 03(2-2-0). Engineering Applications of GIS and GPS. F.

Integration of GPS and GIS in the planning and decision making process, application to case study.

CIVE 577 03(2-2-0). GIS in Civil and Environmental Engineering. S. Prerequisite: CIVE 300; CIVE 322/ENVE 322.

GIS technology for spatial design/analysis; applications in facilities management, urban infrastructure, water resources, environmental

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engineering. (NT-O)

CIVE 578 03(3-0-0). Infrastructure and Utility Management. S. Prerequisite: Ten credits of engineering, economics, public administration, or planning courses.

Infrastructure and utility planning, management, and security. Systems approach to life cycle management. Problems, analysis, decision support systems. (NT-O/V)

CIVE 579 03(3-0-0). Risk and Security of the Built Environment. F.

Infrastructure security and safety to prepare the built environment against natural and human-caused threats. (NT-O)

CIVE 584 Var. Supervised College Teaching.

CIVE 592A-L 01(0-0-1). Seminar.

A) Fluid mechanics and wind engineering. E) Geotechnical engineering. G) Environmental engineering. L) Space engineering.

CIVE 604 03(3-0-0). Fluid Turbulence and Modeling. S. Prerequisite: CIVE 502 or CIVE 504.

Engineering concepts for transport of pollutants, toxic and flammable species, sand, and snow. Fluid modeling, numerical and analytical approaches.

CIVE 607 03(3-0-0). Computational Fluid Dynamics. S. Prerequisite: CIVE 300.

Numerical methods used in computational solutions of hydraulics, environmental and wind engineering problems.

CIVE 610 03(3-0-0). Special Topics in Hydraulics. S. Prerequisite: CIVE 502.

Advanced topics in hydraulics, hydromechanics, environmental hydraulics, and computational hydraulics

CIVE 612 04(4-0-0). Open Channel Flow. S. Prerequisite: CIVE 502.

Steady, uniform, and non-uniform flow; backwater curves; flow through bridge piers, transitions, and culverts; spatially varied and unsteady flow.

CIVE 613 03(3-0-0). Stream Rehabilitation Design. S. Prerequisite: CIVE 401.

Analysis and design of streams and channels in harmony with the environment.

CIVE 622 03(3-0-0). Risk Analysis of Water/Environmental Systems. F. Prerequisite: CIVE 322/ENVE 322; STAT 315.

Risk and uncertainty analysis applied to hydrology, hydraulics, groundwater, water resources, and environmental engineering systems.

CIVE 623 03(3-0-0). Water Quality Hydrology. S. Prerequisite: CIVE 322/ENVE 322.

Effects and dispersion of natural, municipal, industrial, toxic, and other water pollutants on natural and impounded waters.

***CIVE 624 03(3-0-0). Control of Floods and Droughts.** S. Prerequisite: CIVE 522.

Flood and drought characteristics, impacts; structural, nonstructural flood control measures; drought prediction, drought control, drought response.

CIVE 631 03(3-0-0). Computational Methods in Subsurface Systems. F. Prerequisite: CIVE 531; MATH 340.

Numerical flow models; finite difference and finite element methods; parameter identification, stochastic modeling and advanced analytical solutions.

CIVE 638 03(3-0-0). Groundwater Quality and Contaminant Transport. S. Prerequisite: CIVE 531.

Analysis of hydrochemical data. Advection with and without mixing.

Retardation of reactive solutes. Design of groundwater quality investigations.

***CIVE 639/*SOC 639 03(3-0-0). Technology Assessment and Social Forecasting.** F. Prerequisite: SOC 500. Credit not allowed for both CIVE 639 and SOC 639.

Interrelationship between technology and society emphasizing procedures for evaluating impacts and forecasting alternatives.

***CIVE 645 03(2-2-0). Computer-Aided Water Management and Control.** F. Prerequisite: CIVE 546 or CIVE 577.

Real-time management and control of water resource systems; applications of computer control concepts to improve system performance.

***CIVE 654 03(2-3-0). Experimental Soil Mechanics.** F. Prerequisite: CIVE 355.

Experimental design; data acquisition; soil fabric; isotropic/ K_0 condensation; swelling; stiffness; shear wave velocity; triaxial; hollow cylinder; partial saturation.

CIVE 655 03(3-0-0). Advanced Soil Mechanics. F. Prerequisite: CIVE 355.

Advanced topics in shear strength and consolidation of soils; stress paths; anisotropy; submergence; partial and radial drainage; numerical methods.

CIVE 658 03(3-0-0). Remediation Systems-Subsurface Contamination. S.

Applications in geoenvironmental engineering practice involving design of in situ containment and remediation systems.

CIVE 662 03(3-0-0). Foundations of Solid Mechanics. F. Prerequisite: CIVE 560;

Analysis of stress and strain in solids emphasizing linear elasticity and plasticity; introductions to creep, viscoelasticity, and finite deformations.

CIVE 664 03(3-0-0). Mechanics of Fatigue and Fracture. S. Prerequisite: CIVE 560.

Fracture mechanics including linear elastic, elastic-plastic, and dynamic fracture; on ductile and cleavage fracture in metals.

CIVE 667 03(3-0-0). Advanced Structural Analysis. S. Prerequisite: CIVE 566.

Analysis program development, application of finite element analysis, computer-assisted analysis, introduction to nonlinear analysis.

***CIVE 669 03(3-0-0). Advanced Design of Metal Structures.** S. Prerequisite: CIVE 466.

Behavior of steel, aluminum, and cold formed members. Development of elastic and inelastic code provisions. LRFD design methods, building systems.

CIVE 684 Var. Supervised College Teaching.

CIVE 695A-J Var. Independent Study.

A) Fluid mechanics and wind engineering. B) Hydraulics. C) Hydrology and water resources. D) Mechanics. E) Geotechnical engineering. F) Structures. G) Environmental engineering. H) Water resource planning and management. I) Groundwater. J) Bioresource and agricultural engineering.

CIVE 696A-J Var. Group Study.

A) Fluid mechanics and wind engineering. B) Hydraulics. C) Hydrology and water resources. D) Mechanics. E) Geotechnical engineering. F) Structures. G) Environmental engineering. H) Water resource planning and management. I) Groundwater. J) Bioresource and agricultural engineering.

CIVE 699A-J Var. Thesis.

A) Fluid mechanics and wind engineering. B) Hydraulics. C) Hydrology and water resources. D) Mechanics. E) Geotechnical engineering. F) Structures. G) Environmental engineering. H) Water resource planning and management. I) Groundwater. J) Bioresource and agricultural engineering.

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°CIVE 703 03(3-0-0). **Special Topics in Fluid Mechanics.** F. Prerequisite: CIVE 502.

Advanced topics in fluid mechanics; associated experimental and numerical techniques.

CIVE 716 03(3-0-0). **Erosion and Sedimentation.** F. Prerequisite: CIVE 502.

Sediment properties; resistance to flow; incipient motion and bedforms; sediment transport, reservoir sedimentation.

CIVE 717 03(3-0-0). **River Mechanics.** S. Prerequisite: CIVE 716.

Characteristics of rivers, mechanics of sediment and water discharge emphasizing alluvial systems, channel stabilization, control, response.

°CIVE 721 03(3-0-0). **Stochastic Water and Environmental Systems.** S. Prerequisite: CIVE 622.

Stochastic analysis of water and environmental systems. Simulation, forecasting, spatial analysis, modeling changes, stochastic differential equations.

°CIVE 722 03(3-0-0). **Large Scale Hydrology.** F. Prerequisite: CIVE 520.

Global and regional scale hydrologic processes; land/atmosphere interaction; scaling in hydrology, geomorphoclimatic structure of hydrologic response.

*CIVE 724 03(3-0-0). **River Basin Morphology.** S. Prerequisite: Written consent of instructor.

Analysis of river basin properties including their connections to statistical theories and erosion processes and their hydrologic implications.

*CIVE 742 03(2-3-0). **Advanced Topics in Environmental Engineering.** S. Prerequisite: CIVE 540/CBE 540.

Selected topics from current environmental engineering research including molecular methods, water/wastewater treatment, hazardous waster remediation.

*CIVE 751 03(3-0-0). **Soil Dynamics.** S. Prerequisite: CIVE 355.

Soil behavior under dynamic loading; stress wave propagation; foundation response to vibratory and transient loading; elements of earthquake effects.

°CIVE 754 03(3-0-0). **Special Topics in Geotechnical Engineering.** S. Prerequisite: CIVE 655; written consent of instructor.

Advanced topics in geotechnical engineering including cold regions problems, expansive/collapsing soils, computer applications.

*CIVE 766 03(3-0-0). **Theory of Plates and Shells.** F. Prerequisite: CIVE 560.

Classical plate, shell and membrane theory for isotropic and layered anisotropic media. Analytic and computational solution techniques.

°CIVE 767 03(3-0-0). **Structural Dynamics and Earthquake Engineering.** F. Prerequisite: CIVE 562; CIVE 667.

Analysis, behavior, and design of structural systems subjected to dynamic loads, including earthquakes, wind, and ocean waves.

CIVE 799A-J Var. Dissertation.

A) Fluid mechanics and wind engineering. B) Hydraulics. C) Hydrology and water resources. D) Mechanics. E) Geotechnical engineering. F) Structures. G) Environmental engineering. H) Water resource planning and management. I) Groundwater. J) Bioresource and agricultural engineering.

CELL AND MOLECULAR BIOLOGY COURSES

Nondepartmental, Interdisciplinary Office of Provost and Executive Vice President

CM 795 Var. Independent Study.
CM 799 Var. Dissertation.

CM 501 04(4-0-0). Advanced Cell Biology. F. Prerequisite: BZ 310.
Cell structure and organelle function.

CM 502/NB 502 02(1-3-0). Techniques in Molecular & Cellular Biology. F. Prerequisite: One college-level course with laboratory in each: biology, biochemistry, physics; written consent of instructor. Credit not allowed for both CM 502 and NB 502.

Current methods in molecular and cellular neurobiology.

CM 510 01(1-0-0). Introduction to Cell and Molecular Biology. F.
Overview of CMB program and research opportunities; enhances writing and oral communication skills.

***CM 520 03(2-0-1). Proteolytic Regulation of Cellular Processes.** S.
Prerequisite: CM 501.

Functions of proteolytic pathways in the regulation of eukaryotic cellular processes, such as mitosis, apoptosis, signal transduction and gene regulation.

CM 595 Var. Independent Study.

CM 601 01(0-0-1). Responsible Conduct of Research in CMB. S.
Prerequisite: Enrollment in the CMB graduate program.

Key aspects of responsible conduct of research and ethical considerations in cell and molecular biology.

CM 640 03(3-0-0). Creative Science Writing. S.

Consideration of creative writing techniques and their relevance to traditional science/nature writing.

°CM 666/°PHIL 666 03(3-0-0). Science and Ethics. S. Credit not allowed for both CM 666 and PHIL 666.

Ethical issues of research on humans and animals; biosafety; fraud and deception in science; genetic engineering.

CM 699 Var. Thesis.

CM 701D-I. Topics in Cell and Molecular Biology. F, S. Prerequisite: BC 403; CM 501; MATH 255.

D) Radiation cytogenetics 01(1-0-0). **I)** Planning research and grant proposals 02(2-0-0).

CM 702B-E Methods in Cell and Molecular Biology. F, S.

B) Mammalian cell culture techniques 01(0-3-0). Prerequisite: BC 403; CM 501. **C)** Immunochemical techniques 01(0-3-0). Prerequisite: BC 403; CM 501; MATH 255. **D)** Radiation cytogenetics 01(0-3-0). Prerequisite: BC 403; CM 501; **E)** Flow cytometry and cell sorting 02(0-4-0). Prerequisite: BC 403; CM 501.

CM 710/BSPM 710 03(0-4-1). Techniques in Molecular Biology and Genetics. S. Prerequisite: BC 463 or BZ 346 or BZ 350 or MIP 450 or SOCR 330. Credit not allowed for both CM 710 and BSPM 710.

Genetic manipulation of bacteria, bacteriophage, and yeast including experiments in molecular cloning and gene expression.

CM 784 Var. Supervised College Teaching.

CM 792 01(1-0-0). Cell and Molecular Biology Seminar. F, S.
Prerequisite: CM 501 or concurrent registration.

Preparation and presentation of cell and molecular biology seminars.

CM 793 01(0-0-1). Seminar.

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COMPOSITION COURSES

Department of English

College of Liberal Arts

CO 130 03(3-0-0). Academic Writing. (GT-CO1). F, S. Prerequisite: composition challenge/placement exam.

Academic writing, critical thinking, and critical reading through study of a key academic issue.

CO 150 03(3-0-0). College Composition. (GT-CO2, AUCC 1A). F, S, SS. Prerequisite: SAT critical reading score of 600 or above or ACT English score of 26 or above or composition placement/challenge exam (score of 3, 4, or 5) or CO 130. (For students registered at CSU prior to Fall 2008, SAT verbal score of 500 or above or ACT English score of 20 or above.)

Understanding and writing for rhetorical situations; critical reading and response; writing source-based argument for academic and public audiences. (NT-O)

CO 300 03(3-0-0). Writing Arguments. (AUCC 2). F, S, SS. Prerequisite: CO 150 or HONR 193.

Reading, analyzing, researching, and writing arguments.

CO 301A-D 03(3-0-0). Writing in the Disciplines. (AUCC 2). F, S, SS. Prerequisite: CO 150 or HONR 193.

Learning writing strategies for addressing general audiences. **A)** Arts and humanities. **B)** Sciences. **C)** Social sciences. (NT-O) **D)** Education.

CO 302 03(3-0-0). Writing Online. (AUCC 2). F, S. Prerequisite: CO 150 or HONR 193.

Writing and analysis of electronic texts.

CO 401 03(3-0-0). Writing and Style. F, S. Prerequisite: CO 300 or CO 301A or CO 301B or CO 301C or CO 301D or CO 302.

Advanced expository and persuasive writing emphasizing modes, strategies, and styles for a variety of audiences and purposes.

CO 402 03(3-0-0) Advanced Writing Online. F, S. Prerequisite: CO 302 or JTC 372 or SPCM 346.

Advanced study of rhetorical contexts shaping online texts. Builds on fluency in coding and familiarity with online document design.

CONSTRUCTION MANAGEMENT COURSES

Department of Construction Management College of Applied Human Sciences

CON 101 03(3-0-0). Introduction to Construction Management. F, S.

Identify and understand relationships among participants in the construction process and its history.

CON 131 02(0-4-0). Graphic Communications/CAD. F, S, SS.

Reading technical drawings, manual drafting techniques, reprographic technologies. CAD applications are introduced.

CON 136 03(1-4-0). Computer-Aided Design. F, S, SS. Prerequisite: BUS 150.

Introduction to and application of computer-aided design and drafting software. Applications using the latest release of AutoCAD. (NT-O/C)

CON 151 03(3-0-0). Construction Materials and Methods. F, S.

Materials and methods utilized in the design and construction of buildings.

CON 251 02(1-2-0). Materials Testing and Processing. F, S. Prerequisite: CON 151.

Testing of construction materials for standards and quality. Conduct common quality tests and document the results. (\$)

CON 261 03(2-3-0). Construction Surveying. F, S, SS. Prerequisite: CON 131 or INTD 166; MATH 125 or MATH 160.

Surveying fundamentals to field of construction, building layout, measurement procedures, vertical controls, line and grade, surveying, instrument operation. (\$)

CON 265 03(2-2-0). Construction Estimating I. F, S. Prerequisite: CON 151.

Integration of construction materials and methods into construction systems that will be incorporated in projects. (\$)

CON 267 01(0-0-1). Construction Management Pre-Internship. F, S, SS. Construction management majors only.

Skills and concepts related to successful internships within the construction management industry.

CON 270 03(3-0-0). Introduction to Road Construction. F.

Steps necessary to construct a paved roadway from conception, land acquisition and finance through paving operations and trafficking.

CON 317 02(2-0-0). Safety Management. F, S.

Safety management in construction, corporate, and institutional environments.

CON 351 02(1-2-0). Construction Field Management. F, S. Prerequisite: CON 251 or concurrent registration; CON 317 or concurrent registration.

Materials and methods used in construction, administrative and organizational planning used to complete a project.

CON 352 02(1-2-0). Metal Fabrication for Construction. F, S. Prerequisite: CON 251.

Shaping, cutting, and joining of structural and non-structural metal. Emphasis on jobsite safety, economics, and efficiency. (\$)

CON 359 04(4-0-0). Structures I. F, S. Prerequisite: MATH 125; junior or senior standing.

Behavior of structural components and systems, overview of structural engineering analysis/design process.

CON 360 03(2-2-0). Electrical and Control Systems. F, S. Prerequisite: CON 265.

Electrical and control systems and their application in the construction industry.

CON 365 03(2-2-0). Construction Estimating II. F, S. Prerequisite: CON 265.

Industry-recognized methods for work item analysis, quantity surveying, resource estimating, and bid development using work breakdown structures.

CON 366 03(2-2-0). Construction Equipment and Methods. F, S. Prerequisite: CON 261.

Equipment/methods in heavy and highway construction; equipment selection, productivity, and costs. Infrastructure, tunneling, and trenchless technology.

CON 367 03(3-0-0). Construction Contracts/Project Administration. F, S. Prerequisite: CON 265; CON 351 or concurrent registration. Construction management majors and minors only.

Utilization of field engineering systems and procedures to effectively meet project objectives.

CON 370 03(2-2-0). Asphalt Pavement Materials and Construction. F, S.

Constituents of asphalt pavements; manufacture of asphalt cement, emulsions, and cutbacks; material properties and behavior.

CON 371 03(3-0-0). Mechanical and Plumbing Systems. F, S. Prerequisite: CON 360 or concurrent registration or INTD 276 or concurrent registration.

Heating, ventilation, air conditioning, plumbing, and fire suppression with emphasis on design, operation, and interaction.

CON 384 Var [1-5]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

CON 450/INTD 450 03(3-0-0). Travel Abroad-Sustainable Building. SS. Credit not allowed for both CON 450 and INTD 450.

Major components of sustainable design and construction, energy, healthy buildings, natural resources, and other environmental issues.

CON 459 04(4-0-0). Structures II. F, S. Prerequisite: CON 359.

Design of formwork, falsework, and shoring.

CON 461 03(2-2-0). Construction Project Scheduling and Cost Control. F, S. Prerequisite: CON 365 or concurrent registration. Construction management majors and minors only.

Strategies and techniques for efficient scheduling of project activities and control of project costs; emphasis on Critical Path Method.

CON 462 03(3-0-0). Financial Management for Construction. F, S. Prerequisite: ACT 205 or ACT 210; MGT 305 or MGT 320.

Financial statements, financial ratios, applications of engineering economy, cash flow analysis, construction financing, and cost information systems.

CON 465 03(1-0-2). Construction Management Professional Practice. F, S. Prerequisite: CON 461 or concurrent registration; CON 487A or CON 487B. Construction management majors only.

Professional practice using an understanding of the contractual and working relationships among all participants in the design/construction process.

CON 469 03(2-0-1). Soils Engineering for Construction Managers. F, S. Prerequisite: CON 359.

Soil mechanics, foundation engineering, and foundation construction.

CON 471 03(3-0-0). Project Management for Mechanical Systems. F. Prerequisite: CON 371; CON 365 or concurrent registration.

Fundamental principles of mechanical systems. Presentation and practice of management principles relevant to mechanical projects.

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CON 476 03(3-0-0). Sustainable Practices-Design and Construction. F.
Major components of sustainable design/construction: energy, healthy buildings, cultural, natural resources, use, other environmental/economic issues.

CON 487A-B Var[3-6]. Internship. F, S, SS.
A) Construction Management I. (06(0-0-18). Prerequisite: CON 267; CON 367. B) Construction Management II. Prerequisite: CON 267; CON 367; 500 hours of documented work experience.

CON 495 Var. Independent Study-Construction.

CON 496 Var. Group Study-Construction.

CON 500 03(3-0-0). Models of Disciplined Inquiry. F. Prerequisite: Admission to master's program.
Models and methods of disciplined inquiry used in diverse organizations; applying disciplined inquiry methods to solve problems.

CON 560 03(3-0-0). Applied Project Management. F. Prerequisite: Admission to master's program.
Project development, planning, and control relevant to construction, manufacturing and technology education professionals.

CON 561 03(3-0-0). Applied Productivity Improvement. S. Prerequisite: Admission to master's program.
Existing and emerging tools for productivity enhancement in project and production environment.

CON 562 03(3-0-0). Issues and Trends in Construction Management. F. Prerequisite: Admission to master's program.
Current issues and trends related to management of technology in fields associated with manufacturing and construction industries.

CON 565 03(3-0-0). Legal Aspects of Construction Process. S. Prerequisite: Admission to master's program.
Common points of dispute; methods of avoiding disputes among owner, architect, engineer, and contractor.

CON 566 03(3-0-0). Advanced Construction Estimating. F. Prerequisite: Admission to master's program.
Advanced estimating procedures dealing with special application and techniques in construction.

CON 567 03(3-0-0). Preservation and Rehabilitation of Buildings. F. Prerequisite: Admission to master's program.
Theory and applications of preservation technology used in the management and rehabilitation of historic and archaic buildings.

CON 568 03(3-0-0). Construction Industry Institute Practices. F. Prerequisite: CON 367.
Senior executives from the Construction Industry Institute (CII) present best practices developed by CII over the last 25 years.

CON 569 03(3-0-0). Regulatory Impact on Construction. S. Prerequisite: Admission to master's program.
Role government plays in the design and construction of the built environment.

CON 571 03(3-0-0). Facility Planning and Management. S. Prerequisite: Admission to master's program.
Planning, organizing, and managing large educational and/or commercial facilities.

CON 575 03(3-0-0). Managerial Decision Making for Constructors. F. Prerequisite: Admission to master's program.
Construction and real estate development applications of multi-disciplinary managerial analysis and decision-making techniques.

CON 576 03(2-0-1). Sustainable Technology in Built Environments. S.

Prerequisite: CON 450/INTD 450 or CON 476.

Major components of creating environmentally sustainable built environments.

CON 590 Var. Workshop.

CON 592 Var. Seminar.

CON 684 Var. Supervised College Teaching.

CON 687 Var [1-6]. Internship. Maximum of 6 credits allowed in course.

CON 695 Var. Independent Study.

CON 696 Var. Group Study. Prerequisite: Admission to master's program.

CON 698 Var. Research.

CON 699 Var [1-6]. Thesis.

COMPUTER SCIENCE COURSES

Department of Computer Science

College of Natural Sciences

CS 110 04(3-3-0). Personal Computing. F, S, SS.

Hardware/software concepts, Internet services, OS commands, electronic presentations, spreadsheets, databases, programming concepts. (NT-O)

CS 115 03(2-0-1). Computer Science Concepts and Practices. F, S, SS.

Prerequisite: Placement into MATH 117 or MATH 130.

Development of computer science, central concepts: algorithm, recursion, autonomous computation, computability limits. Examples using programming. (NT-O)

CS 122/MATH 122 01(0-0-1). Theory for Introductory Programming.

F, S, SS. Prerequisite: MATH 118; concurrent registration in CS 161. Credit not allowed for both CS 122 and MATH 122. Credit not allowed for students who have completed CS 160.

Set theory, definitions operations, Venn diagrams, power sets, propositional logic and proofs. Functions; loop invariants. (NT-O)

CS 150 04(3-0-1). Interactive Programming with Java. F, S.

Prerequisite: Placement into MATH 117 or MATH 130.

Introduction to object-oriented programming with Java; problem solving, creating applets for Web pages, and graphical user interfaces. (NT-O)

CS 155 01(1-0-0). Introduction to Unix. F, S.

Unix shell commands, utilities (editors, sorting, file management), shell scripting.

CS 156 01(1-0-0). Introduction to C Programming I. F, S. Prerequisite:

CS 155 or concurrent registration; MATH 118.

Basic elements of language structure, data types, expressions, program control flow and modularity.

CS 157 01(1-0-0). Introduction to C Programming II. F, S. Prerequisite:

CS 156 or concurrent registration; MATH 118.

More basic design types, function usage and strings. Arrays, user-defined types and structures, enumerated types, recursion, dynamic storage allocation.

CS 158/MATH 158 01(0-2-0). Mathematical Algorithms in C. S.

Prerequisite: CS 156; MATH 151; MATH 160. Credit not allowed for both CS 158 and MATH 158.

Compilers, expressions, variable types, control statements, pointers, logical statements, plotting, secant method, trapezoidal rule, recursion.

CS 160 04(3-2-0). Foundations in Programming. F, S. Prerequisite:

MATH 118 with a C or better.

Introduction to computer theory, programming and systems. Sets, functions, logic. Procedural programming in Java. Computer and data models.

CS 161 04(3-2-0). Object-Oriented Problem Solving. F, S, SS.

Prerequisite: CS 160 with a C or better; MATH 141 or concurrent registration or MATH 155 or concurrent registration or MATH 160 or concurrent registration.

Fundamental object oriented concepts, inheritance, polymorphism, basic algorithms, linked lists, assertions, recursion, induction, counting.

CS 192 02(1-0-1). First Year Seminar in Computer Science. F, S.

Computer science majors only.

Introduction to the computer science major; basic computer skills; campus resources, and various subject-specific topics.

CS 200 04(3-2-0). Algorithms and Data Structures. F, S, SS.

Prerequisite: CS 161 with a C or better; MATH 141 with a C or better or MATH 155 with a C or better or MATH 160 with a C or better.

Data structures; abstract data types; algorithm correctness; complexity

analysis; sorting, searching, hashing. (NT-V)

CS 253 04(3-0-1). Problem Solving with C++. F, S. Prerequisite: CS 200 with a C or better; CS 270 with a C or better or ECE 251 with a C or better.

C++ programming techniques for experienced programmers. UNIX tools for editing, compiling, debugging, and testing C++ programs. (NT-V)

CS 270 04(3-0-1). Computer Organization. F, S. Prerequisite: CS 161

with a C or better; CS 200 or concurrent registration; MATH 141 with a C or better or MATH 155 with a C or better or MATH 160 with a C or better..

Representation of data, arithmetic, assembly language, digital logic, digital systems, memory organization, and architecture. (NT-V)

CS 295 Var [1-4]. Independent Study.

Investigation of special topics under direction of computer science faculty.

CS 314 03(3-0-0). Software Development Methods. F, S. Prerequisite: CS

253 with a C or better.

Methods used to develop large-scale software projects in industry emphasizing design, implementation, and testing. (NT-V)

CS 320 03(3-0-0). Algorithms—Theory and Practice. F, S. Prerequisite:

CS 200 with a C or better; MATH 161 with a C or better; MATH 229 with a C or better or MATH 369 with a C or better.

Analysis, design, implementation and applications of algorithms.

CS 356 03(3-0-0). Systems Security. F, S. Prerequisite: CS 253 with a C

or better; CS 270 with a C or better or ECE 251 with a C or better; STAT 201 or STAT 204 or STAT 301 or STAT 307 or STAT 311 or STAT 315.

Computer and system security, authentication, access control, malicious software, and software security.

CS 370 03(3-0-0). System Architecture and Software. F, S. Prerequisite:

CS 200 with a C or better; CS 270 with a C or better or ECE 251 with a C or better.

Introduction to operating systems including memory organization, I/O control, multitasking, process control, coordination, and resource management. (NT-V)

CS 410 04(3-2-0). Introduction to Computer Graphics. F. Prerequisite:

CS 253 with a C or better; MATH 229 with a C or better or MATH 369 with a C or better.

Graphics hardware and software; drawing simple objects; coordinate transformations in 2D and 3D; modeling and viewing complex 2D and 3D objects. (NT-O)

CS 414 04(3-3-0). Object-Oriented Design. F. Prerequisite: CS 314 with a

C or better.

Object-oriented methods for large-scale software systems. Software design for reuse using patterns. Development of WWW applications in languages, e.g., Java. (NT-O)

CS 420 04(3-0-1). Introduction to Analysis of Algorithms. F.

Prerequisite: CS 320 with a C or better.

Efficiency analysis, correctness proofs, design strategies, illustrations from domains such as graph theory, scheduling and optimization, geometry. (NT-O)

CS 430 04(3-2-0). Database Systems. S. Prerequisite: CS 314 with a C or

better.

Database analysis, design, administration, implementation, hierarchical, network relational models; data sublanguages; query facilities. (NT-O)

CS 440 04(3-2-0). Introduction to Artificial Intelligence. F. Prerequisite:

CS 253 with a C or better; CS 320 with a C or better.

Concepts, representations, and algorithms for applications of problem solving search, logical reasoning and machine learning. (NT-O)

CS 451 04(3-3-0). Operating Systems. S. Prerequisite: CS 370 with a C or

better.

Operating system design and implementation, file systems, distributed

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

operating systems, case studies.

CS 453 04(3-0-1). Introduction to Compiler Construction. S. Prerequisite: CS 314 with a C or better.

Functional components of a compiler: modules, interfaces, lexical and syntax analysis, error recovery, resource allocation, code generation.

CS 454 04(3-3-0). Principles of Programming Languages. S. Prerequisite: CS 253 with a C or better; CS 320 with a C or better.

Language design concepts; functional programming; interpreter support for environments, procedures, recursion, types, objects; language paradigms.

CS 455 04(3-2-0). Introduction to Distributed Systems. S. Prerequisite: CS 370 with a C or better.

Fundamentals of distributed systems: concurrency, thread pools, scalable servers, graphs, data formats, transactions, secure systems, and overlays.

CS 457 04(3-3-0). Computer Networks and the Internet. F, S. Prerequisite: CS 253 with a C or better; CS 370 with a C or better; STAT 301 with a C or better or STAT 303/ECE 303 with a C or better or STAT 307 with a C or better or STAT 311 with a C or better or STAT 315 with a C or better.

Principles of communications, local area networks, communication protocols, TCP/IP, and the Internet. (NT-O/V)

CS 460/ECE 460 04(3-3-0). Embedded Systems. F. Prerequisite: CS 370. Credit not allowed for both CS 460 and ECE 460.

Industry standard tools for embedded system hardware software co-design. VHDL, ModelSim, Xilinx ISE and EDK.

CS 470 04(3-2-0). Computer Architecture. S. Prerequisite: CS 370.

Instruction set; hardwired, microprogramming; memory; arithmetic; I/O and buses; performance evaluation; pipelining; RISC. (NT-O)

CS 475 04(3-3-0). Parallel Programming. F. Prerequisite: CS 370 with a C or better.

Parallel programming techniques for shared-memory and message-passing systems; process synchronization, communication; example languages. (NT-O)

CS 486 Var [1-4]. Practicum. Maximum of 12 credits allowed for any combination of CS 486, CS 495.

Supervised work experience in approved computer science setting with periodic consultation of faculty.

CS 495 Var. Independent Study. Maximum of 12 credits allowed for any combination of CS 486, CS 495.

CS 498 Var [1-4]. Research. F, S, SS. Prerequisite: Written consent of instructor; computer science majors only.

Supervised research in computer science.

CS 510 04(3-3-0). Image Computation. S. Prerequisite: CS 410.

Image generation theory and implementation, image manipulation/interpretation. Ray tracing, geometric and photometric manipulation, image matching.

CS 514 04(3-3-0). Software Product and Process Evaluation. F. Prerequisite: CS 414.

Software development process modeling and evaluation; software metrics, testing verification, validation; experimental methods in software engineering. (NT-O)

CS 517 04(3-3-0). Software Specification and Design. S. Prerequisite: CS 414.

Rigorous techniques for modeling, specifying, and analyzing software requirements and designs; reusable software development. (NT-O)

CS 518 04(3-2-0). Distributed Software System Development. S. Prerequisite: CS 414; CS 451.

Principles of developing distributed systems; middleware technologies

and techniques for building complex distributed component-based systems.

CS 520 04(3-3-0). Analysis of Algorithms. S. Prerequisite: CS 420.

Asymptotic complexity, algorithm complexity, and problem complexity; the Master Method; parallel algorithms; algorithm design.

CS 530 04(3-3-0). Fault-Tolerant Computing. S. Prerequisite: CS 370.

Achieving high reliability and fault tolerance. Fault modeling, testing, reliability evaluation, redundancy, fault tolerance. (NT-O)

CS 533 04(3-2-0). Database Management Systems. F. Prerequisite: CS 430.

Theory and implementation of concurrency control, recovery, and query processing as it applies to centralized and distributed systems. (NT-O)

CS 540 04(3-3-0). Artificial Intelligence. S. Prerequisite: CS 440.

Knowledge-based systems, representation, automated logic, planning, neural networks, genetic algorithms, natural language, vision, machine learning. (NT-V)

CS 545 04(3-3-0). Machine Learning. F. Prerequisite: CS 440.

Computational methods that allow computers to learn; neural networks, decision trees, genetic algorithms, bagging and boosting. (NT-O)

CS 548/STAT 548 04(3-2-0). Bioinformatics Algorithms. F. Prerequisite: STAT 301 or STAT 307 or STAT 315; knowledge of a contemporary programming language.

Computational methods for analysis of DNA/protein sequences and other biological data.

CS 551 04(3-3-0). Distributed Operating Systems. F, SS. Prerequisite: CS 370 with a C or better or CS 451 with a C or better.

Distributed operating systems, memory management, computer security, client-server computing, distributed resource management failure recovery. (NT-O)

CS 553 04(3-3-0). Algorithmic Language Compilers. F. Prerequisite: CS 453.

Compiler construction; lexical scanner generators, parser generators, dataflow analysis, optimization.

CS 555 04(3-3-0). Distributed Systems. F. Prerequisite: CS 451 with a B or better.

Principles, paradigms, protocols and algorithms underlying modern distributed systems.

CS 556 04(3-2-0). Computer Security. F. Prerequisite: CS 451.

Topics in computer security: Concepts, threats, risks, access control models, trusted systems, cryptography, authentication. (NT-O)

CS 557 04(3-3-0). Advanced Networking. S. Prerequisite: CS 457.

Core internet protocols including transport, routing, and security protocols. Protocol design principles. Network measurements and assessment. (NT-O)

CS 560/ECE 560 04(3-2-0). Foundations of Fine-Grain Parallelism. S. Prerequisite: CS 475 or CS 460/ECE 460. Credit not allowed for both CS 560 and ECE 560.

Programming novel architectures; performance tuning; automatic parallelization; program transformation; polyhedral model; equational programming. (NT-O, CS 560 only)

CS 561/ECE 561 04(3-3-0). Hardware/Software Design of Embedded Systems. S. Prerequisite: CS 270 or CS 470 or ECE 251 or ECE 452. Credit not allowed for both CS 561 and ECE 561.

Embedded systems design including system level modeling, design space exploration, hardware-software partitioning, high-level synthesis.

CS 570 04(3-3-0). Advanced Computer Architecture. F. Prerequisite: CS 470.

Pipelined CPU design. Superscalar architectures and instruction-level

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

parallelism. Cache and memory hierarchy design. Storage systems.

CS 575 04(3-3-0). Parallel Processing. F. Prerequisite: CS 475.

Parallel and distributed computing models, algorithms, mapping and performance evaluations, parallel computing tools and applications. (NT-O)

CS 612 04(3-2-0). Topics in Computer Graphics. F. Prerequisite: CS 510.
Computer graphics research topics.

CS 614A-E 04(3-3-0). Advanced Topics in Software Engineering. F, S.
Prerequisite: CS 514 or CS 517 or CS 518.

Advanced topics in software engineering. **A)** Specification and design. **B)** Testing and verification. **C)** Software environments and tools. **D)** Software measurement, analysis and evaluation. **E)** Application domains.

CS 620 04(3-2-0). Advanced Topics in Algorithms. F. Prerequisite: CS 520.

Designing and analyzing algorithms and data structures; illustrations from variety of problem domains.

CS 635 04(3-3-0). Advanced Fault-Tolerant Computing. F. Prerequisite: CS 530.

Advanced topics and recent developments in high reliability and fault-tolerant systems.

CS 640 02(2-0-0). Advanced Artificial Intelligence I. F. Prerequisite: CS 540.

Research topics in artificial intelligence: genetic algorithms, neural networks, connectionist models; machine learning; planning, automated reasoning.

CS 641 02(2-0-0). Advanced Artificial Intelligence II. S. Prerequisite: CS 640.

Advanced research topics in artificial intelligence.

CS 646 04(3-2-0). Machine Learning in Bioinformatics. S. Prerequisite: CS 545 or STAT 560.

Recent research on the applications of machine learning in bioinformatics.

CS 653 04(3-3-0). Topics in Programming-Language Implementation. S. Prerequisite: CS 553.

Data dependence analysis; code generation.

CS 655 04(3-2-0). Advanced Topics in Distributed Systems. F.
Prerequisite: CS 555.

Issues related to robustness, replication, consistency, scalability, isolation and privacy in large-scale distributed systems.

CS 656A-C 04(3-2-0). Advanced Topics in Computer Security. F, S.
Prerequisite: CS 556.

Advanced research topics in computer security. **A)** Formal models of computer security. **B)** Models for privacy and application security. **C)** Network security.

CS 657 04(3-2-0). Advanced Topics in Computer Networking. F.
Prerequisite: CS 557.

Advanced research topics in computer networks.

CS 658/ECE 658 04(3-3-0). Internet Engineering. F. Prerequisite: CS 457 or ECE 456. Credit not allowed for both CS 658 and ECE 658.

Link technologies, multiple access, hardware and software for internetworks routing, switching flow control, multicast, performance, and applications. (NT-O)

CS 670 B-D/ECE 670B-D Var [1-4]. Topics in Architecture/Systems. F, S. Prerequisite: CS 570 or ECE 554. Credit not allowed for both CS 670B-D and ECE 670B-D.

B) Performance evaluation and modeling. **C)** Distributed systems. **D)** Architecture of advanced systems.

***CS 674/*ECE 674 03(3-0-0). Heterogeneous Computing.** S.
Prerequisite: CS 551 or CS 570 or CS 575 or ECE 550 or ECE 554. Credit not allowed for both CS 674 and ECE 674.

Allocation of resources to tasks in parallel and distributed heterogeneous computing systems. A variety of computational environments are considered.

CS 675 04(3-3-0). Advanced Parallel Computing. S. Prerequisite: Written consent of instructor.

Parallel computing, computational models, parallel languages and algorithms, distributed simulation, Internet and mobile computing, parallel search.

CS 692 Var. Seminar.

CS 695 Var. Independent Study.

CS 696 Var. Group Study.

CS 699 Var. Thesis.

CS 787 01(0-3-0). Internship. SS.

CS 799 Var. Dissertation.

COMPUTING TECHNOLOGY COURSES

Department of Computer Science
College of Natural Sciences

CT 310 04(3-3-0). Web Development. F, S, SS. Prerequisite: CS 200.

Web development languages used to create fully functional dynamic web sites; server and client scripting, database access and security issues.

CT 320 04(3-3-0), Network and System Administration. F, S. Prerequisite: (CS 155 and CS 156) or CS 253.

Installation of network and operating systems services, management and support; upgrades, security, backups.

DANCE COURSES

Department of Music, Theatre, and Dance *College of Liberal Arts*

D 110 03(3-0-0). Understanding Dance. (GT-AH1, AUCC 3B). F, S, SS.
For non-dance majors. Previous dance experience not necessary.
Broad examination of dance.

D 120A-C 02(0-4-0). Dance Techniques I. F, S.
A) Modern. (\$) B) Ballet. (\$) C) Jazz.

D 121A-C. Dance Techniques II. F, S.
A) Modern 02(0-4-0). Prerequisite: D 120A. (\$) B) Ballet 03(0-6-0).
Prerequisite: D 120B; written consent of instructor. (\$) C) Jazz 02(0-4-0).
Prerequisite: D 120C.

D 126 02(1-2-0). Dance Improvisation. F, S. Prerequisite: None.
Organic movement and inventive dance movement through
improvisational skills, body, physicality, space/direction/level imagery and
partnering.

***D 160 02(0-4-0). Musical Tap Forms.** S.
Basic tap dance forms with emphasis on terminology, study of rhythm,
and tap styles; historical development of tap in American culture.

D 220A-C. Dance Techniques III. F.
A) Modern 02(0-4-0). Prerequisite: D 121A. (\$) B) Ballet 03(0-6-0).
Prerequisite: D 121B; written consent of instructor. (\$) C) Jazz 02(0-4-0).
Prerequisite: D 121C.

D 221A-C. Dance Techniques IV. S.
A) Modern 02(0-4-0). Prerequisite: D 220A. (\$) B) Ballet 03(0-6-0).
Prerequisite: D 220B; written consent of instructor. (\$) C) Jazz 02(0-4-0).
Prerequisite: D 220C.

D 226 02(1-2-0). Dance Choreography I. F. Prerequisite: D 121A or D
121B or D 121C.
Elements of dance composition including space, levels, rhythm,
dynamics, qualities of movement, form, style.

D 286 Var [1-3]. Practicum. F, S. Prerequisite: D 121A; D 121B.
Dance performance and production experience.

D 320A-C Dance Techniques V. F.
A) Modern 03(0-6-0). Prerequisite: D 221A; written consent of
instructor. (\$) B) Ballet 03(0-6-0). Prerequisite: D 221B; written consent of
instructor. (\$) C) Jazz 02(0-4-0). Prerequisite: D 221C.

D 321A-C. Dance Techniques VI. S.
A) Modern 03(0-6-0). Prerequisite: D 320A; written consent of
instructor. (\$) B) Ballet 03(0-6-0). Prerequisite: D 320B; written consent of
instructor. (\$) C) Jazz 02(0-4-0). Prerequisite: D 320C.

D 324 02(1-2-0). Teaching Creative Movement for Children. S.
Theoretical and practical experience in teaching creative movement.

D 325 03(2-2-0). Dance Production. S. Prerequisite: TH 161.
Advanced stage management, lighting, and sound design.

D 326 02(1-2-0). Dance Choreography II. S. Prerequisite: D 226.
Advanced choreographic elements: group work, music influence, and
nontraditional performance venues.

D 330 Var [1-3]. Dance Repertory. F, S, SS. Prerequisite: Written consent
of dance faculty.
Experience in choreographic styles and choreography of national,
international choreographers; opportunity to develop individual repertoire
of dance.

D 420A-C 02(0-4-0). Dance Techniques VII. F.
A) Modern. Prerequisite: D 321A. B) Ballet. Prerequisite: D 321B. (\$) C) Jazz. Prerequisite: D 321C.

D 421A-C 02(0-4-0). Dance Techniques VIII. S.
A) Modern. Prerequisite: D 420A. B) Ballet. Prerequisite: D 420B. (\$) C) Jazz. Prerequisite: D 420C.

D 424 03(3-0-0). Dance Pedagogy. F. Prerequisite: D 324.
Theories of dance education.

D 426 02(1-2-0). Dance Choreography III. F, S. Prerequisite: D 321A or
D 321B or D 321C.
Studies in 20th-century dance composition forms.

***D 427 03(3-0-0). Dance History I.** S.
History of classical ballet to modern times from its origins in folk dance
of Middle Ages and social dance of Renaissance.

°D 428 03(3-0-0). Dance History II. S.
History of contemporary dance forms including modern, jazz, and tap
dance.

D 432 03(2-2-0). Dance Therapy. SS.
Use of dance forms in therapy for mentally and physically handicapped.

D 471 03(0-6-0). Dance Concert. F, S. Prerequisite: D 321A-C; D 325; D
326; D 330; written consent of faculty. Dance majors only.
Demonstration of individual performance and choreographic proficiency
in a public performance. Supporting paper and video documentation
required.

D 484 Var [1-3]. Supervised College Teaching. F, S. Prerequisite: D
324; D 424; D 486. A maximum of 10 combined credits for all 384 and 484
courses are counted towards graduation requirements.

D 486 Var [1-3]. Practicum. S. Prerequisite: D 221A or D 221B or
D221C; D 324; D 424.
Theory and practice of teaching methods in dance.

D 491 Var [1-3]. Workshop.

D 495 Var. Independent Study.

D 496 Var. Group Study.

D 527 02(0-4-0). Contemporary Dance. S.
Techniques of dance movement and choreography.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

DESIGN AND MERCHANDISING COURSES

Department of Design and Merchandising College of Applied Human Sciences

DM 120 03(2-2-0). Textiles. F, S, SS.

Fibers, fabrics, and finishes basic to selection, use, and care. (NT-O)

DM 272 03(3-0-0). Consumers in the Marketplace. F, S.

Analysis and evaluation of consumers in the marketplace as applied to merchandising. (NT-O)

DM 300 03(3-0-0). Retail Sales and Customer Strategies. F, S, SS.

Examine selling practices and their impact on business and consumers in the global marketplace. (NT-O)

DM 360/MKT 360 03(3-0-0). Retailing. F, S, SS. Prerequisite: MKT 300 or MKT 305. Credit not allowed for both DM 360 and MKT 360.

Retail markets, institutions, operations, and problems. (NT-O)

DM 400 03(1-2-1). U.S. Travel-New York City. S. Prerequisite: Six credits in AM, DM and/or INTD courses.

Interview/analyze designers, manufacturers, buying offices, retail stores, magazine firms, interior design and architecture firms, etc. (\$)

DM 470A-B 02(1-0-1). International Design and Merchandising. F, S, SS.

Historical, cultural, and business aspects of international design and merchandising in selected countries. A) Apparel Merchandising. Prerequisite: AM101; AM130; DM 120; concurrent registration in DM482A. B) Interior Design. Prerequisite: ART 100; INTD 129; INTD 166; concurrent registration in DM 482B.

DM 482 01(0-0-1). Travel Abroad. F, S, SS. Prerequisite: AM 101; AM130; DM 120; concurrent registration in DM 470A.

Historical, cultural, aesthetic, and business aspects of design and merchandising in the selected country(ies).

DM 487A-F Internship.

A) Merchandising. Var [12-16]. Prerequisite: GPA 2.500; AM 371; DM 360/MKT 360; DM 492. B) Apparel design and production. Var [12-16]. Prerequisite: GPA 2.500; AM 244; DM 492. F) General. Var [3-16]. Prerequisite: Written consent of instructor.

DM 490 A-C Var [1-6]. Workshop.

A) Merchandising. B) Apparel design and production. C) Interior design.

DM 492 02(1-0-1). Preinternship Seminar. F, S. Prerequisite: Minimum GPA of 2.50; minimum of 60 credits completed..

Professional standards/corporate structure of apparel and merchandising companies in apparel design, product development, and/or merchandising.

DM 495 Var. Independent Study. Maximum of ten credits allowed in course.

DM 496 Var. Group Study. Maximum of ten credits allowed in course.

DM 501 03(0-0-3). Research and Theory—Design and Merchandising. F, SS.

Theory and various approaches and philosophies of research in design and merchandising. Critical evaluation and synthesis of scholarly literature. (NT-O)

DM 510 03(3-0-0). Consumer Behavior. F.

Evaluation of psychological, sociological, and cultural theories of consumer behavior through examination of factors that influence decision

making. (NT-O)

DM 518 03(3-0-0). Consumer Issues-Global Perspectives. F.

Understanding and analysis of consumer well-being and issues from global perspective.

DM 520 03(3-0-0). Professional Advancement in Merchandising. SS. Offered as an online course only.

Analysis of leadership and how it affects organizational culture and change through a prism of past and current experiences. (NT-O)

DM 530 03(3-0-0). Product Design Development and Evaluation. SS. Offered as an online course only.

Issues and strategies necessary to design and produce a competitive product, including the role of globalization and technology. (NT-O)

DM 540 03(3-0-0). Promotional Strategies in Merchandising. F.

Integrated marketing communications while fostering cultural and global awareness, social responsibility and ethical decision-making. (NT-O)

***DM 542 03(1-4-0). Advanced Computer-Aided Textile Design.** S. Prerequisite: None.

Use of computer-aided design system to produce fabric designs for apparel or interior professional end use. (\$)

DM 550 03(3-0-0). Retail Theory and Practice. S. Offered as an online course only.

Theoretical and applied analysis of merchandising strategies; assessment of internal and external environmental forces; trend analysis of forecasting. (NT-O)

DM 551 03(3-0-0). Research Methods. S.

Design and methods of research applicable to design and merchandising. (NT-O)

DM 563 03(1-2-1). Care and Exhibit of Museum Collections. S. Prerequisite: Three credits of ART or HIST or AM or DM.

Hands-on experience in management, care, exhibition, and interpretation of museum collections.

DM 578 03(2-0-1). Trends-Consumer Issues. F, S, SS.

Developments and projections of consumer issues.

DM 590A-C Var [1-6]. Workshop.

A) Merchandising. B) Apparel design and production. C) Interior design.

DM 592 Var [1-3]. Seminar.

DM 596 Var. Group Study.

DM 610 03(3-0-0). Historical and Contemporary Issues in Trade. F. Offered as an online course only.

Examination of fiber, textile, and apparel industries in a global context; how economic, political, and social systems affect production and trade. (NT-O)

DM 620 03(3-0-0). International Merchandise Management. F. Offered as an online course only.

Comprehensive understanding of theory, practices, and trends in international merchandise management. Analysis of global retail system. (NT-O)

DM 630 03(3-0-0). Merchandising Research Methods. S. Prerequisite: Graduate level course in statistics; completion of DM 500-level courses. Offered as an online course only.

Research process used in social science, including survey and analysis of research methodologies; review of merchandising literature. (NT-O)

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

DM 640 03(3-0-0). Merchandising Finance. F. Offered as an online course only.

Advanced study of financial trends in merchandising; implications for sole proprietors, partnerships, franchises, S corporations, and C corporations. (NT-O)

DM 650 03(3-0-0). Strategic Decisions in Merchandising. S. Offered as an online course only.

Examination of executive planning processes utilized to develop successful corporate strategies; emphasis on the importance of a market orientation. (NT-O)

DM 684 Var [1-6]. Supervised College Teaching. F, S.

DM 687 Var. Internship.

DM 695 Var. Independent Study. (NT-B)

DM 698 03(0-0-3). Research. F, S, SS. Prerequisite: Written consent of instructor. (NT-O)

DM 699 Var. Thesis. (NT-O)

ENGLISH COURSES

Department of English *College of Liberal Arts*

E 140 03(3-0-0). The Study of Literature. (GT-AH2, AUCC 3B). F, S, SS.

Basic principles of reading literary texts.

E 179 03(3-0-0). Western American Literature. F, S, SS.

Trans-Mississippi West in fiction and other literary forms.

E 210 03(3-0-0). Beginning Creative Writing. F, S. Prerequisite: Any lower-level E prefix course.

Basic techniques of writing fiction and poetry; may include some elements of drama.

E 232 03(3-0-0). Introduction to Humanities. (GT-AH2, AUCC 3B). F, S.

Great literature of Western cultural tradition from ancient times to present.

E 234/ETST 234 03(3-0-0). Introduction to Native American Literature. S. Credit not allowed for both E 234 and ETST 234.

Native American writings and their significance in American culture.

E 237 03(3-0-0). Introduction to Science Fiction. F, S.

Historical development and major themes of science fiction, featuring writers such as Wells, Huxley, Bradbury, and LeGuin.

E 238 03(3-0-0). 20th-Century Fiction. (GT-AH2, AUCC 3E). F, S.

20th-century fiction chosen for its relevance to global and cultural awareness. (NT-O)

E 239/ETST 239 03(3-0-0). Introduction to Chicano Literature. F, S. Credit not allowed for both E 239 and ETST 239.

Chicano fiction and poetry with consideration of historical roots and influences.

E 240 03(3-0-0). Introduction to Poetry. F, S, SS.

Development of critical skills necessary to understand and enjoy poetry.

E 242 03(3-0-0). Reading Shakespeare. (GT-AH2, AUCC 3B). F, S.

Reading of Shakespeare texts, using various approaches of interpretation for understanding and relation to our contemporary cultural situation.

E 245 03(3-0-0). World Drama. (GT-AH2, AUCC 3E). F, S.

World drama in cultural contexts.

E 270 03(3-0-0). Introduction to American Literature. (GT-AH2, AUCC 3B). F, S, SS.

History and development of American writings from 16th-century travel narratives through early 20th-century modernism.

E 276 03(3-0-0). Survey of British Literature I. (GT-AH2, AUCC 3B). F.

British literature from Beowulf through the 18th century in relation to its historical contexts.

E 277 03(3-0-0). Survey of British Literature II. (GT-AH2, AUCC 3B). S.

British literature from the Romantics to the present in relation to its historical contexts.

E 300/AMST 300 03(3-0-0). American Lives-Methods in American Studies. F, S. Prerequisite: AMST 100; AMST 101. Credit not allowed for both E 300 and AMST 300.

Methods and changing approaches of American studies since 1950s using autobiography as organizing theme.

E 302 03(3-0-0). Reading and the Web. F, S. Prerequisite: CO 150 or

HONR 193.

Critical examination of reading processes, as well as the rhetorical and cultural contexts of readers on the web.

E 305 03(3-0-0). Principles of Writing and Rhetoric. F, S. Prerequisite: CO 300 or CO 301A or CO 301B or CO 301C or CO 301D.

Humanities-based exploration of central principles of rhetoric in written communication.

E 311A-C 03(3-0-0). Intermediate Creative Writing. F.

Group discussion of student writing, literary models, and theory; emphasis on developing individual style. **A)** Fiction. Prerequisite: E 210 with a B or better. **B)** Poetry. Prerequisite: E 210 with a B or better. **C)** Nonfiction. Prerequisite: CO 150; E 210 with a B or better or JTC 210.

E 320 03(3-0-0). Introduction to the Study of Language. F, S, SS.

Varied topics covering general linguistics or the relationships between language and literature or society and science.

E 322 03(3-0-0). English Language for Teachers I. F.

Foundations of language structure, emphasizing grammar, sounds, spelling, word structure, linguistic variation, usage, acquisition, and pedagogy.

E 323 03(3-0-0). English Language for Teachers II. S. Prerequisite: E 322.

Advanced grammar; language history; meaning; applications to teaching composition, reading, and literature.

E 324 03(3-0-0). Teaching English as a Second Language. F, S. Prerequisite: E 320 or E 322.

Introduction to teaching English to speakers of other languages for teacher certification candidates and for those wanting to teach abroad.

E 326 03(3-0-0). Development of the English Language. S.

Chronological study of four historical stages of English (Old, Middle, Early Modern, Modern) with emphasis on grammar, vocabulary, and phonology.

E 327 03(3-0-0). Syntax and Semantics. S.

Linguistic study of sentence structure and grammatical relations, semantic roles and representation.

E 328 03(3-0-0). Phonology, Morphology, and Lexis. S.

Linguistic study of pronunciation, word-formation, and vocabulary.

E 329 03(3-0-0). Pragmatics and Discourse Analysis. S.

Linguistic study of general principles of interpretation and textual patterns.

E 330 03(3-0-0). Gender in World Literature. F, S.

Selected world literature ranging from ancient world to present, considered in light of various complexities of gender relations.

E 331 03(3-0-0). Early Women Writers. F, S. Prerequisite: E 276 or E 277.

Selected women writers from any period before the 20th century.

E 332 03(3-0-0). Modern Women Writers. S.

Selected 20th-century women writers in variety of genres emphasizing relationships between gender, writing, and reading.

E 333 03(3-0-0). Critical Studies of Popular Texts. F, S. Prerequisite: CO 150.

Texts representing one or more popular modes focusing on issues of gender, sexuality, racial or ethnic identity, technology, and colonialism.

E 334 03(3-0-0). Gay and Lesbian Literature. S.

Literature by gay and lesbian authors on gay and lesbian themes.

E 337 03(3-0-0). Western Mythology. S. Prerequisite: One course in literature.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Major themes in western myth: classical, Biblical, and Germanic.
E 338 03(3-0-0). Ethnic Literature in the United States. F, S, SS. Prerequisite: One literature course or one ETST course.

Comparative study of literatures from a range of U.S. ethnic experiences and perspectives.

E 339 03(3-0-0). Literature of the Earth. F, S. Prerequisite: CO 150.

Non-fiction, fiction, and poetry on landscape, climate, animality, ecology, place.

E 341 03(3-0-0). Principles of Literary Criticism. F, S. Prerequisite: One course in literature.

Theory and practice of modern literary analysis and evaluation; writing about literature.

E 342 03(3-0-0). Shakespeare I. F, S, SS. Prerequisite: E 240 or E 276.

Shakespeare's development as a poet and dramatist from the early plays through *Hamlet*.

E 343 03(3-0-0). Shakespeare II. F, S, SS. Prerequisite: E 240 or E 276.

Shakespeare's development as a poet and dramatist after *Hamlet*.

E 345 03(3-0-0). American Drama. F. Prerequisite: One course in literature.

Representative examples from mainstream and alternative drama.

E 350 03(3-0-0). The Gothic in Literature and Film. S. Prerequisite: One course in literature.

Interdisciplinary, cross-cultural approach to gothic works from the 18th to the 20th centuries.

E 356 03(3-0-0). Asian Literature. F.

Masterpieces of classical and contemporary literature of China, India, and Japan.

E 370 03(3-0-0). American Literature in Cultural Contexts. F, S, SS. Prerequisite: E 270.

American literature in social, political, economic, aesthetic, intellectual, and multimedia contexts.

E 384A-B Var [1-3]. Supervised College Teaching. F, S. Prerequisite: Written consent of department chair. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Supervised assistance in instruction. A) Classroom. May be taken for maximum of 6 credits. B) Writing Center.

E 401 03(3-0-0). Teaching Reading. F, S. Prerequisite: CO 301D.

Theory and pedagogy for understanding, interpreting, and evaluating print and visual texts.

E 402 03(3-0-0). Teaching Composition. F, S. Prerequisite: CO 301A or CO 301B or CO 301C or CO 301D.

Theory and practice of the analysis and the teaching of writing.

E 403 03(3-0-0). Writing the Environment. S. Prerequisite: One course in literature or CO 301A-D or E 311A-C.

Creative writing in conjunction with study of recent American literature on nature and landscape.

E 405 03(3-0-0). Adolescents' Literature. F, S.

Survey of literature for adolescents emphasizing development of critical ability, appreciation, and taste.

E 406 03(3-0-0). Topics in Literacy. F, S. Maximum of 6 credits allowed in course.

Exploring literacy through written theory: specific issues of cultural difference, gender, technology, acquisition, and workplace.

E 412A-C 03(3-0-0). Creative Writing Workshop. S. Maximum of 6 credits allowed per subtopic.

Individual projects with group discussion and analysis. A) Fiction.

Prerequisite: E 311A with a B or better. B) Poetry. Prerequisite: E 311B with a B or better. C) Nonfiction. Prerequisite: E 311C with a B or better.

E 420 03(3-0-0). Beat Generation Writing. S. Prerequisite: One course in literature.

Shared experiences and historical pressures that made Beat Generation writers, including Kerouac, Ginsberg, Burroughs, and Waldman, a countercultural movement.

E 421 03(3-0-0). Asian American Literature. F, S. Prerequisite: CO 150; E 270.

Asian American writing on immigration, exile, exclusion, detainment, neocolonialism, resistance, hybridity, and transnationalism.

E 422 03(3-0-0). African-American Literature. F. Prerequisite: One course in literature.

African-American literature as a distinct tradition of writing and protest.

E 423 03(3-0-0). Latino/a Literature. F, S. Prerequisite: CO 150; E 270.

Latino/a writing on themes of settlement, expropriation, resistance, conquest, immigration, exile, hybridity and transnationalism.

E 424 03(3-0-0). English Renaissance. F. Prerequisite: E 276 or E 342 or E 343.

English Renaissance literature (1500-1670), covering a range of poetry, drama, and prose.

***E 425 03(3-0-0). Restoration and 18th Century Literature S.** Prerequisite: One course in literature.

Poetry, drama, and prose, 1600-1789.

E 426 03(3-0-0). British Romanticism. F. Prerequisite: E 276 or E 277 or E 341.

British Romantic era literature (1780-1830) with emphasis on the social and cultural context.

E 427 03(3-0-0). Victorian Age. F. Prerequisite: E 276 or E 277 or E 341.

Victorian era literature (1830-1900) in social and cultural context, with attention to multiple genres (poetry, fiction, drama, and essay).

E 428 03(3-0-0). Postcolonial Literature. F, S. Prerequisite: One course in literature.

Selected readings in postcolonial literatures and theory.

E 430 03(3-0-0). 18th-Century English Fiction. F. Prerequisite: One course in literature.

English fiction from Defoe to Austen stressing Richardson, Fielding, Smollett, and Sterne.

E 431 03(3-0-0). 19th-Century English Fiction. S. Prerequisite: E 276 or E 277 or E 341.

English fiction in Victorian and Edwardian eras emphasizing Dickens, the Brontes, Thackeray, George Eliot, and Hardy.

E 432 03(3-0-0). 20th-Century British Fiction. F. Prerequisite: One course in literature.

British fiction from Conrad to the present emphasizing Joyce, Lawrence, Forster, Woolf, and Beckett.

E 433 03(3-0-0). Literatures of the American West. F, S, SS. Prerequisite: One course in literature or HIST 351 or HIST 352 or HIST 353.

Relationships between places, environments, cultures, and literature in the American West.

E 436 03(3-0-0). American Fiction, 1945-Present. S. Prerequisite: One course in literature. Offered only as an online course through the Division of Continuing Education.

Form, content, and context of American fiction from 1945 to present: Kesey, Updike, Heller, Pynchon, Barthelme, Vonnegut, and others. (Ω-O)

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

E 438/ETST 438 03(3-0-0). Native American Literature. F. Credit not allowed for both E 438 and ETST 438.

Literature of Native Americans emphasized as distinctive tradition in American literature and cultural expression of indigenous peoples.

E 440 03(3-0-0). American Prose Before 1900. F, S, SS. Prerequisite: One course in literature.

Novels, stories, and/or literary non-fiction prose written in the U.S. before 1900.

E 441 03(3-0-0). American Prose Since 1900. F, S, SS. Prerequisite: One course in literature.

Novels, stories, and/or literary non-fiction prose written in the U.S. from 1900 to the present.

E 443 03(3-0-0). English Renaissance Drama. F. Prerequisite: E 276 or E 342 or E 343.

Interplay between dramatic form and cultural context in the plays of Marlowe, Jonson, Cary, Middleton, Heywood, Dekker, Webster.

E 444 03(3-0-0). Restoration and 18th-Century Drama. S. Prerequisite: One course in literature.

Major plays and dramatic issues from 1660 to 1780 including Dryden, Etherege, Congreve, Sheridan, and others.

E 445 03(3-0-0). Modern British and European Drama. S. Prerequisite: One course in literature.

Realism and anti-realism in modern British and European drama.

E 452 03(3-0-0). Masterpieces of European Literature. S. Prerequisite: One course in literature.

Selected works of European literature through the 19th century.

E 455 03(3-0-0). European Literature after 1900. S. Prerequisite: Two courses in literature.

Continental European texts in translation since 1900.

E 460 03(3-0-0). Chaucer. S. Prerequisite: E 341; one other upper-division E prefix course.

Chaucer's works in medieval context.

E 463 03(3-0-0). Milton. F. Prerequisite: E 276 and E 341.

Milton's poetry and prose emphasizing *Paradise Lost*.

E 465 03(3-0-0). Topics in Literature and Language. F, S. Prerequisite: E 341; one other upper-division E prefix course. Maximum of 6 credits allowed in course.

Selected issues in literature and language.

E 470 03(3-0-0). Individual Author. F, S, SS. Prerequisite: E 341; one other upper-division E prefix course. Maximum of 6 credits allowed in course.

Intensive study of works of a single major author.

E 475 03(3-0-0). American Poetry Before 1900. F. Prerequisite: E 240.

Major American poets through the 19th century including Whitman, Dickinson, and Frost.

E 478 03(3-0-0). Modern Poetry. F. Prerequisite: E 240.

Major British and American poets from late 19th century to World War II.

E 479 03(3-0-0). Recent Poetry of the United States. F, S, SS. Prerequisite: E 240.

U.S. poetry since World War II, emphasis on the 1980s through the present.

E 487A-B. Internship. Prerequisite: **A-B)** 2.500 GPA; CO 150; written consent of department head or director. **C)** 2.500 GPA; CO 150; written consent of CLC director. **D)** 2.500 GPA; CO 300 or CO 301A-D; written

consent of Writing Center director. Maximum of 4 credits allowed in E 487A and E 487B.

A) Supervised work experience. Var [1-3]. Maximum of 3 credits allowed in course. **B)** Literary editing. 01(0-0-1). **C)** Community literacy center. Var [1-3]. **D)** CSU writing center. Var [1-3].

E 495 Var [1-3]. Independent Study. Maximum of 6 credits allowed in course.

Individually guided studies in literature, writing, English language, and linguistics.

E 501 03(3-0-0). Theories of Writing. F. Prerequisite: E 402.

Theoretical approaches to the nature of the composing process.

E 502 03(3-0-0). Language, Literacy, and Learning. F. Prerequisite: Teaching experience or 3 credits in upper-division English or education courses.

Theoretical and practical perspectives on language and learning skills necessary for basic academic reading and writing.

E 503 03(3-0-0). Investigating Classroom Literacies. F, S, SS.

Research methods and ethical issues in classroom-based inquiry into oral and written literacy practices.

E 504 03(3-0-0). Situating Composition Studies. F, S. Prerequisite: E 501.

Contexts for composition programs, roles for program administrators, and professional opportunities for teachers and scholars.

E 505A-C 03(3-0-0). Major Authors. F, S. Prerequisite: Six credits of literature.

Intensive study of the works of one or two major authors. **A)** English. **B)** American. **C)** World.

E 506A-C 03(3-0-0). Literature Survey. F, S. Prerequisite: Six credits of literature.

Synthesis of literary attitudes, modes, genres of an age. **A)** English. **B)** American. **C)** Comparative.

E 507 03(3-0-0). Special Topics in Linguistics. F, S. Prerequisite: Written consent of instructor.

E 513A-C 03(3-0-0). Form and Technique in Modern Literature. F.

Selected readings in and discussions of modern literature and criticism from the writer's point of view with emphasis on form and technique. **A)** Fiction. **B)** Poetry. **C)** Essay.

E 514 03(3-0-0). Phonology/Morphology-ESL/EFL. F.

English sound system and word formation in relation to second language acquisition and teaching.

E 515 03(3-0-0). Syntax for ESL/EFL. F.

Major grammatical structures of English in relation to second language acquisition and teaching.

E 520 03(3-0-0). English Phonetics and Phonology. S.

Articulatory phonetics, phonological theory and analysis with principal applications to American English and to pedagogy.

E 522 03(3-0-0). Semantics, Pragmatics, and Discourse. F.

Linguistic study of literal and nonliteral meaning, including role of textual and situational context.

E 526 03(3-0-0). Teaching English as Foreign/Second Language. F.

Principles of teaching English as a foreign/second language. Development of a coherent method, including activities, materials, and course design.

E 527 03(3-0-0). Theories of Foreign/Second Language Learning. S. Prerequisite: E 526.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Theories of second language learning/acquisition; emphasis on psycholinguistic processes of language learning.

E 590 Var [1-3]. Workshop in TESOL. F, S. Prerequisite: E 526.

Methodology/linguistic theory designed to solve practical problems in teaching, testing, and materials development.

E 600A-B 03(3-0-0). Research Methods and Theory.

Research methods in English studies.

A) Literary scholarship. B) Research design with quantitative and qualitative methods.

E 601 Var [2-3]. Research in Teaching English as Second Language. F.

Prerequisite: E 526.

Evaluation and design of research in language acquisition.

E 603 03(3-0-0). Computers and Composition. S.

Relationship of computer-assisted instruction to rhetoric and composition.

E 605 03(3-0-0). Reading/Writing Connection. S.

Theoretical understanding of reading and writing processes; practical implications for professional writers and teachers of writing.

E 607A-B 03(3-0-0). Teaching Writing. F, S.

A) Composition and rhetoric. B) Creative writing.

E 608 01(0-0-1). Integrating Writing in the Academic Core. F.

Theories and best practices associated with writing integration in the academic core.

E 615 03(3-0-0). Reading Literature-Recent Theories. F, S, SS.

Recent developments in critical and cultural theories of discourse.

E 630A-D 03(3-0-0). Special Topics in Literature. F, S.

A) Area studies. B) Genre studies. C) Theory and technique studies. D) Gender studies.

E 631 03(3-0-0). Crossing Boundaries. F, S.

Cross-topical studies of literature.

E 632 Var [1-3]. Professional Concerns in English. F, S.

Professional concerns of secondary school teachers of English.

E 633 03(3-0-0). Special Topics in Discourse Studies. F, S, SS.

Varied topics covering cultural or historical areas, or literacy and discourse theory and practice, or professional pedagogical issues.

E 634 03(3-0-0). Special Topics in TEFL/TESL. F, S.

Theory, practice, and professional conduct of teaching English as a foreign or second language.

E 635 03(3-0-0). Critical Studies in Literature and Culture. F, S.

Prerequisite: E 615.

Advanced interpretation in contemporary literary and critical studies.

E 636 03(3-0-0). Environmental Literature and Criticism. F, S.

Literary, critical, and theoretical representations of nature, animals, human-environment relations.

E 637 03(3-0-0). History of Writing. F, S.

Writing systems and practices across time, cultures, and varied constructions of author, text, audience, social context, technology.

E 640A-C Var [1-5]. Graduate Writing Workshop. F, S. Maximum of 11 credits allowed per subtopic.

Individual projects with group discussion and analysis. A) Fiction. B) Poetry. C) Essay.

E 641 Var [1-5]. Nonfiction Workshop. F, S. Prerequisite: E 640C.

Writing workshop exploring various areas within literary nonfiction.

E 642 Var [1-5]. Writing Hypertexts. F, S.

Writing workshop exploring development of texts in electronic formats.

E 679 01(1-0-0). Community Service Learning. F, S.

Opportunities to learn, practice, and develop skills by serving the community.

E 684A-E Var [1-5]. Supervised College Teaching. F, S.

A) Composition. B) ESL. C) Creative writing. D) Literature. E) Computer-assisted instruction.

E 687A-M Var [1-5]. Internship. Prerequisite: B) E 501; E 684A.

A) Teaching college English. B) Composition supervision/administration. C) Literary editing. E) Teaching ESL, K-12. H) ESL-adult learning. I) ESL-supervision/administration. J) Arts administration in literature. K) Public education. L) Computers and writing. M) Writing/editing for specific purposes.

E 692 01(0-0-1). Rhetoric and Composition Seminar. S.

Forum for faculty and student work in progress.

E 694 Var[1-3]. Independent Study: Portfolio. F, S, SS.

E 695 Var. Independent Study.

E 698 Var[1-2]. Research: Project. F, S, SS.

E 699 Var. Thesis.

E 700 03(0-0-3). Introduction to Doctoral Studies in English. F.

Prerequisite: Admission to the doctoral program.

Disciplinary approaches to the study of written discourse.

E 710 03(3-0-0). Writing for Publication. F, S.

Shaping research questions, determining publication venues, writing and revising for publication.

E 792A-C 03(0-0-3). Seminar. F, S.

A) New Literacies. B) Writing about Science and the Environment. C) Writing and Cultural Contexts.

E 795 Var. Independent Study. F, S, SS.

Individually guided study in doctoral topic.

E 799 Var[1-12]. Dissertation. F, S, SS.

ENGLISH FOR ACADEMIC PURPOSES COURSES

Department of English

College of Liberal Arts

CSU-INTO

EAP 150 06(6-0-0). English for International Students I. F, S, SS.

Prerequisite: Admission to Pathways program.

Academic English for international students, emphasizing analysis and integration of text and lecture-based information and its application.

EAP 151 03(3-0-0). English for International Students II. F, S, SS.

Prerequisite: EAP 150.

Academic English for international students, emphasizing research and writing papers in various academic genres using appropriate academic language.

ELECTRICAL AND COMPUTER ENGINEERING COURSES

*Department of Electrical and Computer
Engineering
College of Engineering*

ECE 102 04(3-2-0). Digital Circuit Logic. F.

Boolean algebra; Karnaugh maps; multiplexers, decoders, ROMs, PLAs, flip-flops, counters; sequential networks; state tables. (\$)

ECE 103 03(2-2-0). DC Circuit Analysis. S. Prerequisite: MATH 160.

Basic DC circuit analysis. Use of scientific-oriented software to solve problems and analyze small projects. (\$)

ECE 202 04(3-3-0). Circuit Theory Applications. S, SS. Prerequisite: ECE 103.

Basic circuit analysis techniques and applications to engineering design problems. (\$)

ECE 204 03(3-0-0). Introduction to Electrical Engineering. S. Prerequisite: MATH 161; PH 142.

Basic analog and digital circuits and systems; introduction to electromechanical devices.

ECE 251 04(3-3-0). Introduction to Microprocessors. F. Prerequisite: ECE 102 with a C- or better.

Microprocessor organization, assembly language, I/O techniques, real-time interfaces, applications, hardware/software. (\$)

ECE 303/STAT 303 03(3-0-0). Introduction to Communications Principles. F. Prerequisite: ECE 311 or concurrent registration.; MATH 261. Credit not allowed for both ECE 303 and STAT 303.

Basic concepts in design and analysis of communication systems.

ECE 311 03(3-0-0). Linear System Analysis I. F. Prerequisite: ECE 202 with a C- or better; MATH 340 or MATH 345.

Continuous and discrete time signals and systems representations in time and frequency domain; time convolution.

ECE 312 03(3-0-0). Linear System Analysis II. S. Prerequisite: ECE 311 with a C- or better.

Laplace and Z transforms, applications to modulation, filtering and sampling, state space representation.

ECE 325 03(3-0-0). Telecommunication Networks. S. Prerequisite: MATH 141 or MATH 155 or MATH 160.

Principle technologies that support data and voice communications. (NT-O)

ECE 331 04(3-3-0). Electronics Principles I. F. Prerequisite: ECE 202 with a C- or better; MATH 340 or MATH 345.

Discrete component semiconductor devices, characteristics and applications. Rectifier circuits, single-stage and multi-stage amplifiers. (\$)

ECE 332 04(3-3-0). Electronics Principles II. S. Prerequisite: ECE 331 with a C- or better.

Discrete and integrated-circuit amplifiers-frequency response, negative feedback; digital logic circuits. (\$)

ECE 341 03(3-0-0). Electromagnetic Fields and Devices I. F. Prerequisite: MATH 340 with a C- or better or MATH 345 with a C- or better; PH 142 with a C- or better.

Basic concepts of electrostatic and magnetostatic fields.

ECE 342 03(3-0-0). Electromagnetic Fields and Devices II. S. Prerequisite: ECE 341 with a C- or better.

Basic concepts of time varying electromagnetic fields and transmission lines.

ECE 395 Var. Independent Study.

ECE 401 03(1-4-0). Senior Design Project I. F, S, SS. Prerequisite: CS 301 with a C- or better or ECE 332 with a C- or better; ECE 312 with a C- or better; ECE 342 with a C- or better or ECE 452 with a C- or better

Advanced project, seminar series, formal written report, and oral presentation. (\$)

ECE 402 03(1-4-0). Senior Design Project II. F, S, SS. Prerequisite: ECE 401.

Advanced project, formal report, and oral presentation. (\$)

ECE 404 02(1-3-0). Experiments in Optical Electronics. F. Prerequisite: Concurrent registration in ECE 441.

Experiments in optical electronics and lasers.

ECE 411 04(3-3-0). Control Systems. F. Prerequisite: ECE 312 with a C- or better.

Control system analysis and design for linear systems; stability and performance; time and frequency domain techniques.

ECE 412 03(3-0-0). Digital Control and Digital Filters. S. Prerequisite: ECE 411.

FIR and IIR digital filter design, analog and digital invariance and direct digital control algorithms, hybrid systems analysis. (NT-O)

ECE 421 03(3-0-0). Telecommunications I. F. Prerequisite: ECE 303/STAT 303 with a C- or better; ECE 312 with a C- or better.

Digital communication (source coding; modulation and detection; channel coding), analog communication (modulation). (NT-O/V)

ECE 422 03(3-0-0). Telecommunications II. S. Prerequisite: ECE 421.

Issues of source coding, detection and estimation, and equalization; introduction of information theory.

ECE 423 03(1-4-0) DSP for Communications. S. Prerequisite: ECE 312.

Design and programming of communication and signal processing algorithms into DSP hardware using C and assembly language. (NT-V)

ECE 430/MATH 430 03(3-0-0). Fourier and Wavelet Analysis with Apps. S. Prerequisite: MATH 345. Credit not allowed for both ECE 430 and MATH 430.

Fourier analysis and transforms, FFTs; sampling theorems, computational algorithms; wavelets; applications to communication, imaging, and compression.

ECE 441 03(3-0-0). Optical Electronics. F. Prerequisite: ECE 342 with a C- or better.

Concepts of modern physics, optical properties of atoms, light sources, lasers, optical detectors, optical cavities, and optical fiber transmission.

ECE 444 03(3-0-0). Antennas and Radiation. F. Prerequisite: ECE 342 with a C- or better.

Retarded potential theory, antenna arrays, long wire antennas, dipoles, aperture antennas, receiving antennas.

ECE 450 01(0-3-0). Digital System Design Laboratory. F. Prerequisite: Concurrent registration in ECE 451.

Small digital circuits are designed and simulated using very high speed hardware description language and synthesis tools.

ECE 451 03(3-0-0). Digital System Design. F. Prerequisite: ECE 251 with a C- or better; concurrent registration in ECE 450.

State machines with PLAs as controllers and small computers; timing and race elimination considerations; state and microprogramming implementation.

ECE 452 03(3-0-0). Computer Organization and Architecture. S. Prerequisite: ECE 251 with a C- or better.

CPU design; microarchitecture; data path and control path; pipelining;

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memory system; I/O system; program optimization by system software/hardware. (NT-O)

ECE 454 03(3-0-0). Database Computers. F. Prerequisite: ECE 251 with a C- or better or CS 370.

Computer architectures for database processing. Data filters, associative processors, parallel and distributed computers, text search processors.

ECE 456 04(3-3-0). Computer Networks. S. Prerequisite: ECE 251; ECE 303/STAT 303; CS 160 or (CS 155; CS 156; CS 157). Credit not allowed for both ECE 456 and CS 457.

Circuit/packet switching, protocols, LAN/MAN, TCP/IP, error correction, ATM, wireless LANS, mobile networks. (NT-O)

ECE 457 03(3-0-0). Fourier Optics. S. Prerequisite: ECE 311 with a C- or better; ECE 342 with a C- or better.

Introduction to optical systems for signal and information processing with emphasis on Fourier optics.

ECE 460/CS 460 04(3-3-0). Embedded Systems. F. Prerequisite: CS 370. Credit not allowed for both ECE 460 and CS 460.

Industry standard tools for embedded system hardware software co-design. VHDL, ModelSim, Xilinx ISE and EDK.

ECE 461 03(3-0-0). Power Systems. F. Prerequisite: ECE 341 with a C- or better; ECE 462 or concurrent registration.

Multi-phase power systems; power generation, transformer design, power distribution, power costs.

ECE 462 01(0-3-0). Power Systems Laboratory. F. Prerequisite: ECE 332 with a C- or better; ECE 461 or concurrent registration.

Set of labs designed to enhance students' understanding of power systems.

ECE 465 02(2-0-0). Electrical Energy Generation Technologies. S. Prerequisite: ECE 202.

Various electrical energy generation alternatives. Comparisons based on cost, reliability, availability and environmental impact.

ECE 466 02(2-0-0). Integrated Lighting Systems. F. Prerequisite: ECE 331 or INTD 330.

Technical underpinnings of light sources, their associated heat sink fixtures and power electronics drivers.

ECE 471 03(3-0-0). Semiconductor Devices. F. Prerequisite: ECE 332 with a C- or better; ECE 342 with a C- or better.

Semiconductor physics, device fabrication technology, analysis of PN junctions, and bipolar and field-effect transistors. (NT-O)

ECE 472 03(3-0-0). MOS Integrated Circuits. S. Prerequisite: ECE 332 with a C- or better.

MOS transistor theory, design rules, layout design, gate, cell and circuit design, memories, clocking strategies, MOS technologies.

ECE 495 Var. Independent Study.

ECE 501/ENGR 501 03(0-0-3). Foundations of Systems Engineering. F, S. Credit not allowed for both ECE 501 and ENGR 501.

Functional components of systems engineering, application of systems engineering to practical problems, system life-cycle process (NT-O)

***ECE 503 03(3-0-0). Ultrafast Optics.** S. Prerequisite: ECE 341; ECE 342.

Principles and theory behind ultrashort pulse generation, amplification, and manipulation.

ECE 504 03(3-0-0). Physical Optics. F. Prerequisite: ECE 341; ECE 342.

Classical optics from first principles; basic electromagnetic theory to wave and geometric guides.

°ECE 505 03(3-0-0). Nanostructures: Fundamentals and Applications. F. Prerequisite: ECE 342; PH 353.

Fundamentals of quantum confinement; nanostructures optical properties; fabrication and characterization. (NT-O)

ECE 506 03(3-0-0). Optical Interferometry and Laser Metrology. F. Prerequisite: ECE 341; ECE 342; ECE 441.

High resolution metrology techniques utilizing and interferometric sensors using lasers and other light sources. (NT-O)

ECE 507 03(3-0-0). Plasma Physics and Applications. S. Prerequisite: ECE 342.

Fundamental principles and industrial applications of plasmas.

ECE 508/ENGR 508 03(3-0-0). Introduction to Power System Markets. F. Prerequisite: ECE 461. Credit not allowed for both ECE 508 and ENGR 508.

Deregulated electrical power systems, system security, investments in generation and transmission, ancillary services, and nodal pricing. (NT-O)

ECE 509/ENGR 509 03(3-0-0). Signal Processing for Power Systems. F. Prerequisite: ECE 312; ECE 461. Credit not allowed for both ECE 509 and ENGR 509.

Signal processing tools for analyzing power systems, voltage frequency, magnitude variations, unbalance, waveform distortion. (NT-O)

ECE 512 03(3-0-0). Digital Signal Processing. F. Prerequisite: ECE 312 with a C- or better.

Discrete time signals and systems, digital filter design and implementation, fast algorithms, quantization effects. (NT-O)

ECE 513 03(3-0-0). Digital Image Processing. S, SS. Prerequisite: ECE 303/STAT 303 with a C- or better; ECE 312.

Image acquisition and display systems, image enhancement, restoration and encoding, image analysis; real-life applications. (NT-O)

ECE 514 03(3-0-0). Applications of Random Processes. F. Prerequisite: ECE 303/STAT 303 with a C- or better; ECE 312 with a C- or better.

Bit-error rates, signal-to-noise power ration, signal detection, signal estimation, Wiener filter, application.

***ECE 516 03(3-0-0). Information Theory.** Prerequisite: ECE 303/STAT 303; ECE 421.

Information measures and their properties; lossless data compression; channel capacity; channel coding theorem; rate distortion theorem.

°ECE 520 03(3-0-0). Optimization Methods-Control and Communication. S. Prerequisite: MATH 229; MATH 317.

Linear and nonlinear optimization theory and methods; applications in systems, control, and communication.

ECE 521 03(3-0-0). Satellite Communication. S. Prerequisite: ECE 421.

Principles of satellite communication systems engineering.

ECE 524 03(3-0-0). Wireless Telecommunications. S. Prerequisite: ECE 421.

Physical layer design, including channel modeling, receiver design and performance, and multiple access techniques.

ECE 525 3(3-0-0). Fiber Optic Communications. S, SS. Prerequisite: ECE 471.

Optoelectronic and optical components for fiber optics; communications system physical layer issues and examples. (NT-O)

ECE 526/BIOM 526 03(3-0-0). Biological Physics. S. Prerequisite: MATH 340 or MATH 345; PH122 or PH142. Credit not allowed for both ECE 526 and BIOM 526.

Mathematical and physical modeling of biological systems. Mass transport in cellular environments. Electrical/mechanical properties of biomolecules.

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ECE 530/ENGR 530 03(3-0-0). Overview of Systems Engineering Processes. F, S. Prerequisites: ECE 303/STAT 303 or STAT 315. Credit not allowed for both ECE 530 and ENGR 530.

Systems engineering life-cycle process and analysis techniques. Reliability and robustness. (NT-O)

ECE 531/ENGR 531 03(3-0-0). Engineering Risk Analysis. F, S. Prerequisite: ECE 303/STAT 303 or STAT 315; ENGR/ECE 501 or concurrent enrollment. Credit not allowed for both ECE 531 and ENGR 531.

Estimation and risk identification, development of mitigation techniques. (NT-O)

ECE 532/ENGR 532 03(3-0-0). Dynamics of Complex Engineering Systems. F, S. Prerequisites: ENGR 501/ECE 501 or concurrent registration. Credit not allowed for both ECE 532 and ENGR 532.

Higher-level behavior and issues that emerge from interaction between components in complex socio-technical systems. (NT-O)

ECE 533/BIOM 533. 03(2-3-0). Biomolecular Tools for Engineers. F. Prerequisite: BMS 300 or MIP 300. Credit not allowed for both BIOM 533 and ECE 533.

Theoretical and practical aspects of biomolecular laboratory tools—PCR, cloning, sequencing, single-molecule optical techniques and live-cell imaging. (S)

ECE 534 03(3-0-0). Analog Integrated Circuit Design. F. Prerequisite: ECE 332 with a C- or better; concurrent registration in ECE 535.

Design methods for state-of-the-art analog integrated circuits, including CMOS op-amps, comparators, and phase-locked loops.

ECE 535 01(0-2-0). Analog Integrated Circuit Laboratory. F. Prerequisite: Concurrent registration in ECE 534.

Analog integrated circuits are designed and simulated using modern software tools.

ECE 536 03(3-0-0). RF Integrated Circuit Design. F. Prerequisite: ECE 332.

Design of state-of-the-art ICs for RF applications including CMOS low-noise amplifiers, voltage-controlled oscillators, mixers and power amplifiers. (NT-O)

***ECE 537/BIOM 537 03(3-0-0). Biomedical Signal Processing.** S. Prerequisite: MATH 340 or ECE 311 or STAT 303. Credit not allowed for both ECE 537 and BIOM 537.

Measuring, manipulating, and interpreting biomedical signals.

°ECE 540 03(3-0-0). Computational Electromagnetics. S. Prerequisite: ECE 342.

Computational techniques for practical applications in electromagnetic fields, devices, scattering, propagation, and radiation.

ECE 546 03(3-0-0). Laser Fundamentals and Devices. S. Prerequisite: ECE 441.

Amplification of light, laser excitation mechanisms, laser devices, characteristics and design.

ECE 548 03(3-0-0). Microwave Theory and Component Design. F. Prerequisite: ECE 342 with a C- or better.

Fundamentals of microwave engineering, components, devices, and measurements. (NT-O)

ECE 549 03(3-0-0). Radar Systems and Design. F. Prerequisite: ECE 444. Fundamental ideas of radar operation and basic design of various radar types including current topics. (NT-O)

ECE 550A-B. Microprocessors Based Systems. F. Prerequisite: ECE 451. High-performance microprocessors, e.g., 68000 family; intelligent I/O processors. Asynchronous bus, virtual memory, microprocessor in control and multi-user systems. **A)** 04(3-2-0). **B)** 03(3-0-0). CSUN students only.

ECE 554 03(3-0-0). Computer Architecture. F. Prerequisite: CS 470 or ECE 452.

Fundamentals of computer design, multiprocessors and thread-level parallelism, storage systems, and interconnection networks and clusters. (NT-O/V)

ECE 555 03(3-0-0). Robot Motion Planning. F. Prerequisite: CS 253; MATH 369.

Concepts in geometry and spatial reasoning for the design of autonomous robots.

ECE 557 03(3-0-0). Digital Optical Computing. S. Prerequisite: ECE 441 or ECE 451 or ECE 554.

Optical devices; optical disks, holographic memories; interconnection networks. Optical systems for numerical and nonnumerical data processing. (NT-V)

ECE 560/CS 560 04(3-2-0). Foundations of Fine-Grain Parallelism. S. Prerequisite: CS 475 or CS 460/ECE 460. Credit not allowed for both ECE 560 and CS 560.

Programming novel architectures; performance tuning; automatic parallelization; program transformation; polyhedral model; equational programming.

ECE 561/CS 561 04(3-3-0). Hardware/Software Design of Embedded Systems. F, S. Prerequisite: CS 270 or CS 470 or ECE 251 or ECE 452. Credit not allowed for both CS 561 and ECE 561.

Embedded systems design including system level modeling, design space exploration, hardware-software partitioning, high level synthesis. (ECE 561 only: NT-O)

ECE 562 03(3-0-0). Power Electronics I. F. Prerequisite: ECE 332 with a C- or better.

Switch mode and resonant converters, control using switch averaged dynamic models, modeling of all circuit components including sources, loads, and switches. (NT-O)

ECE 563 03(3-0-0). Power Electronics II. S. Prerequisite: ECE 562.

Electrical energy, processing circuits, lightweight power management, and power conversion circuits, emphasizing small signal transfer functions. (NT-O/V)

***ECE 564 03(3-0-0). Resonant Converters.** S. Prerequisite: ECE 562.

Analysis and design of resonant converters.

ECE 565/ENGR 565 03(3-0-0). Electrical Power Engineering. F, S. Prerequisite: ECE 332; ECE 342. Credit not allowed for both ECE 565 and ENGR 565.

Analysis of power systems in terms of current, voltage, and active/reactive power; introduction of computer-aided tools for power systems. (NT-O)

ECE 566/ENGR 566 03(3-0-0). Energy Conversion for Electrical Power Systems. F, S. Prerequisite: ECE 332. Credit not allowed for both ECE 566 and ENGR 566.

Energy conversion; fuel cell, battery storage, solar-photovoltaic, wind energy and traditional rotating-magnetic-field based machines. (NT-O)

ECE 567/ENGR 567 03(3-0-0). Systems Engineering Architecture. F, S. Prerequisite: ECE 501 or ENGR 501. Credit not allowed for both ECE 567 and ENGR 567.

Observation/classification of systems architecture. Systems architecture principles and critical evaluation through design studies. (NT-O)

ECE 568/ENGR 568 03(3-0-0). Electrical Energy Generation Systems. F, S. Prerequisite: Written consent of instructor.

Energy systems: renewable and traditional. Physics and operation of energy devices; solar-photovoltaic, wind energy, gas, coal, and nuclear plants. (NT-O)

***ECE 569/*MECH 569 03(3-0-0). Micro-Electro-Mechanical Devices.**

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S. Prerequisite: ECE 331 with a C- or better or MECH 344. Credit not allowed for both ECE 569 and MECH 569.

Micro-electro-mechanical processes and applications in sensors, optics, and structures. (NT-O)

ECE 570 03(3-0-0). Compound Materials and Devices. S. Prerequisite: ECE 471.

III-V and II-VI alloy semiconductors; bandgap engineering; quantum well heterostructures; HEMT, HBT, and high-performance devices; GaAsICs.

ECE 571 03(3-0-0). VLSI System Design. S. Prerequisite: ECE 451; concurrent registration in ECE 575.

Design of integrated circuits at the system level including cell design, digital systems, parallel architecture, systolic arrays. (NT-V)

ECE 573 03(1-4-0). Semiconductor Optoelectronics Laboratory. S. Prerequisite: ECE 471.

Experimental characterization techniques for semiconductor optoelectronic devices and design and testing of related electronic circuits.

ECE 574 03(3-0-0). Optical Materials and Devices. S. Prerequisite: ECE 441 or ECE 471.

Semiconductor light emitters and detectors, dielectrics, and light reflection from, and propagation through, anisotropic dielectrics.

ECE 575 01(0-3-0). Experiments in VLSI System Design I. S. Prerequisite: ECE 451; concurrent registration in ECE 571.

Set of labs designed to enhance students' understanding of the materials in ECE 571.

ECE 576 03(3-0-0). VLSI Processing-Science and Technology I. S. Prerequisite: ECE 472.

Physics, chemistry of VLSI processing including plasma, thermal techniques of oxidation, deposition; photolithography; etching; cleaning, process modeling.

ECE 604 03(3-0-0). Nonlinear Optics. F. Prerequisite: ECE 504; PH 451.

Principles of nonlinear optics, symmetry properties, multiple order nonlinear phenomenon, and nonlinear spectroscopy.

ECE 611 03(3-0-0). Nonlinear Control Systems. F. Prerequisite: ECE 412.

Controller analysis and design for nonlinear systems. (NT-O)

ECE 612 03(3-0-0). Robust Control Systems. S. Prerequisite: ECE 411.

Introduction to modern robust control theory techniques for analysis and design of large-scale uncertain multivariable systems. (NT-V)

ECE 614 03(3-0-0). Principles of Digital Communications. S. Prerequisite: ECE 514.

Information theory, optimal receiver design, waveform coding, error correcting coding.

ECE 621/ENGR 621 03(3-0-0). Energy Storage for Electrical Power Systems. F, S. Prerequisite: Written consent of instructor. Credit not allowed for both ECE 621 and ENGR 621.

Physics and operation of electrical, mechanical, thermal and novel energy storage systems/devices. (NT-O)

ECE 622/ENGR 622 03(3-0-0). Energy Networks and Power Distribution Grids. F, S. Prerequisite: ECE 411 or MECH 417; ECE 565/ENGR 565. Credit not allowed for both ECE 622 and ENGR 622.

Energy networks: generation, storage, consumers. Systems approach to analysis of distribution networks and transition to intelligent grid systems. (NT-O)

ECE 623/ENGR 623 03(3-0-0). Electric Power Quality. S. Prerequisite: ECE 461 or ECE 562. Credit not allowed for both ECE 623 and ENGR 623.

Interconnecting power electronic devices and renewable energy sources

to power systems. (NT-O)

***ECE 641 03(3-0-0). Electromagnetics.** F. Prerequisite: ECE 342 with a C- or better.

Electrostatics, magnetostatics, boundary value problems, EM induction, quasi-statics, Maxwell's equations.

ECE 642 03(3-0-0). Time Harmonic Electromagnetics. S. Prerequisite: ECE 641.

Maxwell's equations, radiation, boundary value problem, dyadic Green's functions, scattering theory.

ECE 650 03(3-0-0). Extreme Ultraviolet and Soft X-Ray Radiation. S. Prerequisite: ECE 342.

Fundamental principles of short wavelength electromagnetic radiation.

ECE 651 03(3-0-0). Detection Theory. F. Prerequisite: ECE 512; ECE 514.

Neyman-Pearson and Bayes detectors and properties, matched filter and matched subspace detectors, distributed detection, and applications.

ECE 652 03(3-0-0). Estimation and Filtering Theory. S. Prerequisite: ECE 411 or ECE 412; ECE 514 or STAT 525.

Linear and Nonlinear parameter and state estimation methods; Optimal Kalman state estimation and applications.

ECE 655 03(3-0-0). Multidimensional Digital Signal Processing. S. Prerequisite: ECE 512.

Multidimensional signals and systems, 2-D transforms, stability methods, design and implementations, spectral factorization, and image modeling.

ECE 656 03(3-0-0). Neural Networks and Adaptive Systems. F. Prerequisite: ECE 512.

Various adaptation rules, neural network paradigms, learning, stability and convergence, applications in signal/image processing and control.

ECE 658/CS 658 04(3-3-0). Internet Engineering. F. Prerequisite: CS 457 or ECE 456. Credit not allowed for both ECE 658 and CS 658.

Link technologies, multiple access, hardware and software for interworks routing, switching flow control, multicast, performance, and application. (NT-O)

ECE 660 03(3-0-0). Advanced Topics in VLSI Design. S. Prerequisite: ECE 571.

VLSI synthesis, optimization, and other issues.

ECE 661 04(3-3-0). Advanced Topics in Embedded Systems. S. Prerequisite: ECE 561/CS 561; ECE 452.

Embedded systems design: networks on chip, novel memory architectures, synthesis algorithms, optimization for low power, fault tolerance, security.

ECE 666 03(3-0-0). Topics in Robotics. S. Prerequisite: ECE 555 or MECH 514 or MECH 564.

Recent advances in robotics, automation, and intelligent systems.

ECE 670 B-D/CS 670B-D Var [1-4]. Topics in Architecture/ Systems. F, S. Prerequisite: CS 570 or ECE 554. Credit not allowed for both ECE 670B-D and CS 670B-D.

B) Performance evaluation and modeling. **C)** Distributed systems. **D)** Architecture of advanced systems.

ECE 672/PH 672 03(3-0-0). Principles of Semiconductors. S. Prerequisite: ECE 471 or PH 531. Credit not allowed for both ECE 672 and PH 672.

Electronic properties of semiconductors: band structure, statistics, transport properties, photoelectronic properties, potential barriers, interfaces.

ECE 673 03(3-0-0). Thin Film Growth. F. Prerequisite: One course in

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thermodynamics.

Microstructures of physically vapor-deposited films; thin-film morphological development; atomistic processes of condensation, nucleation, and growth.

***ECE 674/*CS 674 03(3-0-0). Heterogeneous Computing.** S. Prerequisite: CS 551 or CS 570 or CS 575 or ECE 550 or ECE 554. Credit not allowed for both ECE 674 and CS 674.

Allocation of resources to tasks in parallel and distributed heterogeneous computing systems. A variety of computational environments are considered.

ECE 695 Var. Independent Study.

ECE 697/ENGR 697 Var[1-6]. Group Study. F, S, SS.

ECE 699 Var. Thesis.

***ECE 721 03(3-0-0). Topics in Communication Theory.** F. Prerequisite: ECE 521.

Detection and estimation theory; radar-sonar problems; nonlinear modulation; information theory; communication systems.

°ECE 742 03(3-0-0). Topics in Electromagnetics. S. Prerequisite: ECE 641.

Applications of wave propagation and scattering to microwave radar, Doppler radar, meteorological radar applications.

***ECE 744 03(3-0-0). Topics in Plasma Dynamics.** S.

Kinetic equations, nonlinear theory of waves and instabilities; plasma fluctuation and radiations; plasma diagnostics and plasma heating.

***ECE 752 03(3-0-0). Topics in Signal Processing.** F. Prerequisite: ECE 512; ECE 514 or STAT 525.

Adaptive filtering, spectral estimation, sonar/radar signal processing, and detection/classification schemes.

ECE 773 03(3-0-0). Topics in Solid State Electronics. F. Prerequisite: ECE 471 or ECE 672/PH 672.

Advanced principles of microwave devices, solar cells, theory of solids, or transport in materials.

***ECE 777 03(3-0-0). X-ray Lasers.** S. Prerequisite: ECE 546.

Fundamentals, design, and implementation of soft X-ray lasers and X-ray optics.

ECE 795 Var. Independent Study.

ECE 799 Var. Dissertation.

ECOLOGY COURSES

Nondepartmental, Interdisciplinary Warner College of Natural Resources and College of Natural Sciences

ECOL 505 02(2-0-0). Foundations of Ecology. F. Prerequisite: One course in ecology.

Overview of the science of ecology; what questions are asked, how they are answered.

ECOL 571 Var [1-3]. Advanced Topics in Ecology. S. Prerequisite: One course in ecological principles.

Current research topics presented and analyzed by visiting scientists.

ECOL 592 Var [1-3]. Interdisciplinary Seminar in Ecology. F, S. Prerequisite: One 300- or 400-level course in ecology.

Concepts and principles of basic and applied ecology in an interdisciplinary context.

ECOL 600 03(2-0-1). Community Ecology. S. Prerequisite: One course in general ecology, calculus, and statistics.

Current theories and tests of the dynamics and regulation of plant and animal communities.

***ECOL 610 03(3-0-0). Ecosystem Ecology.** F. Prerequisite: LIFE 320 or any ECOL course.

Concepts, methods, issues in ecosystem science: energy and matter cycling, systems perspectives, simulation modeling, sustainability, global change.

***ECOL 620 04(2-2-1). Applications in Landscape Ecology.** F. Prerequisite: Previous coursework in geographic information systems, ecology, statistics, and mathematics.

Spatial patterning of landscape elements and dynamics of ecological systems; spatial heterogeneity. Influence on biotic and abiotic processes.

ECOL 693 01(0-0-1). Research Seminar. Prerequisite: Written consent of instructor.

Critique of research programs, plans, and ecological theory.

ECOL 695 Var. Independent Study.

ECOL 698 Var. Research.

Non-thesis research in ecology.

ECOL 699 Var. Thesis.

ECOL 799 Var. Dissertation.

ECONOMICS COURSES

Department of Economics

College of Liberal Arts

ECON 101 03(3-0-0). Economics of Social Issues. (GT-SS1, AUCC 3C). F, S, SS.

Economic analysis of poverty, crime, education, and other social issues. Basics of macro, micro, and political economy.

ECON 202 03(2-0-1). Principles of Microeconomics. (GT-SS1, AUCC 3C). F, S, SS. Prerequisite: MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160. Credit not allowed for both ECON 202 and AREC 202.

Introduction to decision-making by households, firms, and government, and resulting allocation of resources through markets. (NT-O)

ECON 204 03(2-0-1). Principles of Macroeconomics. (GT-SS1, AUCC 3C). F, S, SS. Prerequisite: AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160.

Determinants of national output, employment, and price level; inflation and unemployment; fiscal and monetary policy. (NT-O)

ECON 211 03(3-0-0). Gender in the Economy. (GT-SS1, AUCC 3E). F, S, SS.

Role gender plays in economies; the way gender affects economic outcomes for individuals and societies. (NT-O)

ECON 212 03(3-0-0). Racial Inequality and Discrimination. (GT-SS1, AUCC 3C). F.

Economic inequality between Afro-Americans and Euro-Americans. Debates about causes, consequences, and remedies.

ECON 240/AREC 240 03(3-0-0). Issues in Environmental Economics. (GT-SS1, AUCC 3C). F, S, SS. Credit not allowed for both ECON 240 and AREC 240.

Discussion and economic analysis of current environmental issues with special emphasis on the impact of economic growth. (NT-C/O)

ECON 304 03(3-0-0). Intermediate Macroeconomics. F, S, SS. Prerequisite: ECON 204; MATH 141 or MATH 155 or MATH 160.

Theory of national income, its measurement and determinants; analysis of inflation, growth, debt, and public policy. (NT-C/O)

ECON 306 03(3-0-0). Intermediate Microeconomics. F, S, SS. Prerequisite: AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160.

Analysis of competitive and noncompetitive markets in terms of efficiency of resource utilization. (NT-O)

ECON 310 03(3-0-0). Poverty and the Welfare State. S, SS. Prerequisite: AREC 202 or ECON 101 or ECON 202.

Description and analysis of U.S. poverty; the "underclass"; feminization of poverty; working poor; the welfare state.

ECON 315 03(3-0-0). Money and Banking. F, S, SS. Prerequisite: ECON 204.

Monetary theory and policy; description of financial institutions and markets. (NT-O)

ECON 320 03(3-0-0). Economics of Public Finance. F, S, SS. Prerequisite: ECON 204.

Impact of taxes, government expenditures on allocation of resources, distribution of income; evaluation of government expenditure program; tax policies. (NT-O)

ECON 325 03(3-0-0). Health Economics. S. Prerequisite: ECON 202.

Economic analysis of health care markets, health insurance markets, and public policy regarding health care.

ECON 332/POLS 332 03(3-0-0). International Political Economy. F, S. Prerequisite: AREC 202 or ECON 202; POLS 232. Credit not allowed for both ECON 332 and POLS 332.

Theories on relations between international politics and economics. Policy implications of different theories and case studies.

ECON 335/AREC 335 03(3-0-0). Introduction to Econometrics. F, S. Prerequisite: ECON 204; MATH 141 or MATH 155 or MATH 160; STAT 201 or STAT 204 or STAT 301 or STAT 307. Credit not allowed for both ECON 335 and AREC 335.

Estimating statistical regression models of economic relationships; treatment of special problems that may arise in analysis of economic data. (NT-O)

ECON 340/AREC 340 03(3-0-0). Introduction: Economics of Natural Resources. S. Prerequisite: AREC 202 or ECON 202. Credit not allowed for both ECON 340 and AREC 340.

Concepts, theories, institutions; analytical methods for economic evaluation of alternative resource use patterns and land use plans.

ECON 344 03(3-0-0). Economics of Energy Resources. S. Prerequisite: AREC 202 or ECON 202.

Supply, consumption trends and projected demand for alternative energy resources in domestic and world perspective; economics of public energy policies.

ECON 346/AREC 346 03(3-0-0). Economics of Outdoor Recreation. F. Prerequisite: AREC 202 or ECON 202. Credit not allowed for both ECON 346 and AREC 346.

Benefit cost framework in public planning for outdoor recreation, pricing problems, projecting demand, and regional economic development.

ECON 370 03(3-0-0). Comparative Economic Systems. F. Prerequisite: AREC 202 or ECON 101 or ECON 202.

Place of the economy in different societies; nature and evolution of capitalism; crisis of command economies and capitalist restoration.

ECON 372 03(3-0-0). History of Economic Institutions and Thought. F, S. Prerequisite: AREC 202 or ECON 101 or ECON 202.

Origins and development of capitalist institutions including contemporary issues of alienation, loss of community, and changing values. (NT-O)

ECON 376 03(3-0-0). Marxist Economic Thought. S. Prerequisite: AREC 202 or ECON 101 or ECON 202.

Marxist critique of capitalism and orthodox economics in both its original 19th-century and contemporary settings.

ECON 379/HIST 379 03(3-0-0). Economic History of the United States. F. Prerequisite: AREC 202 or ECON 101 or ECON 202 or any two courses in American history; completion of 45 credits. Credit not allowed for both ECON 379 and HIST 379.

Economic analysis of growth and welfare from beginning of industrialization to present.

ECON 404 03(3-0-0). Macroeconomic Policy. S. Prerequisite: ECON 304.

Alternative macroeconomic policies, policy coordination; application to current macroeconomic problems, policies, proposals.

ECON 410 03(3-0-0). Labor Economics. S. Prerequisite: ECON 306.

Capital/labor relationship; supply, demand of labor; wage determination; role of unions; unemployment and instability; structure of modern working class.

ECON 435 03(3-0-0). Economic Forecasting. S. Prerequisite: AREC 335/ECON 335 or STAT 340; ECON 204.

Theory and techniques used in economic forecasting as practiced by economists in industry, government, and academic life.

ECON 440 03(3-0-0). International Economics I. F. Prerequisite: ECON

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

306.

Theory of international trade; payments, commercial policies, and economic integration. (NT-O)

ECON 442 03(3-0-0). International Economics II. F, S, SS. Prerequisite: ECON 304.

Balance of payments, adjustment mechanisms, and international monetary systems. (NT-O)

ECON 460 03(3-0-0). Economic Development. F. Prerequisite: ECON 304.

Economic problems of underdeveloped nations. (NT-O)

ECON 463 03(3-0-0). Regional Economics-Tools/Analysis/Policy. S. Prerequisite: ECON 306.

Introduction to economic importance of location for firms, consumers, and policy makers. Basic tools, applications, and student research.

ECON 474 03(3-0-0). Recent Economic Thought. S. Prerequisite: ECON 304; ECON 306.

Nontraditional schools of economic thought, such as institutionalism and neo-Marxism, that critique neoclassical economic theory.

ECON 484 Var [1-3]. Supervised College Teaching. F, S, SS. Prerequisite: Written consent of instructor. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Assistance in teaching introductory economics courses.

ECON 487 Var [1-3]. Internship.

ECON 492 03(0-0-3). Seminar. F, S, SS. Prerequisite: Senior status.

Summarizes, debates, and applies issues and policies chosen by the instructor. Emphasis on student participation, debate, and research.

ECON 495 Var. Independent Study.

ECON 501 03(3-0-0). Quantitative Methods for Economists. F. Prerequisite: MATH 141 or MATH 155 or MATH 160.

Quantitative methods essential for graduate study in economics; functional forms, optimization, matrix methods, topological modeling.

ECON 504 03(3-0-0). Macroeconomic Analysis I. S. Prerequisite: ECON 304; ECON 306.

Analysis of national income, employment, price levels, growth, and policies to achieve national economic goals.

ECON 505 03(3-0-0). History of Economic Thought. F. Prerequisite: Graduate status.

History of economic thought as a foundation for studying economic theory.

ECON 506 03(3-0-0). Microeconomic Analysis I. S. Prerequisite: ECON 306; ECON 501.

Price theory: analyses of demand, production, and costs; analysis of various market structures; factor markets; general equilibrium, welfare economics.

***ECON 510 03(3-0-0). Labor Market Analysis.** F. Prerequisite: ECON 304; ECON 306.

Determination of wages and employment. Focus on theoretical and applied controversies.

°ECON 515 03(3-0-0). Financial Institutions-Structure/Regulation. F.

Regulation of financial institutions in the U.S.; international banking and international financial institutions, and financial modernization.

ECON 520 03(3-0-0). Public Economics I. S. Prerequisite: ECON 506.

Analysis and evaluation of tax policy in terms of efficiency and equity.

***ECON 530/AREC 570 03(3-0-0). Methodology of Economic Research.** F. Prerequisite: ECON 304; ECON 306. Credit not allowed for both ECON 530 and AREC 570.

Philosophical foundations of science and research. Concepts and skills for planning, performing, reporting, and evaluating economic research.

ECON 535/AREC 535 03(3-0-0). Applied Econometrics. F. Prerequisite: AREC 335/ECON 335; ECON 304 or ECON 306;.Credit not allowed for both ECON 535 and AREC 535.

Econometric techniques applied to testing and quantification of theoretical economic relationships drawn from both microeconomics, macroeconomics.

ECON 540/AREC 540 03(3-0-0). Economics of Natural Resources. F. Prerequisite: ECON 340/AREC 340; MATH 141. Credit not allowed for both ECON 540 and AREC 540.

Public natural resources policy, effect on resource use in private sector, optimal pricing of minerals, timber and fisheries, public project analysis.

ECON 541/AREC 541 03(3-0-0). Environmental Economics. S. Prerequisite: ECON 306. Credit not allowed for both ECON 541 and AREC 541.

Economics of environmental policy; partial equilibrium and general equilibrium model; pollution; natural environments; population and economic growth.

ECON 563/AREC 563 03(3-0-0). Regional Economics-Theory, Methods, and Issues. F. Prerequisite: ECON 306; ECON 501 or concurrent registration. Credit not allowed for both ECON 563 and AREC 563.

Tools and methods of regional economics, including supply, demand, and externality analyses. Applications to current urban and regional policy issues.

***ECON 570 03(3-0-0). Evolution of Economic Thought.** F. Prerequisite: ECON 304; ECON 306.

From Plato and Aristotle to the modern period.

ECON 635/AREC 635 03(3-0-0). Econometric Theory I. F. Prerequisite: AREC 535/ECON 535; ECON 501 or concurrent registration. Credit not allowed for both ECON 635 and AREC 635.

Theory of mathematical statistics and classical linear regression model in context of economic application.

ECON 640 03(3-0-0). International Trade Theory. F. Prerequisite: ECON 306 or ECON 506.

Theory of international trade including comparative advantage, factor growth, market distortions, and commercial policy.

ECON 663 03(3-0-0). Urban and Regional Modeling. S. Prerequisite: ECON 506.

Methodological approaches in regional economics: general equilibrium, input-output, compatible general equilibrium models; social accounting matrices.

ECON 695 Var. Independent Study.

ECON 698 03(0-0-3). Research—Technical Paper. F, S, SS. Prerequisite: ECON 504; ECON 506; ECON 705; ECON 735/AREC 735.

ECON 699 Var. Thesis.

ECON 704 03(3-0-0). Macroeconomic Analysis II. F. Prerequisite: ECON 501; ECON 504.

Theoretical framework for analyzing flows of aggregate income and expenditure; relationship between these flows and other dimensions of economic activity.

ECON 705 03(3-0-0). Heterodox Approaches to Economics. S. Prerequisite: ECON 505.

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Contemporary heterodox approaches to economic research.

ECON 706 03(3-0-0). Microeconomic Analysis II. F. Prerequisite: ECON 501; ECON 506.

Partial and general equilibrium analysis of demand, production, pricing, and welfare under competitive and imperfectly competitive conditions.

ECON 715 03(3-0-0). Monetary Economics. F. Prerequisite: ECON 504.

Principle issues of monetary theory: money supply and demand, interest rates, and current problems of monetary policy.

ECON 720 03(3-0-0). Public Economics II. F. Prerequisite: ECON 506.

Analysis of welfare foundations of public expenditure, including cost-benefit analysis.

ECON 735/AREC 735 03(3-0-0). Econometric Theory II. S. Prerequisite: AREC 635/ECON 635. Credit not allowed for both ECON 735 and AREC 735.

Model building, estimation and testing, using both microanalytic models and aggregate models of the economy.

ECON 742 03(3-0-0). International Production and Monetary Theory. S. Prerequisite: ECON 304 or ECON 504.

Factor movements, theory of international production (multinationalism), balance of payments, and international monetary system.

ECON 760 03(3-0-0). Theories of Economic Development. S. Prerequisite: ECON 460.

Analysis of fundamentals of economic development (processes, problems, and strategies) with special reference to developing nations.

ECON 770 03(3-0-0). Economic Thought and Systems. S. Prerequisite: ECON 570.

Aspects of modern economic thought and comparative economics selected according to backgrounds and interests of the class.

ECON 771 03(3-0-0). Political Economy of Race and Gender. F, S. Prerequisite: Graduate status.

Economic approaches to inequality based on race/ethnicity, gender, and class.

ECON 772 03(3-0-0). Marxian Political Economy. F. Prerequisite: ECON 505.

Marxian method, relevance of Marxian approach, and relation to other economic approaches.

ECON 784 Var. Supervised College Teaching.

ECON 792A-E Var. Seminar.

A) Theory. C) Social and political. D) Quantitative analysis. E) Development.

ECON 793 03(0-0-3). Seminar—Doctoral Research. S. Prerequisite: ECON 704; ECON 705; ECON 706; ECON 735/AREC 735.

ECON 795 Var. Independent Study.

ECON 799 Var. Dissertation.

ADULT EDUCATION COURSES

School of Education

College of Applied Human Sciences

EDAE 495 Var. Independent Study-Adult Education.

EDAE 520 03(0-0-3). Adult Education. F.

Philosophical foundations, a description of program service areas, adult participation trends, and current issues. (NT-O, V)

EDAE 586 Var. Practicum.

Participation in field experiences relevant to study program and objectives.

EDAE 590 Var. Workshop.

Specially designed learning situations to provide opportunities for concentrated problem-solving experiences. (NT-O)

EDAE 601 03(3-0-0). Philosophy/Organization of Workforce Education. SS.

Principles, philosophy, practices, and innovations of workforce education and human resources. (NT-O/V)

EDAE 620 03(0-0-3). Processes and Methods. F.

Processes and methods including helping theories used by adult learning facilitators. (NT-O)

EDAE 624 03(0-0-3). Adult Teaching and Learning I. S. Prerequisite: EDAE 520.

Using theory and best practices to design and deliver instruction for adults. (NT-O)

EDAE 629 03(0-0-3). Program Development. S.

Models for planning, implementing, and evaluating programs for adult learners. (NT-O)

EDAE 639 03(1-0-2). Instructional Design. F. Prerequisite: none.

Apply instructional design principles in the development of a course or workshop and explore application of various learning methods. (NT-O)

EDAE 668 03(3-0-0). Cognitive Theory and Learning Transfer. F. Prerequisite: None.

Investigation of learning processes and training strategies that lead to application of learning outside of the classroom. (NT-O)

EDAE 687 Var. Internship.

Career or job fieldwork experience with an adult education institution, agency, or program.

EDAE 692 Var. Seminar-Adult Education. (NT-O)

EDAE 695 Var. Independent Study.

EDAE 698 Var. Research. Prerequisite: EDAE 520; EDAE 624; EDRM 600.

EDAE 699 Var. Thesis. Prerequisite: EDAE 520; EDAE 624; EDRM 600.

EDAE 724 03(0-0-3). Adult Teaching and Learning II. F.

Adult teaching and learning, alternative delivery systems, performance technology, and faculty evaluation.

COMMUNITY COLLEGE EDUCATION COURSES

School of Education

College of Applied Human Sciences

EDCL 675 03(3-0-0). The Community College. SS. Prerequisite: None.

Role and scope of community college: history, philosophy, organization, administration.

EDCL 687 Var. Internship.

EDCL 701 03(0-0-3). Higher Education Law. S. Legal theory, analysis, and review of cases relevant to higher education. (NT)

EDCL 702 03(2-0-1). Community College Curriculum. F. .

Investigation and research of critical curricular issues affecting the community college now and in the future.

EDCL 703 03(2-0-1). Community College Leadership. S. Prerequisite: EDCL 675.

Investigation and research of critical leadership issues affecting the community college now and in the future.

EDCL 750 03(0-0-3). Simulated Presidential Cabinet I. SS. Prerequisite: EDCL 701; EDUC 710.

Issues and challenges relating to students, faculty, instructional programs, noninstructional programs, and instructional delivery.

EDCL 751 03(0-0-3). Simulated Presidential Cabinet II. SS. Prerequisite: EDCL 701; EDUC 710.

Issues and challenges relating to internal/external governances, legal authority, institutional revenues, expenditures and insurances, human resources.

EDCL 792 Var [1-6]. Seminar. F.

EDCL 799 Var. Dissertation.

COUNSELING AND CAREER DEVELOPMENT COURSES

School of Education

College of Applied Human Sciences

EDCO 500 03(0-0-3). Career and Employment Concepts. F.
Prerequisite: Bachelor's degree.

Career and lifestyle studies that provide an understanding of career development, employment concepts, and career counseling resources. (NT-O)

EDCO 550 03(3-0-0). Professional School Counseling. S. Prerequisite: Admission to Counseling and Career Development Program or approval of instructor.

History, professionalism, ethics, program planning and program development of school counseling programs.

EDCO 552 03(0-0-3). School Counseling Program Delivery/Evaluation. F. Prerequisite: EDCO 550.

Effective school counseling program development, delivery, and evaluation.

EDCO 590 Var. Workshop.

EDCO 625 03(2-0-1). Foundations of Counseling. F. Prerequisite: Bachelor's degree.

Foundations and techniques of individual guidance and counseling.

EDCO 650 03(2-0-1). Individual Guidance and Counseling. F.
Prerequisite: EDCO 625.

Theories of individual counseling and development.

EDCO 651 03(2-0-1). Group Guidance and Counseling. S.
Prerequisite: EDCO 650.

Theory and techniques of group guidance and counseling.

EDCO 652 03(3-0-0). Ethics in Counseling/Career Development. S.
Prerequisite: Admission to Counseling and Career Development Program.

Awareness and critical analysis of ethical and legal issues in counseling and career development.

EDCO 656 03(1-0-2). Tests and Assessment. SS.

Use of tests in educational, vocational, and counseling assessment. (\$)

EDCO 660 03(3-0-0). Career Development Counseling. S, SS.
Prerequisite: EDCO 500.

Career development programs and processes over the life span with particular attention to career choice.

EDCO 686 Var. Practicum.

EDCO 687 Var. Internship.

EDCO 692 03(1-0-2). Seminar-Brief Counseling. S, SS. Prerequisite: EDCO 650; EDCO 652; proof of professional counseling liability insurance.

Blends theory of brief counseling with practice. Individualized for application in the student's counseling setting.

EDCO 693 Var. Seminar.

EDCO 696 Var. Group Study.

EDCO 792A-C Var. Seminar.

A) Individual counseling. B) Group counseling. C) Contemplative practices in counseling and education. S.

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CAREER AND TECHNICAL EDUCATION COURSES

School of Education

College of Applied Human Sciences

EDCT 300 02(0-0-2). Principles of Career and Technical Education. F, S, SS. Offered only through Continuing Education, School of Education

History, purpose, administration, funding, programs, services, and delivery of career and technical education within educational systems. (NT-O)

EDCT 370 03(3-0-0). Laboratory Management, Safety, and Liability. S, SS.

Organization and management of learning laboratories. Approved principles and practices of classroom and laboratory safety including impact of accidents.

EDCT 387 Var. Internship.

Coordinated and supervised experiences in business, industry, or agriculture selected to strengthen the intern's specialty through experience.

EDCT 400 02(2-0-0). Building Student Organizations/Partnerships. F, S, SS. Credit not allowed for both EDCT 400 and EDCT 402.

Techniques and methods to implement and advise student leaders; establish and nurture business/industry partners and work-based experiences. (NT-O)

EDCT 403 02(0-0-2). Coordination Techniques of Cooperative Programs. F, S, SS. Offered only through Continuing Education, School of Education.

Techniques and methods employed in organization, development, and maintenance of a cooperative program. (NT)

EDCT 420 03(3-0-0). Agricultural Experience and Adult Education. S.

Developing secondary agriculture experience programs. Organizing and teaching adult education classes in agriculture.

EDCT 425 04(4-0-0). Methods/Materials in Agricultural Education. F. Prerequisite: Concurrent registration in EDCT 492; EDUC 350 or concurrent registration or EDUC 450 or concurrent registration.

Methods and procedures in teaching and evaluating agricultural education in the classroom and laboratory; vocational foundations; microteaching.

EDCT 431 04(4-0-0). Methods/Materials in Business Education. F. Prerequisite: Concurrent registration in EDCT 492; EDUC 350 or concurrent registration or EDUC 450 or concurrent registration.

Methods for teaching business education. (NT-O)

EDCT 441 01(1-0-0). Methods/Materials-Vocational Marketing Education. F. Prerequisite: EDCT 431; EDUC 350 or concurrent registration or EDUC 450 or concurrent registration.

Instructional methods and resource materials development for vocational marketing education. (NT-O)

EDCT 451 04(3-2-0). Methods-Family/Consumer Sciences Education. F. Prerequisite: EDUC 350 or concurrent registration or EDUC 450 or concurrent registration.

Teaching methods, processes, and materials for family and consumer sciences education.

EDCT 465 03(3-0-0). Methods and Materials in Technology Education. F. Prerequisite: EDUC 350 or concurrent registration or EDUC 450 or concurrent registration.

Strategies and practices of teaching in a technical laboratory setting.

EDCT 471 02(2-0-0). Orientation and Assessment of New Teachers. F, S, SS. Offered only through Continuing Education, School of Education.

Orientation to teaching and individual assessment of teaching skills; development and implementation of professional growth plan. (NT)

EDCT 472 01(0-0-1). Classroom Management. F, S, SS. Prerequisite: Admission to TAP; EDCT 471. Offered only through Continuing Education, School of Education.

Introduction to student management techniques and program management. Teachers will create a preliminary plan for instruction. (NT)

EDCT 473 01(0-0-1). Communication Strategies. F, S, SS. Prerequisite: Admission to TAP; EDCT 471. Offered only through Continuing Education, School of Education.

Introduction to improved communication techniques, conflict resolution, performing occupational advisement, and facilitating leadership activities. (NT)

EDCT 485 Var. Student Teaching. F, S. Prerequisite: EDUC 450; appropriate special (content) methods courses.

Teacher education candidates participate in an intensive and extensive on-site capstone experience within a public school setting. (\$)

EDCT 486 Var [1-6]. Practicum. Prerequisite: Admission to teacher licensure.

EDCT 492 Var. Seminar-Professional Relations. F, S. Prerequisite: EDUC 450; appropriate special (content) methods course; concurrent registration in EDCT 485.

Collegial and professional discussions, support, and assistance.

EDCT 494 Var. Independent Study.

EDCT 496 Var. Group Study.

EDCT 520 Var. Teaching Agricultural Education. SS. Prerequisite: Admission to teacher licensure.

Methods of teaching recent developments in the field of agriculture and allied industries.

EDCT 571 03(0-0-3). Vocational Assessment for Special Needs. F, S, SS.

Information on techniques regarding vocational assessment of special needs students including traditional and curriculum-based strategies. (NT-O)

EDCT 590 Var. Workshop.

EDCT 612 03(0-0-3). Career and Technical Administrative Strategies. F, S, SS. Offered only through Continuing Education, School of Education.

Basic educational systems; the scientific method as a basis for analysis; systems as a tool for planning and decision making. (NT)

EDCT 630 02(2-0-0). Organization of Business Education. SS. Prerequisite: EDCT 300.

Procedures for organizing new programs and for managing or modifying existing programs. (NT-O)

EDCT 631 02(2-0-0). Management of Business Departments. SS. Prerequisite: EDCT 300.

Preparation of teachers and administrators for implementation of vocational business and office education programs. (NT-O)

EDCT 640 02(2-0-0). Methods in Marketing Education. SS. Prerequisite: EDCT 441.

Instruction and curricula for secondary and postsecondary vocational marketing education. (NT-O)

EDCT 641 02(2-0-0). Programs in Marketing Education. SS. Prerequisite: EDCT 441.

Techniques used in determining need for and implementations of new or additional programs of vocational marketing education. (NT-O)

EDCT 693 Var. Seminar.

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°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HIGHER EDUCATION COURSES

School of Education

College of Applied Human Sciences

Service learning. **D)** International programs.
EDHE 694 Var. Independent Field Studies.

EDHE 695 Var. Independent Study.

EDHE 590A-M 01(0-0-1). Workshop-Student Personnel. Prerequisite: Enrollment in SAHE program.

A) Admissions. **F. B)** College union administration. **F. C)** Housing/auxiliary services. **S. D)** International programs. **F. E)** Career services. **S. F)** Service learning. **S. G)** Wellness programs. **S. H)** Advising student groups. **F. °J)** Access and Opportunity in Higher Education 01(0-0-1). **S** (odd years). ***K)** Leadership and Service in Higher Education. **F** (even years). ***L)** Working with Students' Parents and Families. **F** (even years). **°M)** Spiritual Dimensions of Student Development. **S** (odd years).

EDHE 660 02(1-0-1). Financial Management in Student Affairs. **F, S.** Prerequisite: Written consent of instructor.

Budgeting, fiscal planning, and financial administration in student affairs. (NT-O)

EDHE 661 03(3-0-0). Inclusive University. **S.** Prerequisite: Enrollment in SAHE program.

Exploration of broad range of human differences and their impact in higher education.

EDHE 662 02(2-0-0). Trends/Issues/Assessment in Higher Education. **S.** Prerequisite: Enrollment in SAHE program.

Assessment and research involving students in collegiate settings.

EDHE 670 03(0-0-3). College Student Personnel Administration. **F, SS.** Prerequisite: Written consent of instructor.

Historical, philosophical, and professional development in student affairs functions; analysis of role of student affairs in higher education. (NT-O)

EDHE 671 03(3-0-0). Higher Education Administration. **F, SS.**

History, purpose, structure, and role of leadership within the administration of higher education with relevance to present day higher education.

EDHE 672 02(2-0-0). Ethical and Practical Issues-Student Affairs. **F, S.** Prerequisite: Enrollment in SAHE program.

Ethical principles and standards used in student affairs. (NT-O)

EDHE 673 03(0-0-3). Student Development Theory. **F, S.**

Strategies for application of student development theories in practice. (NT-B)

EDHE 674 03(3-0-0). Campus Ecology. **SS.**

Patterns of relationships among students and the college campus' social and physical environments. (NT-O)

EDHE 676 03(3-0-0). Organizational Behavior in Student Affairs. **S.** Prerequisite: Enrollment in SAHE program.

Understanding and application of basic organizational behavior principles within administration of student affairs in higher education.

EDHE 677 03(3-0-0). Law in Student Affairs. **F.** Prerequisite: Enrollment in SAHE program.

Legal issues focusing on sources and application of educational law and responsibilities of higher education administrators.

EDHE 678 02(2-0-0). Current Issues in Student Affairs. **S, SS.** Prerequisite: Enrollment in SAHE program.

Capstone analyzing current issues and leadership in transition to professional roles. (NT-O)

EDHE 692A-D Var. Seminar. Prerequisite: Enrollment in SAHE program.

A) Current trends and issues. **B)** Working with student groups. **C)**

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ORGANIZATION PERFORMANCE AND CHANGE COURSES

School of Education

College of Applied Human Sciences

EDOD 506 03(3-0-0). Human Resource Development. S. Prerequisite: Admission to the Organizational Performance and Change specialization.
Human resource development foundational theory, research, and techniques for workplace and organizational learning and performance. (NT-O)

°EDOD 670 03(3-0-0). Strategic Human Resource Development. SS. Prerequisite: Admission to OPC specialization.
Examine fundamentals of strategy from a HRD perspective, utilizing management tools, recent research and contemporary theory.

***EDOD 671 03(3-0-0). Performance Consulting and Causal Analysis.** S. Prerequisite: Admission to OPC specialization.
Performance analysis and causal analysis; roles and responsibilities of performance consultants and process in performance consulting.

***EDOD 672 03(3-0-0). Change Facilitation.** F. Prerequisite: Admission to OPC specialization.
Roles and responsibilities of change agents and the fundamentals of change: principles, practices, processes, and resistance strategies.

EDOD 673 03(3-0-0). Organizational Intervention Strategies. S. Prerequisite: Admission to the Organizational Performance and Change specialization.
Identify, analyze, evaluate, and select performance improvement interventions/change initiatives for organizational performance problem or breakdown.

EDOD 674 03(3-0-0). Analyze Workplace Learning. S. Prerequisite: EDOD 506 or concurrent registration.
Analyze workplace learning and performance issues drawing on foundational principles.

EDOD 687 Var. Internship

EDOD 692 Var. Seminar-Human Resource Development. Prerequisite: Admission to OPC specialization.

***EDOD 765 03(3-0-0). Strategic Planning of Education for Work.** F. Prerequisite: Admission to OPC specialization.
Human capital as component of strategic planning of education; training and development at national, regional, and organizational levels.

EDOD 767 03(3-0-0). Cross-Culture and International Training. S. Prerequisite: Admission to OPC specialization.
Issues, models, techniques of development and delivery of human resource development and training programs across cultural, interregional, national barriers.

***EDOD 768 03(3-0-0). Workforce Development.** S. Prerequisite: Admission to OPC specialization.
Characteristics and elements of workforce development with special attention to the roles and responsibilities of employers and managers.

°EDOD 769 03(3-0-0). Theory and Practice of Change. F, S. Prerequisite: None.
Theory, history, characteristics, nature, levels, and types of change and modern conceptual and integrated models of change. (NT-B)

EDOD 770 03(3-0-0). Organizational Culture. F. Prerequisite: Admission to the Organizational Performance and Change specialization.
Examine the theories, methods, and practices of organizational culture

for evaluating, analyzing, and changing organizational culture.

EDOD 786 Var. Practicum. Prerequisite: Admission to OPC specialization.

EDOD 792 Var. Seminar-Human Resource Development. Prerequisite: Admission to OPC specialization.

EDOD 799 Var. Dissertation. F, S, SS. Prerequisite: None. Dissertation research, writing, and defense.

EDUCATION RESEARCH METHODS COURSES

School of Education

College of Applied Human Sciences

EDRM 600 03(3-0-0). Introduction to Research Methods. F, S, SS.

Methods of research, scientific methods, problem identification, research design, preparation and evaluation of research reports. (NT-O/V)

EDRM 602 03(3-0-0). Action Research. S, SS. Prerequisite: EDRM 600.

Provide educators with knowledge and skills to plan and implement school-based research to improve teaching and learning. (NT-B)

EDRM 606 03(3-0-0). Principles: Quantitative Data Analysis. F, S, SS. Prerequisite: EDRM 600; STAT 201.

Quantitative data analysis in social science research; descriptive statistics; fundamentals of inference. (NT-B)

EDRM 612 03(2-0-1). Assessing Students in Educational Settings. F, S, SS. Prerequisite: Admissions into a Master's program within the School of Education.

Various ways of assessing students including traditional, authentic, and portfolio techniques for P-20 education. (NT-O)

EDRM 666 03(3-0-0). Program Evaluation. F, S. Prerequisite: EDRM 600.

Models and practices of program evaluation in both public and private sector organizations. (NT-B)

EDRM 692 Var. Seminar-Research Methods and Proposal Design.

EDRM 698 Var. Research. (NT-O)

EDRM 699 Var. Thesis. (NT-O)

EDRM 700 03(3-0-0). Quantitative Research Methods. F, S. Prerequisite: EDRM 606 or concurrent registration.

Design, data analysis, interpretation of results, and evaluation of educational research studies. (NT-B)

EDRM 701 03(3-0-0). Applied Linear Models-Educational Research. S. Prerequisite: EDRM 606.

General linear model applications in educational research emphasizing conceptual understanding and characteristics of non-experimental designs.

EDRM 702 03(3-0-0). Foundations of Educational Research. F, S.

Philosophical, theoretical, and ethical foundations of educational research. (NT-B)

EDRM 703 03(3-0-0). Applied Longitudinal Data Analysis. F. Prerequisite: EDRM 701.

Methods and empirical applications of individual growth modeling and discrete-time event history analysis in educational research.

EDRM 704 03(3-0-0). Qualitative Research. F. Prerequisite: EDRM 600.

Examination of qualitative research theory, methods, and applications to education and the social sciences. (NT-O)

EDRM 705 03(3-0-0). Qualitative Data Analysis. S. Prerequisite: EDRM 704.

Examination of qualitative methods of data analysis, data presentation, and use of computer. (NT-O)

EDRM 706 03(3-0-0). Analysis of Variance-Education Research. S, SS. Prerequisite: EDRM 700 or concurrent registration.

Analysis of variance applications in educational research; experimental design and analysis of data from experiments.

EDRM 707 03(0-0-3). Quantitative Data Collection Methods/Analysis. F, S. Prerequisite: EDRM 700.

Selection or development of questionnaires, tests, structured interviews, and observations. Reliability and validity. Reporting educational studies. (NT-B)

EDRM 708 03(3-0-0). Narrative Inquiry. F. Prerequisite: EDRM 704.

Theory, methods and design of narrative approaches to research including data collection and analysis applications. (NT-B)

EDRM 711 03(3-0-0) Ethnographic Research. S. Prerequisite: EDRM 704.

Theoretical underpinnings, research design, ethics and practical application of ethnographic research in a naturalistic setting.

EDRM 786 Var[1-6]. Practicum. F, S, SS.

EDRM 792A-B Var. Seminar.

A) Research methodology. **B)** Proposal development. (NT-B, subtopic B only.)

EDRM 798 Var. Research. F, S, SS.

EDRM 799 Var. Dissertation.

EDUCATION COURSES

School of Education

College of Applied Human Sciences

EDUC 255 02(2-0-0). Introduction to Education. F, S, SS.

Overview of teaching profession emphasizing teaching opportunities, licensure, and University professional program.

EDUC 275 03(3-0-0). Schooling in the United States. (GT-SS1, AUCC 3C). F, S, SS. Prerequisite: Completion of 30 credits course work.

Social, political, historical, and economic forces that shape U.S. system of public schooling (P-12).

EDUC 296 Var. Group Study.

EDUC 320 03(0-0-3). Educational Psychology. F, S, SS. Offered as an online or correspondence course only.

Psychological conditions of classroom learning and teaching including understanding needs of exceptional children in the classroom. (NT-O/C)

EDUC 331 02(1-2-0). Educational Technology and Assessment. F, S, SS. Prerequisite: EDUC 275; EDUC 340; admission to teacher licensure.

Skills and strategies for the use of appropriate technology and assessment in teacher education.

EDUC 340 03(1-2-1). Literacy and the Learner. F, S, SS. Prerequisite: Completion of 30 credits of course work. Required background check through CDE, CBI, FBI.

Understanding and supporting literacy and numeracy development. Field experiences, service learning experiences.

EDUC 350 03(2-2-0). Instruction I-Individualization/Management. F, S, SS. Prerequisite: EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure.

Theory, research, and practice of teaching at the junior high/middle school level; adapting instruction for individuals including learners with special needs.

EDUC 386 Var [1-3]. Practicum-Instruction I. Prerequisite: EDUC 275; EDUC 340; concurrent registration in EDUC 350; admission to teacher licensure.

EDUC 400 03(1-4-0). Diagnostic Teaching of Reading. F, S. Prerequisite: EDUC 275; EDUC 340; HDFS 217; HDFS 310; HDFS 320.

Development of the knowledge base, skills, and strategies for teaching reading from birth to age 8. Service learning experiences.

EDUC 425 04(2-6-0). Early Childhood Education I. F, S. Prerequisite: EDUC 275; EDUC 340; admission to teacher licensure.

Integrated methods; theoretical bases; teacher's role; appropriate curriculum; measurement; environments; pedagogy; instructional design and decisions.

EDUC 426 04(2-4-0). Early Childhood Education II. F, S. Prerequisite: EDUC 425.

Integrated methods; organizing/presenting materials/activities; applying decisions; managing groups; individual instruction; assessment/evaluation.

EDUC 450 04(2-4-0) Instruction II-Standards and Assessment. F, S. Prerequisite: EDUC 331; EDUC 350; EDUC 386; concurrent registration in EDUC 486J. Course must be taken semester immediately prior to student teaching semester.

Theory, research, and practice of standards-based instruction: assessment, literacy and technology. Includes work in public schools.

EDUC 460 04(3-2-0). Methods and Materials in Teaching Science. F. Prerequisite: Admission to teacher licensure.

Current trends in science education, K-12; techniques of experimentation demonstrations; study of equipment, facilities, and resource materials.

EDUC 462 04(4-0-0). Methods and Assessment in Teaching Languages. F. Prerequisite: Admission to teacher licensure; oral and written competency in the language endorsement area.

Objectives, methods, and resource materials for teaching languages in secondary schools.

EDUC 463 04(4-0-0). Methods in Teaching Language Arts. F, S. Prerequisite: Admission to teacher licensure.

Objectives, content, and methods of teaching English, speech, and journalism in secondary schools.

EDUC 464 04(4-0-0). Methods and Materials in Teaching Mathematics. S. Prerequisite: 18 credits in mathematics; admission to teacher licensure.

Problems and techniques of teaching secondary mathematics; evaluation of student achievement and teacher effectiveness.

EDUC 465 04(4-0-0). Methods and Materials in Social Studies. F. Prerequisite: Admission to teacher licensure.

Methods of teaching social studies; sources of information and teaching materials and literature for social studies teachers.

EDUC 466 04(4-0-0). Methods and Assessment in K-12 Art Education. F. Prerequisite: EDUC 275; admission to teacher licensure.

Objectives, methods, and resource materials for teaching art in elementary and secondary schools.

EDUC 474 02(1-3-0). Elementary Music Methods I. F. Prerequisite: Admission to teacher licensure.

Developmentally appropriate strategies and materials for K-6 music instruction; emphasis on common methodologies, resources, standards-based teaching.

EDUC 475 02(1-3-0). Elementary Music Methods II. S. Prerequisite: EDUC 474.

Classroom management, motivational strategies, technology tools, assessment/evaluation of music learning and field experiences in K-6 music education. (\$)

EDUC 476 02(1-3-0). Choral Methods for Secondary Schools. F. Prerequisite: MU 217; admission to teacher licensure.

General music classes, choral techniques and literature; current practices and trends. (\$)

EDUC 477 02(1-3-0). Instrumental Methods for Secondary Schools. F. Prerequisite: MU 217; admission to teacher licensure.

Organization and administration of instrumental music, grades 5-12. (\$)

EDUC 485A-C. Var [6-14]. Student Teaching. F, S.

Teacher education candidates participate in an intensive and extensive on-site capstone experience within a public school setting. **A)** Elementary. Prerequisite: EDUC 450; appropriate special methods courses. **B)** Secondary. Prerequisite: EDUC 450; appropriate special methods courses. **(S) C)** Early childhood. Prerequisite: EDUC 426. (\$)

EDUC 486A-E Var. Practicum. Prerequisite: Admission to teacher licensure.

A) K-12 classroom. **B)** Reading. **C)** Mathematics. **D)** Literacy. **E)** Instruction II.

EDUC 493A-B Var [1-3]. Seminar. Prerequisite: EDUC 426 or EDUC 450; appropriate special methods course(s); EDUC 485A or concurrent registration, or EDUC 485B or concurrent registration, or EDUC 485C or concurrent registration, or EDCT 485 or concurrent registration.

A) Professional relations. Collegial and professional discussions, support, and assistance. **B)** Assessment of learning. Information and techniques that enable educators to use assessment results to inform planning and instructional practices.

EDUC 494 Var. Independent Field Studies.

Specialized field study in the public schools under direction and supervision of faculty.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

EDUC 495 Var. Independent Study.

EDUC 496 Var. Group Study.

EDUC 501 03(3-0-0). Reading in the Content Areas. SS. Prerequisite: EDUC 320.

Specific methods, materials, and techniques for helping students become more efficient in reading content area material.

EDUC 502 03(3-0-0). Human Relations in Education. F, S. Prerequisite: Bachelor's degree or EDCT 300.

Human relations in an individual's educational, organizational, and social activities as applied to various educational settings. (NT-O)

EDUC 525A-D Expert Teaching. Prerequisite: Bachelor's degree; admission to teacher licensure.

Theories related to effective classroom instruction. **A)** Inclusion, special needs. 02(0-0-2) **S. B)** Thinking and learning. 02(0-0-2) **F. C)** Literacy and numeracy. 03(0-0-3) **S. D)** Standards, assessment. 02(0-0-2). F.

EDUC 526 04(0-4-2). Interdisciplinary Methods. F. Prerequisite: Bachelor's degree; admission to teacher licensure.

Methods and theories related to effective classroom instruction.

EDUC 530 02(1-2-0). Computer Applications in Effective Instruction. F, SS. Prerequisite: Bachelor's degree; admission to teacher licensure.

Increasing instructional effectiveness through the use of computer technology.

EDUC 570 03(2-2-0). Perspectives of Special Education. F, SS.

Historical and legal, philosophical foundations, student characteristics, and building collaborative relationships in special education.

EDUC 572 03(3-0-0). Special Needs-Foundations and Practices. SS. Prerequisite: Teacher licensure.

Theory related to foundations and professional practices relevant for teaching students with mild/moderate special needs.

EDUC 573 03(3-0-0). Differentiating Instruction for Diverse Needs. F, SS. Prerequisite: EDUC 570.

Information techniques, and practice regarding methods for differentiating instruction.

EDUC 574 03(3-0-0). Transition and Secondary Services. F, SS. Prerequisite: EDUC 570.

Methods comprising state-of-the-art transition services for individuals with disabilities for the special education generalist.

EDUC 575 04(4-0-0). Methods for Mild/Moderate Special Needs. S. Prerequisite: EDUC 572; teacher licensure.

Methods addressing learning of students with mild/moderate special needs and instructional accommodations in regular classes.

EDUC 576A-L. Issues in Education. F, S, SS. Prerequisite: Baccalaureate degree. Offered only through Division of Continuing Education.

Issues in educating a diverse student population. Methods used in identification and assessment; strategies for intervention and/or instruction. **A)** Talented and Gifted. 02(0-0-2). **B)** Attention Deficit Disorder. 02(0-0-2). **C)** Autism/Asperger's. 02(0-0-2). **D)** Behavior is Language. 02(0-0-2). **E)** Classroom Management. 02(0-0-2). **F)** Teaching Diversity. 01(0-0-1). **G)** Harassment in Schools. 01(0-0-1). **H)** Assessing Special Needs. 02(0-0-2). **I)** Sexually Transmitted Diseases. 01(0-0-1). **J)** Drugs and Alcohol. 02(0-0-2). **K)** Child Abuse. 02(0-0-2). **L)** Traumatized Child. 02(0-0-2). (NT-C)

EDUC 591A-F Var. Workshop.

A) Instruction. **B)** Community partnerships. **C)** Annenberg/CPB science instruction. Var [1-3]. (NT-T) **D)** Annenberg/CPB mathematics instruction. Var [1-3]. (NT-T) **E)** Annenberg/CPB educational theory and issues. Var

[1-3]. (NT-T) **F)** Annenberg/CPB humanities instruction. Var[1-3]. (NT-T)

EDUC 610 03(2-0-1). Principles of Supervision and Evaluation. F,S.

Supervision and evaluation of instruction including required Colorado evaluation training. (NT-B)

EDUC 618 03(3-0-0). School Law. F, S.

Legal framework for operation and management of public and private schools emphasizing legal responsibilities for administrators and teachers.

EDUC 619 03(3-0-0). Curriculum Development. S, SS.

Principles and procedures for school personnel in planning the public school curriculum. (NT-O)

EDUC 620 02(2-0-0). Philosophy of Education. SS.

Contemporary philosophies as related to principles and practices in education.

EDUC 622 03(3-0-0). Innovative Social Studies Teaching. SS. Prerequisite: EDUC 485A or EDUC 485B.

Current trends in secondary school social studies teaching and curriculum techniques and materials for value formulation, decision-making skills, concepts, generalizations, and attitudes.

EDUC 623 03(0-2-2). Innovative Science Teaching. SS. Prerequisite: EDUC 485A or EDUC 485B.

Innovative trends in curriculum and methodology of science teaching.

EDUC 625 03(3-0-0). Contexts of Schooling. SS. Prerequisite: Admission to graduate program.

History, purpose, structure, and role of schooling with relevance to current issues, U.S. and international.

EDUC 628 03(3-0-0). Models of Teaching. F, SS. Prerequisite: Must be enrolled in one of the following levels: professional or graduate.

Exploration of pedagogical topics and skill development related to instructional approaches. (NT-T)

EDUC 629 03(3-0-0). Communication and Classrooms. F, S, SS.

Exploration of pedagogical topics and growth experiences related to classroom management and presentation skills. (NT-T)

***EDUC 635 03(3-0-0). Educators, Systems and Change.** F, S, SS. Prerequisite: EDUC 485A or EDUC 485B. Offered only through the Division of Continuing Education

Process of change in education, focusing on teacher's role as leader and facilitator. (NT)

EDUC 645 03(3-0-0). Leadership and Ethics in Public Education. SS. Prerequisite: Admission to administrator licensure.

Focus on leadership functions for public schools and ethical dimensions of leadership.

EDUC 646 03(3-0-0). School Resource Management. SS. Prerequisite: Admission to administrator licensure.

School resource management including fiscal, personnel, and organization. (NT-O)

EDUC 647 03(3-0-0). School Culture, Climate, and Communications. SS. Prerequisite: Admission to administrator licensure; concurrent registration in EDUC 645; EDUC 646.

Assist public school leaders in their facilitation role in enhancing human relations and communication within schools and communities.

EDUC 648A-C. Role of the Principal.

Role of the principal as a result of changes in society and in the schools. **A)** Professional learning community 01(1-0-0). F. Prerequisite: Admission to administrator licensure; concurrent registration in EDUC 687B. **B)** Managing and leading change 01(1-0-0). S. Prerequisite: Admission to administrator licensure; concurrent registration in EDUC 687B. **C)**

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Capstone 01(1-0-0). SS. Prerequisite: EDUC 687B.

EDUC 651 03(2-0-1). Multicultural and Special Populations. F, S, SS. Prerequisite: Bachelor's degree.

Special concerns for working with people of various cultural, ethnic, exceptional, and special interest groups. (NT-O)

EDUC 660 03(0-0-3). Advanced Methods—Science and Math Instruction. SS. Prerequisite: None. Offered as an online course only through the Division of Continuing Education.

Knowledge and skills to improve the teaching of science, technology, engineering, and mathematics for in service K-12 teachers. (NT-O).

EDUC 670 03(1-0-2). Grant Writing. F, S, SS. Prerequisite: None. Offered as an online course only through the Division of Continuing Education.

Mechanics of proposal writing, including intangibles of the grant-seeker's art. (NT-O)

EDUC 675 03(1-0-2). Analyzing Education Literature. F, S, SS. Prerequisite: EDRM 700 or EDRM 702 or EDRM 704.

Analyze, critique, and interpret scholarly literature in the discipline. (NT-B)

EDUC 684 Var. Supervised College Teaching.

EDUC 686A-B Var. Practicum.

A) Administration. Var[1-6]. F, S, SS. (NT-O). B) Urban teaching. Var.

EDUC 687A-E Var. Internship.

A) Administration. B) Principal. C) Guidance and counseling. D) Teacher licensure I. Prerequisite: Must be enrolled in one of the following levels: professional or graduate. E) Teacher licensure II. Prerequisite: Must be enrolled in one of the following levels: professional or graduate.

EDUC 693A-C Var. Seminar.

A) Administrator. B) Instruction. C) Teacher licensure capstone. Prerequisite: Must be enrolled in one of the following levels: professional or graduate.

EDUC 695 Var. Independent Study.

EDUC 696 Var. Group Study.

EDUC 709 03(3-0-0). Leadership Development. F, S, SS.

Principles, theories, attributes, and skills related to individual leadership development. (NT-B)

EDUC 710 03(0-0-3). Higher Education Finance. S.

Federal, state, and local revenue distribution, budget preparation and controls, accounting options, audit preparation. (NT)

EDUC 713 03(3-0-0). Teaching, Learning, and Professional Growth. F.

Prerequisite: Admission to Ph.D. program.

Teaching, learning, and professional development perspectives related to educational change and reform.

EDUC 714 03(3-0-0). Education Policy Analysis. S, SS. Prerequisite: Admission to Ph.D. program.

Frameworks for analyzing, designing policy proposals, and implementing plans.

EDUC 715 03(3-0-0). Critical Issues for Special Populations. S. Prerequisite: EDUC 709; EDUC 713.

Social and cultural issues related to special populations are researched and analyzed to understand policy that guides educational decisions.

EDUC 716 03(3-0-0). Capstone: Educational Equity and Reform. F, SS. Prerequisite: EDUC 709; EDUC 713.

Applies tenets of educational leadership research and theory into a

context of equity, global citizenship and environmental responsibility.

EDUC 725 03(3-0-0). Professionalism in Education and Leadership. F, SS. Prerequisite: Admitted into doctoral program. Credit not allowed for both EDUC 725 and EDHE 725.

Professional choices and ethical decision making in education and leadership, with emphasis on higher education.

EDUC 786 Var. Practicum.

EDUC 787 Var. Internship.

EDUC 792 Var. Seminar. (NT-O)

EDUC 793 Var. Seminar.

EDUC 795 Var. Independent Study.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC-*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ENGINEERING SCIENCE COURSES

Nondepartmental

College of Engineering

EGSC 492 01(0-0-1). Seminar. F, S.

EGSC 495 Var. Independent Study.

ENGINEERING COURSES

Nondepartmental College of Engineering

ENGR 101 03(3-0-0). Grand Challenges in Engineering. F. Prerequisite: None.

National Academy of Engineering's Grand Challenges in Engineering: overview, roles of engineering disciplines, engineering and societal challenges.

ENGR 102 03(3-0-0). Problem Solving for Engineers. F, S. Prerequisite: MATH 160 or concurrent registration.

Engineering problem solving: dimensional analysis; precision, accuracy, repeatability; problems from all major engineering disciplines.

ENGR 298 Var [1-3]. Undergraduate Research. Prerequisite: Written consent of research mentor and department head.

Directed undergraduate research with a faculty mentor.

ENGR 486 Var[1-3]. Practicum. F, S, SS.

ENGR 496 Var [1-3]. Group Study. F, S.

ENGR 498 Var [1-3]. Undergraduate Research. Prerequisite: Thirty credits in engineering and science; written consent of instructor.

Directed undergraduate research with a faculty mentor.

ENGR 501/ECE 501 03(0-0-3). Foundations of Systems Engineering. F, S. Credit not allowed for both ENGR 501 and ECE 501.

Functional components of systems engineering, application of systems engineering to practical problems, system life-cycle process. (NT-O)

ENGR 508/ECE 508 03(3-0-0). Introduction to Power System Markets. F. Prerequisite: ECE 461. Credit not allowed for both ENGR 508 and ECE 508.

Deregulated electrical power systems, system security, investments in generation and transmission, ancillary services, and nodal pricing. (NT-O)

ENGR 509/ECE 509 03(3-0-0). Signal Processing for Power Systems. F. Prerequisite: ECE 312; ECE 461. Credit not allowed for both ENGR 509 and ECE 509.

Signal processing tools for analyzing power systems, voltage frequency, magnitude variations, unbalance, waveform distortion. (NT-O)

ENGR 510 03(3-0-0). Engineering Optimization: Method/Application. F. Prerequisite: MATH 229; MATH 261. Credit not allowed for both ENGR 510 and MATH 510.

Optimization methods; linear programming, network flows, integer programming, interior point methods, quadratic programming, engineering applications. (NT-O)

ENGR 520 03(3-0-0). Engineering Decision Support/Expert Systems. S. Prerequisite: ENGR 510 or MATH 510. Credit not allowed for both ENGR 520 and ENGR 610.

Decision support systems for complex engineering problems; multicriteria decision making and optimization; hybrid knowledge-based/algorithmic methods. (NT-O/V)

ENGR 530/ECE 530 03(3-0-0). Overview of Systems Engineering Processes. F, S. Prerequisites: ECE 303/STAT 303 or STAT 315. Credit not allowed for both ENGR 530 and ECE 530.

Systems engineering life-cycle process and analysis techniques. Reliability and robustness. (NT-O)

ENGR 531/ECE 531 03(3-0-0). Engineering Risk Analysis. F, S. Prerequisite: ECE 303/STAT 303 or STAT 315; ENGR 501/ECE 501 or concurrent enrollment. Credit not allowed for both ENGR 531 and ECE 531.

Estimation and risk identification, development of mitigation

techniques. (NT-O)

ENGR 532/ECE 532 03(3-0-0). Dynamics of Complex Engineering Systems. F, S. Prerequisites: ENGR 501/ECE 501 or concurrent registration. Credit not allowed for both ENGR 532 and ECE 532.

Higher-level behavior and issues that emerge from interaction between components in complex socio-technical systems. (NT-O)

ENGR 565/ECE 565 03(3-0-0). Electrical Power Engineering. F, S. Prerequisite: ECE 332; ECE 342. Credit not allowed for both ENGR 565 and ECE 565.

Analysis of power systems in terms of current, voltage, and active/reactive power; introduction of computer-aided tools for power systems. (NT-O)

ENGR 566/ECE 566 03(3-0-0). Energy Conversion for Electrical Power Systems. F, S. Prerequisite: ECE 332. Credit not allowed for both ENGR 566 and ECE 566.

Energy conversion; fuel cell, battery storage, solar-photovoltaic, wind energy and traditional rotating-magnetic-field based machines. (NT-O)

ENGR 567/ECE 567 03(3-0-0). Systems Engineering Architecture. F, S. Prerequisite: ECE 501 or ENGE 501. Credit not allowed for both ENGR 567 and ECE 567.

Observation/classification of systems architecture. Systems architecture principles and critical evaluation through design studies. (NT-O)

ENGR 568/ ECE 568 03(3-0-0). Electrical Energy Generation Systems. F, S. Prerequisite: Written consent of instructor. Credit not allowed for both ENGR 568 and ECE 568.

Energy systems: renewable and traditional. Physics and operation of energy devices; solar-photovoltaic, wind energy, gas, coal, and nuclear plants. (NT-O)

ENGR 597 03(0-0-3). Group Study in Systems Engineering. F, S. Prerequisites: CIS 600; ENGR 530/ECE 530; ENGR 531/ECE 531.

Capstone study experience in systems engineering. (NT-O)

+ENGR 601/AGRI 601 03(2-2-0). Bioenergy Technology. F.

Science and engineering aspects of bioenergy production, including plant biology, fermentation, and biofuel properties. Required field trips.

ENGR 621/ ECE 621 03(3-0-0). Energy Storage for Electrical Power Systems. F, S. Prerequisite: Written consent of instructor. Credit not allowed for both ENGR 621 and ECE 621.

Physics and operation of electrical, mechanical, thermal and novel energy storage systems/devices. (NT-O)

ENGR 622/ECE 622 03(3-0-0). Energy Networks and Power Distribution Grids. F, S. Prerequisite: ECE 411 or MECH 417; ECE 565/ENGR 565. Credit not allowed for both ENGR 622 and ECE 622.

Energy networks: generation, storage, consumers. Systems approach to analysis of distribution networks and transition to intelligent grid systems. (NT-O)

ENGR 623/ECE 623 03(3-0-0). Electric Power Quality. S. Prerequisite: ECE 461 or ECE 562. Credit not allowed for both ENGR 623 and ECE 623.

Interconnecting power electronic devices and renewable energy sources to power systems. (NT-O)

ENGR 695 Var. Independent Study. F, S, SS. Prerequisite: None. (NT-O)

ENGR 697/ECE 697 Var[1-6]. Group Study. F, S, SS.

ENGR 699 Var. Thesis. F, S, SS. Prerequisite: None. (NT-O)

ENGR 795 Var. Independent Study. F, S, SS. Prerequisite: None. (NT-O)

ENGR 799 Var. Dissertation. F, S, SS. Prerequisite: None. (NT-O)

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ENVIRONMENTAL ENGINEERING COURSES

Department of Civil and Environmental Engineering College of Engineering

ENVE 322/CIVE 322 03(3-0-0). Basic Hydrology. F, S. Prerequisite: CBE 331 or CIVE 300 or WR 416; CIVE 202 or STAT 301 or STAT 315. Credit not allowed for both ENVE 322 and CIVE 322.

Hydrologic cycle, soil moisture, groundwater, runoff processes, water contamination, applications in water resources and environmental engineering.

ENVE 437/CIVE 437 03(3-0-0). Wastewater Treatment Facility Design. S. Prerequisite: CIVE 300; CIVE 438/ENVE 438 or concurrent registration.

Credit not allowed for both ENVE 437 and CIVE 437.

Design concepts and principles for wastewater treatment systems and unit processes, principles of treatment plant operation.

ENVE 438/CIVE 438 03(3-0-0). Environmental Engineering Concepts. F, S. Prerequisite: CBE 331 or CIVE 300 or MECH 342; CHEM 113. Credit not allowed for both ENVE 438 and CIVE 438.

Environmental engineering approaches to designing water supply, wastewater removal, and pollution control systems.

ENVE 441 03(2-3-0). Water Quality Analysis and Treatment. S. Prerequisite: CIVE 438/ENVE 438 or concurrent registration or CIVE 440 or concurrent registration.

Physical, chemical and biological methods for the characterization of waters and wastewaters.

ENVIRONMENTAL AND RADIOLOGICAL HEALTH COURSES

Department of Environmental and Radiological Health Sciences College of Veterinary Medicine and Biomedical Sciences

ERHS 174 01(1-0-0). Freshman Scholar. F, S. Prerequisite: Admission to CVMBS Freshman Scholar's Program. May be taken up to 2 times for credit.

Scholarship-supported exploration of biomedical research theory and practice.

ERHS 192 01(1-0-0). Environmental Health First Year Seminar. F. Prerequisite: Freshman standing.

Introduction to biosciences, college life, learning skills, problem solving, and degree planning.

ERHS 220 03(3-0-0). Environmental Health. F, S. Prerequisite: BZ 101 or concurrent registration or BZ 104 or concurrent registration or BZ 110 or concurrent registration or BZ 120 or concurrent registration or LIFE 102 or concurrent registration.

Impact of people on the physical and biological environment as well as impact of the environment on people; emphasis placed on human health.

ERHS 230 03(0-6-0). Environmental Health Field Methods. F, S. Prerequisite: CHEM 113 or concurrent registration; CHEM 114 or concurrent registration.

Field and laboratory techniques necessary for practice of environmental health. (\$)

ERHS 300 03(3-0-0). Introduction to Radiation Biology. S. Prerequisite: LIFE 102; PH 121.

Genetic and somatic effects of radiation on cells, tissues, and the whole organism; tumor therapy; carcinogenesis; risks vs. benefits of radiation.

ERHS 320 03(3-0-0). Environmental Health Water Quality. F. Prerequisite: MIP 300 or concurrent registration.

Water quality and treatment technologies for practice of environmental health.

ERHS 332 03(3-0-0). Principles of Epidemiology. S. Prerequisite: MIP 149 or concurrent registration or MIP 300 or concurrent registration; STAT 307 or concurrent registration.

Use of epidemiological methods in studying distribution of diseases in human populations.

ERHS 350 03(3-0-0). Industrial Hygiene and Air. F. Prerequisite: BMS 300; ERHS 230.

Industrial and airborne hazards, disease prevention, hazard control and evaluation.

ERHS 400 03(2-3-0). Radioisotope Techniques. F. Prerequisite: CHEM 112; ERHS 300; PH 122.

Radiation measurement, radiochemistry, waste management, radiotracer experiments. Prepares student to act as principal user in radiation laboratory.

ERHS 405 02(2-0-0). Fundamentals of Ergonomics. S. Prerequisite: One college-level animal biology or anatomy/physiology or engineering design course or concurrent registration. Offered as an online course only.

Basic skills, knowledge, and abilities in ergonomics; focus on musculoskeletal injury prevention. (NT-O)

ERHS 410 03(3-0-0). Environmental Health Waste Management. S. Prerequisite: CHEM 245 or concurrent registration or CHEM 343 or concurrent registration or CHEM 346 or concurrent registration; ERHS

230.

Recognition of impacts, occupational and environmental, in handling wastes; administrative management for waste programs.

ERHS 430 03(3-0-0). Human Disease and the Environment. S.

Overview of the human diseases which are associated with the environment.

ERHS 446 03(3-0-0). Environmental Toxicology. F. Prerequisite: CHEM 245 or CHEM 343 or CHEM 346.

Essentials of environmental toxicology based on problem-oriented discussions addressing environmental impacts of organic/inorganic chemicals.

ERHS 448 03(3-0-0). Environmental Contaminants: Exposure and Fate. S. Prerequisite: CHEM 245 or CHEM 341 or CHEM 345; LIFE 102.

Pathways of exposure and behavior of environmental contaminants. Exposure assessment in environmental health protection.

ERHS 487 07(0-21-0). Internship-Environmental Health. F, S.

Professional field practice in environmental health with a public or private sector agency.

ERHS 492 01(0-0-1). Environmental Health Seminar. S.

Networking, preparation of resume, and statement of qualifications for professional internship or employment.

ERHS 494 Var. Independent Study in Environmental Health. Prerequisite: ERHS 220.

Directed independent study or project under faculty guidance.

ERHS 498 Var [1-4]. Research. Prerequisite: Written consent of instructor.

Research in environmental and radiological health sciences.

ERHS 502 03(3-0-0). Fundamentals of Toxicology. F. Prerequisite: BMS 300 or BMS 360; CHEM 245 or CHEM 341 or CHEM 345.

Fundamental principles of toxicology; dose-response, organ targets, toxic agents.

ERHS 510 03(3-0-0). Cancer Biology. S. Prerequisite: BC 351 or BC 403 or concurrent registration or BZ 310 or CM 501.

Cancer biology, from epidemiology and classification, through the molecular basis of the phenotypes to detection and treatment.

ERHS 515 02(2-0-0). Non-Ionizing Radiation Safety. F, S, SS. Prerequisite: CHEM 107 or CHEM 113; MATH 118; PH 122 or PH 142.

Evaluation and safe use of non-ionizing radiation sources. Calculation of safe distances for exposure and maximum permissible exposures. (NT-O)

ERHS 520 03(3-0-0). Environmental and Occupational Health Issues. F. Prerequisite: BZ 110 or LIFE 102; CHEM 245 or CHEM 341 or CHEM 345.

Issues in environmental and occupational health sciences in the context of public health and regulatory concerns. (NT-O)

ERHS 526 03(3-0-0). Industrial Hygiene. F. Prerequisite: CHEM 245 or CHEM 341 or CHEM 345; ERHS 520 or concurrent registration; PH 110 or PH 121.

Theory and application of industrial hygiene principles to management of the occupational environment.

ERHS 527 01(0-3-0). Industrial Hygiene Laboratory. S. Prerequisite: ERHS 526 or concurrent registration.

Industrial hygiene field monitoring equipment and techniques.

ERHS 528 03(3-0-0). Occupational Safety. S. Prerequisite: ERHS 526.

Introduction to occupational safety hazard recognition and control.

ERHS 530 03(3-0-0). Radiological Physics and Dosimetry I. F. Prerequisite: MATH 155 or MATH 160; PH 122.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Theory and detection of ionizing radiation; measurement and calculation of exposure and dose. (NT-V)

ERHS 531 02(1-3-0). Nuclear Instruments and Measurements. S. Prerequisite: ERHS 530 or concurrent registration.

Instrument systems for measurement and identification of ionizing radiations.

ERHS 532 03(2-0-1). Epidemiologic Methods. F. Prerequisite: STAT 307.

Method of epidemiologic investigation and study design. Applications to disease control with literature examples.

***ERHS 536 03(3-0-0). Advanced Occupational Health.** S. Prerequisite: ERHS 446 or ERHS 526.

Advanced topics in occupational health emphasizing contemporary issues, topics, trends, and problems in the field of industrial hygiene.

ERHS 540 03(3-0-0). Principles of Ergonomics. F.

Theory and practice of ergonomics.

°ERHS 541 03(3-0-0). Ergonomics in Product and Process Design. S. Prerequisite: ERHS 540.

Application of ergonomics to design of products and processes with respect to health, safety, function, and quality.

ERHS 542 03(3-0-0). Biostatistical Methods for Qualitative Data. F. Prerequisite: STAT 301 or STAT 307.

Statistical analysis of categorical data as obtained in epidemiology, toxicology, occupational health, and clinical sciences.

ERHS 544/STAT 544 03(3-0-0). Biostatistical Methods for Quantitative Data. S. Prerequisite: STAT 301 or STAT 307. Credit not allowed for both ERHS 544 and STAT 544.

Regression and analysis of variance methods applied to both observational studies and designed experiments in the biological sciences.

ERHS 547 03(0-6-0). Equipment and Instrumentation. S. Prerequisite: ERHS 446.

Sample collection, quality control, theory and application of equipment and instrumentation for analysis and confirmation of organic-inorganic chemicals.(S)

ERHS 549 03(3-0-0). Environmental Health Risk Assessment. S. Prerequisite: ERHS 446 or ERHS 502 or ERHS 532.

Environmental contamination and health effects of chemicals using risk assessment, management and communication approaches.

ERHS 550 05(5-0-0). Principles of Radiation Biology. S. Prerequisite: BZ 310; ERHS 300 or ERHS 530.

Dose-response relationships; physical, chemical, and biological modification of radiation damage; radiation oncology; radiation genetics and oncogenesis.

ERHS 561 02(2-0-0). Radiation Public Health. F, S. Prerequisite: ERHS 530; ERHS 550 or concurrent registration; or ERHS 300 and ERHS 400 with written consent of instructor.

Aspects of radiation public health for students in health physics with emphasis on contemporary issues in radiation protection.

ERHS 563 02(2-0-0). Environmental Contaminant Modeling I. S. Prerequisite: MATH 155.

Mathematical modeling of radionuclide and chemical transport in aquatic and terrestrial ecosystems.

ERHS 565 02(2-0-0). Chemical and Biological Warfare Agents. S. Prerequisite: CHEM 245 or CHEM 346.

Current understanding of chemical and biological agents used in asymmetric warfare.

ERHS 566 03(3-0-0). Clinical and Forensic Toxicology. F. Prerequisite: CHEM 245 or CHEM 346.

Toxic effects on commonly encountered abused and toxic substances.

ERHS 567 03(0-6-0). Cell and Molecular Toxicology Techniques. F. Hands-on techniques exposure to molecular toxicology. (S)

ERHS 568 03(3-0-0). Pharmaceutical and Regulatory Toxicology. S. Prerequisite: ERHS 502.

Toxicology as applied in public (regulatory) and private (pharmaceutical, industrial) sectors.

ERHS 570 02(2-0-0). Radioecology. S.

Environmental transport and exposure assessment of radioactive and other contaminants; estimating risk for human health and ecological impacts. (NT-O)

ERHS 595B-K Var. Independent Study.

B) Large animal radiology. **D)** Radiation therapy. **E)** Radiation physics. **F)** Dosimetry. **G)** Radiation chemistry. **H)** Radiation biology. **I)** Radiological health. **J)** Radiation ecology. **K)** Microcomputer analysis.

ERHS 601 03(3-0-0). Metabolism and Disposition of Toxic Agents. F. Prerequisite: ERHS 502 or concurrent registration.

Metabolism of toxic agents and effects on their fate in the body. Covalent and non-covalent interactions with cellular targets.

ERHS 602 03(3-0-0). Toxicological Mechanisms. S. Prerequisite: ERHS 502.

Role of cellular information systems in toxic mechanisms: DNA expression, signal transduction and control of cellular processes.

ERHS 603 03(3-0-0). Toxicological Pathology. S. Prerequisite: BMS 300 or BMS 360.

Toxicological study of pharmacologic, chemical and environmental agents and resulting morphologic and cellular changes.

ERHS 611 02(2-0-0). Cancer Genetics. F. Prerequisite: BZ 350 or MIP 450.

Role of genetic background in determining individual susceptibility to cancer.

ERHS 630 03(3-0-0). Radiological Physics and Dosimetry II. S. Prerequisite: ERHS 530.

Calculations and measurement techniques for dosimetry shielding and protection from ionizing radiations.

ERHS 632 01(0-3-0). Techniques in Radiation Dosimetry. F. Prerequisite: ERHS 630 or concurrent registration.

Techniques for determining the absorbed dose in tissue from ionizing radiations.

ERHS 633 01(0-3-0). Radiation Detection Methods in Radiobiology. S. Prerequisite: ERHS 630 or concurrent registration.

Detection and measurement of ionizing radiation appropriate for radiobiologists.

***ERHS 636 03(3-0-0). Industrial Hygiene Control Methods.** S. Prerequisite: ERHS 526; ERHS 536 or concurrent registration.

Controlling occupational exposures to chemical agents, emphasizing local exhaust ventilation; personal protective devices.

***ERHS 637 Environment, Safety, and Health Management.** F. Prerequisite: ERHS 526.

Environment, safety, and health management systems for occupational health practitioners; major environmental and DOT regulatory standards and laws.

°ERHS 640 03(3-0-0). Advanced Epidemiology. S. Prerequisite: ERHS

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

In-depth exploration of advanced epidemiologic methods.

***ERHS 642 03(3-0-0). Applied Logistic Regression.** S. Prerequisite: ERHS 532; ERHS 542.

Basic and advanced concepts of logistic regression with focus on practical applications in epidemiology using SAS.

***ERHS 656 03(3-0-0). Occupational Noise Control.** F. Prerequisite: ERHS 527.

Measurement and control of industrial or environmental noise emphasizing practical solutions. (NT-O)

°ERHS 658 03(2-0-1). Environmental/Occupational Epidemiology. S. Prerequisite: ERHS 532.

Epidemiologic analyses of effects of exposure to environmental and occupational health hazards.

ERHS 665 03(2-3-0). Radiochemistry. S. Prerequisite: CHEM 114; ERHS 530 or concurrent registration; MATH 155.

Radionuclide separation and measurement and radiotracer applications in physical and biological systems.

ERHS 670 Var [1-3]. Directed Readings. F, S, SS. Prerequisite: ERHS 520.

Advanced study through supervised readings on specialized topics.

ERHS 671 01(0-3-0). Experimental Radioecology. S. Prerequisite: ERHS 400 or ERHS 532; concurrent registration in ERHS 570.

Experimental techniques used in radioecological and environmental radioactivity studies.

+ERHS 679 01(0-0-1). Occ Env Health Interdisciplinary Symposium. F, S. Prerequisite: Enrollment in a graduate program related to occupational, environmental, or public health. May be repeated for credit.

Evaluation of complex occupational and environmental health issues, through multidisciplinary interactions in seminars and field visits. Required field trips.

ERHS 684 Var [1-3]. Supervised College Teaching.

Participation in environmental health course teachings under guidance of faculty in classroom, laboratory, or field.

ERHS 687 Var [1-6]. Internship.

Advanced study or research in environmental health with a governmental agency, private sector entity, or research facility.

ERHS 692 01(1-0-0). Seminar. F, S.

Professional seminar series with student interaction on weekly basis; topics presented by outside experts, faculty, or doctoral candidates.

ERHS 693A-D 01(0-0-1). Research Seminar.

Presentation of student research and discussion of publications from scientific literature. **A)** Epidemiology. **B)** Industrial hygiene. **C)** Toxicology. **D)** Health physics.

ERHS 695A-P Var. Independent Study.

Specialized study in a defined area under supervision of faculty. **A)** Epidemiology. **B)** Occupational and environmental health. **C)** Toxicology. **D)** Radiation chemistry. **E)** Radiation ecology. **F)** Cancer biology. **G)** Health physics **H)** Exposure assessment. **I)** Small animal radiology. **J)** Large animal radiology. **K)** Special techniques in radiology. **L)** Radiation therapy. **M)** Computed tomography. **N)** Magnetic resonance imaging. **O)** Ultrasound. **P)** Nuclear medicine.

ERHS 696A-D Var [1-3]. Group Study

A) Epidemiology. Prerequisite: ERHS 520. **B)** Industrial hygiene. Prerequisite: ERHS 520. **C)** Toxicology. Prerequisite: ERHS 520. **D)** Health physics. Prerequisite: ERHS 530.

ERHS 698 Var [1-6]. Research. Prerequisite: Written consent of research mentor.

ERHS 699 Var. Thesis.

Master's-level research and preparation of thesis.

°ERHS 701 04(4-0-0) Advanced Diagnostic Imaging Modalities. S. Prerequisite: VM 786A or VM 786B or DVM.

Interpretation/applications of advanced imaging methods including ultrasound, nuclear medicine, magnetic resonance imaging and computed tomography.

***ERHS 711 Var. Advanced Radiographic Interpretation.** S. Prerequisite: VM 786A or VM 786B or DVM

Radiographic interpretation of disease processes of all major systems in large and small animals.

°ERHS 712 03(3-0-0). Physics of Diagnostic Imaging. F. Prerequisite: DVM or equivalent professional veterinary medicine degree.

Physics of imaging for radiology, ultrasound, computerized tomography, magnetic resonance, and nuclear medicine.

***ERHS 714 03(3-0-0). Radiation Therapy Physics.** F. Prerequisite: DVM or health physics, physics, or engineering graduate student.

Radiation therapy physics, photon and electron production for therapeutic use, teletherapy, brachytherapy, radiation protection and quality assurance.

ERHS 721 Var [1-3]. Radiation Oncology. F, S, SS.

Management of spontaneous and experimental tumors with emphasis on radiation therapy.

ERHS 726 03(3-0-0). Aerosols and Environmental Health. F. Prerequisite: PH 141.

Properties and behavior of environmental and occupational aerosols emphasizing how airborne particles affect health of humans and the environment.

°ERHS 733 03(3-0-0). Environmental Carcinogenesis. S. Prerequisite: BC 403.

Molecular and cellular mechanisms by which environmental carcinogens exert effects.

***ERHS 751 03(3-0-0). Advanced Radiation Biology I.** F. Prerequisite: ERHS 550.

Molecular and cellular mechanisms of radiation damage and repair; mammalian radiation genetics.

°ERHS 753 03(3-0-0). Advanced Radiation Biology II. S. Prerequisite: ERHS 550.

Perturbations in cell cycle and cell population growth kinetics by radiation; radiation effects on normal tissues; radiation oncogenesis.

ERHS 765 01(0-3-0). Environmental Contaminant Modeling II. SS. Prerequisite: ERHS 563; ERHS 570.

Development and analysis of advanced computer models for radionuclide and chemical transport in aquatic and terrestrial ecosystems.

ERHS 770 01(0-0-1). Radiation Biology Basic to Tumor Therapy. F, S.

Current aspects of radiation biology pertinent to improvements in radiation therapy.

ERHS 784 Var [1-3]. Supervised College Teaching.

Participation in environmental health course teachings under guidance of faculty in classroom, laboratory, or field.

ERHS 786 Var. Practicum. Prerequisite: ERHS 530.

ERHS 787 Var [1-6]. Internship.

Advanced study or research in environmental health with a

governmental agency, private sector entity, or research facility.

ERHS 792 01(0-0-1). Seminar.

Professional seminar series with student interaction on weekly basis; topics presented by outside experts, faculty, or doctoral candidates.

ERHS 793 01(0-0-1). Seminar.

ERHS 795A-P Var. Independent Study.

A) Epidemiology. B) Occupational and environmental health. C) Toxicology. D) Radiation chemistry. E) Radiation ecology. F) Cancer biology. G) Health physics. H) Exposure assessment. I) Small animal radiology. J) Large animal radiology. K) Special techniques in radiology. L) Radiation therapy. M) Computed tomography. N) Magnetic resonance imaging. O) Ultrasound. P) Nuclear medicine.

ERHS 796 Var. Group Study.

ERHS 799 Var. Dissertation.

Doctoral-level research and preparation of dissertation.

ECOSYSTEM SCIENCE AND SUSTAINABILITY COURSES

*Department of Ecosystem Science and
Sustainability
Warner College of Natural Resources*

ESS 130 01(0-2-0). System Theory and Information Management. F.
Prerequisite: AGRI 140 or BUS 150 or CS 110.

Applying computers, networks, software applications, and the internet for managing information in ecosystem science and sustainability.

ESS 211 03(3-0-0). Foundations in Ecosystem Science. F. Prerequisite: GR 210.

Linkage between society and ecosystems services as foundation for sustainability of the coupled human-environmental system.

+ESS 311 03(3-0-0). Ecosystem Ecology. F. Prerequisite: ESS 211.
Required field trips.

Principles of ecosystems ecology, emphasis on their application to coupled natural and human systems.

ESS 330 03(3-0-0). Quantitative Reasoning for Ecosystem Science. S.
Prerequisite: ESS 211; MATH 155 or MATH 160; STAT 301 or STAT 307; junior or senior standing.

Understanding diverse approaches for using data and models to understand complex ecological systems.

ESS 400 04(2-0-2). Sustainability and Ecosystem Science. S.
Prerequisite: ESS 311; ESS 330.

Integrates ecosystems services and sustainability strategies, application to coupled natural and human systems.

ESS 411 03(2-2-0). Earth Systems Ecology. F. Prerequisite: ESS 311.

Earth as a system, stressing ecological interactions among energy, water, and biogeochemistry.

ESS 440 03(3-0-0). Practicing Sustainability. S. Prerequisite: ESS 311; ESS 330; senior standing in WCNR.

Capstone integration of ecosystem science and sustainability, focused on case studies.

+ESS 486 02(0-0-2). Ecosystem Practicum. F. Prerequisite: ESS 311; NR 220; senior standing. Field trips required.

One-week field practicum to examine ecosystem science and sustainability issues in Colorado landscapes.

ESS 524 03(3-0-0). Foundations for Carbon/Greenhouse Gas Mgmt. F.
Prerequisite: Upper division coursework in biology, ecology, or chemistry.

Foundations for understanding greenhouse gas emissions management and accounting. (NT-O)

ETHNIC STUDIES COURSES

Department of Ethnic Studies *College of Liberal Arts*

ETST 100 03(3-0-0). Introduction to Ethnic Studies. (GT-SS3, AUCC 3E). F, S, SS.

Key concepts, theories, and historical experiences that form the basis of scholarly work in comparative ethnic studies, domestically and internationally.

ETST 205 03(3-0-0). Ethnicity and the Media. (GT-SS3, AUCC 3E). F.

Ethnic representation across time as represented in auto/biography, fiction, poetry, and popular media.

+ETST 208/ART 208 03(3-0-0). Native American Art and Material Culture. S. Credit not allowed for both ETST 208 and ART 208.

Traditional arts and material culture of the indigenous peoples of North America. (\$)

ETST 210 03(3-0-0). Asian American Leaders and Leadership. F.

Cultural, historical and social influences on Asian American leaders and leadership explored via personal histories, culture, and values.

ETST 234/E 234 03(3-0-0). Introduction to Native American Literature. F. Credit not allowed for both ETST 234 and E 234.

Native American writings and their significance in American culture.

ETST 239/E 239 03(3-0-0). Introduction to Chicano Literature. F, S. Credit not allowed for both ETST 239 and E 239.

Chicano fiction and poetry with consideration of historical roots and influences.

ETST 240 03(3-0-0). Native American Cultural Expressions. (GT-AH2, AUCC 3B). F.

Exploration of Native lives and expressions through examination of Native architecture, art, music, film, activism, and literature.

ETST 250/HIST 250 03(3-0-0). African American History. (GT-HI1, AUCC 3D). F. Credit not allowed for both ETST 250 and HIST 250.

Slavery, emancipation, labor, political, socioeconomic, and cultural history of African Americans since colonial times.

ETST 252/HIST 252 03(3-0-0). Asian American History. (GT-HI1, AUCC 3D). F. Credit not allowed for both ETST 252 and HIST 252.

Asian American historical experience in the United States from 1850s to the present time.

°ETST 253 03(3-0-0). Chicana/o History and Culture. GT-HI1, (AUCC 3E). F.

Historical study of Chicana/o/Mexicana/o people and culture from Spanish colonization to beginning of 20th century.

***ETST 254 03(3-0-0). La Chicana in Society.** F.

Historical contributions of Chicana women and current gender issues in Chicano communities in the U.S.

ETST 255/HIST 255 03(3-0-0). Native American History. (GT-HI1, AUCC 3D). S. Credit not allowed for both ETST 255 and HIST 255.

History of Native American peoples in the United States to the present, including origin stories.

ETST 256 03(3-0-0). Border Crossings: People/Politics/Culture. (GT-SS3, AUCC 3E). S.

Colonial and post-colonial discourse, politics of representation and epistemology of "location" it has produced: first and third world.

ETST 261 03(3-0-0). Latina/o Populations in the U.S. F.

Historical processes and sociocultural phenomena that define Latina/o populations in the U.S.

ETST 300 03(3-0-0). Queer Studies and Women of Color. F, S. Prerequisite: None.

Historical/contemporary analysis of contributions of women of color to queer studies; racialized sexual/gender identities; written and cultural works.

ETST 310 03(3-0-0). African American Studies. F.

Meaning of African-American studies in context of American higher education; historical development of such studies; perceptions and misperceptions.

ETST 312 03(3-0-0). African American Situation. F.

Examination of historical, political, social, and economic experiences of the African American people.

ETST 316/JTC 316 03(3-0-0). Multiculturalism and the Media. S.

Credit not allowed for both ETST 316 and JTC 316.

Media and multiculturalism with emphasis on race, ethnicity, and other protected groups.

***ETST 318/*ANTH 318 03(3-0-0). Peoples and Cultures of the Southwest.** F, S. Prerequisite: ANTH 100. Credit not allowed for both ETST 318 and ANTH 318.

Analyze development of cultures of the American Southwest; colonialism, migration, political incorporation, and socioeconomic processes. (NT-O)

ETST 319/ANTH 319 03(3-0-0). Latin American Peasantries. F, S. Credit not allowed for both ETST 319 and ANTH 319. Prerequisite: (ANTH 100; ANTH 200) or ETST 100.

Sociocultural, economic, and political responses of Latin American peasantries to poverty and global processes.

ETST 320 03(3-0-0). Ethnicity and Film: Asian-American Experience. F.

Asian American film image and film representation through both mainstream and independent movies.

ETST 324 03(3-0-0). Asian Pacific Americans and the Law. S.

Legal history of Asian Pacific Americans examined through case studies.

ETST 332 03(3-0-0). Contemporary Chicana/o Issues. S.

Current Chicana/o issues including conquest, immigration, urbanization, health in context of societal trends.

ETST 340 03(3-0-0). Native American Perspectives on Conquest. S.

Native life and expression in the U.S. through response of Native Americans to conquest via revitalization movements, literature, arts.

ETST 344 03(3-0-0). Native American Religious History and Issues. F.

Native ritual, ceremony, and sacred existence; clearer understanding of Native life and religious ways.

ETST 352/SOWK 352 03(3-0-0). Indigenous Women, Children, and Tribes. F. Credit not allowed for both ETST 352 and SOWK 352.

Historical and contemporary lives of women, children, and tribal communities.

ETST 354 03(3-0-0). A Century of Black Cinema. F.

History of Black cinema in 20th century.

ETST 360 03(3-0-0). Service and Leadership in Black Communities. S. Prerequisite: None.

Sociocultural context of leadership in and beyond the African American community.

ETST 364/HIST 364 03(3-0-0). Asian American Social Movements, 1945-Present. F, S. HIST 151 of HIST 252/ETST 252; completion of 45 credits. Credit not allowed for both ETST 364 and HIST 364.

Historical relationships between Asian Americans and social movements

for social, economic, and political equity in the U.S. since 1945.

ETST 365 03(3-0-0). Global Environmental Justice Movements. F, S.

How the world's poor and minorities self-empower to challenge institutional racism and government apathy in order to secure basic environmental goods.

ETST 370 03(3-0-0). Caribbean Identities. F, S.

Development of Caribbean identities from the arrival of Amerindian groups to the abolition of slavery in the nineteenth century.

ETST 371 03(3-0-0). The Modern Caribbean. F, S.

Modern political and socio-economic developments in the Caribbean with emphasis on race, ethnicity, and gender.

ETST 382/LGEN 382 03(2-0-1). Italian Ethnic Identity, Culture, and Gender. SS.

Different ethnic identities in southern and northern Italy. Historical and contemporary culture and feminism. Enhancement of linguistic skills.

ETST 404 03(3-0-0). Race Formation in the United States. F.

Concept of race as a social construct in the shaping of U.S. character, values, and institutions.

ETST 405 03(3-0-0). Ethnicity, Class, and Gender in the U.S. S.

Roles of and interconnections among ethnicity, class and gender for various groups in the United States.

***ETST 410 03(3-0-0). African American Periods and Personalities.** S.

Historical moments, movements, and men and women who have helped shape the African American heritage.

ETST 411 03(3-0-0). Black Feminism(s). F, S. Prerequisite: None.

History and trajectory of Black feminist thought from the nineteenth century to the present.

***ETST 412 03(3-0-0). Africa and African Diaspora.** F.

Interdisciplinary investigation of retention, transformation, and creation of culture in plantation economies of Americas.

ETST 413 03(3-0-0). Queer Creative Expressions. F, S. Prerequisite: None.

Analysis of queer creative expressions within socio-political discourse and cultural works, with an emphasis on critical, queer feminist theory.

°ETST 414/°ANTH 414 03(3-0-0). Development in Indian Country. F. Credit not allowed for both ETST 414 and ANTH 414.

Critical examination of history, public policy, and tribal strategies for economic development and natural resource management in Indian country.

°ETST 424 03(3-0-0). Asian Pacific American Literature and Culture. S.

Asian Pacific American culture viewed through literature, art, and popular culture.

ETST 425 03(3-0-0). Indigenous Film and Video. F, S.

Historical and contemporary analysis of film featuring indigenous peoples.

ETST 430 03(3-0-0). Latina/o Creative Expression. S. Prerequisite: Junior or senior status.

Creative expression in literature, art, theatre, music: approach to understanding experiences of various Chicana/o/Latina/o groups in the U.S.

ETST 432 03(3-0-0). Latina/o Routes to Empowerment. S. Prerequisite: Junior or senior status.

Critical examination of political and economic strategies used to incorporate Chicana/o/Latina/o groups into U.S. society.

ETST 438/E 438 03(3-0-0). Native American Literature. F. Credit not

allowed for both ETST 438 and E 438.

Literature of Native Americans emphasized as distinctive tradition in American literature and cultural expression of indigenous peoples.

ETST 444/SOC 444 03(3-0-0). Federal Indian Law and Policy. S. Credit not allowed for both ETST 444 and SOC 444.

Indian policy processes and their impact on Native lives and culture, particularly Native sovereignty.

ETST 454/SPCM 454 03(2-2-0). Chicano/a Film and Video. F. Credit not allowed for both ETST 454 and SPCM 454.

Emergence of Chicano/a cinema from a place of displacement, resistance, and affirmation found in contemporary Chicano/a film, video.

ETST 484 Var [1-3]. Supervised College Teaching. Prerequisite: Written consent of instructor. May be taken only once. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

ETST 487 Var [1-6]. Internship. Prerequisite: ETST 100.

ETST 492 03(0-0-3). Seminar. F, S.

ETST 493 03(3-0-0). Ethnic Studies Research Methods and Writing. S. Prerequisite: ETST 100; 18 additional ETST credits. Senior standing required.

Research ethics, methodology, theory, and writing in ethnic studies.

ETST 495 Var. Independent Study. F, S.

ETST 500 03(3-0-0). Race, Ethnicity, and Nationality. S.

Intersections of race, ethnicity, and nationality within a broader framework of political economy.

ETST 501 03(3-0-0). Ethnic Studies History and Theory. F. Prerequisite: Graduate or senior status.

History and theory of study of racial and ethnic formation, identity, and politics.

ETST 502 03(3-0-0). Research Methods. F. Prerequisite: Graduate or senior status.

Interdisciplinary ethnic studies research methods.

ETST 503 03(3-0-0). Contemporary Ethnic Studies Issues. F. Prerequisite: Graduate or senior status.

Contemporary ethnic studies issues in the United States and abroad.

ETST 505 03(3-0-0). Academic Writing. S. Prerequisite: Graduate status.

Academic writing skills development including article summaries, literature reviews, annotated bibliographies, proposals, and journal articles.

ETST 510 03(3-0-0). Ethnicity, Race, and Health Disparities in US. F.

Health status of ethnic/racial populations; cultural dimensions that underlie health and health disparities.

ETST 513/ANTH 513 03(3-0-0). Capitalism and Global Ethnic Conflicts. S. Prerequisite: ANTH 200 or ETST 100. Credit not allowed for both ETST 513 and ANTH 513.

Causes of global ethnic conflicts with emphasis on resource competition, capitalist development schemes, and role of the state.

ETST 520 03(3-0-0). Race and U.S. Social Movements. S. Prerequisite: Graduate or senior status.

Intersections of race, class, gender, and sexuality which structure life chances and mobilize movements for rights, recognition, and resources.

ETST 530 03(3-0-0). Race, Labor, and the Economy. S. Prerequisite: Graduate or senior status.

Social stratification, class, race, and gender formation, neoliberalism, and the impact of globalization.

ETST 531 03(3-0-0). Latina/o Politics in the U.S. F, S.

Impact of Latina/o politics on the U.S. political system by examining Latina/o political mobilization patterns and behaviors.

ETST 535 03(3-0-0). Chicana Feminism: Theory and Form. F, S.

Different forms of Chicana feminism as produced by Chicana scholars, writers, poets, artists and activists from historical and contemporary accounts.

ETST 541 03(3-0-0). Gender, Violence, and Indigenous Peoples. F, S.

Multiple forms of violence against indigenous women and children in the Americas, Australia, and New Zealand.

ETST 544/POLS 544 03(3-0-0). National Identities and Nation Building. F. Credit not allowed for both ETST 544 and POLS 544.

How statist conceptions of race and ethnicity have been mobilized in nation-building projects.

ETST 550 03(3-0-0). Law, Policy, and Indigenous Peoples. S.

Prerequisite: Graduate or senior status.

Laws and policies impacting indigenous women, children, families, and communities in North America, New Zealand, and Australia.

ETST 560 03(3-0-0). Race, Ethnicity, and Higher Education. F.

Historical and contemporary experiences of people of color as students, faculty, and staff in higher education in the United States.

ETST 684 Var. Supervised College Teaching.

ETST 687 Var. Internship.

ETST 695 Var. Independent Study.

ETST 698 Var. Research in Ethnicity.

ETST 699 Var. Thesis.

FOREST SCIENCES COURSES

Department of Forest and Rangeland

Stewardship

Warner College of Natural Resources

F 210 03(2-2-0). Forest Ecogeography. F, S. Prerequisite: BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 102.

Ecogeography of forested ecosystems on a global scale and identification of important North American trees.

+F 224 01(0-2-0). Wildland Fire Measurements. F.

Wildland fire control and use measurements: fuels, weather, topography, fire behavior, and fire ecology.

F 230 02(0-4-0). Forestry Field Measurements. SS.

Develop field skills using maps, compasses and aerial photos; photo interpretation; tree and stand measurements; stand volume and value estimates.

F 310/RS 310 03(2-2-0). Forest and Rangeland Ecogeography. F, S. Prerequisite: BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 102.

Distribution of wildland plant communities and identification of important grasses, forbs, shrubs and trees common in North America.

F 311 03(3-0-0). Forest Ecology. F, S. Prerequisite: LAND 220/LIFE 220 or LIFE 320.

Relationships of ecological concepts to the dynamics of forest ecosystems.

F 312 01(0-2-0). Dendrology Lab. F, S. Prerequisite: Concurrent registration in F 310.

Identification of characteristic trees common to North American forests.

+F 321 03(2-2-0). Forest Biometry. F. Prerequisite: NR 220; F 230; MATH 141; STAT 201 or STAT 301.

Measurement and estimation of timber in logs, trees, and stands. Sampling with varying probabilities. Field trips required. (\$)

F 322 03(3-0-0). Economics of the Forest Environment. S. Prerequisite: AREC 202 or AREC 240/ECON 240 or ECON 202.

Economic principles and techniques applied to forested environments.

F 324 03(3-0-0). Fire Effects and Adaptations. F. Prerequisite: LAND 220/LIFE 220 or LIFE 320

Introduction to fire ecology including fire history, ecosystem effects, and organism responses.

F 325 03(3-0-0). Silviculture. S. Prerequisite: F 230; F 311; NR 220. Credit not allowed for both F 325 and NR 326.

Principles of silviculture and their application to major forest types of United States.

+F 330 03(2-2-0). Timber Harvesting and the Environment. S. Prerequisite: F 230 or F 321.

Principles of timber harvesting and effects of logging on the environment.

+F 331 03(2-2-0). Wood Products in Society. F.

Role of wood products in society; spectrum of wood products, some field trips. (\$)

F 421 04(3-3-0). Forest Stand Management. F. Prerequisite: F 230; F 321; F 322; F 325.

Forest management plan preparation: forest condition and health assessment; evaluation of silvicultural treatments; implementation and monitoring.

F 422 03(2-2-0). Quantitative Methods in Forest Management. F.

Prerequisite: F 321; F 322.

Design and analysis of optimization and nonoptimization models in forest managerial operations.

F 424 03(2-2-0). Wildland Fire Behavior and Management. F. Prerequisite: LAND 220/LIFE 220 or LIFE 320

Policies and strategies for the management of fire and fuels. Fire behavior, fuels treatments, prescribed fire, suppression operations, and prevention.

F 425 03(3-0-0). Advanced Wildland Fire Behavior and Management. S. Prerequisite: F 424; NR 319.

Advanced strategies, tools, and techniques for wildland fire management: prediction, prevention, suppression, and use for resource benefit.

F 430 03(1-4-0). Forestry Field Practices. S. Prerequisite: F 330; F 421.

Forestry field course, S212 saw certification, collect stand inventory data, develop and implant stand prescriptions, and harvest and process trees. (\$)

F 487 Var [3-12]. Professional Forestry Internship. Prerequisite: Written consent of department head.

Professional-level field experience with forestry organization.

F 495 Var. Independent Study.

F 510 03(2-3-0). Ecophysiology of Trees. S. Prerequisite: BZ 440.

Environmental factors affecting physiology of woody plants; emphasis on water relations in trees and importance of water in physiological processes.

F 520 03(3-0-0). Advanced Quantitative Methods in Forestry I. F. Prerequisite: F 322; MATH 160.

Design and analysis of optimization models in forest management operations: linear, goal, and dynamic programming.

F 521 03(2-2-0). Advanced Quantitative Methods in Forestry II. S. Prerequisite: F 520.

Analysis of forest inventory information; dynamic and stochastic models oriented to decision making and research in forestry.

F 522 03(3-0-0). Advanced Forest Economics. S. Prerequisite: ECON 306.

Analysis of forestry issues: financial maturity, management intensity, federal policy, taxation, natural environments, and silviculture.

***F 524 03(2-2-0). Forest Fire Meteorology and Behavior.** F.

Effects of atmospheric processes on wild and prescribed fires; interrelationships of weather, fuels, and topography on forest and range fires.

F 525 04(3-0-1). Silvicultural Practices. S. Prerequisite: F 311.

Comprehensive coverage of silvicultural practices as applied in U.S. forestry.

F 540 03(2-3-0). Fuels, Vegetation and Fire Management. F, S, SS. Prerequisite: Admission to the Continuing Education in Fuels Management program through the Office of Conference Services.

Develop, test, and display the impact of alternative fuels and vegetation treatments on vegetation development, fuels and fire behavior.

F 541 03(3-0-0). Data Analysis/Interpretation-Fire Managers. F. Prerequisite: Employment as wildfire manager. Offered only through Division of Continuing Education

Knowledge and skills for complex analyses of fire information. (NT)

F 542 03(3-0-0). Wildland Fire Economics and Management. S. Prerequisite: Employment as wildland fire manager.

Managerial economics and management techniques applied to wildland

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fire situations. (NT)

F 544 03(3-0-0). Decision Methods for Fire Managers. F, S, SS.
Prerequisite: Written consent of instructor.

Application of decision methods, including optimization techniques, finance, and decision trees to initial attack and fuels management problems.

F 593 01(0-0-1). Seminar-Fire Science. F.

F 624 03(2-2-0). Fire Ecology. S. Prerequisite: F 424; one course in ecology.

Fire in forest and range ecosystems; principles and techniques for evaluating fire effects on vegetation, soils, watersheds, and wildlife.

***F 625 03(2-2-0). Ecology of Forest Production.** S. Prerequisite: 300-level course in ecology.

Development, structure, and production in forest communities; manipulation of forest production.

F 693 01(0-0-1). Seminar. F, S.

F 695 Var. Independent Study.

F 698 Var. Research.

F 699 Var. Thesis.

***F 721 03(3-0-0). Forest Policy.** S. Prerequisite: NR 320.

Policies and institutions affecting management of forest lands in U.S.

F 798 Var. Research.

F 799 Var. Dissertation.

FAMILY AND CONSUMER SCIENCES COURSES

School of Education

College of Applied Human Sciences

FACS 179 02(2-0-0). Introduction to Family and Consumer Sciences. S.

Career options in family and consumer sciences; professional leadership responsibilities.

FACS 320 03(3-0-0). Finance—Personal and Family. F, S, SS.

Management of income, expenditures, credit, savings, investment, insurance, taxes, and assets considering legislation and economic conditions. (NT-O)

FACS 479 02(0-0-2). Colloquium-Family and Consumer Sciences. S.

Prerequisite: FACS 179.

Current topics and issues related to professional roles, responsibilities, and opportunities.

FACS 487A-C Var. Internship.

A) Extension. B) Community service. C) Business.

FACS 494 Var. Independent Study.

FACS 590 Var [1-3]. Workshop.

FACS 698 Var. Research.

FIRE AND EMERGENCY SERVICES ADMINISTRATION COURSES

School of Education

College of Applied Human Sciences

FESA 310 03(0-0-3). Fire Service Leadership. F, S, SS.

Theory, practice and application of ethical leadership in public safety; developing personal ethics and leadership skills and abilities. (NT-O)

FESA 330 03(3-0-0). Industrial Processes and Fire Protection. S. Offered only through the Division of Continuing Education.

Industrial processes and fire protection managed by fire and safety personnel. (NT-O/V)

FESA 331 03(3-0-0). Structure Influence on Tactics and Strategy. F, S. Offered only through the Division of Continuing Education.

How construction type, alterations, design and materials influence a building's reaction to fire. Fireground influence on tactics and strategy. (NT-O/V)

FESA 333 03(3-0-0). Proposals/Reports in Fire Service Management. F, S. Offered only through the Division of Continuing Education.

Process of preparing reports and developing a proposal supported by research. Introduction to research techniques, Internet and library use; conventions of documentation. (NT-O)

FESA 334 01(1-0-0). Orientation to Experiential Learning. F, S. Offered only through the Division of Continuing Education.

Demonstration of knowledge, skill, and professional experience for the purpose of enhancing documentation and career development skills. (NT-O/V)

FESA 335 03(3-0-0). Trends in Fire Science Technologies. F. Offered only through the Division of Continuing Education.

Analytical tools designed to evaluate, align, select, and implement emerging fire science technologies. (NT-O)

FESA 336 03(3-0-0). Fire and Emergency Services Management. F, S. Offered only through the Division of Continuing Education.

Fire and emergency service administrative structures and processes. Examination of management and leadership models and applications. (NT-O)

FESA 337 03(3-0-0). Policy and Public Administration. F, S. Prerequisite: FESA 336. Offered only through the Division of Continuing Education.

Political and legal foundations of fire and emergency services. Public administration concepts, decision making and policy development. (NT-O)

FESA 338 03(3-0-0). Essentials of Emergency Management. F, S. Offered only through the Division of Continuing Education.

Emergency management theory; mitigation, planning, response, and recovery in large-scale incidents. Development/operation of emergency operation centers. (NT-O)

FESA 339 03(3-0-0). Incident Command Systems. S. Prerequisite: FESA 331 or FESA 338. Offered only through the Division of Continuing Education.

Theory and application of incident command systems (ICS) to the command and coordination of major emergency operations. (NT-O)

FESA 431 03(3-0-0). Emergency Medical Services Management. F. Prerequisite: FESA 432; FESA 433. Offered only through the Division of Continuing Education.

Emergency medical service models, design implementation evaluation. Interactions with health care systems, public policy and public health

systems. (NT-O)

FESA 432 03(3-0-0). Fire and Emergency Services Budgeting. F, S. Prerequisite: FESA 333; FESA 336. Offered only through the Division of Continuing Education.

Application of emergency service budgeting systems with emphasis on revenues, public financial controls, capital funding and performance measures. (NT-O)

FESA 433 03(3-0-0). Fire and Emergency: Human Resources. F, S. Prerequisite: FESA 333; FESA 336. Offered only through the Division of Continuing Education.

Theory, practice, and models of human resources applied to emergency organizations; workforce development, HR functions, and labor relation. (NT-O)

FESA 434 03(3-0-0). Training Program Management. F. Prerequisite: FESA 432, FESA 433. Offered only through the Division of Continuing Education.

Development of agency training and education programs. Utilization of training and education practices, resources, facilities and technologies. (NT-O)

FESA 435 03(3-0-0). Volunteer/Combination Organization Management. S. Prerequisite: FESA 432; FESA 433. Offered only through the Division of Continuing Education.

Development and management of fire and emergency service organizations with volunteer and combination resources. (NT-O)

FESA 436 03(3-0-0). Fire Protection Through Model Building Codes. S. Offered only through the Division of Continuing Education.

Overview of the most current fire codes that are used across the United States. Discussion of fire inspection methodology and enforcement practices. (NT-O/V)

FESA 437 03(0-0-3). Fire and Emergency: Legal Considerations. F, S, SS. Prerequisite: FESA 432; FESA 433.

Fire service in relation to the complex legal system of the United States, individual states, and local jurisdictions. (NT-O)

FESA 438 03(3-0-0). Prevention Program Management. F. Prerequisite: FESA 432; FESA 433. Offered only through the Division of Continuing Education.

Design, implementation, and evaluation of fire and risk prevention programs using education, engineering, and enforcement approaches. (NT-O)

FESA 467 03(3-0-0). Integrated Management Simulation. F, S. Prerequisite: FESA 331; FESA 338; FESA 432; FESA 433; completion of 15 credits of selected electives. Offered only through the Division of Continuing Education.

Integration management and administrative knowledge and skills in the development of a fire and emergency service management simulation. (NT-O)

FESA 492 Var [1-3]. Seminar. F, S. Prerequisite: Written consent of instructor. Offered only through the Division of Continuing Education.

Discussion and documentation of professional experience in fire and emergency services. (NT-O)

FESA 495 Var [1-6]. Independent Study. F, S. Prerequisite: FESA 334; completion of 30 credits of FESA coursework. Offered only through Division of Continuing Education. (NT-O)

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FINANCE COURSES

Department of Finance and Real Estate College of Business

FIN 300 03(3-0-0). Principles of Finance. F, S, SS. Prerequisite: ACT 205 or ACT 210; AREC 202 or ECON 202; ECON 204; MATH 141 or MATH 155 or MATH 160. Credit not allowed for both FIN 300 and FIN 305.

Overview of financial markets and institutions, analysis of securities and investigation of financial management techniques.

FIN 305 03(3-0-0). Fundamentals of Finance. F, S, SS. Prerequisite: ACT 205 or ACT 210; ECON 204. Credit not allowed for both FIN 305 and FIN 300.

Role of finance in management of the firm; role, structure of financial markets and institutions, valuation of basic securities. (NT-O)

FIN 310 03(3-0-0). Financial Markets and Institutions. F, S, SS. Prerequisite: ECON 204.

Analysis of the functions and operations of financial markets and the primary and secondary securities created in those markets.

FIN 311 03(3-0-0). Debt Securities Analysis. F. Prerequisite: ECON 315 or FIN 310; FIN 300; FIN 355.

Analysis of corporate, government, and mortgage-based debt securities. Emphasis on securitization of asset-backed obligations.

FIN 320 03(3-0-0). Introduction to Financial Planning. F, S. Prerequisite: ACT 210; ECON 202.

Personal financial planning including budgeting, tax planning, credit management, investing, retirement, and estate planning.

FIN 342 03(3-0-0). Risk Management and Insurance. F. Prerequisite: FIN 300 or FIN 305.

Management of insurable risks for the individual and business firm.

FIN 355 03(3-0-0). Principles of Investments. F, S, SS. Prerequisite: FIN 300; FIN 310.

Modern investment theory with applications in the debt and equity markets, with introduction to portfolio management.

FIN 370 03(3-0-0). Financial Management—Theory and Application. F, S. Prerequisite: FIN 300.

Theory and application of financial management to business firms; case problems used for illustration.

FIN 440 03(3-0-0). Estate Planning. F. Prerequisite: ACT 330; FIN 320.

Methods for conservation and transfer of wealth, considering aspects of tax, trusts, wills, probate, advanced directives, and charitable giving.

FIN 445 03(3-0-0). Financial Plan Development. S. Prerequisite: ACT 330; FIN 320; FIN 342.

Analyze client finances and economic conditions, develop and communicate comprehensive financial plan using financial planning professional standards.

FIN 455 03(3-0-0). Advanced Portfolio Management. S. Prerequisite: FIN 355.

Advanced hedging and portfolio management theory and techniques.

FIN 470 03(3-0-0). Financial Risk Management. F, S. Prerequisite: FIN 355.

Futures, options, asset-backed securities and other derivatives as they are used in financial risk management.

FIN 471 03(3-0-0). Enterprise Valuation. S. Prerequisite: FIN 355; FIN 370.

Analytical framework for measuring, managing, and applying principles and tools to value enterprises.

FIN 475 03(3-0-0). International Business Finance. F, S, SS. Prerequisite: FIN 300.

International financial management emphasizing markets, instruments, hedging techniques, and operating strategies.

FIN 487 Var. Internship.

FIN 495 Var. Independent Study.

FIN 496 Var. Group Study.

FIN 498 Var [1-3]. Research.

FIN 524/STAT 524 03(3-0-0). Financial Statistics. F. Prerequisite: MATH 345; STAT 420, or Admission to MSBA program with Financial Risk Management specialization.

Probability and statistical concepts and quantitative tools used in financial modeling and decision-making.

FIN 600 03(3-0-0). Financial Management-Theory and Case Studies. F. Prerequisite: FIN 300 or FIN 305.

Financial problems for various types of business organizations. (NT-V)

FIN 601 03(3-0-0). Financial Management and Markets. S. Prerequisite: Admission to GSSE program.

Integrated coverage of financial management, investments, and markets and institutions from the public, private, and nonprofit perspective.

FIN 605 03(3-0-0). Enterprise Valuation. F. Prerequisite: FIN 300; Admission to MSBA program with Financial Risk Management specialization.

Corporate valuation methodologies including dividend discount model, relative valuation using market multiples, free cash flows and options analysis.

FIN 610 03(3-0-0). Debt Securities Analysis. S. Prerequisite: FIN 524/STAT 524; FIN 655.

Valuation of corporate, government, and mortgage-backed debt securities and strategies for management of debt security portfolios. (NT-V)

FIN 625 03(3-0-0). Quantitative Methods in Finance. F. Prerequisite: FIN 300.

Review and application of mathematical and analytical techniques used in solving financial problems.

FIN 630 03(3-0-0). Financial Modeling. S. Prerequisite: FIN 625.

Practical applications of financial modeling and computer programming to analyze financial data.

FIN 655 03(3-0-0). Investments. S.

Investment analysis and decision making emphasizing equity securities and portfolio management. (NT-V)

FIN 665 03(3-0-0). Financial Engineering. S. Prerequisite: FIN 610 or FIN 655 or FIN 675.

Using futures, options, swaps, and securitized transactions in financial management.

FIN 670 03(3-0-0). Risk Management Theory and Application. S. Prerequisite: FIN 605; FIN 625; FIN 655.

Fundamentals of financial risk management using quantitative techniques and models to identify, measure, and manage corporate risk.

FIN 675 03(3-0-0). International Finance. S.

Analysis of the foreign exchange market and international financial markets. (NT-T/V)

FIN 678 03(3-0-0). Financial Decisions-Theory and Practice. S. Prerequisite: FIN 600.

Analysis of theory of corporate finance with emphasis on underlying

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assumptions and implications for financial decisions.

FIN 695 Var. Independent Study.

FIN 696 Var. Group Study.

FIN 698 Var[1-6]. Research. F. S.

FIN 699 Var. Thesis.

FOOD SCIENCE AND HUMAN NUTRITION COURSES

Department of Food Science and Human Nutrition

College of Applied Human Sciences

FSHN 125 02(2-0-0). Food and Nutrition in Health. F, S.
Nutritional quality and safety of food related to human health.

FSHN 150 03(3-0-0). Survey of Human Nutrition. F, S, SS.
Basic nutrition principles and concepts; their application to personal health and interactions with societal and environmental issues.

FSHN 160 03. Nutrition and the Preschool Child. F, S, SS. Offered as correspondence course only.
Basic nutrition and application of nutrition principles to needs of preschool child. (NT-C)

FSHN 300 03(3-0-0). Food Principles and Applications. F, S.
Prerequisite: CHEM 103 or CHEM 107 or CHEM 111; FSHN 150.
Application of food preparation theories to modification and evaluation of food products.

FSHN 301 02(0-6-0). Food Principles and Applications Laboratory. F, S.
Prerequisite: FSHN 300 or concurrent registration.
Techniques and manipulative skills for preparation and evaluation of standard and modified food products. (\$)

FSHN 350 03(3-0-0). Human Nutrition. F, S, SS. Prerequisite: BMS 300 or concurrent registration; CHEM 245 or CHEM 345.
Metabolism of macro and micronutrients; physiologic basis underlying dietary recommendations for human health. Nutrients, dietary requirements for physical well-being; evaluation of various diets.

FSHN 360 02(2-0-0). Nutrition Assessment. S. Prerequisite: FSHN 350.
Principles of anthropometric, dietary, and biochemical assessment of nutritional status.

FSHN 386 02(0-4-0). Practicum in Food Service Management.

FSHN 392 01(1-0-0). Dietetic Practice Seminar. F, S. Prerequisite: C or above in science courses (CHEM 107, 108 or CHEM 111, 112, 113; LIFE 102 or BZ 110, 111; BMS 300, 302; FSHN 150; FSHN 300, 301); 2.8 overall GPA.
Pre-professional skills to prepare students for the pursuit of careers in the field of dietetics.

FSHN 428 03(3-0-0). Nutrition Teaching and Counseling Techniques. S. Prerequisite: FSHN 350.
Objectives, principles, and organization of subject matter for nutrition education and counseling. (\$)

FSHN 444 01(1-0-0). Nutrition and Aging. F, S. Prerequisite: FSHN 150 or admission to Gerontology Interdisciplinary Studies Program. Credit not allowed for both FSHN 444 and FSHN 459.
Effect of aging on nutrient needs and impact of nutrition on successful aging and health in the elderly. (NT-O)

FSHN 450 05(4-2-0). Medical Nutrition Therapy. F. Prerequisite: BMS 300; FSHN 350.
Use of nutrition therapy in the treatment of acute conditions and chronic disease states. (\$)

FSHN 451 03(3-0-0). Community Nutrition. F. Prerequisite: FSHN 350 or concurrent registration.
Influences on nutritional status, assessment of nutrition problems and needs, planning and evaluation of nutrition intervention programs.

FSHN 459 03(3-0-0). Nutrition in the Life Cycle. F. Prerequisite: FSHN 350. Credit not allowed for both FSHN 459 and FSHN 444.

Nutritional aspects associated with each phase of human life cycle including pregnancy, infancy, childhood, adolescence, and early and late adulthood.

FSHN 470 03(3-0-0). Integrative Nutrition and Metabolism. S.
Prerequisite: BC 351; FSHN 350.

Influence of nutrition on roles and action of hormones and gene expression on metabolism.

FSHN 484 Var [1-3]. Supervised College Teaching. F, S. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

FSHN 486A-C Var [1-3]. Practicum.

Supervised off-campus experience. **A)** Counseling. Prerequisite: FSHN 350. **B)** Nutrition. Prerequisite: FSHN 350. **C)** Food service management. Prerequisite: RRM 310.

FSHN 492 02(0-0-2). Seminar in Dietetics and Nutrition. S. Prerequisite: Senior standing.

Capstone seminar in nutrition and dietetics.

FSHN 495A-B Var. Independent Study.

A) Nutrition. **B)** Food service management.

FSHN 496A-I 01(1-0-0). Group Study in Dietetics and Nutrition.

Prerequisite: FSHN 350.

Current topics in nutrition and professional skills for the dietetics profession. **A)** Energy/weight management. **B)** Sustainable food issues. **C)** Nutrition and chronic disease. **D)** Nutrition for athletes. **E)** Food safety. **F)** Service marketing. **G)** Food and consumer issues. **H)** Public health and policy. **I)** Special topics.

FSHN 500 02(2-0-0). Food Systems, Nutrition, and Food Security. F.
Prerequisite: FSHN 350.

Global and local food systems and their potential influence on nutrition and food security.

FSHN 501 03(3-0-0). Research Methods in Dietetics. S. Prerequisite: Admission to GP-IDEA program in dietetics. Offered as an online course only.

Testing and generating theory. Methods for collecting and analyzing quantitative and qualitative data, critique of research and proposal development. (NT-O)

FSHN 503 03(3-0-0). Issues in Dietetics Practice. F, S. Prerequisite: Admission to GP-IDEA program in dietetics. Offered as an online course only.

Environment in which foodservice, hospitality, and healthcare organizations operate; impact of change on hospitality and healthcare organizations. (NT-O)

FSHN 504 03(3-0-0). Micronutrients. S. Prerequisite: Admission to GP-IDEA program in dietetics. Offered as an online course only.

Coordination of structure and function related to metabolic needs as a basis for evaluating micronutrient needs in normal or altered metabolic states. (NT-O)

FSHN 505 03(3-0-0). Nutrition and Physical Activity in Aging. S.
Prerequisite: Admission to GP-IDEA program in dietetics. Offered as an online course only.

Physiological changes during aging and impacts on health and disease; focus on successful aging with emphasis on physical activity and nutrition. (NT-O)

FSHN 506 03(3-0-0). Nutrition and Human Performance. S.
Prerequisite: Admission to GP-IDEA program in dietetics. Offered as an online course only.

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Relationship of specific nutrients and optimal nutrition to physical efficiency and performance. (NT-O)

FSHN 507 03(3-0-0). Nutrition Education in the Community. F, S. Prerequisite: Admission to GP-IDEA program in dietetics. Offered as an online course only.

Principles and practices of teaching individuals and groups to translate nutrition knowledge into action. Emphasis on research and evaluation. (NT-O)

FSHN 508 03(3-0-0). International Nutrition and World Hunger. S. Prerequisite: Admission to GP-IDEA program in dietetics. Offered only as an online course.

Magnitude, causes, and nature of hunger and under-nutrition; programs and policies to alleviate hunger. (NT-O)

FSHN 510 03(0-0-3). Pediatric Clinical Nutrition. F. Prerequisite: Admission to the GP IDEA program in Dietetics.

Physiological, biochemical and nutritional aspects of disease processes relevant to infants and children up to 18 years of age. (NT-O)

FSHN 511 03(3-0-0). Maternal and Child Nutrition. SS. Prerequisite: Admission to the GPIdea Program in Dietetics; written permission of instructor.

Behavioral, physiological and public health issues impacting dietary and nutritional factors that support growth and development. (NT-O)

FSHN 520 03(3-0-0). Advanced Medical Nutrition Therapy. SS. Prerequisite: FSHN 550 or FSHN 551 or admission to GP-IDEA program in dietetics.

Role of nutrition in etiology and treatment of selected disorders. (NT-O)

FSHN 525 02(2-0-0). Nutrition Education Theories and Practice. F. Prerequisite: FSHN 350.

Examination of current theories, skills, and models used in nutrition education programs as preparation for research and practice.

FSHN 540 03(3-0-0). Nutrigenomics and Advanced Lipid Metabolism. S. Prerequisite: Admission to GP-IDEA program in dietetics. Offered as an online course only.

How nutrients regulate gene expression (nutrigenetics) and how genotype influences an individual's nutrient requirements (nutrigenomics). (NT-O)

FSHN 550 03(3-0-0). Advanced Nutritional Science I. S. Prerequisite: BC 351 or BC 403; FSHN 350.

Protein, vitamin, mineral metabolism; human studies, animal models.

FSHN 551 03(3-0-0). Advanced Nutritional Science II. F. Prerequisite: BC 351 or BC 403; FSHN 350.

Carbohydrate, lipid, energy metabolism; human studies, animal models.

FSHN 575 01(1-0-0). Nutrition Education for a Healthy Heart. F, S, SS. Offered only as a correspondence course only.

Nutrition-related issues of atherosclerotic cardiovascular disease risk reduction and background in the art/science of facilitating behavior change. (NT-C)

FSHN 586 Var [1-3] Practicum-Advanced Clinical Nutrition. SS. (NT-C)

FSHN 587A-C 06(0-18-0). Internship.

A) Clinical dietetics. B) Community dietetics. C) Food service management.

FSHN 590 Var. Workshop. SS.

FSHN 620 03(2-0-1). Community Nutrition Planning and Evaluation. S. Prerequisite: FSHN 350.

Community nutrition assessment; nutrition program planning and evaluation, nutrition policy analysis.

FSHN 628 02(2-0-0). Advanced Nutrition Counseling Techniques. F.

Principles, strategies, and techniques for interviewing, assessing, and providing nutrition counseling in community settings.

FSHN 630/HES 630 03(3-0-0). Integrative Exercise and Nutrition Metabolism. S. Prerequisite: FSHN 551; HES 610. Credit not allowed for both FSHN 630 and HES 630.

Advances in integrative human metabolism under conditions of changing energy flux.

FSHN 640 02(2-0-0). Selected Topics in Nutritional Epidemiology.

F. Prerequisite: FSHN 350; STAT 301 or STAT 307/ERHS 307.

Overview of topics in nutritional epidemiology; study design, interpretation of findings, linkage of data to action.

FSHN 650B-C 02(2-0-0). Recent Developments in Human Nutrition.

Appraisal of literature on human nutritional status. A) Protein, vitamins, and minerals. *F. Prerequisite: FSHN 550. B) Carbohydrates, lipids, and energy. °F. Prerequisite: FSHN 551. C) Genomic, proteomics, and metabolomics. *S. Prerequisite: FSHN 551.

FSHN 660 02(2-0-0). Women's Issues in Lifecycle Nutrition. S. Prerequisite: FSHN 459.

Current nutritional issues related to selected stages of lifecycle compared to normal adult nutritional needs.

***FSHN 661 02(2-0-0). International Nutrition.** F. Prerequisite: FSHN 350.

Roles of technological programs and international agencies in meeting nutritional needs.

°FSHN 670 02(1-2-0). Laboratory Methods. F. Prerequisite: CHEM 245; CHEM 246.

Laboratory techniques and instrumentation in nutrition and food science.

FSHN 675 03(3-0-0). Regulation of Energy Intake. S. Prerequisite: FSHN 350; PSY 454.

Central and peripheral mechanisms controlling energy intake with emphasis on humans. Current theories, experimental approaches, and new research.

FSHN 684 Var. Supervised College Teaching. F, S.

FSHN 686A-C Var. Practicum.

A) Counseling. Prerequisite: FSHN 520. B) Nutrition. C) Food service.

FSHN 692 01(0-0-1). Seminar.

FSHN 695A-C Var. Independent Study.

A) Food science. B) Nutrition. C) Food service management.

FSHN 696A-D Var. Group Study.

A) Food science. B) Nutrition. D) Exercise and nutrition.

FSHN 698A-C Var. Research.

A) Dietetics. F, S. Prerequisite: Enrollment in the Great Plains Idea program in Dietetics. Offered as an online only course through the Division of Continuing Education. (NT-O). B) Nutrition. F, S, SS. C) Food service management. F, S, SS.

FSHN 699B-C Var. Thesis.

B) Nutrition. C) Food service management.

°FSHN 700 02(2-0-0). Cellular Nutrition. F. Prerequisite: FSHN 550 and FSHN 551 or BC 403 and BMS 501.

Essential nutrient requirements of cells and organs.

FSHN 792 01(0-0-1). Seminar-Research Topics in Nutrition. F, S.

Ph.D. seminar in literature review.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

FSHN 795 Var. Independent Study.

FSHN 796 01(0-0-1). Group Study.

FSHN 799 Var. Dissertation-Nutrition.

^oAlternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

FOOD TECHNOLOGY COURSES

Department of Food Science and Human

Nutrition

College of Applied Human Sciences

FTEC 110 03(3-0-0). Food-From Farm to Table. S.

Commercial food processing related to preservation and enhancing of food quality, safety, and value.

FTEC 400 03(3-0-0). Food Safety. F. Prerequisite: CHEM 107 or CHEM 111.

Safety of human food emphasizing safe production, processing, marketing, preparation, consumption, and regulations.

***FTEC 420 03(2-2-0). Quality Assessment of Food Products. S.** Prerequisite: FTEC 110; LIFE 205.

Quality control of raw ingredients to manufactured products; assessment and sensory evaluation of foods.

°FTEC 447 02(2-0-0). Food Chemistry. S. Prerequisite: CHEM 245 or CHEM 345.

Chemistry of food constituents as related to food quality and stability.

FTEC 460 03(2-2-0). Brewing Science and Technology. F, S. Prerequisite: CHEM 245; MATH 118; 21 years of age; completed 60 credits.

Scientific and technical aspects of brewing, fermenting, finishing, and evaluating microbrewed style of lagers and ales.

FTEC 487 Var [1-15]. Internship.

FTEC 495 Var. Independent Study.

***FTEC 570 02(2-0-0). Food Product Development. F.** Prerequisite: FTEC 447.

Food product concepts, feasibility, and evaluation.

°FTEC 572 02(2-0-0). Food Biotechnology. S. Prerequisite: MIP 334.

Interrelationships among microorganisms, food processing methods, advances in biotechnology and food quality, spoilage, shelf-life and safety.

FTEC 574 02(2-0-0). Current Issues in Food Safety. S.

Current food safety issues from field to table; microbiological, consumer, processing, and agricultural issues.

°FTEC 576 02(2-0-0). Cereal Science. F. Prerequisite: FTEC 447.

Chemistry and functionality of cereal grain components and their importance in human nutrition.

***FTEC 578 03(2-0-1). Bioactives and Probiotics for Health. S.** Prerequisite: BC 351; LIFE 205 or MIP 300.

Mechanisms through which functional foods and probiotics modulate intracellular signal transduction and protein expression in chronic disease states. (NT-O)

FTEC 698 Var. Research.

FTEC 699 Var. Thesis.

FTEC 799 Var. Dissertation.

FISH, WILDLIFE, AND CONSERVATION BIOLOGY COURSES

Department of Fish, Wildlife, and

Conservation Biology

Warner College of Natural Resources

FW 104 03(3-0-0). Wildlife Ecology and Conservation. (GT-SC2, AUCC 3A). F, S.

Essentials of wildlife ecology as a foundation for understanding issues on the origins, management and conservation of biodiversity. (NT-O)

+FW 111 01(5-1-0). Basic Outdoor Skills in FWCB. F, S. Prerequisite: May be taken up to 3 times for a maximum of 3 credits.

Basic outdoor skills crucial for FWCB and outdoor novices. History of wildlife conservation and reasons for declining outdoor participation. Required field trips.

+FW 204 03(2-3-0). Introduction to Fishery Biology. F.

Exposure to sampling techniques, agencies, and topics in fishery biology careers. (\$)

FW 260 03(3-0-0). Principles of Wildlife Management. F, S. Prerequisite: MATH 124; BZ 110 or LIFE 103.

Ecology principles applied to conservation and management of fish/wildlife resources. Quantitative methods, socioeconomic factors, population dynamics.

FW 300 02(2-0-0). Ichthyology. S. Prerequisite: BZ 111 or LIFE 103.

Biology of fishes: anatomy, taxonomy, physiology, behavior, ecology, evolution, and zoogeography.

+FW 301 01(0-2-0). Ichthyology Laboratory. F, S. Prerequisite: FW 300 or concurrent registration.

Anatomy, taxonomy, evolution, and ecology of North American freshwater fishes. Field trip required. (\$)

FW 350 04(3-2-0). Teaching Shooting Responsibility. S.

Education and instructor certification course to develop knowledge, skills, behavior for teaching about firearms, shooting sports, and associated ethics.

FW 355 02(0-0-2). Hunter Education for Instructors. F, S, SS. Offered only through the Division of Continuing Education.

Principles of learning and teaching for instructors of state hunter education courses. (NT-C/O)

FW 356 03. Leopold's Ethic for Wildlife and Land. F, S, SS. Offered as a correspondence course only.

Philosophy, art, history, and science of wildlife and land management from writings of Aldo Leopold. (NT-C)

FW 357 03. Wildlife Habitat on the Great Plains. F, S, SS. Offered as a correspondence course only.

Management of cover, food, and water for wildlife and fish in the Great Plains. Emphasis on practices compatible with other uses of private land. (NT-C)

FW 370 03(2-2-0). Design of Fish and Wildlife Projects. F, S. Prerequisite: FW 260 or FW 360; LAND 220/LIFE 220 or LIFE 320; MATH 155 or MATH 160; NR 220; STAT 301 or STAT 307.

Design, analysis, and evaluation of wildlife projects; lab exercises in design and data analysis; preparation and presentation of project proposals.

+FW 375 03(1-4-0). Field Wildlife Studies. S, SS. Prerequisite: LAND 220/LIFE 220 or LIFE 320.

Field trip to see wildlife management and habitats and to discuss problems and practices with professional ecologists and resources managers. (\$)

FW 384 Var [1-5]. Supervised College Teaching. F, S, SS. Prerequisite: Written consent of instructor. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Instruction and practice in laboratory instruction in lower-division departmental courses.

FW 400 03(2-0-1). Conservation of Fish in Aquatic Ecosystems. F. Prerequisite: FW 300; LIFE 320.

Ecological processes that create habitat and biotic template for fish in aquatic ecosystems; human effects; strategies for conserving fishes. (\$)

FW 401 03(2-3-0). Fishery Science. F. Prerequisite: FW 300; MATH 141 or MATH 155 or MATH 160; STAT 301 or STAT 307.

Theory, philosophy, and applications for study and management of fishery resources. (\$)

FW 402 04(3-2-0). Fish Culture. S. Prerequisite: FW 300.

Principles and practices to produce food, bait, and sport fishes. (\$)

°FW 405 03(2-3-0). Fish Physiology. S. Prerequisite: BZ 214 or FW 300. Credit not allowed for both FW 405 and FW 605.

Physiological ecology of fishes; functional adaptations and adjustments used to cope with environmental and physiological states. (\$)

***FW 467 03(2-0-1). Wildlife Disease Ecology.** F. Prerequisite: LIFE 320.

Ecological, epidemiological, and evolutionary principles of disease in fish and wildlife populations; contemporary issues in disease ecology.

°FW 468 03(2-3-0). Wild Bird Management. S. Prerequisite: FW 360.

Ecology and management of game, pest, and rare bird populations and nongame bird communities.

°+FW 469 03(3-0-0). Conservation and Management of Large Mammals. F. Prerequisite: BZ 330; FW 260; LIFE 320; STAT 301 or STAT 307/.

Principles of behavior, ecology, population dynamics, and conservation related to large mammals. Required field trips. (\$)

+FW 471 04(2-4-0). Wildlife Data Collection and Analysis. F, S. Prerequisite: FW 370; NR 220.

Analysis methods used in wildlife management and research; adaptive resource management with emphasis on learning through field and computer labs. (\$)

***+FW 477 03(1-3-1). Wildlife Habitat Use and Management.** F. Prerequisite: FW 260; NR319 or NR322. Credit not allowed for both FW 477 and FW 677.

Wildlife habitat evaluation, classification, and improvement; analysis of habitat use patterns; planning and implementation of management plans. (\$)

FW 487 Var [1-6]. Internship. Prerequisite: Written consent of instructor. Field experience in fish and wildlife management.

FW 492 01(0-0-1). Seminar-Wildlife Biology.

FW 495A-B Var. Independent Study. Prerequisite: One course in resource management; one course in ecology; written consent of instructor. A) Fishery biology. B) Wildlife biology.

FW 496A-B Var. Group Study. Prerequisite: One course in resource management; one course in ecology. A) Fishery biology. B) Wildlife biology.

***FW 540 03(2-0-1). Fisheries Ecology.** S. Prerequisite: One course in fishery science; one course in aquatic ecology.

Population, community, and ecosystem management for fishes and other aquatic organisms in freshwater habitats.

FW 544 03(2-0-1). Ecotoxicology. S. Prerequisite: LAND 220/LIFE 220 or LIFE 320; STAT 301 or STAT 307.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Ecological effects of contaminants on populations, communities, and ecosystems.

FW 551 03(2-0-1). Design of Fish and Wildlife Studies. F. Prerequisite: STAT 301 or STAT 307.

Principles, types of studies and philosophy of science in design of experimental, observational, and sampling studies for wildlife investigations. (NT-O)

***FW 552 03(3-0-0). Applied Sampling for Wildlife/Fish Studies.** S. Prerequisite: STAT 301 or STAT 307.

Survey sampling theory and techniques, including distance sampling, with emphasis on wildlife and fish studies.

FW 555 03(3-0-0). Conservation Biology. S. Prerequisite: LAND 220/LIFE 220 or LIFE 320; STAT 307.

Ecological factors in conservation of biological diversity.

FW 561A-E Var [1-3]. Advanced Topics. F, S. Prerequisite: Written consent of instructor.

A) Fishery biology. B) Wildlife biology. C) Population analysis. E) Vertebrate management.

+FW 565 03(2-2-0). Managing Human-Wildlife Conflicts. S. Prerequisite: FW 260.

Methods for resolving conflicts caused by wildlife; integrating animal behavior, population dynamics, economics, and human dimensions into solutions. (\$)

°FW 567 03(2-0-1). Wildlife Disease Ecology. F. Prerequisite: Graduate standing; LIFE 320; STAT 301 or STAT 307.

Ecological, epidemiological, and evolutionary principles of disease in fish and wildlife populations; contemporary issues in disease ecology. (NT-O)

FW 573 03(3-0-0). Travel Abroad-Wildlife Ecology/Conservation. SS. Prerequisite: Written consent of instructor.

Study tour of various overseas ecosystems and natural resources conservation programs; discussions with local ecologists/managers.

FW 575 03(0-0-3). Wildlife Habitat Evaluation for Educators. F, S, SS. Prerequisite: Graduate standing. Offered only through the Division of Continuing Education.

Teachers or leaders implement wildlife habitat evaluation procedures in classroom or community programs and evaluate performance of students. (NT-C/O)

FW 576 03(0-0-3). Wildlife Policy, Administration, and Law. F, S, SS. Offered only through the Division of Continuing Education. Recommended preparation: One course in political science; introductory course in natural resources management.

Evolution of policy affecting wildlife and humans using historical, current, philosophical, legal, and administrative constructs. (NT-C/O)

°FW 605 04(2-3-1). Advanced Physiological Ecology of Fishes. S. Prerequisite: FW 300. Credit not allowed for both FW 605 and FW 405.

Physiological ecology of fishes; functional adaptations and adjustments used to cope with environmental and physiological states. (\$)

°FW 662 03(1-2-1). Wildlife Population Dynamics. S. Prerequisite: FW 260; MATH 155 or MATH 160; STAT 301.

Population models; experimental evidence and analysis of theories of population regulation; case studies.

***FW 663 05(3-3-1). Sampling and Analysis of Vertebrate Populations.** S. Prerequisite: FW 260; STAT 301.

Sampling and analysis of fish and wildlife populations, including survival estimation, capture-recapture sampling, and transect sampling.

+FW 677 03(1-3-1). Wildlife Habitat Management. F. Prerequisite: FW 260. Credit not allowed for both FW 477 and FW 677.

Habitat models; vegetation manipulation and monitoring for wildlife; extended field trips. (\$)

FW 684 Var [1-5]. Supervised College Teaching. Prerequisite: Written consent of instructor.

FW 692A-B Var. Seminar.

A) Fishery biology. B) Wildlife biology.

FW 695A-B Var. Independent Study.

A) Fishery biology. B) Wildlife biology.

FW 696A-B Var. Group Study.

A) Fishery biology. B) Wildlife biology.

FW 698A-B Var. Research.

A) Fishery biology. B) Wildlife biology.

FW 699A-B Var. Thesis.

A) Fishery biology. B) Wildlife biology.

FW 798A-B Var. Research.

A) Fishery biology. B) Wildlife biology.

FW 799A-B Var. Dissertation.

A) Fishery biology. B) Wildlife biology.

GEOSCIENCE COURSES

Department of Geosciences

Warner College of Natural Resources

+GEOL 120 03(3-0-0). Exploring Earth: Physical Geology. (GT-SC2, AUCC 3A). F, S, SS. Credit allowed for only one of the following: G CC 130, G CC 140, GEOL 120, GEOL 122, GEOL 124I, GEOL 150.

Develops scientific understanding through introduction to earth processes, materials, resources, and hazards.

GEOL 121 01(0-2-0). Introductory Geology Laboratory. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: GEOL 120 or GEOL 122 or GEOL 124 or concurrent registration in GEOL 120 or GEOL 122 or GEOL 124. Credit allowed for only one of the following: G CC 140, GEOL 150, GEOL 121.

Laboratory applications of introductory geology. (\$)

GEOL 122 03(3-0-0). The Blue Planet: Geology of Our Environment. (GT-SC2, AUCC 3A). F, S, SS. Credit allowed for only one of the following: G CC 130, G CC 140, GEOL 120, GEOL 122, GEOL 124, GEOL 150.

Develops scientific understanding through introduction to geological processes, natural hazards, earth resources, and their impacts on society.

GEOL 124 03(3-0-0). Geology of Natural Resources. (GT-SC2, AUCC 3A). S. Credit allowed for only one of the following: G CC 130, G CC 140, GEOL 120, GEOL 122, GEOL 124, GEOL 150.

Develops scientific understanding through introduction to the origin, use, and environmental impact of geological resources extracted from the Earth.

+GEOL 150 04(3-3-0). Physical Geology for Scientists and Engineers. F. Credit allowed for only one of the following: G CC 130, G CC 140, GEOL 120, GEOL 122, GEOL 124, GEOL 150.

Earth materials, structures, and surface processes. Geologic analysis using field data, topographic and geologic maps, and aerial photos. (\$)

+GEOL 154 04(3-3-0). Historical and Analytical Geology. S. Prerequisite: GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150.

Physical and biological history of Earth with introduction to laboratory, computer, and field techniques. (\$)

+GEOL 232 03(2-3-0). Mineralogy. F. Prerequisite: CHEM 111 or concurrent registration; GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150; MATH 124.

Crystal structures, crystal chemistry, rock-forming and economically important minerals, crystal growth and defects, physical properties of minerals. (\$)

GEOL 250 03(3-0-0). The Solid Earth. S. Prerequisite: GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150; MATH 124.

Structure, flow, and composition of the deep Earth; introduction to geophysics; tests of plate tectonic theory.

GEOL 332 02(1-2-0). Optical Mineralogy. F. Prerequisite: GEOL 232 or concurrent registration.

Fundamental light optics in crystalline substances; optical indicatrix; isotropic, uniaxial, and biaxial substances; common minerals in thin section.

GEOL 342 03(2-3-0). Paleontology. F. Prerequisite: GEOL 154.

Description of invertebrates, vertebrates, and plants and their distribution in earth history.

+GEOL 344 04(3-3-0). Stratigraphy and Sedimentology. F. Prerequisite: GEOL 154.

Description, genesis, correlation and age of sediments, sedimentary rocks and layered rock sequences. (\$)

+GEOL 364 04(3-3-0). Igneous and Metamorphic Petrology. S.

Prerequisite: GEOL 232.

Identification, classification, geochemistry, petrogenesis of igneous and metamorphic rocks; textural interpretation of hand samples and thin sections. Field trips required. (\$)

+GEOL 366 04(3-3-0). Sedimentary Petrology and Geochemistry. F. Prerequisite: CHEM 113; GEOL 154; GEOL 364.

Composition, identification, and classification of sedimentary rocks; geochemical processes affecting sedimentary rocks and surficial deposits. (\$)

+GEOL 372 04(3-3-0). Structural Geology. S. Prerequisite: GEOL 154; MATH 125; concurrent registration in PH 141.

Stress and strain in rocks, geometry of deformed rocks, and tectonic principles. (\$)

+GEOL 376 03(1-4-0). Geologic Field Methods. S. Prerequisite: GEOL 344; GEOL 372 or concurrent registration.

Scientific, surveying, and mapping methods used in geologic field studies; proposal, map, and report preparation. (\$)

GEOL 384 Var [1-5]. Supervised College Teaching. Prerequisite: Written consent of instructor. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Instruction and practice in laboratory instruction in lower-division departmental courses.

GEOL 401 01(0-3-0). Geology of the Rocky Mountain Region. F. Prerequisite: GEOL 154. May be taken up to three times for credit. Does not count as a geology elective in the departmental major.

Field course; geology of the local Rocky Mountain region. (\$)

+GEOL 436 06(0-18-0). Geology Summer Field Course. SS. Prerequisite: GEOL 364; GEOL 376.

Geologic mapping, measuring sections, interpreting geologic history in Colorado. Required comprehensive reports, geologic maps, and cross sections. (\$)

GEOL 442 04(3-2-0). Applied Geophysics. F. Prerequisite: GEOL 372; MATH 161; PH 142.

Geophysical exploration methods emphasizing hydrocarbon and mineral exploration, hydrogeology, and engineering applications.

+GEOL 446 03(3-0-0). Environmental Geology. S. Prerequisite: GEOL 454 or concurrent registration.

Geology applied to environmental problems. (\$)

°GEOL 447 03(2-3-0). Mineral Deposits. F. Prerequisite: GEOL 366; GEOL 372.

Occurrence, origin, and exploration of economic metallic mineral deposits. (\$)

+GEOL 452 04(3-3-0). Hydrogeology. F. Prerequisite: GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or GR 210; MATH 161 or MATH 255; PH 141.

Interaction of water and geologic materials; surface and groundwater; quantitative analysis and geologic effects on quality and flow of groundwater. (\$)

GEOL 454 04(3-3-0). Geomorphology. S. Prerequisite: GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or GR 210; STAT 301 or STAT 307 or STAT 315.

Origin of landforms; morphology and processes. (\$)

+GEOL 492 Var. Seminar. F, S. (\$)

GEOL 494A-I Var. Independent Study.

A) Environmental-engineering geology. **B)** Geomorphology. **C)** Mineralogy-petrology. **D)** Geoscience field studies. **E)** Paleontology-stratigraphy. **F)** Sedimentology. **G)** Structural geology. **I)** Geophysics.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

GEOL 498 Var [1-6]. Research. S. Prerequisite: Written consent of instructor.

***GEOL 530 03(2-2-0). Advanced Petrology.** S. Prerequisite: GEOL 364.

Igneous and metamorphic processes and products explored through thermodynamics, phase equilibria, and textural analysis.

+GEOL 546 04(3-3-0). Sedimentary Basin Analysis. S. Prerequisite: GEOL 344.

Sedimentologic data base, correlation, mapping, facies models, classification, and evolution of sedimentary basins. Applications to petroleum exploration. (\$)

°GEOL 547 03(3-0-0). Ore Deposit Geochemistry. S. Prerequisite: GEOL 447.

Geochemical techniques applied to the geology, exploration, and environmental analysis of ore deposits.

GEOL 551 03(3-0-0). Groundwater Modeling. S. Prerequisite: GEOL 452 or CIVE 423.

Groundwater modeling from a geologic perspective. Conceptual models and computer modeling of groundwater flow and solute transport.

GEOL 552 Var [2-3]. Advanced Topics in Hydrogeology. S. Prerequisite: GEOL 452.

Current literature, new techniques, legislative and political developments in hydrogeology, and appropriate case histories.

°GEOL 560 03(2-3-0). Clay Mineralogy. F. Prerequisite: GEOL 364.

Crystallography and chemistry of clay minerals. Applications to geology, engineering, and soil sciences, X-ray analysis of clays.

°GEOL 562 03(3-0-0). Statistical Data Analysis in Earth Resources. F. Prerequisite: STAT 340; STAT 350.

Statistical parameters, sequential data, map analysis, and multivariate data.

°GEOL 565 03(3-0-0). Petroleum Geochemistry and Geology. S. Prerequisite: GEOL 366; GEOL 372.

Geochemistry and geology of hydrocarbon generation, migration, and accumulation. Applications to hydrocarbon exploration.

***GEOL 567 03(3-0-0). Sedimentary Geochemistry.** S. Prerequisite: GEOL 366.

Geochemical processes affecting sedimentary rocks and other surficial materials.

GEOL 570 03(1-0-2). Tectonics. S. Prerequisite: GEOL 364; GEOL 372.

Evidence, environments, and consequences of tectonic theories.

***GEOL 575 04(3-2-0). Subsurface Geophysical Mapping.** S. Prerequisite: GEOL 344; GEOL 372; MATH 161; PH 142.

Advanced techniques for creating subsurface geological maps based on seismic reflection and well log data.

°GEOL 576 03(3-0-0). Exploration Seismology. S. Prerequisite: GEOL 344; GEOL 372; MATH 161; PH 142.

Seismic exploration methods, including theory, data acquisition, and data processing.

+GEOL 601 01(0-0-1). Geoscience Approaches and Thesis Proposals. F. Prerequisite: Graduate student standing in geosciences.

Core concepts of scientific approaches, local geology of Colorado, and preparation of geoscience thesis proposals. (\$)

+GEOL 652 03(3-0-0). Fluvial Geomorphology. F. Prerequisite: GEOL 120.

Geomorphology of channels, slopes, and drainage systems. (\$)

+GEOL 672 03(2-3-0). Advanced Structural Geology. F. Prerequisite: GEOL 436.

Rheology, deformation mechanisms, structural associations, and advanced methods of structural analysis. (\$)

GEOL 684 Var [1-5]. Supervised College Teaching. F, S, SS. Prerequisite: Written consent of instructor.

GEOL 692 Var. Seminar.

GEOL 695 Var. Independent Study.

+GEOL 696 Var. Group Study.

GEOL 698 Var. Research.

GEOL 699 Var. Thesis.

***GEOL 747 04(3-3-0). Advanced Sedimentary Petrology.** S. Prerequisite: GEOL 344.

Classification, origin, depositional history, and diagenesis of detrital sedimentary rocks as determined from thin sections.

GEOL 798 Var. Research.

GEOL 799 Var. Dissertation.

**GLOBAL ENVIRONMENTAL
SUSTAINABILITY COURSES**
Nondepartmental, Interdisciplinary
School of Global Environmental Sustainability
Office of Provost and Executive Vice President

GES 101 03(3-0-0). Foundations of Environmental Sustainability. F.
Concepts, foundations, and metrics of global environmental sustainability applied to global challenges. (NT-O)

GES 192 Var[1-3]. Global Environmental Sustainability Seminar. F, S.
Critical interconnections of global environmental sustainability, the environment, economics, and society.

GES 470 03(3-0-0). Applications of Environmental Sustainability. S.
Prerequisite: GES 101; 12 credits of GES interdisciplinary minor; junior or senior standing.
Integration of dimensions of global environmental sustainability—environment, society, and economy—through case studies and team project.

GEOGRAPHY COURSES

Department of Anthropology

College of Liberal Arts

GR 100 03(3-0-0). Introduction to Geography. F, S. (GT-SS2, AUCC 3C)

Major geographic themes applied to selected regions; physical environment, human-land relationships, regional analysis. (NT-O)

GR 210 03(3-0-0). Physical Geography. S.

Energy, mass budget, and human impacts on atmosphere, hydrosphere, and continental land surfaces.

GR 311 03(1-4-0). GIS for Social Scientists. F, S, SS. Prerequisite: GR100.

Applications of GIS techniques useful to the social sciences. Mapping techniques and GIS toolkits are practiced in lab. (NT-O)

°**GR 320 03(3-0-0). Cultural Geography.** F. Prerequisite: GR 100.

Geographic analysis of cultural phenomena, elements emphasizing human-land relationships and spatial patterns of agriculture, cities, language, religion. (NT-O)

GR 323/NR 323 03(2-2-0). Remote Sensing and Image Interpretation. F. Credit allowed for only one of the following: GR323, NR 323, GR 503, NR 503.

Remote sensing systems and applications; characteristics of photographic, scanner and radar images; imagery interpretation.

+**GR 342 03(3-0-0). Geography of Water Resources.** F.

Overview of spatial and temporal issues. (\$)

°**GR 345 03(3-0-0). Geography of Hazards.** S. Prerequisite: GR 210.

Causes, effects, distributional patterns, and human adjustments to environmental hazards.

GR 410 03(3-0-0). Climate Change: Science, Policy, Implications. S. Prerequisite: 3 credits of geography (GR) course work.

Implications and consequences for earth systems including the cryosphere, hydrosphere, and biosphere.

GR 420 04(3-2-0). Spatial Analysis with GIS. F. Prerequisite: 3 credits of geography (GR) course work. Credit not allowed for both GR 420 and NR 322.

Theory, application of geographic information systems for spatial analysis; conceptual basis of GIS, nature and use of geographic data, case studies.

GR 487 Var[1-9]. Internship. F, S, SS. Prerequisite: 9 credits of anthropology.

Academic-based work experience with selected organizations or agencies. Supervised application of principles of geography.

GR 495 Var. Independent Study. F, S.

GR 503/NR 503 04(3-3-0). Remote Sensing and Image Analysis. F. Credit allowed for only one of the following: GR503, NR 503, GR 323, NR 323.

Interpretation and analysis of photographic, multispectral scanner, and radar data; sensor systems; applications to resource management.

GRADUATE SCHOOL COURSES

Nondepartmental

Graduate School

GRAD 510 03(2-2-0). Fundamentals of High Performance Computing. F.

UNIX; networks; scalar, vector, and parallel architectures; performance programming.

GRAD 511 03(2-2-0). High Performance Computing and Visualization. S. Prerequisite: GRAD 510.

Interactive methods for linear systems; Monte Carlo methods; visualization and image processing.

GRAD 544A-C 01(1-0-0). Ethical Conduct of Research. F, S.

A) Arts and Humanities. B) Life/human sciences. C) Physical science/engineering.

GRAD 592 01(0-0-1). Water Resources Seminar. F.

Interdisciplinary seminar emphasizing issues important to water resources community. Content relates to a preselected theme each semester.

GRAD 596 Var [1-3]. Group Study-Graduate Education. SS.

Prerequisite: Graduate School approval.

Preparation for graduate education.

GRAD 792 02(0-0-2). Seminar on College Teaching. F, S.

Role of college teacher emphasizing applied principles and practices derived from empirical research and collective experience of teaching professors.

HUMAN DEVELOPMENT AND FAMILY STUDIES COURSES

Department of Human Development and Family Studies *College of Applied Human Sciences*

HDFS 101 03(3-0-0). Individual and Family Development. (GT-SS3, AUCC 3C). F, S, SS.

Principles of life-span human development in the context of the family. Theory and research on the influence of family systems on individuals. (NT-O/C)

HDFS 175/PSY 175 03. Developmental Psychology Across the Life Span. F, S, SS. Credit not allowed for both HDFS 175 and PSY 175. Offered as telecourse only.

Theory and research on physical, cognitive, and psychosocial human development across the life span. (NT-T)

HDFS 217 03(3-0-0). Creative Experiences for Children. F, S, SS. Prerequisite: HDFS 101, or concurrent registration in HDFS 277. Credit not allowed for both HDFS 217 and HDFS 218.

Theories of play; art, music, literature as related to child development. (NT-O)

HDFS 276 03. Studying Young Children. F, S, SS. Offered as correspondence course only.

Increasing understanding of young children through development of observation skills while participating in an early childhood center. (NT-C)

HDFS 277 01(1-0-0). Professional Skills Development I. F, S, SS.

Professional skills and opportunities relevant to contemporary issues with individuals, families and community. (NT-B)

HDFS 286 04(2-6-0). Practicum-Professional Skills. F, S. Prerequisite: CO 150 or HONR 193; HDFS 101. Required background check through CBI, FBI. Human development and family studies or family and consumer sciences majors only.

Observational and applied experience with children, adolescents, adults, or families. Exploration of professional skills and opportunities. (NT-O, \$)

HDFS 302 03(3-0-0). Marriage and Family Relationships. F, S, SS. Prerequisite: HDFS 101 or SOC 100.

Preparation for and adjustment to marital and family relationships throughout the life cycle. (NT-T/O)

HDFS 310 03(3-0-0). Infant and Child Development in Context. F, S, SS. Prerequisite: HDFS 101 or PSY 100.

Physical, cognitive, and socioemotional development from conception through middle childhood in context of family, relationships, and culture. (NT-O/V)

HDFS 311 03(3-0-0). Adolescent/Early Adult Development in Context. F, S, SS. Prerequisite: HDFS 101 or HDFS 175 or PSY 100 or PSY 260.

Physical, cognitive, and socioemotional development of adolescents and young adults in context of family, relationships, and culture. (NT-O)

HDFS 312 03(3-0-0). Adult Development-Middle Age and Aging. F, S, SS. Prerequisite: HDFS 101 or HDFS 175 or PSY 100 or PSY 260.

Developmental issues and processes pertaining to middle and later adulthood. Contexts in which adult development and aging occur are emphasized. (NT-C/O)

HDFS 317 03(0-0-3). Special Needs in Early Childhood. F, S, SS. Prerequisite: HDFS 310 or PSY 260. Offered as an online course only through the Division of Continuing Education.

Atypical development in early childhood and recommended practices for fostering development of young children with special needs. (NT-O)

HDFS 318 03(3-0-0). Infancy and Toddlerhood. F, S, SS. Prerequisite: HDFS 101.

Physical, cognitive, language, and socio-emotional development from pre-birth through 36 months with an emphasis on applied settings. (NT-O)

HDFS 320 03(3-0-0). Cognitive and Language Development. F, S, SS. Prerequisite: HDFS 310 or PSY 260.

Cognitive and language development from birth to adulthood; including biological, social, and cultural influences. (NT-O)

HDFS 332 03(3-0-0). Death, Dying, and Grief. F, S, SS. Prerequisite: HDFS 101 or HDFS 175 or PSY 100 or PSY 260.

Developmental processes of death and dying related to dying individuals and their families and for human service agencies. (NT-O)

HDFS 334 03(3-0-0). Parenting Across the Lifespan. F, S, SS. Prerequisite: HDFS 310 or PSY 260.

Parenthood as a developmental process; child rearing as a function of variations in risk status, family systems, and ecological contexts. (NT-O)

HDFS 350 03(2-2-0). Applied Research Methods. F, S, SS.

Prerequisite: HDFS 101 or PSY 100; STAT 201 or STAT 301.

Interpret, apply and write about research findings in human development and family studies. (NT-O)

HDFS 351 03(0-0-3). Promoting Early Socioemotional Competence. F, S, SS. Prerequisite: HDFS 277; HDFS 310. Offered only online through the Division of Continuing Education.

Promoting positive socioemotional development and preventing challenging behaviors in early childhood, based on the Pyramid Model. (NT-O)

HDFS 374 03. Children's Programming/Curriculum Development. F, S, SS. Offered as correspondence course only.

Principles of designing and evaluating developmentally appropriate programs for children. (NT-C)

HDFS 375 03(3-0-0). Programming for Children and Families. F, S. Prerequisite: HDFS 310 or PSY 260.

Prevention and intervention programs for children and families. (NT-O)

HDFS 401 03(3-0-0). Childhood Socialization. F, S, SS. Prerequisite: HDFS 310 or PSY 260.

Socialization processes that influence human development within diverse family styles and cultures. (NT-O)

HDFS 402 03(3-0-0). Family Studies. F, S, SS. Prerequisite: HDFS 101 or SOC 100; junior or senior standing.

Theory and research concerning relationships within families; interaction between family and other social institutions. (NT-O)

HDFS 403 03(3-0-0). Families in the Legal Environment. F, SS.

Legal issues related to families, including adoption, marriage, divorce, parent and child rights, consumer issues, disability, and estate planning. (NT-O)

HDFS 404 02(2-0-0). Child Life Theory and Practice. F, S, SS. Prerequisite: HDFS 310 or PSY 260.

Theories and skills related to effective child life practice in hospitals. (NT-O)

HDFS 439 03(3-0-0). Administration of Early Childhood Programs. F, S, SS. Prerequisite: HDFS 310 or PSY 260.

Center administration related to program development and operations, budgeting, state regulations and licensing, and personnel issues. (NT-O)

HDFS 477 01(1-0-0). Professional Skills Development II. F, S, SS. Prerequisite: HDFS 277.

Applications and integration of human development and family background within professional settings. (NT-O, \$)

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HDFS 484 Var [1-3]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

HDFS 488A-D Var [1-14]. Field Placement. Prerequisite: HDFS 477 or concurrent registration.

Application of human development skills in a professional setting. **A)** Childhood education. (NT-O) **B)** Programming for youth and families. (NT-O) **C)** Child life allied health. (NT-O) **D)** Programming for adults and later life families. (NT-O)

HDFS 490 Var [1-3]. Workshop-Human Development.

HDFS 492 03(0-0-3). Seminar-Program Proposal Development. F, S, SS. Prerequisite: HDFS 477 or concurrent registration or EDUC 400.

Research, development, and oral presentations of program proposals from a family systems and development perspective. (NT-O)

HDFS 493 03(0-0-3). Specialized Seminar. Prerequisite: Written consent of instructor.

Advanced study of theory, research, and application in a specialized area.

HDFS 495A-C Var. Independent Study.

A) Human development. **B)** Family studies. **C)** Early childhood education.

HDFS 497 Var. Group Study. S.

HDFS 498A-B Var [1-3]. Research.

A) Human development. **B)** Family studies.

HDFS 499 Var [1-6]. Thesis. Prerequisite: Written consent of department head.

Independent research project presented to a faculty committee.

HDFS 500 03(2-3-0). Issues in Human Development and Family Studies. F.

A selected, broad issue in human development and family studies emphasizing principles of research (\$).

HDFS 501 01(1-0-0). Readings in the Discipline. S. Prerequisite: Admission to HDFS master's program.

Research in human development and family studies content areas; skills in writing an extended literature review.

HDFS 520 03(1-2-1). Family Therapy Practice: Treatment Planning. S. Prerequisite: Admission to the Marriage and Family Therapy Program.

Integration of family/couple therapy theories and practice related to treatment planning and internal family systems therapy. (\$)

HDFS 521 03(1-2-1). Family Therapy Practice: Common Factors. S. Prerequisite: Admission to the Marriage and Family Therapy Program.

Application of common factors - e.g., therapeutic alliance - in family and couple therapy. (\$)

HDFS 524 03(3-0-0). Family Theory. F. Prerequisite: One family studies course.

Major theories and conceptual frameworks for family analysis.

HDFS 528 04(2-4-0). Child and Family Assessment. F. Prerequisite: Nine credits in human development and family studies or behavioral science at 300-400 level.

Assessment procedures for children and families related to test selection and effective intervention.

HDFS 534 03(3-0-0). Marriage and Family Therapy. F. Prerequisite: HDFS 524.

Theories and techniques.

HDFS 550 03(3-0-0). Research Methods I. S. Prerequisite: Three credits of statistics, three credits of upper-division behavioral sciences.

Research strategies and ethical considerations.

HDFS 590A-B Var [1-3]. Workshop.

A) Human development. **B)** Family studies.

HDFS 592 03(1-0-2). Grant Writing-Human Services and Research. F, S. Prerequisite: STAT 201.

Writing grant proposals that support client services or for research.

HDFS 600B-E 03(3-0-0). Advanced Studies. F, S, SS.

B) Grief and loss. Prerequisite: Six credits in behavioral sciences. **C)** Intimacy and human sexuality. Prerequisite: Six credits in behavioral sciences. **D)** Program planning and evaluation. Prerequisite: HDFS 550 or concurrent registration. **E)** Parenting. Prerequisite: Six credits in behavioral sciences.

HDFS 610 03(3-0-0). Risk and Resilience. S. Prerequisite: Six credits in behavioral sciences.

Risk and resilience processes in human development.

HDFS 612 03(3-0-0). Adolescent Development. F. Prerequisite: One course in adolescence, three credits of upper-division behavioral science.

Classical and contemporary theory; review of research related to major developmental processes.

HDFS 613 03(3-0-0). Adult Development and Aging. S. Prerequisite: One course in adult development or three credits of upper-division behavioral science.

Advanced study of developmental change and adaptation during adult years. (NT-O)

HDFS 620 03(1-2-1). Family Therapy Practice: Addictions. F. Prerequisite: Admission to the Marriage and Family Therapy Program.

Application of marriage and family therapy theories to clinical practice with a focus on addiction and self-of-the-therapist. (\$)

HDFS 621 03(1-2-1). Family Therapy Practice: Topics in Sexuality. F. Prerequisite: Admission to the Marriage and Family Therapy Program.

Integration of family therapy theories and practice related to topics in sexuality, termination and referral, and one's personal theory of change. (\$)

HDFS 624 03(3-0-0). Skills and Techniques in Family Therapy. F. Prerequisite: HDFS 534.

Elaboration of techniques and therapy skills based on theory and research.

HDFS 630 03(3-0-0). Socioemotional Development. S. Prerequisite: Six credits of upper-division behavioral sciences.

Examination of theory and research on issues in social, emotional, and personality development.

HDFS 631 03(3-0-0). Cognitive Development. F. Prerequisite: Six credits of upper-division behavioral sciences.

Examination of child and adolescent cognitive development, including perceptual, linguistic, memory, and social cognitive skills.

HDFS 636 03(3-0-0). Aging and the Family. S. Prerequisite: One course in adult development or six credits of upper-division behavioral science.

Theory and research relating to topics on aging during middle and late years of family life cycle.

HDFS 644 03(3-0-0). Foundations in Family Therapy. F, SS. Prerequisite: HDFS 524.

Contemporary research and treatment strategies for parenting problems, family violence, and substance abuse.

HDFS 650 03(2-0-1). Research Methods II. F. Prerequisite: HDFS 550, STAT 301.

Statistical concepts and analysis.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HDFS 676 03(3-0-0). Professional Skills Development. F. Prerequisite: Admission to Marriage and Family Therapy Program.

Fundamental skills of marriage and family therapy; clinic procedures; case assessment, planning, and management.

°**HDFS 677 03(3-0-0). Ethical and Legal Issues.** S.

Ethical and legal issues in the field of human development and family studies.

HDFS 684 Var. Supervised College Teaching. F, S.

HDFS 686A-E Var [1-15]. Practicum. Prerequisite: Nine credits in human development.

Application of human development skills in a variety of professional settings. **A)** Human development. **B)** Family studies. **D)** Developmental assessment. **E)** Early childhood education.

HDFS 687A-C Var. Internship.

Application of advanced human development skills in professional settings. **A)** Human development. Prerequisite: Nine graduate credits in human development. **B)** Family studies. Prerequisite: Nine graduate credits in human development. **C)** Marriage and family therapy. Prerequisite: HDFS 677 or concurrent registration; HDFS 678 or concurrent registration; HDFS 688 or concurrent registration.

HDFS 692 03(3-0-0). Seminar-Contemporary Family Issues. Prerequisite: Six credits in behavioral sciences.

Current issues in the family with implications for intervention and therapy.

HDFS 695A-C Var. Independent Study.

A) Human development. **B)** Family studies. **C)** Early childhood education.

HDFS 697 Var [1-6]. Group Study.

HDFS 698A-B Var [1-3]. Research.

A) Human development. **B)** Family studies.

HDFS 699 Var. Thesis. Prerequisite: HDFS 550.

°**HDFS 710 03(3-0-0). Theories of Applied Developmental Science.** F. Prerequisite: HDFS 500.

Theories of applied developmental science, and implications for intervention and policy.

°**HDFS 740 03(3-0-0). Family Policy and Programming.** F. Prerequisite: HDFS 500.

Social and family policy initiatives, with attention toward vulnerable populations, using a lifespan developmental perspective.

°**HDFS 750 03(3-0-0). Multivariate Research Methods.** S. Prerequisite: HDFS 650.

Applications of multivariate methods to research in applied developmental science.

HDFS 772 03(2-0-1). Marriage and Family Therapy Supervision. S, SS. Prerequisite: Written consent of instructor.

Prepares professionals to supervise marriage and family therapists in a variety of settings.

***HDFS 792 03(3-0-0). Issues in Applied Developmental Science.** S. Prerequisite: HDFS 500.

Current issues in applied developmental science involving a synthesis of theory, research, and application.

HDFS 799 Var. Dissertation.

HEALTH AND EXERCISE SCIENCE COURSES

Department of Health and Exercise Science College of Applied Human Sciences

HES 100A-P 01(0-3-0). Beginning Physical Education. F, S, SS.

Physical activities for the development of personal motor skills. **A)** Aerobic exercise. **C)** Soccer. **D)** Self-defense. **E)** Tennis. **J)** Volleyball. **K)** Swimming. **L)** Golf. **(S)** **M)** Basketball. **N)** Racquetball. **O)** Weight training. **P)** Ice skating. **(S)**

HES 101B-J 01(0-3-0). Intermediate Physical Education. F, S, SS. Prerequisite: HES 100 or meet departmental standards.

Physical activities for the development of personal motor skills. **B)** Tennis. **C)** Volleyball. **D)** Swimming. **E)** Golf. **(S)** **F)** Soccer. **G)** Basketball. **H)** Racquetball. **I)** Aerobics. **J)** Ice skating. **(S)**

HES 102A-G 01(0-3-0). Physical Education Activities. F, S, SS.

Physical activities for the development of personal motor skills. **A)** Aquatic conditioning. Prerequisite: Intermediate swimming ability. **C)** Special activities. **D)** Advanced swimming. **F)** Conditioning and fitness. **G)** Athletics.

HES 106 01(0-3-0). Scuba Diving. F, S. Prerequisite: Intermediate ability. **(S)**

HES 120 01(1-0-0). Introduction to Health and Exercise Science. F, S.

Health and Exercise Science major, career options, campus resources, tools for academic success, various health-related topics.

HES 123 02(1-2-0). Fitness and Wellness. F, S, SS.

Health, fitness, and wellness; design, implement, and evaluate a complete personal fitness and wellness program. **(S)**

HES 143 02(1-0-1). Survey of Health and Wellness. F, S, SS. Credit not allowed for both HES 143 and HES 145.

Socioeconomic, environmental, physiological, and behavioral factors that affect the health and well being of humans.

HES 145 03(3-0-0). Health and Wellness. F, S, SS. Credit not allowed for both HES 143 and HES 145.

Personal health behaviors and personal choice in response to wellness. **(NT-O)**

HES 203 03(3-0-0). Motor Learning. F, S, SS. Prerequisite: PSY 100.

Motor skill acquisition as function of maturation and experience. Emphasis on strategies for facilitating skill learning in normal school-age population.

HES 207 03(2-2-0). Anatomical Kinesiology. F, S, SS.

Anatomical, physiological, and mechanical fundamentals of human movement.

HES 214 03(2-2-0). Water Safety Instruction. F, S.

Pool management and methods of teaching swimming skills and water safety practices. Red Cross Water Safety Instructor Certificate upon completion.

HES 240 02(1-2-0). First Aid and Emergency Care. F, S.

Principles, applied techniques emphasizing emergency rescue and care. Meets requirements for Red Cross Advanced First Aid and Emergency Care Credential. **(S)**

HES 307 03(3-0-0). Biomechanical Principles of Human Movement. F, S, SS. Prerequisite: BMS 301 or HES 207; PH 121 or PH 141.

Identify with and utilize biomechanical principles pertinent to human movement.

HES 309 02(2-0-0). Methods of Coaching. F, S, SS.

Preparation to coach in an interscholastic athletic situation. **(NT-O)**
HES 319 03(3-0-0). Neuromuscular Aspects of Human Movement. F, S. Prerequisite: BMS 300 or BMS 360; BMS 301.

Neuromuscular anatomy and physiology of human movement. Applied/integrated topics: aging, muscle fatigue, training, and neuromuscular disease.

HES 331A-D 01(0-2-0). Techniques of Teaching Team Sports. F, S. Prerequisite: Corresponding laboratory or competency in area.

Practical and theoretical aspects of teaching team sports with special emphasis on materials, teaching techniques, and analyzing skills. **A)** Soccer. **B)** Basketball. **C)** Field sports. **D)** Volleyball.

HES 332A-H 01(0-2-0). Techniques of Teaching Individual Sports. F, S. Prerequisite: Corresponding laboratory or competency in area.

Practical and theoretical aspects of teaching individual sports with special emphasis on materials, teaching techniques, and analyzing skills. **A)** Badminton. **B)** Golf. **C)** Tennis. **D)** Track and field. **F)** Weight training. **H)** Aerobics.

HES 340 01(1-0-0). Exercise Prescription. F, S, SS. Prerequisite: Concurrent registration in HES 386A.

Theory and practice of exercise prescription for healthy individuals, cardiac patients, and other special populations.

HES 344 03(3-0-0). Methods of Health Education. F, S. Prerequisite: HES 145.

Prepare teaching units and methods for health education in the public schools, K-12.

HES 345 03(3-0-0). Population Health and Disease Prevention. F, S, SS. Prerequisite: HES 145.

Causes of disease throughout the lifespan and interventions designed to prevent disease. **(NT-O)**

HES 346 03(2-2-0). Training Room Methods. F, S. Prerequisite: HES 207.

Preventive measures, taping, bandaging, massage and manipulation, diet and conditioning of athletes.

HES 356 03(3-0-0). Wellness Programming. F, S, SS. Prerequisite: HES 145; HES 386A; HES 386B or concurrent registration.

Assessment of wellness concerns and organizational problems; selection and implementation of program design.

HES 365 02(2-0-0). Program Administration. F, S.

Problems and nature of organization and administration in health and physical education.

HES 379 03(3-0-0). Psychology and Sport. F, S. Prerequisite: PSY 100; minimum GPA of 2.5 in the following courses, with no grade lower than C: HES 145; HES 207; BMS 300.

Psychological and social implications involved in teaching of physical education and coaching of athletics.

HES 386A-B. Practicum.

A) Adult fitness. 02(1-3-0). Prerequisite: BMS 300 with a C or better; FSHN 150 with a C or better; HES 145 with a C or better; HES 207 with a C or better; 2.5 GPA in BMS 300, FSHN 150, HES 145, and HES 207; HES 240; HES 332F; HES 332H; concurrent registration in HES 340. **B)** Wellness program management. 03(1-6-0). Prerequisite: HES 386A.

HES 403 04(3-2-0). Physiology of Exercise. F, S, SS. Prerequisite: BMS 300 or BMS 360; LIFE 102.

Effects of exercise on tissues, organs, and systems of the body. **(S)**

HES 405 02(1-2-0). Exercise Testing Instrumentation. F, S. Prerequisite: HES 403.

Theory and operation of devices commonly employed in quantifying factors related to exercise. **(S)**

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HES 420 03(2-2-0). Electrocardiography and Exercise Management. F, S. Prerequisite: BMS 300.

Interpretation of 12-lead ECG tracings, administering exercise tests, and prescribing exercise program for healthy individuals and special populations. (\$)

HES 430 03(3-0-0). Advanced Athletic Training. F, S. Prerequisite: HES 240; HES 346.

Theory and techniques of habilitative and rehabilitative sports medicine. Emphasis on contemporary evaluative procedures and rehabilitative modalities.

HES 444 02(2-0-0). Successful Aging: Role of Physical Activity. F, S, SS. Prerequisite: BZ 110 or LIFE 102.

Biology and physiology of healthy aging and impact of disease and physical activity on aging processes. (NT-O)

HES 456 03(3-0-0). Advanced Wellness Programming. F, S. Prerequisite: HES 356 or concurrent registration; HES 386B or concurrent registration.

Investigation of established wellness programs with special emphasis on design, implementation, and evaluation of programming models.

HES 476 03(3-0-0). Exercise and Chronic Disease. F, S, SS. Prerequisite: BC 351; FSHN 350; HES 403.

Interaction of physical activity with pathophysiology and treatment of chronic diseases and conditions.

HES 484 Var [1-5]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

HES 486A-C Var [1-3]. Practicum.

A) Adaptive correctives. B) Wellness program management. Prerequisite: BMS 300 with a C or better; FSHN 150 with a C or better; HES 145 with a C or better; HES 207 with a C or better; HES 386B; 2.500 GPA. C) Coaching.

HES 487 15(0-0-40). Internship. Prerequisite: BMS 300 with a C or better; FSHN 150 with a C or better; HES 145 with a C or better; HES 207 with a C or better; HES 486B and all course work; 2.500 GPA.

Practical application of knowledge and skills in a professional situation.

HES 492 02(0-0-2). Health and Exercise Science Seminar. F, S.

Integration and reflection on health and exercise science disciplinary knowledge.

HES 495A-E Var. Independent Study.

A) Health. B) Biomechanics. C) Exercise science. D) Neuromuscular physiology. E) Honors.

HES 496A-E Var. Group Study.

a) Health. B) Athletics. C) Biomechanics. D) Exercise science. E) Neuromuscular physiology.

HES 520 03(2-2-0). Advanced Exercise Testing and Prescription. S. Prerequisite: HES 403.

Theory and practice of exercise testing and prescription in apparently healthy and diseased populations. (\$)

HES 530 03(3-0-0). Clinical Biomechanics. S. Prerequisite: BMS 301; HES 307.

Effect of external loads on internal tissues; concern for injury, injury prevention, and rehabilitation.

***HES 531 03(3-0-0). Muscle and Joint Mechanics.** F. Prerequisite: BMS 301; HES 307.

Integrate muscle, tendon, and location of bone attachment into a comprehensive understanding of human movement at the single- and multi-joint level.

HES 540 03(3-0-0). Human Performance in Environmental Extremes. F. Prerequisite: HES 403.

Ability of humans to exercise or work in extremes of temperature, barometric pressure, air pollution, and sleep deprivation.

HES 545 03(3-0-0). Evolutionary Basis for Health and Fitness. S. Prerequisite: FSHN 350; HES 403.

Evolutionary basis for human health and fitness based upon dietary and exercise patterns of pre-agricultural humans.

HES 556 03(3-0-0). Wellness and Health Promotion Concepts. F.

Discussion of theory and application of health promotion in various settings.

HES 600 03(3-0-0). Research Design in Health/Exercise Science. F. Prerequisite: One course in statistics.

The research.

HES 603 03(3-0-0). Advanced Topics in Exercise Physiology. F. Prerequisite: HES 403.

Advanced principles of theoretical and applied exercise physiology at molecular, cellular, and systemic levels.

HES 604 03(3-0-0). Oxygen Transport in Exercise and Health. S. Prerequisite: HES 403.

Role of oxygen transport mechanisms in exercise performance and in health at the cellular and systemic levels.

HES 610 03(3-0-0). Exercise Bioenergetics. F. Prerequisite: BC 351 or FSHN 350; HES 403.

Biology of energy transfer reactions related to human locomotion and exercise performance in both healthy individuals and disease states.

°HES 619 03(3-0-0). Advanced Neural Control of Movement. F. Prerequisite: BMS 300; BMS 301; HES 403.

Neuroanatomical, neurophysiological, and applied topics on the control of force and human movement.

HES 630/FSHN 630 03(3-0-0). Integrative Exercise and Nutrition Metabolism. S. Prerequisite: FSHN 551; HES 610. Credit not allowed for both HES 630 and FSHN 630.

Advances in integrative human metabolism under conditions of changing energy flux.

HES 645 03(3-0-0). Epidemiology of Health and Physical Activity. S. Prerequisite: HES 600.

Foundation in chronic disease epidemiology that will enable students to evaluate the current epidemiologic literature.

HES 650 03(3-0-0). Health Promotion Programming. F, S.

Development of skills in health promotion program design, implementation and evaluation.

HES 656 03(3-0-0). Comprehensive Stress Management. F, S, SS.

Relationship between stress and illness emphasizing methods to impact its detrimental effects.

HES 684 Var. Supervised College Teaching.

HES 686A-E Var [1-3]. Practicum. Prerequisite: Current CPR certification.

A) Adult fitness-human performance clinical/research laboratory. B) Wellness management. C) Youth fitness and skill development. D) Health and exercise science research. E) Applied health and exercise science.

HES 687 Var [3-9]. Internship. Prerequisite: HES 686A or HES 686B or HES 686C or HES 686D or HES 686E.

Practical application of knowledge and skills in a professional situation.

HES 692 01(0-0-1). Seminar.

Consideration of graduate education in health and exercise science.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HES 693 01(0-0-1). Seminar.

Maximum of 2 credits allowed in course.

Current topics and issues in health and exercise science.

HES 695A-D Var. Independent Study.

A) Health. B) Exercise science. C) Biomechanics. D) Neuromuscular physiology.

HES 696A-E Var. Group Study.

A) Health. B) Exercise and nutrition. C) Exercise science. D) Biomechanics. E) Neuromuscular physiology.

HES 698 Var. Research.

Non-thesis research in health and exercise science.

HES 699 Var. Thesis.

HES 700 03(2-0-1). Professional Skills in Bioenergetics. F. Prerequisite: Admission to doctoral program or admission to M.S. program and written consent of instructor.

Grant writing, authorship, peer review process, responsible conduct of science, research ethics, professional conduct, career opportunities.

HES 704 03(3-0-0). Advanced Topics in Human Bioenergetics. S.

Prerequisite: HES 610.

Selected topics in basic, clinical, and applied energetics exploring pathogenesis and treatment of chronic disease.

°HES 710 03(3-0-0). Exercise in Disease Prevention. S. Prerequisite:

HES 403; HES 520.

Role of exercise/physical activity in the prevention, pathophysiology and treatment of chronic diseases.

°HES 730 03(3-0-0). Cardiovascular Pathophysiology. F. Prerequisite:

HES 403; HES 520.

Cardiovascular physiology with emphasis on the development, progression, and treatment of diseases of the cardiovascular system.

***HES 735 03(2-0-1). Human Cardiovascular Control.** F. Prerequisite:

HES 403.

Dynamics of cardiovascular control in human health and disease.

HES 784 Var [1-3]. Supervised College Teaching.

HES 786 Var [1-3]. Practicum.

HES 793 01(0-0-1). Bioenergetics Seminar. F, S.

HES 795 Var [1-3]. Independent Study.

HES 796 Var [1-3]. Group Study.

HES 798 Var [1-6]. Research.

HES 799 Var. Dissertation.

HISTORY COURSES

Department of History *College of Liberal Arts*

HIST 100 03(3-0-0). Western Civilization, Pre-Modern. (GT-HI1, AUCC 3D). F, S, SS.

Historical development of Western civilization from antiquity to the early modern era (c. 1600 C.E.).

HIST 101 03(3-0-0). Western Civilization, Modern. (GT-HI1, AUCC 3D). F, S, SS.

Historical development of Western civilization from c. 1600 C.E. to the contemporary era.

HIST 115 03(3-0-0). Islamic World to 1800. (GT-HI1, AUCC 3D). F.

Religion, society, and culture in the Islamic world from the time of Muhammad to 1800.

HIST 120 03(3-0-0). Asian Civilizations I. (GT-HI1, AUCC 3D). F.

Major traditional intellectual and cultural patterns of Asia during the formative years.

HIST 121 03(3-0-0). Asian Civilizations II. (GT-HI1, AUCC 3D). S.

Transformation of major intellectual and cultural patterns and the process of globalization in Asia.

HIST 150 03(3-0-0). U.S. History to 1876. (GT-HI1, AUCC 3D). F, S, SS.

Major issues and themes in the development of the United States from the colonial period through reconstruction.

HIST 151 03(3-0-0). U.S. History Since 1876. (GT-HI1, AUCC 3D). F, S, SS.

Major issues and themes in the historical development of the United States since reconstruction.

HIST 170 03(3-0-0). World History, Ancient-1500. (GT-HI1, AUCC 3D). F, S, SS.

Historical developments and interactions of world societies from the ancient to modern periods.

HIST 171 03(3-0-0). World History, 1500-Present. (GT-HI1, AUCC 3D). F, S, SS.

Historical developments and interactions of world societies from 1500 to the present.

HIST 250/ETST 250 03(3-0-0). African American History. (GT-HI1, AUCC 3D). F. Credit not allowed for both HIST 250 and ETST 250.

Slavery, emancipation, labor, political, socioeconomic, and cultural history of African Americans since colonial times.

HIST 252/ETST 252 03(3-0-0). Asian American History. (GT-HI1, AUCC 3D). F. Credit not allowed for both HIST 252 and ETST 252.

Asian-American historical experience in the United States from 1850s to the present time.

HIST 255/ETST 255 03(3-0-0). Native American History. (GT-HI1, AUCC 3D). S. Credit not allowed for both HIST 255 and ETST 255.

History of Native American peoples in the United States to the present, including origin stories.

HIST 300 03(3-0-0). Ancient Greece to 323 B.C.E. F. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 300 and HY 305.

From the Bronze Age to the death of Alexander the Great, emphasizing political, social, intellectual, and cultural developments.

HIST 301 03(3-0-0). Roman Republic. S. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 301 and HY 304.

Roman history from the monarchy to the fall of the republic; special emphasis on political, cultural, and social history.

HIST 302 03(3-0-0). Roman Empire. S. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits.

Roman history from the principate of Augustus to the reign of Constantine; special emphasis on political, intellectual, cultural, and social history.

HIST 303 03(3-0-0). Hellenistic World: Alexander to Cleopatra. S. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 303 and HY 306.

From Alexander the Great to Cleopatra VII, emphasizing intellectual, social, military, political, and cultural developments.

HIST 304 03(3-0-0). Women in Ancient Greece and Rome. F. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 304 and HY 309.

Comparative study of roles of women and gender in Ancient Greece and Rome.

HIST 308 03(3-0-0). Ancient Christianity to 500 A.D. F. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 308 and HY 451.

Growth of Christian Church from 1st to 5th century; emphasis on its role in Roman Empire; development of ecclesiastical institutions and literature.

HIST 309 03(3-0-0). Medieval Christianity, 500-1500. S. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 309 and HY 452.

Christian Church in Eastern and Western Christendom emphasizing its role in medieval society, relationship with the state, and its institutions.

HIST 310 03(3-0-0). Medieval Europe. F, S, SS. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits.

Political, legal, socioeconomic development of Europe from 300-1500 emphasizing emergence of major states.

HIST 311 03(3-0-0). Medieval England. S. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 311 and HY 410.

Political, social, and intellectual development of England from Romans to end of Middle Ages.

HIST 312 03(3-0-0). Women in Medieval Europe. F. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits.

Women in the European Middle Ages; political, social, economic, religious, and cultural developments.

HIST 315 03(3-0-0). Tudor Stuart England, 1485-1689. F, SS. Prerequisite: HIST 100 or HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 315 and HY 414.

Political, economic, and social history of England from 1485-1689 emphasizing religious movements, revolution, and constitutional development.

HIST 317 03(3-0-0). Renaissance and Reformation Europe. F. Prerequisite: HIST 100 or HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 317 and HY 310.

Development of European society during Renaissance and Reformation eras; religion, society, and the rise of nation-states.

HIST 318 03(3-0-0). The Age of the Enlightenment. S. Prerequisite: HIST 100 or HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 318 and HY 312.

Development of European society from settlement of religious wars to French Revolution emphasizing political, economic, and intellectual trends.

HIST 319 03(3-0-0). Early Modern France, 1500-1789. S. Prerequisite: HIST 100 or HIST 101 or HIST 171; completion of 45 credits. Credit not

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

allowed for both HIST 319 and HY 415.

Political, social, economic, religious, and cultural developments in France (16th-18th centuries) emphasizing formation of the absolutist state.

HIST 320 03(3-0-0). Women and Gender in Europe, 1450-1789. F. Prerequisite: HIST 100 or HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 320 and HY 417.

Women and gender in western Europe (15th-18th centuries); political, social, economic, religious, and cultural developments.

°**HIST 321 03(3-0-0). Industrial Society in Europe, 1600-1871.** F. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 321 and HY 474.

Causes and consequences of European industrialization and its impact on society, 1600-1871; emphasis on northwest Europe.

HIST 322 03(3-0-0). Industrial Society in Europe, 1871-1989. S. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 322 and HY 475.

Causes and consequences of industrialization and its impact on European societies between 1871 and 1989; completion of 45 credits.

HIST 323 03(3-0-0). Russia Before 1700. F. Prerequisite: HIST 100 or HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 323 and HY 438.

Russia's political predecessors; contacts with Byzantium, Western Europe, and the Mongol Empire, and resulting cultural, religious, and social change.

HIST 324 03(3-0-0). Imperial Russia. F, S, SS. Prerequisite: HIST 100 or HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 324 and HY 440.

Tsarist Russia from its beginnings to November 1917 Revolution with emphasis on modern period. (NT-C)

°**HIST 327 03(3-0-0). Habsburg Empire.** F. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 327 and HY 422.

From Charles V through World War I emphasizing significance, uniqueness, and crucial role of Danubian Europe in modern history.

HIST 328 03(3-0-0). Modern Europe, 1815-1914. F, SS. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 328 and HY 316.

Europe in 19th century emphasizing growth of liberalism, nationalism, and industrialism.

HIST 329 03(3-0-0). Europe in Crisis, 1914-1941. F. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 329 and HY 318.

Political, social, economic developments since 1914; consequences of world wars, Great Depression, spread of totalitarianism, decline of imperialism.

***HIST 330 03(3-0-0). Eastern Europe Since 1918.** S. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 330 and HY 423.

Breakup of Austrian, German, Russian, Turkish Empires; successor states between wars; communist revolutions and character of East European socialist regimes.

HIST 331 03(3-0-0). The Soviet Union. F, S, SS. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 331 and HY 442.

Formation of Soviet system in 1918 to its demise in 1991 emphasizing emergence of an advanced socialist state.

HIST 332 03(3-0-0). Germany Since World War I. F. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 332 and HY 435.

German history, culture, and everyday life from 1914 to present.

HIST 333 03(3-0-0). Contemporary Europe. F, SS. Prerequisite: HIST 101 or HIST 171. Credit not allowed for both HIST 333 and HY 319.

Political, economic, social, and cultural history of major European nations since World War II; completion of 45 credits.

HIST 334 03(3-0-0). European Culture in the 20th Century. S. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 334 and HY 463.

Cultural developments since World War I emphasizing science, art, clash of ideologies, existentialism, youth culture, and environmental issues.

***HIST 335 03(3-0-0). Britain in the 20th Century.** F. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 335 and HY 418.

Political, economic, and social developments emphasizing role of Britain in world affairs and internal changes that led to welfare state.

***HIST 336 03(3-0-0). Germany from Napoleon to WWI.** F. Prerequisite: HIST 101 or HIST 171; completion of 45 credits.

Modern Germany for the late eighteenth to the early twentieth centuries.

HIST 337 03(3-0-0). Modern Italy: Politics, Society, and Culture. F, SS. Prerequisite: HIST 101 or HIST 171; completion of 45 credits.

Political, social, and cultural developments in Italian history from 1860 to the present.

HIST 339 03(3-0-0). World War II in Europe. F, SS. Prerequisite: HIST 101 or HIST 171; completion of 45 credits.

WWII in Europe (1939-1945): military strategy, tactics; political and diplomatic events; economic and social impacts; ethnic and gender consequences.

HIST 340 03(3-0-0). Colonial North America, 1492-1800. F, SS. Prerequisite: HIST 101 or HIST 150 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 340 and HY 360.

New World encounters between native Americans, Europeans, and Africans, and the colonial societies they built.

HIST 341 03(3-0-0). Eighteenth Century America. S, SS. Prerequisite: HIST 101 or HIST 150 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 341 and HY 362.

Politics, culture, and society in Colonial British America and the new United States, 1700-1815.

***HIST 342 03(3-0-0). The Old South.** F. Prerequisite: HIST 150 or HIST 151; completion of 45 credits.

Old South, 1607-1865; plantation system, slavery, gender, honor, interactions with Native Americans, southern nationalism, secession, Civil War.

°**HIST 343 03(3-0-0). Early U.S. Republic.** F, SS. Prerequisite: HIST 101 or HIST 150 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 343 and HY 364.

Major themes of U.S. cultural, economic, social, and political history, 1787 to 1815.

HIST 344 03(3-0-0). Age of Jackson. S, SS. Prerequisite: HIST 101 or HIST 150 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 344 and HY 368.

National growth, 1815 to 1850, emphasizing political, social, and economic developments.

HIST 345 03(3-0-0). Civil War Era. S. Prerequisite: HIST 101 or HIST 150 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 345 and HY 370.

U.S. history between 1848 and 1865 emphasizing causes and results of the Civil War.

HIST 346 03(3-0-0). Reconstruction and the New South. F. Prerequisite:

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HIST 101 or HIST 150 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 346 and HY 372.

Reconstruction Era, 1865-1877, and the South to present with emphasis on purposes and results of Reconstruction.

***HIST 347 03(3-0-0). United States, 1876-1917.** S. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 347 and HY 375.

Victorian way of life; rise of industry; reform movements; imperialism; World War I.

HIST 348 03(3-0-0). United States, 1917-1945. F, SS. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 348 and HY 376.

World War I, the 1920s, the Great Depression, and World War II.

HIST 349 03(3-0-0). United States Since 1945. S, SS. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 349 and HY 377.

The Cold War, foreign and domestic affairs from Truman to present.

HIST 350 03(3-0-0). United States Foreign Relations Since 1914. S. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 350 and HY 457.

Main problems in U.S. foreign relations in the 20th century, especially causes and consequences of the two world wars, Great Depression, and the Cold War.

HIST 351 03(3-0-0). American West to 1900. F. Prerequisite: HIST 101 or HIST 150 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 351 and HY 470.

Social, political, economic, environmental developments and intercultural relations in trans-Mississippi West to 1900.

HIST 352 03(3-0-0). American West Since 1900. S. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 352 and HY 471.

Social, political, economic, environmental developments and intercultural relationships in trans-Mississippi West since 1900.

HIST 353 03(3-0-0). U.S.-Mexico Borderlands. F, S, SS. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 353 and HY 472.

Borderlands, northern Mexico, southwestern U.S.; intercultural relationships among Indian, Spanish, Mexican, U.S. cultures. (§)

HIST 354 03(3-0-0). American Architectural History. S. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 354 and HY 443.

Broad historical interpretation of the North American built environment from 1500 to present.

HIST 355 03(3-0-0). American Environmental History. S. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 355 and HY 464.

Interaction of humans and nature in American history with emphasis on relationships between environmental, social, and cultural change.

HIST 356 03(3-0-0). American Cultural and Intellectual History. F, S, SS. Prerequisite: HIST 100 or HIST 101 or HIST 115 or HIST 120 or HIST 121 or HIST 150 or HIST 151 or HIST 170 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 356 and HY 466.

Role of American cultural and intellectual developments in American society and the world.

HIST 357/MLSC 357 03(3-0-0). The American Military Experience. F, SS. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 357/MLSC 357 and HY 401/MS 401.

Role of the armed forces in American society; development of military

traditions, institutions, and practices.

HIST 358 03(3-0-0). American Women's History to 1800. F. Prerequisite: HIST 100 or HIST 101 or HIST 150 or HIST 151 or HIST 170 or HIST 171; completion of 45 credits.

History of Indian, African, and European women in North America from early colonial contact through the American Revolution and into Early Republic.

HIST 359 03(3-0-0). American Women's History Since 1800. S. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 359 and HY 468.

Social, cultural, economic, and political history of women in the United States since 1800.

HIST 360 03(3-0-0). United States Immigration History. S. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 360 and HY 469.

Examines central themes of U.S. immigration from perspective of major immigrant groups and within context of U.S. immigration policy.

***HIST 361 03(3-0-0). American Indians in the Age of Conquest.** S. Prerequisite: HIST 101 or HIST 150 or HIST 171 or HIST 255; completion of 45 credits. Credit not allowed for both HIST 361 and HY 461.

American Indian history from pre-contact to the era of Indian removal (1840s) focused on the impact of colonization.

°HIST 362 03 (3-0-0). American Indian Renaissance in Modern America. S. Prerequisite: HIST 101 or HIST 151 or HIST 171 or HIST 255; completion of 45 credits. Credit not allowed for both HIST 362 and HY 462.

American Indian history from the reservation era to the present with a focus on cultural and political renewal.

***HIST 363 03(3-0-0). Colorado History.** S. Prerequisite: HIST 100 or HIST 101 or HIST 150 or HIST 151 or HIST 170 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 363 and HY 260.

History of Colorado from pre-history to present.

HIST 364/ETST 364 03(3-0-0). Asian American Social Movements, 1945-Present. F, S. Prerequisite: HIST 151 or HIST 252/ETST 252; completion of 45 credits. Credit not allowed for both HIST 364 and ETST 364.

Historical relationships between Asian Americans and social movements for social, economic, and political equity in the U.S. since 1945.

+HIST 365 03(2-3-0). American West Field Study. SS. Students may take course only once for credit toward degree completion.

Explore western U.S. history through primary sources and field trips to sites in Colorado and the West. Topic varies by semester and instructor. Required field trips.

HIST 366 03(3-0-0). African-American History to 1865. F, S. Prerequisite: HIST 150 or HIST 151; completion of 45 credits.

African-American history from the colonial era to the end of the Civil War.

HIST 367 03(3-0-0). African-American History Since 1865. F, S. Prerequisite: HIST 150 or HIST 151; completion of 45 credits.

African-American history from the end of the Civil War to the late twentieth century.

HIST 379/ECON 379 03(3-0-0). Economic History of the United States. F. Prerequisite: AREC 202 or ECON 101 or ECON 202 or any two courses in American history; completion of 45 credits. Credit not allowed for both HIST 379 and ECON 379.

Economic analysis of growth and welfare from beginning of industrialization to present.

HIST 410 03(3-0-0). Colonial Latin America. F, S. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; § Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HIST 410 and HY 354.

Spanish and Portuguese America from pre-Columbian times through independence (c. 1825).

HIST 411 03(3-0-0). Latin America Since Independence. F, S, SS. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits.

Major trends in the social, cultural, political, and economic evolution of Spanish America and Brazil since independence.

HIST 412 03(3-0-0). Mexico. S. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 412 and HY 350.

Social, economic, and political development of Mexican people from pre-Columbian times to present.

HIST 413 03(3-0-0). Caribbean Civilization. F. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 413 and HY 352.

Socioeconomic, political, and cultural development of the nations of the Caribbean.

HIST 414 03(3-0-0). Revolutions in Latin America. F, S. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 414 and HY 444.

Historical and theoretical issues arising from revolutionary episodes in Latin America, with emphasis on 20th century case studies.

HIST 420 03(3-0-0). Africa-Precolonial States and Empires. F. Prerequisite: HIST 100 or HIST 101 or HIST 115 or HIST 120 or HIST 170 or HIST 171; completion of 45 credits.

Origins of societal and political development in Africa before 1800; technology, the environment, human migrations, and trade.

°**HIST 421 03(3-0-0). Africa: Colonialism to Independence.** S. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 421 and HY 330.

Africa from abolition of the slave trade to independence, focusing on economic, social, and political change under colonialism.

***HIST 422 03(3-0-0) Modern Africa.** S. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 422 and HY 429.

Colonial roots of modern Africa focusing on the period since 1935. Case studies of social and political change in Africa since World War II.

°**HIST 423 03(3-0-0). South African History.** F. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 423 and HY 425.

South African history from human origins to the end of Apartheid.

HIST 424 03(3-0-0). East African History. F, S. Prerequisite: HIST 100 or HIST 101 or HIST 115 or HIST 120 or HIST 121 or HIST 170 or HIST 171.

Overview of east African history from human origins to modern times, focusing on Kenya, Tanzania, and Uganda.

***HIST 430 03(3-0-0). Ancient Near East.** S. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 430 and HY 302.

Neolithic period to 500 B.C.E. emphasizing political, social, intellectual, and cultural developments.

HIST 431 03(3-0-0). Ancient Israel. F. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 431 and HY 303.

Ancient Israel and the Near Eastern world of the Hebrew Bible/Old Testament.

HIST 432 03(3-0-0). Sacred History in the Bible and the Qur'an. F, S, SS. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 432 and HY

342.

Conceptions of sacred history in the Biblical and Qur'anic traditions, emphasizing pre-modern historiography and exegesis.

***HIST 433 03(3-0-0). Muhammad and the Origins of Islam.** F. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 433 and HY 344.

Emergence of Islam and growth of the Islamic community from time of Muhammad to decline of the Arab Caliphate.

HIST 435 03(3-0-0). Jihad and Reform in Islamic History. F. Prerequisite: HIST 100 or HIST 101 or HIST 115 or HIST 120 or HIST 121 or HIST 170 or HIST 171; completion of 45 credits.

Jihad and reform in classical and modern Islamic thought and practice.

HIST 438 03(3-0-0). The Modern Middle East. S. Prerequisite: HIST 101 or HIST 115 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 438 and HY 348.

Historical developments in the Middle East in 19th and 20th centuries.

HIST 440 03(3-0-0). Modern South Asia. F, S. Prerequisite: HIST 101 or HIST 120 or HIST 121 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 440 and HY 331.

Major political, social, economic and cultural developments in South Asia from the seventeenth century to the present.

HIST 441 03(3-0-0). South Asia Since Independence. S. Prerequisite: HIST 101 or HIST 120 or HIST 121 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 441 and HY 332.

Major political, social, economic, and cultural developments in South Asia since independence.

HIST 450 03(3-0-0). Ancient China. F. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 450 and HY 337.

Development of civilization in China from Neolithic times to 200 B.C.E.

HIST 451 03(3-0-0). Medieval China and Central Asia. S. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 121 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 451 and HY 339.

Historical developments in China and Central Asia from 200 B.C.E. to 1300 A.D.

HIST 452 03(3-0-0). China in the Modern World, 1600-Present. S, SS. Prerequisite: HIST 101 or HIST 120 or HIST 121 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 452 and HY 341.

Historical developments in China since 1600.

HIST 455 03(3-0-0). Tokugawa and Modern Japan, 1600-Present. F, S. Prerequisite: HIST 101 or HIST 120 or HIST 121 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 455 and HY 335.

Historical developments in Japan since 1600.

HIST 456 03(3-0-0). East Asia in the Age of Empire, 1800-Present. F. Prerequisite: HIST 120 or HIST 121 or HIST 171; completion of 45 credits.

Rise of modern imperialism in East Asia, both from without (the "West") and from within (Japan), 1800-present.

HIST 460 03(3-0-0). Slavery in the Americas. F. Prerequisite: HIST 101 or HIST 150 or HIST 171 or HIST 250; completion of 45 credits.

Slave labor; Atlantic world economy; African contributions to American culture; gender and racial dynamics; emancipation movements.

°**HIST 461 03(3-0-0). Rise and Fall of British Empire.** S. Prerequisite: HIST 100 or HIST 101 or HIST 121 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 461 and HY 416.

Beginnings of globalization; its origins in the spread of the British Empire; major causes of expansion, forms of control, long-term effects.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HIST 462 03(3-0-0). Themes in World History. F, S. Prerequisite: HIST 100 or HIST 101 or HIST 115 or HIST 120 or HIST 121 or HIST 150 or HIST 151 or HIST 170 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 462 and HY 445.

Major themes in world history including urbanization, technology, religion, politics, and economics.

HIST 463 03(3-0-0). Science and Technology in Modern History. S. Prerequisite: HIST 101 or HIST 121 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 463 and HY 447.

Impact of science and technology on industry, agriculture, medicine, education, etc. Issues in science and technology policy.

HIST 464 03(3-0-0). Pacific Wars: Philippines-WWII. F. Prerequisite: HIST 101 or HIST 121 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 464 and HY 402.

Diplomatic, ideological, political, cultural, and military aspects of war in the Pacific from the Philippines war through WWII.

HIST 465 03(3-0-0). Pacific Wars: Korea and Vietnam. S. Prerequisite: HIST 101 or HIST 121 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 465 and HY 403.

Diplomatic, ideological, political, cultural, and military aspects of war in the Pacific from the war in Korea through the war in Vietnam.

HIST 466 03(3-0-0). U.S. China Relations Since 1800. F, S. Prerequisites: HIST 120 or HIST 121 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 466 and HY 460.

United States-China relations as represented in travel narratives, memoirs, journalistic and diplomatic writing, biography, and autobiography.

***HIST 468 03(3-0-0). Islamic Gunpowder Empires, 1500-1800.** F. Prerequisite: HIST 100 or HIST 101 or HIST 115 or HIST 120 or HIST 121 or HIST 170 or HIST 171; completion of 45 credits.

History of the Ottoman, Safavid, and Timurid/Mughal Empires, 1500-1800.

HIST 469 03(3-0-0). The Crusades. S. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit allowed for only one of the following: HIST 434, HIST 469, or HY 346.

The Crusades, emphasizing religion, politics, and warfare in Western Europe, Byzantium, the Near East, and the Mongol world empire, c. 1050-1300.

HIST 470 03(3-0-0). World Environmental History, 1500-Present. F. Prerequisite: HIST 101 or HIST 121 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits.

World environmental history since 1500, emphasizing the dynamic interaction of nature, culture, and human activity.

HIST 471 03(3-0-0). History of Antarctica, 1800-Present. S. Prerequisite: HIST 101 or HIST 171; completion of 45 credits.

History of Antarctica from discovery in the early nineteenth century to the present.

HIST 476 03(3-0-0). History of America's National Parks. S. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits.

The national park system and its development from concept to design to implementation.

HIST 477 03(3-0-0). Teaching History. F. Prerequisite: EDUC 465 or concurrent registration; admittance to teacher licensure; completion of 45 credits.

Teaching history, emphasizing teaching historical literacy, research, and writing at the middle and high school levels.

°HIST 478/°ANTH 478 03(3-0-0). Heritage Resource Management. S. Prerequisite: Junior standing. Credit not allowed for both HIST 454 and

ANTH 454. Credit not allowed for both HIST 478/ANTH 478 and HY 454/AP 454.

Cultural resource laws and policy; practices commonly employed in the management and preservation of these diverse resources.

***HIST 479 03(3-0-0). Practice of Public History.** F. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits.

Public history methodology.

HIST 484 Var. Supervised College Teaching. Prerequisite: Completion of 45 credits.

Assisting the instructor in teaching introductory history courses; relevant readings and discussions.

HIST 487 Var [1-3]. Internship. Prerequisite: Completion of 45 credits. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Application of historical methods in museums, libraries, and at historic sites.

HIST 492 03(0-0-3). Capstone Seminar. F, S. Prerequisite: Senior status. History majors only. To count toward the major, the course must be completed with a C or better.

Seminar involving critical reading, writing, research, and discussion. Topics vary by instructor.

HIST 495 Var [1-3]. Independent Study. Prerequisite: Completion of 45 credits.

HIST 497 Var [1-3]. Group Study. Prerequisite: Completion of 45 credits.

HIST 501 03(0-0-3). Historical Method: Historiography. F, S, SS. Prerequisite: Written consent of instructor.

Historiographical skills and methods; emphasis on research, writing, and interpretation.

HIST 502 03(0-0-3). Historical Method: Archives. F, S, SS. Prerequisite: Written consent of instructor.

Historiographical skills and methods; emphasis on fundamentals of archival science.

HIST 503 03(0-0-3). Historical Method: Preservation. F, S, SS. Prerequisite: Written consent of instructor.

Historiographical skills and methods; emphasis on theory and practice of historic preservation.

HIST 504 03(0-0-3). Historical Method: Museums. F, S, SS. Prerequisite: Written consent of instructor.

Historiographical skills and methods; emphasis on philosophy and practices of history museums.

HIST 511 03(0-0-3). Reading Seminar-U.S. to 1877. F, S, SS. Prerequisite: HIST 501.

Readings on United States history to 1877.

HIST 512 03(0-0-3). Reading Seminar-U.S. Since 1877. F, S, SS. Prerequisite: HIST 501.

Readings on United States history since 1877.

°HIST 515 03(3-0-0). Records Management. S. Prerequisite: HIST 501.

Basic records management techniques and concepts such as retention, vital records, disaster planning, and electronic records.

HIST 520 03(0-0-3). Reading Seminar-Europe to 1815. F, S, SS. Prerequisite: HIST 501.

Readings on European history to 1815.

HIST 521 03(0-0-3). Reading Seminar-Europe Since 1815. F, S, SS. Prerequisite: HIST 501.

Readings on European history since 1815.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HIST 530 03(0-0-3). Reading Seminar-Africa. F, S, SS. Prerequisite: HIST 501.

Readings on major historiographical issues in African history.

HIST 531 03(0-0-3). Reading Seminar-Latin America. F, S, SS. Prerequisite: HIST 501.

Readings on major historiographical issues in Latin American history.

HIST 532 03(0-0-3). Reading Seminar-Middle East. F, S, SS. Prerequisite: HIST 501.

Readings on major historiographical issues in Middle East history.

HIST 533 03(0-0-3). Reading Seminar-East Asia. F, S, SS. Prerequisite: HIST 501.

Readings on major historiographical issues in East Asian history.

HIST 534 03(0-0-3). Reading Seminar-South Asia. S. Prerequisite: HIST 501.

Major historiographical issues in South Asian history.

HIST 539 03(0-0-3). Reading Seminar—World Environmental History. S. Prerequisite: Graduate standing.

Major works in the field of world environmental history and the major historiographical debates.

HIST 540 03(0-0-3). Material Culture. F, S, SS. Prerequisite: HIST 501.

Social, cultural, economic, and political developments in history as interpreted through artifacts.

HIST 586 Var. Practicum. Prerequisite: HIST 501.

HIST 587 Var [1-6]. Internship. Prerequisite: HIST 501.

Work-oriented instruction involving implementation of classroom or laboratory experiences coordinated by faculty member.

HIST 611 03(0-0-3). Research Seminar: United States. F, S, SS. Prerequisite: HIST 501.

Research on United States history.

HIST 621 03(0-0-3). Research Seminar: Europe. F, S, SS. Prerequisite: HIST 501.

Research on European history.

HIST 640 03(0-0-3). Research Seminar: State and Local History. F, S, SS. Prerequisite: Written consent of instructor.

Research in and interpretation of state and local history within the broader context of United States history.

HIST 684 Var. Supervised College Teaching.

Discussions and readings to enhance teaching proficiency.

HIST 695 Var. Independent Study. Prerequisite: HIST 501.

HIST 697 Var [1-3]. Group Study.

HIST 699 Var. Thesis. Prerequisite: HIST 501.

HONORS COURSES

Nondepartmental

University Honors Program

Office of Provost and Executive Vice President

HONR 192 04(3-0-1). Honors First Year Seminar. F, S. Prerequisite: Participation in University Honors Program.

Humanistic and scientific studies; emphasis on literate activities, written communication; student development and transition to university life.

HONR 193 03(0-0-3). Honors Seminar. (AUCC 1A). F, S. Prerequisite: HONR 192; participation in University Honors Program.

Humanistic and scientific studies with emphasis on rigorous literate activities, especially written communication.

HONR 195 Var [1-3]. Honors Independent Study. Prerequisite: Participation in University Honors Program.

HONR 197 Var [1-4]. General Honors Colloquium. Prerequisite: Participation in University Honors Program. Limited to qualified freshmen and sophomores.

Students from all major fields meet in small groups to focus on a problem of concern to all.

HONR 384 Var. Supervised College Teaching. F, S. Prerequisite: Participation in University Honors Program. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

HONR 392 03(0-0-3). Honors Seminar. (AUCC 3B). F, S. Prerequisite: HONR 193, participation in University Honors Program.

Various topics in humanistic and scientific studies.

HONR 397 Var [1-4]. General Honors Colloquium. Prerequisite: Participation in University Honors Program. Normally limited to qualified juniors and seniors.

Students from all major fields meet in small groups to focus on a problem of concern to all.

HONR 399 01(0-0-1). Pre-thesis. F, S. Prerequisite: Participation in University Honors Program.

Preparation for Honors senior thesis.

HONR 492 03(0-0-3). Honors Senior Seminar. (AUCC 3C). Prerequisite: HONR 392; participation in University Honors Program.

Variable topics on humanistic and scientific studies.

HONR 495 Var [1-5]. Independent Study. Prerequisite: Participation in University Honors Program.

Individual projects developed by the student and the major adviser at the upper-division level but which transcends basic course content.

HONR 498 Var[1-4]. Honors Undergraduate Research. F. Prerequisite: Junior standing; participation in University Honors program.

HONR 499 03(0-0-3). Senior Honors Thesis. Prerequisite: HONR 399; participation in University Honors Program.

HORTICULTURE COURSES

Department of Horticulture and Landscape

Architecture

College of Agricultural Sciences

HORT 100 04(3-2-0). Horticultural Science. (AUCC 3A). F, S, SS.

Principles of plant science and related disciplines as the base and context for the introduction of horticulture practices. (\$)

HORT 171/SOCR 171 03(2-0-1). Environmental Issues in Agriculture. (GT-SS3, AUCC 3E). F. Credit not allowed for both HORT 171 and SOCR 171.

Historical development of agriculture, environmental consequences of modern food production, and other cultural approaches to agriculture.

+HORT 221 04(2-4-0). Landscape Plants. F, S.

Identification, landscape features, cultural requirements, and landscape use of coniferous and deciduous trees and shrubs, vines, and evergreens. (\$)

HORT 231 04(2-4-0). Landscape Graphics Studio. F.

Mechanical and freehand graphic techniques for landscape design. Use of pencil, ink, and colored markers. Plan, sectional, and perspective views.

HORT 232 04(2-4-0). Principles of Landscape Design. S. Prerequisite: HORT 231.

Basic concepts in the art and process of landscape design. (\$)

HORT 260 04(3-2-0). Plant Propagation. S. Prerequisite: BZ 120 or concurrent registration or HORT 100 or concurrent registration or LIFE 103 or concurrent registration.

Theories, principles, and techniques of sexual and asexual propagation. (\$)

HORT 270 02(2-0-0). Fundamentals of Horticultural Therapy. F.

Theory and practice of horticultural therapy in health care and human services; applications, settings, and professional career topics. (NT)

°HORT 277 01(1-0-0). Introduction to Enology. F.

Methods/criteria to evaluate, compare, and describe aroma and flavor characteristics in sound commercial wines; identification of common wine defects.

HORT 310 04(3-2-0). Greenhouse Management. F, S, SS.

Design and use of enclosed structures to manipulate controlled environments, effects on growth as applied to crops, production, and marketing crops. (\$, NT-O)

+HORT 321 04(3-2-0). Nursery Production and Management. S. Prerequisite: BZ 120 or HORT 100 or LIFE 103.

Nursery industry organization, management, equipment, field and container production, storage, shipping, marketing, and business management practices. (\$)

+HORT 322 03(2-2-0). Herbaceous Plants. F.

Identification, landscape features, cultural requirements, and uses of ornamental annual, perennial, and bulb plants. (\$)

HORT 330 02(1-2-0). Computers for Landscape Design. S.

Applications and techniques of computer software utilized in small-scale landscape design-build.

HORT 331 02(2-0-0). Landscape Design. S, SS. For non-design majors only.

Fundamentals of landscape design theory and plant composition as presented in simple problems. For non-design majors only.

+HORT 335 04(2-4-0). Landscape Structures. F. Prerequisite: CON 131; HORT 232.

Design and construction methods for structures commonly used in

residential landscaping. Preparation of construction documents. (\$)

HORT 336 04(2-4-0). Landscape Grading and Drainage Studio. S. Prerequisite: HORT 221; HORT 322; HORT 335; MATH 118.

Basic design principles for grading, drainage, and earth forms for small-scale projects. (\$)

+HORT 341 03(2-2-0). Turfgrass Management. F. Prerequisite: HORT 100 or concurrent registration.

Principles and practices of turfgrass propagation and maintenance. (\$)

***HORT 344 01(1-0-0). Organic Greenhouse Production.** S. Prerequisite: HORT 310.

Fundamentals of greenhouse production using organic production methods.

***HORT 345/*SOCR 345 02(0-4-0). Diagnosis and Treatment in Organic Fields.** SS. Prerequisite: BSPM 302 or BSPM 308 or BSPM 361; HORT 100 or SOCR 100; SOCR 240. Credit not allowed for both HORT 345 and SOCR 345.

Field experience in diagnosis of pest and nutrient problems on organic farms and development of treatment recommendations. (\$)

HORT 367 03(2-2-0). Landscape Irrigation. S. Credit allowed for only one of the following: HORT 367, HORT 368, LAND 368.

Practical design of sprinkler and trickle irrigation systems for commercial and residential landscapes.

HORT 368/LAND 368 03(2-2-0). Landscape Irrigation and Water Conservation. F, S. Prerequisite: HORT 100 or LAND 110. Credit allowed for only one of the following: HORT 367, HORT 368, LAND 368.

Practical approaches and methods of irrigation, water conservation, and water management in the designed landscape.

HORT 370 01(1-0-0). Landscape Irrigation. S. Prerequisite: HORT 100 or concurrent registration.

Necessary skills to design and manage irrigation systems commonly used in the landscape industry.

HORT 377 01(1-0-0). Horticultural Methods for Therapy Programs. S. Prerequisite: HORT 100; HORT 270.

Horticultural methods for health care and human service settings, including indoor and outdoor growing techniques, management and plant selection (NT)

HORT 382 03(0-0-3). Origins of Agriculture in the Andes of Peru. SS. Prerequisite: HORT 100 or BZ 120 or LIFE 103.

Study abroad experience focused on understanding the agricultural, biological, cultural and geographical diversity of the Andes region of Peru.

HORT 384 Var [1-5]. Supervised College Teaching. F, S, A. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

***HORT 401 03(3-0-0). Medicinal and Value-Added Uses of Plants.** S. Prerequisite: BZ 120 or HORT 100 or LIFE 103.

Chemical, biochemical and ethnobotanical perspective on the medicinal and value-added uses of plants.

+HORT 412 04(3-0-1). Floriculture Crops. F, S, SS.

Commercial production and marketing of bedding plants, potted container crops, and cut flowers. (\$, NT-O)

HORT 421 02(2-0-0). Horticultural Therapy Techniques. S. Prerequisite: HORT 270.

Clinical skills in horticultural therapy; communication, safety, leadership, therapeutic relationships, adaptation of tools and activities. (NT)

HORT 423 02(2-0-0). Horticultural Therapy Programming. S. Prerequisite: HORT 421.

Methods for individual treatment planning, intervention, documentation, and reporting within therapy, social, and vocational HT programs. (NT)

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

***HORT 424/SOCR 424 03(3-0-0). Topics in Organic Agriculture.** S. Prerequisite: AREC 202 or ECON 202; AREC 328; HORT 100 or SOCR 100; HORT 171/SOCR 171; SOCR 240. Credit not allowed for both HORT 424 and SOCR 424.

Examination of issues specific to organic food production systems and marketing.

HORT 425 03(2-0-1). Horticultural Therapy Management. F. Prerequisite: HORT 423.

Horticultural therapy program and site design, proposals, funding, marketing, management, and evaluation. (NT)

HORT 431 04(2-4-0). Planting Design Studio. F. Prerequisite: HORT 221; HORT 322; HORT 336.

Functional and aesthetic values of plant materials; their creative use in landscape design. (\$)

+HORT 432 05(2-6-0). Intensive Landscape Design Studio. S. Prerequisite: HORT 431; HORT 487.

Site planning and design for landscape projects of a limited scale. Problems of increasing complexity. Emphasis on real sites and clients. (\$)

+HORT 441 03(3-0-0). Turfgrass Science. S Prerequisite: BZ 120 or HORT 100 or SOCR 240.

Examination of turfgrass management practices from a scientific perspective; discussion of advanced turfgrass management technologies. (\$)

+°HORT 450A-D 01(1-0-0). Horticulture Food Crops. F. Prerequisite: BZ 120 or HORT 100 or LIFE 103 or SOCR 100

. *A) Cool season vegetable production. (\$) *B) Warm season vegetable production. (\$) °C) Small fruit production. (\$) °D) Tree fruit production. (\$)

***HORT 452 01(1-0-0). Viticulture-Grape Production.** F. Prerequisite: BZ 120 or HORT 100 or LIFE 103 or SOCR 100.

Grape production in temperate zone climates. (\$)

HORT 454 02(2-0-0). Horticulture Crop Production and Management. S. Prerequisite: HORT 310 or HORT 450A-B.

Production and management of horticulture crops.

°HORT 460/SOCR 460 03(2-0-1). Plant Breeding. F. Prerequisite: BZ 350 or concurrent registration or LIFE 201A or concurrent registration or SOCR 330 or concurrent registration. Credit not allowed for both SOCR 460 and HORT 460.

Theory and practice of plant breeding using principles of genetics and related sciences.

°HORT 461/SOCR 461 01(0-2-0). Plant Breeding Laboratory. S. Prerequisite: HORT 460/SOCR 460 or concurrent registration. Credit not allowed for both HORT 461 and SOCR 461.

Techniques and procedures used in public and commercial plant breeding programs.

°HORT 462 03(3-0-0). Viticulture Practices in Grape Production. F.

Biology of grape vines and cultural practices including planning, training, pest control, pruning, and harvesting; special emphasis on Colorado.

+HORT 464 03(2-2-0). Arboriculture. F. Prerequisite: HORT 100; SOCR 240.

Care of trees in the landscape including planting, pruning, appraisal, and diagnosis.

HORT 465 03(2-2-0). Landscape Estimating. F. Prerequisite: MATH 117; MATH 118; MATH 124 or MATH 125 or MATH 141 or MATH 155; HORT 221.

Landscape construction estimating and bidding, contract documentation, and other business practices relevant to landscape design-build and

contracting. (\$)

***HORT 466 03(2-2-0). Community Forestry.** S. Prerequisite: HORT 221.

Policies and management of public and privately owned community forests in urbanized areas.

°HORT 476 03(3-0-0). Environmental Plant Stress Physiology. S. Prerequisite: BZ 440. Credit not allowed for both HORT 476 and HORT 576.

Plant growth, development and physiology, major sources of stress in plants, global issues in environment and plant stress.

***HORT 477 03(3-0-0). Enology-History and Winemaking.** F. Prerequisite: CHEM 107 or concurrent registration and CHEM 108 or concurrent registration or CHEM 111 or concurrent registration and CHEM 112 or concurrent registration.

History and development of the wine industry; mechanics of various processes and factors affecting wine quality and consumer acceptance.

HORT 479 02(2-0-0). Professional Landscape Practices. S. Prerequisite: HORT 100; HORT 465.

Business skills involved in a successful career in the green industry.

HORT 486A-B. Practicum.

A) Floriculture. 02(0-4-0). F, S. Prerequisite: HORT 310. Directed experience in applications of floriculture. B) General. Var [1-6]. F, S, SS. Directed experiences in applications of horticulture techniques and procedures.

HORT 487 Var. Internship.

HORT 495 Var. Independent Study.

HORT 496 Var. Group Study.

***HORT 571 03(3-0-0). Soil-Plant-Water Relations/Water Stress.** S. Prerequisite: BZ 440.

Movement of water in the soil-plant-atmosphere continuum. Instrumentation for measuring plant-water relations. Plant responses to drought and salinity.

***HORT 575 02(2-0-0). Plant Germplasm Conservation.** S. Prerequisite: HORT 460/SOCR 460.

Principles, concepts, and methodology for collection, conservation, and utilization of plant genetic resources.

°HORT 576 04(3-0-1). Advanced Environmental Plant Stress Physiology. S. Prerequisite: BZ 440. Credit not allowed for both HORT 576 and HORT 476.

Advanced aspects of plant growth, development and physiology, major sources of stress in plants, global issues in environment and plant stress.

HORT 588 Var. Supervised Extension Practices.

Field experiences in extension practices in horticulture.

°HORT 601 02(1-0-1). Topics in Root and Rhizosphere Biology. S. Prerequisite: One course in plant physiology; one course in biochemistry.

In-depth overview of the biology of roots and the rhizosphere processes related to roots.

HORT 675 03(3-0-0). Plant Stress Physiology. F. Prerequisite: BZ 440.

Research concepts based on physiological, biochemical, and molecular mechanisms controlling environmental stresses in plants.

HORT 698 Var. Research.

HORT 699 Var. Thesis.

HORT 784 Var. Supervised College Teaching.

HORT 792 01(0-0-1). Seminar. F, S.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HORT 795 Var. Independent Study.

HORT 799 Var. Dissertation.

^oAlternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

INTERNATIONAL EDUCATION COURSES

Nondepartmental, Interdisciplinary Office of Provost and Executive Vice President

IE 116/AGRI 116 03(2-0-1). Plants and Civilizations. (GT-SS3, AUCC 3E). F, S. Credit not allowed for both IE 116 and AGRI 116.

Plant origins and their relationships with cultures/civilizations as food, spices, perfumes, and medicines and in art, religion, wars, slavery, etc.

IE 179 03(3-0-0). Globalization: Exploring Our Global Village. F. Prerequisite: Residents of Global Village Residential Learning.

Analysis and implications of social, cultural, economic, and political change in the context of globalization and transnational relationships.

IE 270/AGRI 270 03(3-0-0). World Interdependence-Population and Food. (GT-SS3, AUCC 3E). S. Credit not allowed for both IE 270 and AGRI 270.

Survey of world population and food; emphasis on understanding the problems and opportunities in a world context.

IE 271 03(3-0-0). India. S.

Interdisciplinary interpretation of philosophical, historical, cultural, physical, social, and technological influences shaping modern India.

IE 272 Var[1-3]. World Interdependence-Current Global Issues. F.

Current global issues, using guest speakers and focusing on global/international topics that are in the news.

IE 370 03(3-0-0). Model United Nations. (AUCC 3E) F.

Structure and function of the United Nations; role of international organizations in international relations; opportunity to practice modeling role of UN representatives.

IE 450/SOWK 450 03(2-0-1). International Social Welfare and Development. F. Credit not allowed for both IE 450 and SOWK 450.

Framework of social welfare and development in international area; social need with focus on cultures/countries in transition.

IE 470 03(3-0-0). Women and Development. F.

Research and policy issues related to women in developing countries.

IE 471 03(3-0-0). Children and Youth in Global Context. S.

Global issues affecting children and youth are examined in cultural context. (NT-O)

IE 472 03(3-0-0). Education for Global Peace. F, S. Prerequisite: Upper-division status.

Peacekeeping, peacemaking and peace-building on micro and macro levels, and education's role in them, as key components for sustaining global peace.

IE 479/ANTH 479 03(3-0-0). International Development Theory and Practice. F. Prerequisite: Junior or senior standing.

Contemporary issues in international community and economic development with practical and theoretical analysis from interdisciplinary perspectives.

IE 482A-G Var [1-6]. Travel Study-Global Studies. F, S.

Current global issues, topics, traditions studies in one or more countries of the region. **A)** Africa. **B)** Asia. **C)** Australia/Oceania. **D)** Canada/North America. **E)** Europe. **F)** Latin America and the Caribbean. **G)** Middle East.

IE 492 Var[1-3]. International Education Seminar. F, S, SS.

Topics in international education.

***IE 517/*PSY 517 03(0-0-3). Perspectives in Global Health.** S. Credit

not allowed for both IE 517 and PSY 517.

Science, skills, and beliefs directed at the maintenance and improvement of health for all people.

IE 550/PHIL 550 03(3-0-0). Ethics and International Development. F. Prerequisite: Written consent of instructor. Credit not allowed for both IE 550 and PHIL 550.

Ethical reflection applied to development goals, strategies of Third World countries; relations between developed and developing countries.

IE 679/ANTH 679 03(3-0-0). Applications of International Development. F, S. Prerequisite: Graduate standing.

In-depth interdisciplinary analysis of theoretical and practical issues in implementing economic and community-based international development programs.

IE 692 Var[1-3]. International Education Seminar. F, S, SS.

Topics in international education.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

INTERNATIONAL STUDIES COURSES

Nondepartmental

College of Liberal Arts

INST 300 03(0-0-3). Approaches to International Studies. F.
Prerequisite: GR 100.

Interdisciplinary and comparative analytical approaches to the field of international studies.

INST 484 Var[1-5]. Supervised College Teaching. F, S, SS.

A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

INST 487 Var[1-3]. Internship. F, S, SS.

INST 492 03(0-0-3). Seminar. F, S. Prerequisite: INST 300; International Studies concentration students only.

INTERIOR DESIGN COURSES

Department of Design and Merchandising *College of Applied Human Sciences*

INTD 129 03(3-0-0). Introduction to Interior Design. F, S, SS.

Interior design discipline's professional values with emphasis on elements and principles of design. (NT-O)

INTD 166 03(0-6-0). Visual Communication/Sketching. F, S, SS.

Hand drafting, free-hand sketching and conceptualization to communicate interior design concepts visualizing 2 and 3 dimensional representations.

INTD 200 03(3-0-0). Housing Values in America. F, S.

Housing issues in the U.S.; values, norms, roles of government and building professions; interaction of issues with U.S. public values to meet housing needs.

INTD 201 03(0-6-0). Two-Dimensional Fundamentals–Interior Design.

F. Prerequisite: INTD 129; INTD 166; design scenario advancement.

Demonstration of 2-dimensional elements and principles of design incorporating creative thinking, design fundamentals, design communication skills.

INTD 210 03(3-0-0). Interior Design Anatomy. F. Prerequisite: INTD 129; INTD 166; design scenario advancement.

Applying basic concepts of human behavior, anthropometrics, and space planning to residential interiors.

INTD 235 03(2-2-0). Interior Design Technologies. F. Prerequisite: CON 151; INTD 166.

Principles and procedures required in interpreting and producing building site plans, floor plans, elevations, sections, and interior details.

INTD 236 03(0-6-0). Three Dimensional Thinking. F. Prerequisite: INTD 129; INTD 166; design scenario advancement.

Demonstration and application in visualizing interior space in three dimensions.

INTD 255 03(3-0-0). Residential Interiors. F, S, SS. Offered as an online course only.

Theories, issues, and planning elements that impact the design of residential interiors. (NT-O)

INTD 256 03(1-4-0). Computer-Aided Design for Interior Designers. F. Prerequisite: INTD 129; INTD 166; design scenario advancement.

Use of computer-aided design (CAD), specifically two-dimensional and three-dimensional drafting using PC software.

INTD 266 03(0-6-0). Visual Communication-Multi-Media. S. Prerequisite: INTD 210; INTD 236.

Visual communication using advanced sketching rendering, manually and with technology, and alternative presentation methods.

INTD 276 03(0-6-0). Interior Design I. S. Prerequisite: CON 235; INTD 210; INTD 236; INTD 256.

Application of design process to small interior design projects. Design solutions communicated using manual and technology tools.

INTD 296A-B Var [1-3]. Group Study. F, S, SS. Prerequisite: Design scenario advancement.

A) Space planning and application. B) Design application.

INTD 330 03(2-2-0). Lighting Design. F. Prerequisite: CON 371 or concurrent registration; INTD 276 with a C or better.

Application of lighting design in interior environments. (\$)

INTD 336 03(3-0-0). Color. F, S, SS. Offered only through the Division

of Continuing Education.

Color theories, principles, trends and application in design. (NT-O)

INTD 340 03(3-0-0). Interior Materials and Finishes. F. Prerequisite: DM 120; INTD 276 with a C or better.

Analysis of materials and resources for interiors.

INTD 350 03(3-0-0). Codes-Health and Safety. S. Prerequisite: INTD 210; INTD 276 or concurrent registration or INTD 376 or concurrent registration.

Health and safety issues in interior design, including codes, regulations, and universal design.

INTD 356 03(3-0-0). Professional Communications-Interior Design.

S. Prerequisite: CO 150 or HONR 193; INTD 276 with a C or better.

Mastery of written communication skills required in the field of interior design.

INTD 359 03(3-0-0). History of Interior Design. S. Prerequisite: INTD 276 with grade of C or better.

Survey of interior design history from ancient through the present.

INTD 376 03(0-6-0). Interior Design II. S. Prerequisite: CON 371; INTD 330; INTD 340.

Application of design components to medium-scale residential and non-residential interior design projects.

INTD 384 Var. Supervised College Teaching. F, S. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

INTD 400 04(1-4-1). Interior Design Research Proposal. F. Prerequisite: INTD 376 with a C or better.

Research, development, and presentation of a programming proposal for a large scale interior design project with service learning component.

INTD 450/CON 450 03(3-0-0). Travel Abroad-Sustainable Building. SS. Credit not allowed for both INTD 450 and CON 450.

Major components of sustainable design and construction, energy, healthy buildings, natural resources, and other environmental issues.

INTD 476 04(0-8-0). Interior Design Project. S. Prerequisite: INTD 400 with a C or better.

Large scale projects representing research-based design solutions, illustrating synthesis and analysis of entry-level concepts, portfolio development. (\$)

INTD 487 Var Internship. Prerequisite: INTD 356; INTD 376 with a C or better.

INTD 495 Var. Independent Study. Maximum of 10 credits allowed in course.

INTD 496A-B Var [1-3]. Group Study. Maximum of 10 credits allowed in course.

A) Program skills. B) Design application.

INTD 550 03(3-0-0). Universal Design. F. Prerequisite: INTD 376 with a C or better.

Analysis and evaluation of universal design as it applies to diverse population segments and interior environments.

INTD 575 Var [1-8]. Problems-Interior Design. F, S, SS. Prerequisite: INTD 376 with a C or better or undergraduate degree in interior design or related field. (NT-O)

INTD 578 03(2-0-1). Trends/Issues in Interior Design. F, S, SS. Prerequisite: INTD 376 with a C or better. (NT-O)

INTD 675 Var [1-8]. Problems-Interior Design. F, S, SS. Prerequisite: Three credits of INTD 575. (NT-O)

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

INTRA-UNIVERSITY COURSES

Nondepartmental

Office of Provost and Executive Vice President

IU 150 02(2-0-0). Diverse Students in Higher Education. S. Prerequisite: None.

Issues surrounding educational opportunity and social mobility through direct mentoring with high school students.

IU 170 02(1-0-1). A Call to Lead I: Theories and Skills. F. Prerequisite: Must be a member of the President's Leadership Program; written consent of instructor.

Fundamentals of leadership theories and skills.

IU 171 02(1-0-1). A Call to Lead II: Social Change Model. S. Prerequisite: Must be a member of the President's Leadership Program; IU 170; written consent of instructor.

Social change model of leadership development.

IU 193 01(0-0-1). Freshman Seminar. F, S, SS. Prerequisite: Students who have earned fewer than 30 credits (CSU and transfer) only. Maximum of 1 credit allowed.

Academic study in small-class setting. Topics vary by instructor. (\$)

IU 198 01(0-3-0). Freshman Laboratory Research. Prerequisite: Freshmen only; written consent of instructor.

Hands-on research on an academic research project.

IU 263 03(1-0-2). Academic and Career Decision-Making. F.

Prerequisite: Participation in the Key Learning Community.

Enhance academic and career development and decision-making through self-authorship, critical thinking, and reflection.

IU 270 02(1-0-1). Leadership Styles I: Personal Application. F.

Prerequisite: Must be a member of the President's Leadership Program; written consent of instructor.

Leadership styles and contexts for personal application.

IU 271 02(1-0-1). Leadership Styles II: Prominent Leaders. S.

Prerequisite: Must be a member of the President's Leadership Program; IU 270; written consent of instructor.

Leadership styles and contexts of prominent leaders for personal application.

IU 272 03(2-0-1). Leadership-Higher Education Environment. F.

Personal leadership and diversity theories.

IU 273 02(1-0-1). Leadership Techniques for Greeks. F, S.

Critical elements of analytical and intellectual examination and reflection of certain core issues in the practice of leadership.

IU 470 03(2-0-1). Effective Leadership I: Success as a Leader. F.

Prerequisite: Must be a member of the President's Leadership Program; written consent of instructor. Personal leadership skill development and its relationship to success as a leader.

IU 471 03(2-0-1). Effective Leadership II: Vision and Change. S.

Prerequisite: Must be a member of the President's Leadership Program; IU 470; written consent of instructor.

Individual personal leadership styles; relationship between personal skill development and successful leadership.

JOURNALISM AND TECHNICAL COMMUNICATION COURSES

Department of Journalism and Technical Communication

College of Liberal Arts

JTC 100 03(3-0-0). Media in Society. (GT-SS3, AUCC 3C). F, S.
Role of media in American democracy; impact of media on individuals and society.

JTC 192 03(1-4-0). Freshman Seminar. F, S. Prerequisite: Admission to major. Credit not allowed for both JTC 192 and JTC 210.
Basic journalism skills; newsgathering and newswriting.

JTC 200 03(1-0-2). Professional Writing. F, S. Prerequisite: CO 150 or HONR 193.
Basic elements of writing for professional and specialized audiences.

JTC 210 03(1-4-0). Newswriting. F, S, SS. Prerequisite: Satisfactory performance on typing and diagnostic test. Credit not allowed for both JTC 210 and JTC 192.
Theory and practice in newswriting.

JTC 211 03(3-0-0). Computer-Mediated Visual Communication. F, S. Prerequisite: JTC 210.
Theory, techniques for using computer-related techniques for visual presentation of news, specialized, and technical information.

JTC 300 03(3-0-0). Professional and Technical Communication. (AUCC 2B). F, S, SS. Prerequisite: CO 150 or HONR 193.
Professional writing and presentation skills applied to students' major fields. (NT-O)

JTC 301 03(2-0-1). Business Communication. F, S. Prerequisite: CO 150 or HONR 193.
Principles and practice of effective business communication with emphasis on written professional reports. (NT-O)

JTC 310 03(2-2-0). Copy Editing. F, S. Prerequisite: JTC 100; JTC 210.
Theory of copy preparation and editing; publication layout.

JTC 311 03(3-0-0). History of Media. F, S. Prerequisite: None.
Media development, growth, trends within context of political, social, and economic change. (NT-O)

JTC 316/ETST 316 03(3-0-0). Multiculturalism and the Media. S. Credit not allowed for both JTC 316 and ETST 316.
Media and multiculturalism with emphasis on race, ethnicity, and other protected groups.

JTC 320 03(1-4-0). Reporting. F, S. Prerequisite: JTC 210.
Theory, methods, and practice of gathering information and reporting news.

JTC 326 03(2-2-0). Online Writing and Journalism. F, S. Prerequisite: JTC 210; JTC 211.
Website and message design and creation for media practitioners based on understanding of online attributes and technological context of journalism. (NT-O)

JTC 328 03(3-0-0). Feature Writing. S. Prerequisite: JTC 210.
Theory, methods and practice of reporting and writing feature stories, including human-interest, travel/adventure, reflective and in-depth articles.

JTC 335 03(2-2-0). Digital Photography. F, S. Prerequisite: JTC 211.
Basic photographic theory and practice using digital camera and image processing technology. (\$)

+JTC 340 03(2-2-0). Digital Video Editing. F, S. Prerequisite: JTC 210.
Theory and technique of editing picture and sound on digital platforms. (\$) (NT-O)

JTC 341 03(2-2-0). TV News Writing, Reporting and Producing. F, S. Prerequisite: JTC 210.
Practical application of principles, theory, and methods used in television newswriting, reporting, and producing. (\$)

JTC 342 03(2-2-0). Writing for Specialized Electronic Media. F. Prerequisite: JTC 210.
Audience and subject research; script structure and development; narrative techniques; visual story and role of visual media as change agents.

JTC 343 03(2-2-0). Advanced Television News Production. F, S. Prerequisite: JTC 341.
Advanced theory and practice of reporting and producing television news; basics of television news management. (\$)

+JTC 345 03(2-2-0). Electronic Field Production. F, S. Prerequisite: JTC 340.
Theory and techniques of video field production emphasizing news, current affairs, and special interest programs. (\$)

JTC 350 03(3-0-0). Public Relations. F, S.
Public relations principles and practices of business, industry, education, and public agencies. (NT-O)

JTC 351 03(2-2-0). Public Relations Practices. F, S. Prerequisite: JTC 210.
Planning, preparation, and application of public relations techniques.

JTC 353 03(3-0-0). Public Relations Campaigns. F, S. Prerequisite: JTC 210; JTC 350.
Development of professional public relations programs and campaigns, including analysis and research, strategy, implementation and evaluation.

JTC 355 03(3-0-0). Advertising. F, S.
Advertising principles and techniques used to develop effective advertising campaigns. (NT-O)

JTC 356 03(3-0-0). Advertising Creativity and Copywriting. F, S. Prerequisite: JTC 211; JTC 355.
Principles and practices producing advertising materials-print, broadcast, digital, out-of-home media, direct response, and collateral.

JTC 358 03(3-0-0). Advertising Media Buying and Selling. F, S. Prerequisite: JTC 211; JTC 355.
Principles of advertising planning, assessment and sales for client, agency and media organization personnel.

JTC 361 03(2-2-0). Writing for Specialized Magazines. S. Prerequisite: JTC 210.
Writing articles for agricultural, business, hobby, technical, trade, and other specialized periodicals whose readers use information to make decisions. (NT-O)

JTC 365 03(3-0-0). Computer Mediated Communication Foundations. F. Prerequisite: JTC 210.
Issues and research in computer mediated communication relating to individuals, groups, community, and society.

JTC 371 03(2-2-0). Publications Design and Production. F, S. Prerequisite: JTC 211.
Principles of producing publications for print and electronic delivery, including newspapers, magazines, newsletters, brochures, and printed ephemera.

JTC 372 03(2-2-0). Web Design and Management. F, S. Prerequisite: JTC 210; JTC 211.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Design, development, and management of World Wide Web content. (NT-O)

JTC 373 03(3-0-0). Digital Promotion Management. F. Prerequisite: JTC 211.

How organizations use digital technologies for advertising, publicity, promotional, and information purposes.

JTC 386 Var [1-3]. Communication Practicum. F, S, SS.

Practicum in using the different communication tools that comprise student media.

JTC 410 02(2-0-0). Newspaper Editing. F. Prerequisite: JTC 310.

Editorial techniques, responsibilities, news evaluation.

JTC 411 03(3-0-0). Media Ethics and Issues. F, S. Prerequisite: Junior or senior status.

Professional ethics, issues of media performance and of the relation of media systems to the social systems. (NT-O)

JTC 412 03(3-0-0). International Mass Communication. S.

Media communication systems, their roles throughout the world; news flow; propaganda in national development; role of foreign correspondents.

JTC 413 03(3-0-0). New Communication Technologies and Society. F, S.

Political, economic, social, philosophical, legal, and educational impacts of new technologies. (NT-O)

JTC 414 03(3-0-0). Media Effects. F, S.

Perspectives on audience processes and media effects on individuals and society.

JTC 415 03(3-0-0). Communications Law. F, S. Prerequisite: Junior or senior status.

Constitutional, statutory law of political speech, obscenity, advertising, libel; privacy, copyright, information ownership and access.

JTC 420 03(1-4-0). Advanced Reporting. F, S. Prerequisite: JTC 211; JTC 310; JTC 320.

Advanced techniques for gathering and evaluating information; interpretive reporting of public affairs issues.

JTC 433 03(3-0-0). Advanced Video Editing. S. Prerequisite: JTC 345.

Professional video editing practices, theories, and techniques with practical applications using current hardware and software.

JTC 435 03(2-3-0). Documentary Video Production. F. Prerequisite: JTC 345.

Writing, directing, and editing of long-form television documentaries. (\$)

+JTC 440 03(2-2-0). Advanced Electronic Media Production. F, S. Prerequisite: JTC 341; JTC 345.

Techniques and concepts used in advanced media production for television. (\$)

JTC 450 03(2-2-0). Public Relations Cases. S. Prerequisite: JTC 351; JTC 353; JTC 371 or JTC 372 or JTC 373.

Preparation of materials, use of media to achieve objectives with target audiences; work with nonprofit organizations in actual campaigns.

JTC 456/LB 456 03(2-2-0). Documentary Film as a Liberal Art. F. Prerequisite: Junior or senior standing. Credit not allowed for both JTC 456 and LB 456.

Documentary film and its role in human history, culture, and social interaction.

***JTC 460 03(3-0-0). Media Development.** S. Prerequisite: JTC 326; 27 additional credits of JTC.

Creation, design, production, and management of media.

JTC 461 03(2-2-0). Writing about Science, Health, and Environment. F. Prerequisite: JTC 210 or JTC 300 or LB 300.

Writing about science, health, and the environment for lay audiences from a journalistic perspective.

JTC 464 03(2-2-0). Technical Communication. F, S. Prerequisite: JTC 210 or JTC 300 or LB 300.

Writing and producing technical and scientific information for electronic and print media for professionals.

JTC 465 03(2-2-0). Specialized and Technical Editing. S. Prerequisite: JTC 211; JTC 310; JTC 361; JTC 371 or JTC 372; JTC 461 or JTC 464.

Editorial purpose, techniques, and evaluation of specialized and technical print and online information.

JTC 468 03(3-0-0). Convergence and Hypermedia. S. Prerequisite: JTC 310; JTC 365; 9 credits selected from JTC 326, JTC 372, JTC 373, or JTC 487.

Applications of theories of convergence, hypermedia, and social practices in computer-mediated communication. Development of a professional portfolio.

JTC 471 03(3-0-0). Communication Research Methods. F. Prerequisite: One statistics course. Credit not allowed for both JTC 471 and JTC 500.

Quantitative, qualitative methods of analyzing process and effects of mass and interpersonal communication.

JTC 484 Var [1-3]. Supervised College Teaching. F, S. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

JTC 487 Var [1-3]. Internship. Prerequisite: Written consent of department.

JTC 490 Var [1-3]. Workshop.

JTC 495A-G Var [1-3]. Independent Study.

A) Electronic reporting. B) Editing. C) Photojournalism. D) Public relations. E) Readings. F) Reporting. G) Technical communication.

JTC 496 Var [1-3]. Group Study.

JTC 500 04(4-0-0). Communication Research and Evaluation Methods. F. Credit not allowed for both JTC 500 and JTC 471.

Theory and applied communication research and evaluation methodologies for assessing and improving communication in technological environment.

JTC 501 04(4-0-0). Process and Effects of Communication. F. Prerequisite: JTC 500 or concurrent registration.

Examination of communication theory including communicator credibility, messages, channels, audiences, and information, behavior, and attitude change.

JTC 513 Var [1-2]. Impacts of New Communication Technologies. F, S.

Current topics and issues regarding uses and impacts of video and computer-based communication technologies.

JTC 535 03(3-0-0). Electronic Media Regulation and Policy. F.

Role of legislators, regulatory agencies, judiciary and public in the evolution of U.S. broadcast and digital media. Implications for free press.

JTC 544 03(2-3-0). Corporate and Institutional Media Production. S.

Advanced techniques in media production and management in corporate and institutional settings. (\$)

JTC 550 03(3-0-0). Public Relations. F, S. Offered only off campus.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Contemporary public relations principles and practices. (NT)

JTC 560 03(3-0-0). Managing Communications Systems. S. Prerequisite: JTC 501.

Examination of role, responsibilities of communication managers in translating theory into effective, applied communication programs.

JTC 568A-C Var [1-3]. Journalism for High School Advisers. F, S, SS. A) Journalism concepts. B) Newspapers. C) Yearbooks.

***JTC 570 03(3-0-0). Political Economy of Global Media.** F. Prerequisite: ECON 505 or JTC 500 or POLS 531 or SOC 667 or 18 credits in JTC classes.

Examination of the changing media information system worldwide and the role of social, political, legal and economic forces upon it.

JTC 601 03(3-0-0). Cognitive Communication Theory. F. Prerequisite: JTC 501.

Theories of information technology and communication as they relate to cognitive and social cognitive processing.

JTC 602 03(3-0-0). Social and Cultural Communication Theory. F. Prerequisite: JTC 500.

Theories of information technology and communication as they relate to the field of media systems, organizations, and culture.

JTC 614 03(3-0-0). Public Communication Campaigns. F. Prerequisite: JTC 501.

Conceptual, methodological issues and decisions underpinning determination of communication campaign effects, planning, implementation, and evaluation.

***JTC 630 03(3-0-0). Health Communication.** F. Prerequisite: JTC 501. Role of health communication in public health programs and campaigns.

JTC 640 03(3-0-0). Public Communication Technologies. S. Prerequisite: JTC 501.

Analysis of evolving and emergent communication technologies.

JTC 650 03(3-0-0). Public Relations Management. F. Prerequisite: JTC 501 or concurrent registration.

Theoretical and practical management techniques for public relations campaigns including societal, ethical, and legal issues involved.

JTC 660 03(3-0-0). Communication in Technology Transfer. F. Prerequisite: JTC 501 or concurrent registration.

Communication's role in technology transfer as related to nature, process, and effects of technology transfer, knowledge dissemination, and utilization.

JTC 661 03(3-0-0). Information Design. S. Prerequisite: JTC 501.

Theoretical and empirical review of creation, presentation, storage, and distribution of information.

JTC 662 03(3-0-0). Communicating Science and Technology. S. Prerequisite: JTC 501.

Examination of theoretical and empirical studies concerning communication of science and technology subject matter.

JTC 664 03(3-0-0). Quantitative Research in Communication. F. Prerequisite: JTC 500; one 300-level or higher statistics course.

Advanced quantitative research methods used in communication research.

JTC 665 03(3-0-0). Qualitative Methods in Communication Research. S. Prerequisite: JTC 500.

Techniques for collecting; interpreting, analyzing qualitative communication data.

JTC 684 Var. Supervised College Teaching. Prerequisite: Written

consent of instructor.

Philosophy, techniques, and approaches to teaching journalism skills courses, as supervised by faculty.

JTC 687 Var [1-3]. Internship. Prerequisite: Written consent of instructor.

JTC 690 Var [1-3]. Workshop. Prerequisite: Written consent of instructor.

JTC 695 Var [1-3]. Independent Study. Prerequisite: Written consent of instructor.

JTC 698 03(0-0-3). Research. Prerequisite: JTC 500.

Development of theoretical basis and methodology for thesis or research project.

JTC 699 Var. Thesis.

JTC 701 01(1-0-0). Colloquium in Communication and IT. F, S. Course may be taken up to four times for credit.

Orientation to graduate studies; communication theories, processes, media, and technology.

JTC 784 Var. Supervised College Teaching. F, S.

JTC 790 Var. Workshop. F, S.

JTC 792A-E 03(0-0-3). Seminar. F, S. Prerequisite: JTC 601; JTC 602.

A) Health and risk. B) Human computer interaction. C) Communication technology in organizations. D) Ethics, law, and policy. E) Strategic communication.

JTC 793A-F 03(0-0-3). Seminar. F, S. Prerequisite: JTC 601; JTC 602.

A) Experimental design. B) Survey design. C) Content analysis. D) Qualitative methods. E) Human factors. F) Critical and cultural methods.

JTC 795 Var. Independent Study.

JTC 798 03(0-0-3). Research. F, S. Prerequisite: JTC 601; JTC 602.

JTC 799 Var. Dissertation.

KEY ACADEMIC COMMUNITY COURSES

Nondepartmental

Office of Provost and Executive Vice President

KEY 192A-C Var[1-3]. Key Community Seminar. F, S. Prerequisite:
Concurrent registration in companion courses in the Key Course Cluster.
Examination of an intellectual problem or theme. Topics vary by
instructor. A) 01(0-0-1). B) 02(0-0-2). C) 03(0-0-3).

LANDSCAPE ARCHITECTURE COURSES

Department of Horticulture and Landscape Architecture

College of Agricultural Sciences

LAND 110 03(1-2-1). Introduction to Landscape Architecture. F.

Introductory theories, methods, and applications of landscape studies.

LAND 120 03(3-0-0). History of the Designed Landscape. S.

Major monuments and spaces from ancient Middle East through classical antiquity, the Renaissance, and Western tradition.

LAND 220/LIFE 220 03(3-0-0). Fundamentals of Ecology. (GT-SC2, AUCC 3A). F. Prerequisite: Three credits of 100-level biology or HORT 100; three credits of 100-level mathematics. Credit allowed for only one of the following: BIO 220, BIO 320, LAND 220, LIFE 220, LIFE 320, SOCR 320.

Interrelationships among organisms and their environments. (NT-O)

LAND 230 04(2-4-0). Drawing the Landscape. F.

Visual communication techniques; exploration of symbology, model building, design development drawing, and construction documentation draughting. (\$)

LAND 240 04(1-4-1). Fundamentals of Landscape Design Process. S. Prerequisite: LAND 230.

Initiation of formal exploration of design elements, materials, and principles, and introduction of design process as a defensible methodology. (\$)

LAND 241 03(1-4-0). Environmental Analysis. S. Prerequisite: LAND 230; concurrent registration in LAND 240.

Exploration and understanding of natural and cultural landscapes through analytical simulation techniques. (\$)

LAND 357 04(0-8-0). Omnibus Field Studies. SS. Prerequisite: Three credits in landscape drawing and analysis.

Theories and methods for the analysis, design, and planning of garden and landscape scale environments.

LAND 360 03(0-6-0). Basic Landscape Design and Construction. F. Prerequisite: LAND 240.

Site programming, analysis, design, and construction, including skill development in specifying earthwork, drainage, and vegetative composition. (\$)

LAND 361 03(2-2-0). Digital Methods. F. Prerequisite: LAND 360 or concurrent registration.

Landscape research, analysis, and design with ARCVIEW, AutoCAD, Microstation, and Photoshop. (\$)

LAND 362 03(0-6-0). Form and Expression in Garden Design. S. Prerequisite: LAND 361.

Formal decision making for site scale environments, including creative processes for form-giving, and generation of experimental solutions. (\$)

LAND 363 04(2-4-0). Advanced Landscape Site Engineering. S. Prerequisite: LAND 360.

Understanding and documenting the built environment with emphasis on construction and surveying as integral parts of design process. (\$)

LAND 364 04(1-6-0). Design and Nature. F. Prerequisite: LAND 361.

Computer-aided processes for siting, organizing, and evaluating cultural activities within ecologically fragile, landscape-scale environments. (\$)

LAND 365 03(2-2-0). Landscape Contract Drawing and Specifications. F. Prerequisite: LAND 363.

Construction details, design development, and construction

documentation emphasizing implementation of design projects.

LAND 366 04(0-8-0). Landscape Design Expression. S. Prerequisite: LAND 365.

Idea, values, and process landscape form applied to interactions of natural, cultural systems at the site and community scale; design competitions. (\$)

LAND 368/HORT 368 03(2-2-0). Landscape Irrigation and Water Conservation. F, S. Prerequisite: HORT 100 or LAND 110. Credit not allowed for both LAND 368 and HORT 368.

Practical approaches and methods of irrigation, water conservation, and water management in the designed landscape.

LAND 384 Var [1-5]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

LAND 392 02(0-0-2). Seminar-Designed Landscapes-Theory and Criticism. F. Prerequisite: LAND 365.

Readings, discussions, and writing in landscape architectural design theory; critical analysis of the designed and constructed landscape.

+LAND 444 03(3-0-0). Ecology of Landscapes. S. Prerequisite: LAND 220/LIFE 220; LIFE 320. Field trips required.

Theories, methods, and practices for interpreting, describing, and representing natural and human modified landscapes. (\$)

LAND 446 04(0-8-0). Urban Design. F. Prerequisite: LAND 366.

Designing the urban landscape, including precedent exploration about overall image, materials, and structure of the city and its components. (\$)

LAND 447 04(0-8-0). Comprehensive Landscape Design. S. Prerequisite: LAND 446.

Terminal studio; research, analysis, and synthesis for comprehensive project identified by student and approved in advance by faculty committee.

LAND 449 01(1-0-0). Professional Practice. S. Prerequisite: LAND 447 or concurrent registration.

Theory and skills of landscape architectural professional practice including functional, human, business, legal, and political aspects.

LAND 454 05(1-6-1). Landscape Field Studies. SS. Prerequisite: LAND 366.

Field observation of spatial and temporal landscape patterns resulting from natural and cultural processes and interactions.

LAND 455 05(1-6-1). Travel Abroad-European Landscape Architecture. SS. Prerequisite: LAND 362.

Exploration of major theoretical platforms in design through drawing, photographing, and measuring landscape architecture precedents in Europe.

LAND 495A-B Var [1-4]. Landscape Architectural Independent Study.

A) Design projects. B) Field service.

LAND 496 Var [1-8]. Group Study. Maximum of 8 credits allowed in course.

LAND 510 03(2-2-0). Virtual Design Methods. F.

Exploration and application of advanced computing technology and methods for analyzing and organizing natural and cultural landscapes.

LAND 520 03(1-4-0). Geographic Information Systems. S. Prerequisite: LAND 241.

Theories and applications of geographic information systems in spatial analysis and land planning.

LAND 560 03(2-2-0). Structure of Landscape Patterns. S. Prerequisite: 300-level ecology course.

Mechanisms and concepts in landscape structure for planning, design, and environmental management.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC-*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

LAND 610 04(2-6-0). Topics in Garden Design. F. Prerequisite: Graduate standing.

Garden design theories, methods, and operations.

LAND 620 04(2-6-0). Topics in Park Design. S. Prerequisite: Graduate standing.

Ideas, values, and processes of landscape form applied to interactions of natural and cultural systems for park and recreation applications.

LAND 630 04(2-6-0). Topics in Urban Design. F. Prerequisite: Graduate standing.

History and application of urban design principles, practices, and policies.

LAND 640 04(2-6-0). Major Landscape Change.S. Prerequisite: Graduate standing.

Addresses social and ecological resilience of large-scale landscapes through theory and application.

LAND 670 04(1-6-1). Landscape Architecture Studio Option. F, S. Prerequisite: Graduate standing. Course may be taken up to 5 times for credit.

Ideas, values, and processes of landscape architectural studio practice.

LAND 695A-B Var[1-4]. Landscape Architectural Independent Study. F, S, SS. Prerequisite: Graduate Standing.

A) Design projects. B) Field service.

LAND 698 Var[1-5]. Research. F, S, SS. Prerequisite: Graduate standing.

Guided research experience in landscape architecture.

ARABIC LANGUAGE COURSES

*Department of Foreign Languages and
Literatures
College of Liberal Arts*

LARA 105 05(5-0-0). First-Year Arabic I. F, S, SS. Prerequisite: No previous study in Arabic.

Essentials of Arabic for the beginner: aural comprehension, speaking, reading, writing.

LARA 107 05(5-0-0). First-Year Arabic II. F, S, SS. Prerequisite: LARA 105.

Essentials of Arabic for the continuing student: aural comprehension, speaking, reading, writing.

LARA 200 04(4-0-0). Second-Year Arabic I. (GT-AH4, AUCC 3B). F, S. Prerequisite: LARA 107 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing.

LARA 201 04(4-0-0). Second-Year Arabic II. (GT-AH4, AUCC 3B). F, S. Prerequisite: LARA 200 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing.

LARA 250 03(3-0-0). Arabic Language, Literature, Culture in Translation. (GT-AH2, AUCC 3B). F, S.

Selected works in translation from different periods and genres which represent the interrelationship of language, literature, and culture.

LARA 296 Var [1-5]. Group Study-Arabic. F, S.

LARA 300 03(3-0-0). Third Year Arabic. F. Prerequisite: LARA 201.

Develop reading and writing skills.

LARA 301 03(3-0-0). Oral Communication-Arabic. S. Prerequisite: LARA 201.

In-depth language study to improve proficiency, emphasizing oral communication.

LARA 495 Var[1-6]. Independent Study-Arabic. Prerequisite: Three years of college-level Arabic.

LIBERAL ARTS COURSES

Nondepartmental

College of Liberal Arts

LB 170 03(3-0-0). World Literatures to 1500. (GT-AH2, AUCC 3E). F, S.

Culturally significant literary texts from the beginnings of writing to 1500 from Europe, Asia, and Africa.

LB 171 03(3-0-0). World Literatures-The Modern Period. (GT-AH2, AUCC 3E). F, S.

Culturally significant literary texts from 1500 to the present from Europe, Asia, Africa, the Americas.

LB 192 03(0-0-3). College of Liberal Arts First-Year Seminar. F.

Traditions, concepts, and topics integral to the liberal arts; cultivates reading, communication, and critical thinking.

LB 200 01(1-0-0). Liberal Arts Research Methods. F, S.

Research methods for the liberal arts, evaluation of sources, various style manuals (MLA/APA), essay format, note cards, and selected reference works.

LB 300 03(2-0-1). Specialized Professional Writing. (AUCC 2) F, S, SS. Prerequisite: CO 150 or HONR 193.

Emphasizes specialized writing skills used in professional letters, resumes, manuals, critiques complaints, and interest-specific research projects. (NT-O)

LB 386A-E Var[1-3]. Practicum. F, S. Prerequisite: None.

Practicum at CTV, KCSU, The Collegian, College Avenue, or in Arts Production. A) CTV. B) KCSU. C) Collegian. D) College Avenue. E) Arts Production.

LB 455/SPCM 455 03(2-3-0). Narrative Fiction Film as a Liberal Art. S. Prerequisite: Senior standing. Credit not allowed for both LB 455 and SPCM 455.

Narrative fiction film and its role in human history, culture, and social interaction.

LB 456/JTC 456 03(2-2-0). Documentary Film as a Liberal Art. F. Prerequisite: Junior or senior standing. Credit not allowed for both LB 456 and JTC 456.

Documentary film and its role in human history, culture, and social interaction.

LB 484 Var[1-5]. Supervised College Teaching. F, S, SS.

A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

LB 487 Var[1-3]. Internship. F, S, SS.

LB 492 03(3-0-0). Liberal Arts Capstone Seminar. F, S.

Integration and reflection for graduating liberal arts majors with a career component that will prepare them for the job market. (NT-O)

LB 495 Var. Independent Study.

CHINESE LANGUAGE COURSES
*Department of Foreign Languages and
Literatures*
College of Liberal Arts

LCHI 105 05(5-0-0). First-Year Chinese I. F, S, SS. Prerequisite: No previous study in Chinese.

Essentials of Chinese for the beginner: aural comprehension, speaking, reading, writing.

LCHI 107 05(5-0-0). First-Year Chinese II. F, S, SS. Prerequisite: LCHI 105.

Essentials of Chinese for the continuing student: aural comprehension, speaking, reading, writing.

LCHI 200 05 (5-0-0). Second-Year Chinese I. (GT-AH4, AUCC 3B). F, S. Prerequisite: LCHI 107 or placement exam. Credit not allowed for both LCHI 200 and LCHI 228A.

Grammar review and extensive practice in conversation, reading, and writing.

LCHI 201 05(5-0-0). Second-Year Chinese II. (GT-AH4, AUCC 3B). F, S. Prerequisite: LCHI 200 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing.

LCHI 205 03(3-0-0). Intermediate Written Chinese. S. Prerequisite: LCHI 200 or placement exam.

Development of fundamental language skills emphasizing writing and reading.

LCHI 250 03(3-0-0). Chinese Language, Literature, Culture in Translation-Chinese. (GT-AH2, AUCC 3B). F, S.

Selected works in translation from different periods and genres which represent the interrelationship of Chinese literature, and culture.

LCHI 296 Var [1-5]. Group Study-Chinese.

Group study in language/literature/culture.

LCHI 304 03(3-0-0). Third-Year Chinese I. F. Prerequisite: LCHI 201 or placement exam.

Development of reading comprehension, communicative competence, and cultural understanding.

LCHI 305 03(3-0-0). Third-Year Chinese II. S. Prerequisite: LCHI 304 or placement exam.

Development of reading comprehension, communicative competence, and cultural understanding.

LCHI 309 03(3-0-0). Contemporary Chinese Literature and the Arts. S.

Trends resulting from traditional Chinese and contemporary foreign influences in Chinese literature and the arts.

LCHI 365 03(3-0-0). Introduction to Chinese Cinema Studies. F, S. Prerequisite: LCHI 305.

Terminology, techniques, and approaches specific to Chinese cinema. Taught in Chinese.

LCHI 408 01(1-0-0). Chinese Calligraphy. F, S. Prerequisite: LCHI 304.

History of Chinese calligraphy and basic Chinese calligraphy skills.

LCHI 495 Var [1-6]. Independent Study-Chinese. Prerequisite: Three years of college-level Chinese.

LCHI 496 Var [1-5]. Group Study-Chinese. F.

FRENCH LANGUAGE COURSES

Department of Foreign Languages and Literatures

College of Liberal Arts

LFRE 105 05(5-0-0). First-Year French I. F, S, SS. Prerequisite: No previous study in French. Credit not allowed for both LFRE 105 and LFRE 106.

Essentials of French for the beginner: aural comprehension, speaking, reading, writing.

LFRE 106 03(3-0-0). First-Year French Review. F, S, SS. Prerequisite: Placement exam or instructor placement. For students with minimal proficiency. Credit not allowed for both LFRE 106 and LFRE 105.

Basic review of essential skills: aural comprehension, speaking, reading, writing.

LFRE 107 05(5-0-0). First-Year French II. F, S, SS. Prerequisite: LFRE 105 or LFRE 106.

Essentials of French for the continuing student: aural comprehension, speaking, reading, writing.

LFRE 108 05(5-0-0). Intensive French I. F. Prerequisite: Grade of A in LFRE 105 or LFRE 106 with written consent of instructor; or placement by exam.

Accelerated practice in speaking, reading, writing, and aural comprehension.

LFRE 120 03(3-0-0). Reading for Proficiency. F, S, SS. Credit for LFRE 120 not allowed if LFRE 107 or LFRE 108 has been completed.

Essentials of language for developing reading proficiency.

LFRE 200 03(3-0-0). Second-Year French I. (GT-AH4, AUCC 3B). F, S. Prerequisite: LFRE 107 or LFRE 108 or placement exam. Credit not allowed for both LFRE 200 and LFRE 228A.

Grammar review and extensive practice in conversation, reading, and writing.

LFRE 201 03(3-0-0). Second-Year French II. (GT-AH4, AUCC 3B). F, S. Prerequisite: LFRE 200 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing.

LFRE 208 05(5-0-0). Intensive French II. S. Prerequisite: LFRE 108 or placement exam.

Accelerated practice in speaking, reading, writing, and aural comprehension.

LFRE 250 03(3-0-0). French Language, Literature, Culture in Translation-French. (GT-AH2, AUCC 3B). F, S.

Selected works in translation from different periods and genres which represent the interrelationship of language, literature, and culture.

LFRE 296 Var [1-5]. Group Study-French. F, S.

LFRE 300 03(3-0-0). Reading and Writing for Communication-French. F, S, SS. Prerequisite: LFRE 201 or LFRE 208 or placement.

Development of reading and writing proficiency through an in-depth examination of contemporary writing.

LFRE 301 03(3-0-0). Oral Communication-French. F, S. Prerequisite: LFRE 201.

In-depth language study to improve proficiency in all language skills emphasizing oral.

LFRE 310 03(3-0-0). Approaches to French Literature. F, S. Prerequisite: LFRE 300.

Appreciation and critical readings of representative works in prose, drama, and poetry.

LFRE 312 03(3-0-0). Introduction to French Linguistics. F. Prerequisite: LFRE 300 or concurrent registration.

French linguistics, phonetics, phonology, morphology, syntax, semantics, and pragmatics.

LFRE 313 03(3-0-0). Introduction to French Translation and Interpreting. F, S. Prerequisite: LFRE 300.

Translation and interpreting of written and oral texts into and from the foreign language.

LFRE 326 03(3-0-0). French Phonetics. F, S. Prerequisite: LFRE 300 or concurrent registration.

Phonetic principles and their application to language sound system; intensive practice in pronunciation, intonation.

LFRE 335 03(3-0-0). Issues in French/Francophone Culture. F, S. Prerequisite: LFRE 300.

Historical context of contemporary issues in the culture of French-speaking countries.

LFRE 345 03(3-0-0). Business French. F, S, SS. Prerequisite: LFRE 300.

Business and commercial aspects of the French language and culture.

LFRE 355 03(3-0-0). 20th Century French Literature. F, S. Prerequisite: LFRE 310.

Representative literary works from the 20th century.

LFRE 365 03(3-0-0). Introduction to French Cinema Studies. F, S. Prerequisite: LFRE 310 or LFRE 335.

Terminology, techniques, and approaches specific to French cinema. Taught in French.

LFRE 400 03(3-0-0). Advanced French Communication Skills. F. Prerequisite: LFRE 300.

Development of speaking, reading, and writing proficiency through an in-depth examination of representative writings and media communications.

LFRE 413 03(3-0-0). Advanced French Translation and Interpreting. F, S. Prerequisite: LFRE 313.

Advanced practice in translation and interpreting of written and oral texts into and from French.

LFRE 433A-B 03(3-0-0). Advanced French/Francophone Culture. F. Prerequisite: LFRE 400.

French and Francophone cultural identities and their history. A) Representations. B) Center and margins.

LFRE 441 03(3-0-0). Advanced Business French. F, S. Prerequisite: LFRE 345.

Advanced business and commercial aspects of the French language and culture.

LFRE 450 03(3-0-0). Selected French Literary Movements and Periods. F, S. Prerequisite: LFRE 300; LFRE 310. May be taken up to 3 times for credit.

Studies in selected literary movements and periods of France, such as classicism, realism, naturalism, existentialism.

LFRE 452 03(3-0-0). Genre Studies in French. F, S. Prerequisite: LFRE 300; LFRE 310. May be taken up to 3 times for credit.

Development of critical approaches to major works in literature through selected literary genres and subgenres.

LFRE 453 03(3-0-0). Author Studies in French. F, S. Prerequisite: LFRE 300; LFRE 310. May be taken up to 3 times for credit.

Development of critical approaches to authors through the appreciation and analysis of selected works.

LFRE 454 03(3-0-0). Topic Studies in French. F, S. Prerequisite: LFRE 300; LFRE 310. May be taken up to 3 times for credit.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

LFRE 695 Var [1-6]. Independent Study-French.

Selected topic studies such as themes, topoi, and interdisciplinary subjects in literature.

LFRE 460 03(3-0-0). French/Francophone Women Writers. S. Prerequisite: LFRE 300; LFRE 310. May be taken up to 3 times for credit.

Selected French and Francophone women writers in a variety of genres emphasizing relationships among gender, culture, and writing.

***LFRE 470 03(3-0-0). French Grammatical Constructions.** S. Prerequisite: LFRE 312.

Linguistic analysis of selected French grammatical constructions (word order, word formation, and sentence structure), their relationship to meaning.

LFRE 492 03(0-0-3). Seminar-French Language, Literature, and Society. F, S. Prerequisite: LFRE 310; two 400-level L*** courses; senior status.

Integrative study of language, literature, and society.

LFRE 495 Var [1-6]. Independent Study-French. Prerequisite: Three years of college-level French.

LFRE 500 03(3-0-0). Language Analysis/Stylistics-French. F. Prerequisite: LFRE 400.

Analysis of language structure through the examination of style in literary and non-literary texts.

LFRE 508 04(3-3-0). Intensive French-Graduate Review. SS. Prerequisite: Admission to Summer Institute for Foreign Language Teaching.

Immersion review of language for the teacher, developing intermediate-level proficiency in culture and the four skills.

LFRE 514 01(1-0-0). Issues in Teaching Language-French. F, S. Prerequisite: Concurrent graduate teaching assistantship.

Current theory and practice in second-language instruction; technological applications.

LFRE 525 03(3-0-0). History of the French Language. S. Prerequisite: LFRE 400.

Investigation of both internal (strictly linguistic) and external (sociolinguistic) factors in development of the language.

LFRE 536 03(3-0-0). Topics in French Linguistics. F, S. Prerequisite: LFRE 500.

Acquisition, discourse analysis, and language change and variation over time and space.

LFRE 551 03(3-0-0). Selected French Literary Movements/Periods. F. Prerequisite: Undergraduate degree in French.

Advanced studies in and critical approaches to selected literary movements or periods.

LFRE 552 03(3-0-0). Advanced Studies in French Literary Genres. F. Prerequisite: Undergraduate degree in French.

Advanced studies in and critical approaches to literary genres through study of major works in foreign literatures.

LFRE 553 03(3-0-0). Advanced French Author Studies. S. Prerequisite: Undergraduate degree in French.

Critical approaches to the study of selected authors through appreciation and analysis of their major works.

LFRE 554 03(3-0-0). Advanced Topic Studies-French. S. Prerequisite: Undergraduate degree in French.

Selected topics (theme, topoi, and interdisciplinary subjects) in foreign literatures.

LFRE 692 03(0-0-3). Seminar-French. F, S. Prerequisite: Undergraduate degree in French.

Treatment of selected topics in seminar.

FOREIGN LANGUAGES AND LITERATURES – GENERAL COURSES

Department of Foreign Languages and Literatures *College of Liberal Arts*

LGEN 114 Var [1-10]. First-Year Language I. SS. Offered only through the Division of Continuing Education.

Critical language immersion courses taught abroad by members of the Council of American Overseas Research Centers.

LGEN 115 Var [1-10]. First-Year Language II. SS. Offered only through the Division of Continuing Education.

Critical language immersion courses taught abroad by members of the Council of American Overseas Research Centers.

LGEN 192 03(3-0-0). Modern Languages/Cultures: Italian and Japanese. S.

Language, cultural issues, and historical heritage of modern Italian and Japanese societies.

LGEN 214 Var [1-10]. Second-Year Language I. SS. Offered only through the Division of Continuing Education.

Critical language immersion courses taught abroad by members of the Council of American Overseas Research Centers.

LGEN 215 Var [1-10]. Second-Year Language II. SS. Offered only through the Division of Continuing Education.

Critical language immersion courses taught abroad by members of the Council of American Overseas Research Centers.

LGEN 290 Var [1-3]. Theatre Workshop in a Foreign Language. F, S. Prerequisite: LARA 105 or LCHI 105 or LFRE 105 or LGER 105 or LITA 105 or LJPJ 105 or LKOR 105 or LRUS 105 or LSPA 105.

Application of communication skills in a foreign language through informal staging of dramatic scripts.

LGEN 296 Var [1-5]. Group Study-General.

Group study in language/literature/culture.

LGEN 314 Var [1-10]. Third-Year Language I. SS. Offered only through the Division of Continuing Education.

Critical language immersion courses taught abroad by members of the Council of American Overseas Research Centers.

LGEN 315 Var [1-10]. Third-Year Language II. SS. Offered only through the Division of Continuing Education.

Critical language immersion courses taught abroad by members of the Council of American Overseas Research Centers.

LGEN 365 03(3-0-0). Introduction to Foreign Cinema Studies. F, S. Prerequisite: LCHI 305 or LFRE 310 or LFRE 335 or LGER 310 or LGER 335 or LJPJ 305 or LRUS 305 or LSPA 310 or LSPA 335.

Terminology, techniques, and approaches specific to foreign cinema. Taught in English.

LGEN 382/ETST 382 03(2-0-1). Italian Ethnic Identity, Culture, and Gender. SS.

Different ethnic identities in southern and northern Italy. Historical and contemporary culture and feminism. Enhancement of linguistic skills.

LGEN 414 Var [1-10]. Fourth-Year Language I. SS. Offered only through the Division of Continuing Education.

Critical language immersion courses taught abroad by members of the Council of American Overseas Research Centers.

LGEN 415 Var [1-10]. Fourth-Year Language II. SS. Offered only

through the Division of Continuing Education.

Critical language immersion courses taught abroad by members of the Council of American Overseas Research Centers.

LGEN 465A-D 03(3-0-0). Studies in Foreign Film. F, S.

Representation of foreign societies through film, taught in English. **A)** The Americas. **B)** Asia. **C)** Europe. **D)** Africa.

LGEN 487 Var [1-12]. Internship.

LGEN 492 03(0-0-3). Language, Literature, and Society-General. F, S. Prerequisite: LFRE 310 or LGER 310 or LSPA 310; two 400-level L*** courses; senior status.

Integrative study of language, literature, and society.

LGEN 505 02(2-1-0). Methods/Technologies in Language Instruction. SS. Prerequisite: Admission to Summer Institute for Foreign Language Teaching.

Theory and methodology of teaching foreign languages and cultures, including video and computer-assisted technology.

LGEN 510 01(1-0-0). Research Methods. F. Prerequisite: Written consent of instructor.

Resources and reference tools appropriate to research in foreign languages and literatures.

LGEN 516 03(3-0-0). Theory/Methods-Foreign Language Instruction. F. Prerequisite: Admission to graduate studies in foreign languages. Foreign language teaching methodology.

LGEN 530 3(3-0-0). Literary and Cultural Theory. F. Prerequisite: Written consent of instructor.

Theoretical approaches to contemporary literary and cultural criticism.

LGEN 535 03(3-0-0). Graduate Studies in Civilization. S. Prerequisite: LFRE 433A-B or LGER 434 or LSPA 436 or LSPA 437.

Critical and analytical approaches to a foreign civilization and culture. Research related to language of specialization.

LGEN 545 Var [1-3]. Literary Translation Theory and Practice. S. Prerequisite: Reading knowledge of foreign language.

Theory and practice of translating literary texts from foreign language to comparable English.

LGEN 684 Var. Supervised College Teaching. F, S.

LGEN 694 Var[1-6]. Independent Study: Portfolio. F, S, SS.

LGEN 699 Var [1-6]. Thesis.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC-*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

GERMAN LANGUAGE COURSES

Department of Foreign Languages and Literatures

College of Liberal Arts

LGER 105 05(5-0-0). First-Year German I. F, S, SS. Prerequisite: No previous study in German.

Essentials of German for the beginner: aural comprehension, speaking, reading, writing.

LGER 107 05(5-0-0). First-Year German II. F, S, SS. Prerequisite: LGER 105.

Essentials of German for the continuing student: aural comprehension, speaking, reading, writing.

LGER 108 05(5-0-0). Intensive German I. F. Prerequisite: Grade of A in LGER 105 and written consent of instructor; or placement by exam.

Accelerated practice in speaking, reading, writing, and aural comprehension.

LGER 120 03(3-0-0). Reading for Proficiency. F, S, SS. Credit for LGER 120 not allowed if LGER 107 or LGER 108 has been completed.

Essentials of language for developing reading proficiency.

LGER 200 03(3-0-0). Second-Year German I. (GT-AH4, AUCC 3B). F, S. Prerequisite: LGER 107 or LGER 108 or placement exam. Credit not allowed for both LGER 200 and LGER 228A.

Grammar review and extensive practice in conversation, reading, and writing.

LGER 201 03(3-0-0). Second-Year German II. (GT-AH4, AUCC 3B). F, S. Prerequisite: LGER 200 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing.

LGER 208 05(5-0-0). Intensive German II. S. Prerequisite: LGER 108 or placement exam.

Accelerated practice in speaking, reading, writing, and aural comprehension.

LGER 250 03(3-0-0). German Language, Literature, Culture in Translation. (GT-AH2, AUCC 3B). F, S.

Selected works in translation from different periods and genres which represent the interrelationship of language, literature, and culture.

LGER 296 Var [1-5]. Group Study-German.

Group study in language/literature/culture.

LGER 300 03(3-0-0). Reading and Writing for Communication-German. F, S, SS. Prerequisite: LGER 201 or LGER 208 or placement.

Development of reading and writing proficiency through an in-depth examination of contemporary writing.

LGER 301 03(3-0-0). Oral Communication-German. S. Prerequisite: LGER 201 or placement exam.

In-depth language study to improve proficiency in all language skills emphasizing oral.

LGER 310 03(3-0-0). Approaches to German Literature. F, S. Prerequisite: LGER 201 or LGER 208.

Appreciation and critical readings of representative works in prose, drama, and poetry.

LGER 313 03(3-0-0). Introduction to German Translation and Interpreting. F, S. Prerequisite: LGER 300.

Translation and interpreting of written and oral texts into and from German.

LGER 326 03(3-0-0). German Phonetics. F, S. Prerequisite: LGER 300.

Phonetic principles and their application to language sound system; intensive practice in pronunciation, intonation.

LGER 335 03(3-0-0). Issues in German Culture. S. Prerequisite: LGER 300.

Historical context of contemporary issues in the culture of German-speaking countries.

LGER 336 03(3-0-0). Issues in Swiss and Austrian Culture. S. Prerequisite: LGER 300.

Swiss and Austrian culture focusing on the development of their respective cultures from the medieval to the modern periods. Taught in German.

LGER 345 03(3-0-0). Business German. F, S, SS. Prerequisite: LGER 300.

Business and commercial aspects of the German language and culture.

LGER 355 03(3-0-0). 20th Century German Literature. F, S. Prerequisite: LGER 310.

Representative literary works from the 20th century.

LGER 365 03(3-0-0). Introduction to German Cinema Studies. F, S. Prerequisite: LGER 310 or LGER 335.

Terminology, techniques, and approaches specific to German cinema. Taught in German.

LGER 400 03(3-0-0). Advanced German Communication Skills. F. Prerequisite: LGER 300.

Development of speaking, reading, and writing proficiency through an in-depth examination of representative writings and media communications.

LGER 401 03(3-0-0). Advanced German Oral Communication. S. Prerequisite: LGER 300.

Advanced language study to improve proficiency in German language skills, with an emphasis on oral communication.

LGER 413 03(3-0-0). Advanced German Translation and Interpreting. F, S. Prerequisite: LGER 313.

Advanced practice in translation and interpreting of written and oral texts into and from German.

LGER 434 03(3-0-0). Advanced German Culture. F, S. Prerequisite: LGER 335.

Critical examination of selected topics in culture and cultural history of German-speaking countries.

LGER 441 03(3-0-0). Advanced Business German. F, S. Prerequisite: LGER 345.

Advanced business and commercial aspects of the German language and culture.

LGER 450 03(3-0-0). Selected German Literary Movements and Periods. F, S. Prerequisite: LGER 300; LGER 310. May be taken up to 3 times for credit.

Studies in selected literary movements and periods of Germany such as classicism, realism, naturalism, existentialism.

LGER 452 03(3-0-0). Genre Studies in German. F, S. Prerequisite: LGER 300; LGER 310. May be taken up to 3 times for credit.

Development of critical approaches to major works in literature through selected literary genres and subgenres.

LGER 453 03(3-0-0). Author Studies in German. F, S. Prerequisite: LGER 300; LGER 310. May be taken up to 3 times for credit.

Development of critical approaches to authors through the appreciation and analysis of selected works.

LGER 454 03(3-0-0). Topic Studies in German. F, S. Prerequisite:

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

LGER 300; LGER 310. May be taken up to 3 times for credit.

Selected topic studies such as themes, topics, and interdisciplinary subjects in literature.

LGER 465 03(3-0-0). Advanced Studies in German Film. S.

Prerequisite: LGER 365.

Representation of German society and culture through film. Taught in German.

LGER 492 03(0-0-3). Seminar-German Language, Literature, and Society. F.S. Prerequisite: LGER 310; two 400-level LGER courses; senior status.

Integrative study of language, literature, and society.

LGER 495 Var [1-6]. Independent Study-German. Prerequisite: Three years of college-level German.

LGER 500 03(3-0-0). Language Analysis/Stylistics-German. F.

Prerequisite: LGER 400.

Analysis of language structure through the examination of style in literary and non-literary texts.

LGER 508 04(3-3-0). Intensive German-Graduate Review. SS.

Prerequisite: Admission to Summer Institute for Foreign Language Teaching.

Immersion review of language for the teacher, developing intermediate-level proficiency in culture and the four skills.

LGER 514 01(1-0-0). Issues in Teaching German. F, S. Prerequisite: Concurrent graduate teaching assistantship.

Current theory and practice in second-language instruction; technological applications.

LGER 525 03(3-0-0). History of the German Language. S. Prerequisite: LGER 400.

Investigation of both internal (strictly linguistic) and external (sociolinguistic) factors in development of the language.

LGER 551 03(3-0-0). Selected German Literary Movements/Periods. F.

Prerequisite: Undergraduate degree in German.

Advanced studies in and critical approaches to selected literary movements or periods.

LGER 552 03(3-0-0). Advanced Studies in German Literary Genres. F.

Prerequisite: Undergraduate degree in German.

Advanced studies in and critical approaches to literary genres through study of major works in foreign literatures.

LGER 553 03(3-0-0). Advanced German Author Studies. S.

Prerequisite: Undergraduate degree in German.

Critical approaches to the study of selected authors through appreciation and analysis of their major works.

LGER 554 03(3-0-0). Advanced German Topic Studies. S. Prerequisite:

Undergraduate degree in German.

Selected topics (theme, topoi, and interdisciplinary subjects) in foreign literatures.

LGER 692 03(0-0-3). Seminar-German. F, S. Prerequisite:

Undergraduate degree in German.

Treatment of selected topics in seminar.

LGER 695 Var [1-6]. Independent Study-German.

GREEK LANGUAGE COURSES

*Department of Foreign Languages and
Literatures
College of Liberal Arts*

***LGRK 152 03(3-0-0). Classical Greek I. S.**

Essentials of the language, reading, and translation.

***LGRK 153 03(3-0-0). Classical Greek II. S.** Prerequisite: LGRK 152.

Essentials of the language, reading, and translation.

LIBRARY INFORMATION COURSE

Nondepartmental

Dean, University Libraries

LI 301 01(1-0-0). Research in the Information Age. F, S, SS.

Developing strategies for library research; locating appropriate resources; and selecting, evaluating, and recording relevant information.
(NT-O)

LIFE SCIENCE COURSES

Nondepartmental, Interdisciplinary

Office of Provost and Executive Vice President

LIFE 102 04(3-3-0). Attributes of Living Systems. (GT-SC1, AUCC 3A) F, S, SS. Prerequisites: High school chemistry. Intended for students requiring additional courses in biology or areas related to biological science.

Levels of organization, stability, and change in living systems. (\$)

LIFE 103 04(3-3-0). Biology of Organisms-Animals and Plants. F, S, SS. Prerequisite: LIFE 102.

Diversity of animals and plants; their structural and functional characteristics. (\$)

LIFE 201A-B 03(3-0-0). Introductory Genetics. (GT-SC2, AUCC 3A) F, S. Prerequisite: LIFE 102. Credit not allowed for both LIFE 201A and LIFE 201B.

A) Emphasis on applied genetics, population genetics, and conservation/ecological genetics. **B)** Emphasis on molecular, immunological, and developmental genetics.

LIFE 202A-B 01 (0-0-1). Introductory Genetics Recitation. F, S. Credit not allowed for both LIFE 202A and LIFE 202B.

Case studies and problems solving in: **A)** Applied genetics, population genetics, and conservation/ecological genetics. Prerequisite: LIFE 201A or concurrent registration. **B)** Honors Recitation. Molecular genetics. Prerequisite: LIFE 201B or concurrent registration; participation in University Honors program.

LIFE 203 02(0-3-1). Introductory Genetics Laboratory. S. Prerequisite: LIFE 201A or concurrent registration or LIFE 201B or concurrent registration.

Basic molecular genetics and molecular aspects of development laboratory.

LIFE 205 03(3-0-0). Survey of Microbial Biology. S.

Introduction to the microbial world, covering both eukaryotic and prokaryotic microbes; emphasis on applied and environmental microbiology.

LIFE 206 02(0-4-0). Microbial Biology Laboratory. F, S. Prerequisite: LIFE 205 or concurrent registration. (\$)

LIFE 210 03(3-0-0). Introductory Eukaryotic Cell Biology. F, S. Prerequisite: CHEM 111; CHEM 112 or concurrent registration; LIFE 102.

Solid understanding of a cell, different cell types, molecular aspects of cellular and subcellular biology and biochemistry.

LIFE 211 01(0-0-1). Introductory Cell Biology Honors Recitation. F, S. Prerequisite: LIFE 210 or concurrent registration; participation in University Honors program.

Molecular aspects of cellular and subcellular biology and introductory biochemistry recitation.

LIFE 212 02(0-3-1). Introductory Cell Biology Laboratory. F, S. Prerequisite: CHEM 112 or concurrent registration.; LIFE 210 or concurrent registration.

Molecular aspects of cellular and subcellular biology and introductory biochemistry laboratory.

LIFE 220/LAND 220 03(3-0-0). Fundamentals of Ecology. (GT-SC2, AUCC 3A). F. Prerequisite: Three credits of 100-level biology or HORT 100; three credits of 100-level mathematics. Credit allowed for only one of the following: BIO 220, BIO 320, LAND 220, LIFE 220, LIFE 320, SOCR 220.

Interrelationships among organisms and their environments. (NT-O)

LIFE 320 03(3-0-0). Ecology. F, S. Prerequisite: BZ 101 or BZ 104 or BZ

110 or BZ 120 or LIFE 102; MATH 141 or MATH 155 or MATH 160. Credit allowed for only one of the following: BIO 220, BIO 320, LAND 220, LIFE 220, LIFE 320, SOCR 220.

Interrelationships among organisms and their environments using conceptual models and quantitative approaches.

ITALIAN LANGUAGE COURSES
*Department of Foreign Languages and
Literatures*
College of Liberal Arts

LITA 105 05(5-0-0). First-Year Italian I. F, S, SS. Prerequisite: No previous study in the language.

Essentials of Italian for the beginner: aural comprehension, speaking, reading, writing.

LITA 107 05(5-0-0). First-Year Italian II. F, S, SS. Prerequisite: LITA 105.

Essentials of Italian for the continuing student: aural comprehension, speaking, reading, writing.

LITA 200 03(3-0-0). Second-Year Italian I. F, S. Prerequisite: LITA 107 or placement exam. Credit not allowed for both LITA 200 and LITA 228A.

Grammar review and extensive practice in conversation, reading, and writing.

LITA 201 03(3-0-0). Second-Year Italian II. F, S. Prerequisite: LITA 200 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing.

LITA 296 Var [1-5]. Group Study-Italian.

Group study in language/literature/culture.

LITA 365 03(3-0-0). Studies in Foreign Film-Italian. F, S.

Representation of Italian society through film. Taught in Italian.

LITA 495 Var [1-6]. Independent Study-Italian. Prerequisite: Three years of college-level Italian.

JAPANESE LANGUAGE COURSES

Department of Foreign Languages and Literatures *College of Liberal Arts*

LJPN 105 05(5-0-0). First-Year Japanese I. F, S, SS. Prerequisite: No previous study in Japanese.

Essentials of Japanese for the beginner: aural comprehension, speaking, reading, writing.

LJPN 107 05(5-0-0). First-Year Japanese II. F, S, SS. Prerequisite: LJPN 105.

Essentials of Japanese for the continuing student: aural comprehension, speaking, reading, writing.

LJPN 200 05(5-0-0). Second-Year Japanese I. (GT-AH4, AUCC 3B). F, S. Prerequisite: LJPN 107 or placement exam. Credit not allowed for both LJPN 200 and LJPN 228A.

Grammar review and extensive practice in conversation, reading, and writing.

LJPN 201 05(5-0-0). Second-Year Japanese II. (GT-AH4, AUCC 3B). , S. Prerequisite: LJPN 200 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing.

LJPN 208 01(1-0-0). Kanji Study. F, S. Prerequisite: LJPN 105. May be taken up to 4 times for credit.

Kanji (Chinese characters) learning strategies, through examination and analysis of Kanji characters.

LJPN 250 03(3-0-0). Japanese Language, Literature, Culture in Translation. (GT-AH2, AUCC 3B). F, S.

Selected works in translation from different periods and genres which represent the interrelationship of Japanese language, literature, and culture.

LJPN 296 Var [1-5]. Group Study-Japanese.

Group study in language/literature/culture.

LJPN 304 03(3-0-0). Third-Year Japanese I. F. Prerequisite: LJPN 201 or placement exam.

Development of reading comprehension, communicative competence, and cultural understanding.

LJPN 305 03(3-0-0). Third-Year Japanese II. S. Prerequisite: LJPN 304 or placement exam.

Enhanced development of reading comprehension, communicative competence, and cultural sensitivity.

LJPN 365 03(3-0-0). Introduction to Japanese Cinema Studies. F, S. Prerequisite: LJPN 305.

Terminology, techniques, and approaches specific to Japanese cinema. Taught in Japanese.

LJPN 404 03(3-0-0). Historical Aspects of the Language and Society. F. Prerequisite: LJPN 305.

Advanced Japanese language course designed to further enhance proficiency through a variety of activities.

LJPN 405 03(3-0-0). Integrated Japanese: Beyond Words. S. Prerequisite: LJPN 305.

Advanced Japanese language course designed to further enhance proficiency through a variety of activities for the continuing student.

LJPN 408 01(1-0-0). Advanced Kanji Study. F, S. Prerequisite: LJPN 201. May be taken up to four times for credit.

Kanji learning strategies and acquisition of advanced Kanji characters.

LJPN 495 Var [1-6]. Independent Study-Japanese. Prerequisite: Three years of college-level Japanese.

LJPN 496 Var [1-5]. Group Study-Japanese. Prerequisite: LJPN 305. Group study in language/literature/culture.

KOREAN LANGUAGE COURSES
*Department of Foreign Languages and
Literatures*
College of Liberal Arts

LKOR 105 05(5-0-0). First-Year Korean I. F, S, SS. Prerequisite: No previous study in Korean.

Essentials of Korean for the beginner: aural comprehension, speaking, reading, writing.

LKOR 107 05(5-0-0). First-Year Korean II. F, S, SS. Prerequisite: LKOR 105.

Essentials of Korean for the continuing student: aural comprehension, speaking, reading, writing.

LKOR 202 03(3-0-0). Intermediate Korean and Culture I. F, S, SS. Prerequisite: Prerequisite: LKOR 107.

LKOR 203 03(3-0-0). Intermediate Korean and Culture II. F, S, SS. Prerequisite: LKOR 202.

LATIN LANGUAGE COURSES

*Department of Foreign Languages and
Literatures
College of Liberal Arts*

LLAT 105 05(5-0-0). First Year Latin I. F.

Essentials of Latin grammar, vocabulary, and phonology.

LLAT 107 05(5-0-0). First-Year Latin II. S. Prerequisite: LLAT 105.

Six tenses of verbs, active and passive; use subjunctive review of the five declensions of nouns and adjectives; new vocabulary.

LLAT 296 Var [1-5]. Group Study-Latin. F, S.

RUSSIAN LANGUAGE COURSES
*Department of Foreign Languages and
Literatures*
College of Liberal Arts

LRUS 105 05(5-0-0). First-Year Russian I. F, S, SS. Prerequisite: No previous study in Russian.

Essentials of Russian for the beginner: aural comprehension, speaking, reading, writing.

LRUS 107 05(5-0-0). First-Year Russian II. F, S, SS. Prerequisite: LRUS 105.

Essentials of Russian for the continuing student: aural comprehension, speaking, reading, writing.

LRUS 200 03(3-0-0). Second-Year Russian I. (GT-AH4, AUCC 3B). F, S. Prerequisite: LRUS 107 or placement exam. Credit not allowed for both LRUS 200 and LRUS 228A.

Grammar review and extensive practice in conversation, reading, and writing.

LRUS 201 03(3-0-0). Second-Year Russian II. F, S. (GT-AH4, AUCC 3B). Prerequisite: LRUS 200 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing.

LRUS 250 03(3-0-0). Russian Literature, Culture in Translation. (GT-AH2, AUCC 3B). F, S.

Selected works in translation from different periods and genres which represent the interrelationship of language, literature, and culture.

LRUS 296 Var [1-5]. Group Study-Russian..

Group study in language/literature/culture.

LRUS 304 03(3-0-0). Third-Year Russian I. F. Prerequisite: LRUS 201 or placement exam.

Development of reading comprehension, communicative competence, and cultural understanding.

LRUS 305 03(3-0-0). Third-Year Russian II. S. Prerequisite: LRUS 304 or placement exam.

Enhanced development of reading comprehension, communicative competence, and cultural sensitivity.

LRUS 365 03(3-0-0). Introduction to Russian Cinema Studies. F, S. Prerequisite: LRUS 305.

Terminology, techniques, and approaches specific to Russian cinema. Taught in Russian.

LRUS 495 Var [1-6]. Independent Study-Russian. Prerequisite: Three years of college-level Russian.

LRUS 496 Var [1-5]. Group Study-Russian. Prerequisite: LRUS 305 or placement exam.

Group study in language/literature/culture.

SIGN LANGUAGE COURSES

Department of Foreign Languages and Literatures College of Liberal Arts

LSGN 109 05(5-0-0). American Sign Language I. F.

Vocabulary, grammar and basic conversational skill in ASL, with information on deaf culture.

LSGN 110 05(5-0-0). American Sign Language II. F, S, SS. Prerequisite: LSGN 109.

Development of communicative competence in ASL skill and expansion of knowledge of deaf culture.

LSGN 296 Var [1-5]. Group Study–American Sign Language. F, S.

SPANISH LANGUAGE COURSES

Department of Foreign Languages and Literatures

College of Liberal Arts

LSPA 105 05(5-0-0). First-Year Spanish I. F, S, SS. Prerequisite: No previous study in Spanish. Credit not allowed for both LSPA 105 and LSPA 106.

Essentials of Spanish for the beginner: aural comprehension, speaking, reading, writing.

LSPA 106 03(3-0-0). First-Year Spanish Review. F, S, SS. Prerequisite: Placement exam or instructor placement. For students with minimal proficiency. Credit not allowed for both LSPA 106 and LSPA 105.

Basic review of essential skills: aural comprehension, speaking, reading, writing.

LSPA 107 05(5-0-0). First-Year Spanish II. F, S, SS. Prerequisite: LSPA 105 or LSPA 106.

Essentials of Spanish for the continuing student: aural comprehension, speaking, reading, writing.

LSPA 108 05(5-0-0). Intensive Spanish I. F. Prerequisite: Grade of A in LSPA 105 or LSPA 106 with written consent of instructor; or placement by exam.

Accelerated practice in speaking, reading, writing, and aural comprehension.

LSPA 120 03(3-0-0). Reading for Proficiency-Spanish. F, S, SS. Credit for LSPA 120 not allowed if LSPA 107 or LSPA 108 has been completed.

Essentials of language for developing reading proficiency.

LSPA 200 03(3-0-0). Second-Year Spanish I. (GT-AH4, AUCC 3B). F, S. Prerequisite: LSPA 107 or LSPA 108 or placement exam. Credit not allowed for both LSPA 200 and LSPA 228A.

Grammar review and extensive practice in conversation, reading, and writing.

LSPA 201 03(3-0-0). Second-Year Spanish II. (GT-AH4, AUCC 3B). F, S. Prerequisite: LSPA 200 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing.

LSPA 208 05(5-0-0). Intensive Spanish II. S. Prerequisite: LSPA 108 or placement exam.

Accelerated practice in speaking, reading, writing, and aural comprehension.

LSPA 230 03(3-0-0). Spanish for Heritage Speakers. S. Prerequisite: Instructor's written permission.

Expands vocabulary, oral communication, writing and reading skills, as well as the contents and contexts of communication in the language.

LSPA 250 03(3-0-0). Spanish Language, Literature, Culture in Translation. (GT-AH2, AUCC 3B). F, S.

Selected works in translation from different periods and genres which represent the interrelationship of Spanish literature, and culture.

LSPA 296 Var [1-5]. Group Study-Spanish.

Group study in language/literature/culture.

LSPA 300 03(3-0-0). Reading and Writing for Communication. F, S, SS. Prerequisite: LSPA 201 or placement exam.

Development of reading and writing proficiency through an in-depth examination of contemporary writing.

LSPA 301 03(3-0-0). Spanish Oral Communication. F, S. Prerequisite: LSPA 201 or placement exam.

In-depth language study to improve proficiency in all language skills emphasizing oral.

LSPA 310 03(3-0-0). Approaches to Spanish Literature. F, S. Prerequisite: LSPA 300 or placement exam.

Appreciation and critical readings of representative works in prose, drama, and poetry.

LSPA 312 03(3-0-0). Introduction to Spanish Linguistics. F. Prerequisite: LSPA 300 or concurrent registration.

Phonetics, phonology, morphology, syntax, semantics, and pragmatics.

LSPA 313 03(3-0-0). Introduction to Spanish Translation and Interpreting. F, S. Prerequisite: LSPA 300.

Translation and interpreting of written and oral texts into and from the foreign language.

LSPA 326 03(3-0-0). Spanish Phonetics. F, S. Prerequisite: LSPA 300 or concurrent registration.

Phonetic principles and their application to Spanish sound system; intensive practice in pronunciation, intonation.

LSPA 335 03(3-0-0). Issues in Hispanic Culture. F. Prerequisite: LSPA 300.

Historical context of contemporary issues in the culture of Spanish-speaking countries.

LSPA 345 03(3-0-0). Business Spanish. F, S, SS. Prerequisite: LSPA 300.

Business and commercial aspects of the Spanish language and culture.

LSPA 346 03(3-0-0). Spanish for Health Care. F, S. Prerequisite: LSPA 300.

Specific linguistic and cultural issues necessary to function in the Hispanic health care world.

LSPA 365 03(3-0-0). Studies in Foreign Film-Spanish. F, S. Prerequisite: LSPA 310.

Representation of Spanish society through film. Taught in Spanish. (NT-O)

LSPA 379 01(0-2-0). Service Learning-Spanish. F, S, SS. Prerequisite: Concurrent registration with 300-level Spanish course with written consent of instructor.

Language-related voluntary community work.

LSPA 400 03(3-0-0). Advanced Spanish Communication Skills. F, S, SS. Prerequisite: LSPA 300.

Development of speaking, reading, and writing proficiency through an in-depth examination of representative writings and media communications.

LSPA 401 03(3-0-0). Advanced Spanish Oral Communication. S. Prerequisite: LSPA 300.

Advanced language study to improve proficiency in Spanish language skills, with an emphasis on oral communication.

LSPA 413 03(3-0-0). Advanced Spanish Translation and Interpreting. F, S. Prerequisite: LSPA 313.

Advanced practice in translation and interpreting of written and oral texts into and from Spanish.

LSPA 435 03(3-0-0). Caribbean Culture in Hispanic Literature. S. Prerequisite: LSPA 335.

Hispanic-Caribbean cultures with emphasis on African heritage and cultural identity.

LSPA 436 03(3-0-0). Advanced Latin American Culture. F, S, SS. Prerequisite: LSPA 335.

Latin American cultural identities and their history.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

LSPA 437 03(3-0-0). Advanced Spanish Culture. F, S. Prerequisite: LSPA 335.

Cultural characteristics of Spanish society through the ages.

LSPA 441 03(3-0-0). Advanced Business Spanish. F, S. Prerequisite: LSPA 345.

Advanced business and commercial aspects of the Spanish language and culture.

LSPA 442 03(3-0-0). Colonial Latin American Literature. F.

Prerequisite: LSPA 300; LSPA 310.

Literature and literary culture of colonial Latin America.

LSPA 443 03(3-0-0). Spanish Theatre. F, S. Prerequisite: LSPA 300; LSPA 310.

Major authors and works of Spanish theatre.

LSPA 445 03(3-0-0). Women Writers in the Hispanic Worlds. F. Prerequisite: LSPA 300; LSPA 310.

Selected Hispanic women writers in a variety of genres emphasizing relationships among gender, culture, and writing.

LSPA 449 03(3-0-0). Spanish-American Literary Movements and Periods. F. Prerequisite: LSPA 300; LSPA 310.

Studies in selected literary movements and periods of Spanish America such as classicism, realism, naturalism, existentialism.

LSPA 450 03(3-0-0). Selected Spanish Literary Movements and Periods. F, S. Prerequisite: LSPA 300; LSPA 310.

Studies in selected literary movements and periods of Spain, such as classicism, realism, naturalism, existentialism.

LSPA 452 03(3-0-0). Genre Studies in Spanish. F, S. Prerequisite: LSPA 300; LSPA 310. May be taken up to 3 times for credit.

Development of critical approaches to major works in literature through selected literary genres and subgenres.

LSPA 453 03(3-0-0). Author Studies in Spanish. F, S. Prerequisite: LSPA 300; LSPA 310. May be taken up to 3 times for credit.

Development of critical approaches to authors through the appreciation and analysis of selected works.

LSPA 454 03(3-0-0). Topic Studies in Spanish. F, S. Prerequisite: LSPA 300; LSPA 310. May be taken up to 3 times for credit.

Selected topic studies such as themes, topoi, and interdisciplinary subjects in literature.

LSPA 465A 03(3-0-0). Studies in Foreign Film—Spain. S, SS. Prerequisite: LSPA 310 and LSPA 335.

Representation of Spanish society or specific topics through film. Taught in Spanish.

LSPA 465B 03(3-0-0). Studies in Foreign Film—Latin America. S, SS. Prerequisite: LSPA 310 and LSPA 335.

Representation of Latin American societies or specific topics through film. Taught in Spanish.

LSPA 468 03(3-0-0). Spanish Vocabulary and Word Formation. F, S. Prerequisite: LSPA 312.

Spanish vocabulary: meaning relations, word formation through prefixation, suffixation, and composition, and meaning change over time and space.

LSPA 470 03(3-0-0). Spanish Grammatical Constructions. S. Prerequisite: LSPA 400.

Linguistic analysis of selected Spanish grammatical constructions (word order, word formation, and sentence structure), their relationship to meaning.

LSPA 479 01(0-2-0). Service Learning-Spanish. F, S, SS. Prerequisite:

Concurrent registration with 400-level Spanish course. May be taken up to 3 times for credit.

Language-related voluntary community work in conjunction with a 400-level departmental course with written consent of instructor.

LSPA 492 03(0-0-3). Seminar-Spanish Language, Literature, and Society. F, S. Prerequisite: LSPA 310; two 400-level Spanish courses; senior status.

Integrative study of language, literature, and society.

LSPA 495 Var [1-6]. Independent Study-Spanish. Prerequisite: Three years of college-level Spanish.

LSPA 500 03(3-0-0). Language Analysis/Stylistics-Spanish. F. Prerequisite: LSPA 400.

Analysis of language structure through the examination of style in literary and non-literary texts.

LSPA 508 04(3-3-0). Intensive Spanish-Graduate Review. SS. Prerequisite: Admission to Summer Institute for Foreign Language Teaching.

Immersion review of language for the teacher, developing intermediate-level proficiency in culture and the four skills.

LSPA 514 01(1-0-0). Issues in Teaching Spanish. F, S. Prerequisite: Concurrent graduate teaching assistantship.

Current theory and practice in second-language instruction; technological applications.

LSPA 525 03(3-0-0). History of the Spanish Language. S. Prerequisite: LSPA 400.

Investigation of both internal (strictly linguistic) and external (sociolinguistic) factors in development of the language.

LSPA 536 03(3-0-0). Topics in Spanish Linguistics. F, S. Prerequisite: LSPA 500.

Acquisition, discourse analysis, and language change and variation over time and space.

LSPA 549 03(3-0-0). Literary Periods of Spanish America. F. Prerequisite: Undergraduate degree in Spanish.

Advanced studies in critical approaches to selected literary movements or periods of Spanish America.

LSPA 551 03(3-0-0). Selected Spanish Literary Movements/Periods. F. Prerequisite: Undergraduate degree in Spanish.

Advanced studies in and critical approaches to selected literary movements or periods.

LSPA 552 03(3-0-0). Advanced Studies in Spanish Literary Genres. F. Prerequisite: Undergraduate degree in Spanish.

Advanced studies in and critical approaches to literary genres through study of major works in foreign literatures.

LSPA 553 03(3-0-0). Advanced Spanish Author Studies. S. Prerequisite: Undergraduate degree in Spanish.

Critical approaches to the study of selected authors through appreciation and analysis of their major works.

LSPA 554 03(3-0-0). Advanced Spanish Topic Studies. S. Prerequisite: Undergraduate degree in Spanish.

Selected topics (theme, topoi, and interdisciplinary subjects) in foreign literatures.

LSPA 692 03(0-0-3). Seminar-Spanish. F, S. Prerequisite: Undergraduate degree in Spanish.

Treatment of selected topics in seminar.

LSPA 695 Var [1-6]. Independent Study-Spanish.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC-*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

MATHEMATICS COURSES

Department of Mathematics

College of Natural Sciences

MATH 117 01(1-0-0). College Algebra in Context I. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: Mathematics Placement Examination.

Functions as mathematical models. Linear, quadratic, and polynomial functions considered symbolically, graphically, numerically, and contextually.

MATH 118 01(1-0-0). College Algebra in Context II. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 117.

Reciprocals of linear functions, rational functions, and power functions considered symbolically, graphically, numerically, and contextually.

MATH 122/CS 122 01(0-0-1). Theory for Introductory Programming. F, S, SS. Prerequisite: MATH 118; concurrent registration in CS 161. Credit not allowed for both MATH 122 and CS 122. Credit not allowed for students who have completed CS 160.

Set theory, definitions operations, Venn diagrams, power sets, propositional logic and proofs. Functions; loop invariants. (NT-O)

MATH 124 01(1-0-0). Logarithmic and Exponential Functions. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 118 or placement.

Definition and graphs of exponential and logarithmic functions, properties of logarithmic functions, exponential and logarithmic equations, applications.

MATH 125 01(1-0-0). Numerical Trigonometry. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 118 or placement.

Definition and graphs of trigonometric functions, laws of sines and cosines, solutions of right and oblique triangles, applications.

MATH 126 01(1-0-0). Analytic Trigonometry. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 125 or placement.

Inverse trigonometric functions, trigonometric identities, solving trigonometric equations.

MATH 130 03(2-2-0). Math in the Social Sciences. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: Mathematics Placement Examination.

Voting theory, power indices, fair division, apportionment, circuits and trees, list processing, descriptive statistics, probability.

MATH 133 03(2-2-0). Financial Mathematics. (GT-MA1, AUCC 1B). F. Prerequisite: Mathematics Placement Examination. Calculator required.

Pricing, taxes, insurance, interest, annuities, amortization, investments using financial calculators and spreadsheets.

MATH 135 03(2-0-1). Patterns of Phenomena. (GT-MA1, AUCC 1B). S. Prerequisite: Mathematics Placement Examination.

Applications of mathematical ideas and mode of thought in the arts and humanities, focusing on classification, recognition.

MATH 141 03(3-0-0). Calculus in Management Sciences. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 118. Credit allowed for only one of the following courses: MATH 141, MATH 155, or MATH 160.

Analytic geometry, limits, equilibrium of supply and demand, differentiation, integration, applications of the derivative, integral.

MATH 151 01(0-2-0). Mathematical Algorithms in Matlab I. S. Prerequisite: MATH 141 or MATH 155 or MATH 160.

Statements, expressions and variable assignments, scripts, control statements and logical statements. Newton's method, Simpson's rule, recursion.

MATH 152 01(0-2-0). Mathematical Algorithms in Maple. S. Prerequisite: MATH 141 or MATH 155 or MATH 160.

Iteration and recursion, control and logical statements, expressions, functions, data types, binary numbers, symbolic manipulation of terms.

MATH 155 04(4-0-0). Calculus for Biological Scientists I. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 124; MATH 125. Credit allowed for only one of the following courses: MATH 141, MATH 155, or MATH 160.

Limits, continuity, differentiation, and integration of elementary functions with applications in the biosciences. Programmable graphing calculator required.

MATH 158/CS 158 01(0-2-0). Mathematical Algorithms in C. S. Prerequisite: CS 156; MATH 151; MATH 160. Credit not allowed for both MATH 158 and CS 158.

Compilers, expressions, variable types, control statements, pointers, logical statements, plotting, secant method, trapezoidal rule, recursion.

MATH 160 04(3-2-0). Calculus for Physical Scientists I. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 124; MATH 126. Credit allowed for only one of the following: MATH 141; MATH 155; MATH 160.

Limits, continuity, differentiation, and integration of elementary functions with applications; conic sections.

MATH 161 04(3-2-0). Calculus for Physical Scientists II. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 124; MATH 160.

Transcendental functions, integration techniques, polar coordinates, sequences and series, with mathematical software.

MATH 192 01(0-0-1). First-Year Seminar in Mathematical Sciences. F.

Introduction to the richness and variety of problems addressed by mathematical language and techniques; resources and available careers.

MATH 229 02(2-0-0). Matrices and Linear Equations. F, S, SS. Prerequisite: MATH 141 or MATH 155 or MATH 160.

Linear systems, matrix arithmetic, homogeneous coordinates, complex numbers, eigenvalues, eigenvectors, applications to discrete dynamical systems.

MATH 230 03(2-2-0). Discrete Mathematics for Educators. F. Prerequisite: EDUC 275 or concurrent registration; MATH 161. Credit allowed for only one of the following: MATH 230, MATH 301, MATH 330.

Voting theory, fair division, graph theory, linear programming, probability, teaching in small groups, proof techniques, mathematical technology.

MATH 255 04(4-0-0). Calculus for Biological Scientists II. (GT-MA1, AUCC 1B). F, S. Prerequisite: Concurrent registration in MATH 126; MATH 155. Credit not allowed for both MATH 255 and MATH 261.

Derivatives and integrals of functions of several variables, differential and difference equations, matrices, applications in the biosciences. Programmable graphing calculator required.

MATH 261 04(4-0-0). Calculus for Physical Scientists III. F, S, SS. Prerequisite: MATH 161. Credit not allowed for both MATH 261 and MATH 255.

Vector functions, partial differentiation, cylindrical and spherical coordinates, multiple integrals, line integrals, Green's theorem.

MATH 301 03(3-0-0). Introduction to Combinatorial Theory. F. Prerequisite: MATH 160. Credit not allowed for both MATH 301 and MATH 330.

Matrices, orthogonal Latin squares, designs, difference sets, sets, binomial coefficients, inclusion and exclusion, recurrence, Ramsey's theorem, SDRs.

MATH 317 04(4-0-0). Advanced Calculus of One Variable. F, S, SS. Prerequisite: MATH 161.

Convergence of sequences, series: limits, continuity, differentiation, integration of one-variable functions; development of skills for proving theorems.

MATH 331 03(3-0-0). Introduction to Mathematical Modeling. F. Prerequisite: MATH 161 or concurrent registration; MATH 229 or

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concurrent registration or MATH 369 or concurrent registration.

Problem formulation. Modeling, theoretical and empirical. Variable selection. Derivation and simulation of solutions. Model testing including predication.

MATH 332 03(3-0-0). Partial Differential Equations. S. Prerequisite: MATH 340 or MATH 345. Credit not allowed for both MATH 332 and MATH 530.

Partial differential equations, separation of variables, Fourier series and transforms, Laplace, heat, and wave equations.

MATH 340 04(3-2-0). Introduction to Ordinary Differential Equations. F, S, SS. Prerequisite: MATH 255 or MATH 261. Credit not allowed for both MATH 340 and MATH 345.

First and second order equations, series, Laplace transforms, linear algebra, eigenvalues, first order systems of equations, numerical techniques.

MATH 345 04(3-2-0). Differential Equations. F, S. Prerequisite: MATH 161 or MATH 255; MATH 229 or MATH 369. Credit not allowed for both MATH 345 and MATH 340.

First and second order equations, Laplace transforms, first order systems of equations, numerical methods, applied linear algebra, linearization.

MATH 348/BZ 348 04(3-3-0). Theory of Population and Evolutionary Ecology. F. Prerequisite: MATH 155 or MATH 160. Credit allowed for only one of the following: MATH 348, BZ 348, BZ 548. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Principles and methods for building, analyzing, and interpreting mathematical models of ecological and evolutionary problems in biology.

MATH 360 03(3-0-0). Mathematics of Information Security. F. Prerequisite: MATH 229 or MATH 369.

Codes, ciphers, Chinese remainder theorem, primality testing, public key ciphers, RSA, finite fields, discrete algorithms, advanced encryption standard.

MATH 366 03(3-0-0). Introduction to Abstract Algebra. F, S, SS. Prerequisite: MATH 161.

Sets, integers, polynomials, real and complex numbers, groups, integral domains, and fields; development of skills for proving theorems.

MATH 369 03(3-0-0). Linear Algebra. F, S, SS. Prerequisite: MATH 161.

Linear systems, matrices, subspaces of Euclidean spaces, linear transformations on Euclidean spaces, eigenvalues, eigenvectors.

MATH 384 01(1-0-0). Supervised College Teaching. F, S. Prerequisite: Written consent of instructor. May not be used to satisfy Mathematics degree requirements. Maximum of 1 credit allowed in course.

Skills for effective tutoring of precalculus mathematics; design and implementation of the Individualized Mathematics Program.

***MATH 405 03(3-0-0). Introduction to Number Theory.** S. Prerequisite: MATH 360 or MATH 366.

Diophantine equations; distribution of primes; multiplicative functions; finite fields; quadratic reciprocity; quadratic number fields.

MATH 417 03(3-0-0). Advanced Calculus I. F. Prerequisite: MATH 369.

Topology of Euclidean spaces, limits, derivatives and integrals on Euclidean spaces. Implicit functions and the implicit function theorem.

MATH 418 03(3-0-0). Advanced Calculus II. S. Prerequisite: MATH 417.

Line and surface integrals, series, sequences and series of functions.

MATH 419 03(3-0-0). Introduction to Complex Variables. F. Prerequisite: MATH 261.

Analyticity, Cauchy integral theorem and formula, Taylor and Laurent series, residue calculus, conformal mapping and harmonic functions.

MATH 425 03(3-0-0). History of Mathematics. F. Prerequisite: ED 331; two of the following courses: MATH 317, MATH 366, MATH 369.

Historical development of geometry, arithmetic, algebra, and calculus from ancient times to 20th century.

MATH 430/ECE 430 03(3-0-0). Fourier and Wavelet Analysis with Apps. S. Prerequisite: MATH 345. Credit not allowed for both MATH 430 and ECE 430.

Fourier analysis and transforms, FFTs; sampling theorems, computational algorithms; wavelets; applications to communication, imaging, and compression.

MATH 435 03(1-4-0). Projects in Applied Mathematics. S. Prerequisite: CS 156 or CS 160 or CS 253 or MATH 151; MATH 229 or MATH 369; MATH 340 or MATH 345.

Open-ended projects with emphasis on problem identification and formulation, team approach, and reporting results.

MATH 450 03(3-0-0). Introduction to Numerical Analysis I. F. Prerequisite: CS 156 or CS 160 or CS 253 or MATH 151; MATH 255 or MATH 261.

Solutions of systems of linear and nonlinear equations, interpolation, approximation.

MATH 451 03(3-0-0). Introduction to Numerical Analysis II. S. Prerequisite: CS 156 or CS 160 or CS 253 or MATH 151; MATH 340 or MATH 345.

Numerical computation of eigenvalues, numerical solution of ordinary and partial differential equations.

°MATH 455 03(3-0-0). Mathematics in Biology and Medicine. F. Prerequisite: MATH 255 or MATH 348/BZ 348 or MATH 340 or MATH 345.

Models in population biology, cell division, host-parasitoid systems, bacterial growth and predator-prey systems.

MATH 460 03(3-0-0). Information and Coding Theory. S. Prerequisite: MATH 360; MATH 369; STAT 321.

Entropy, mutual information, channel capacity, channel coding theorem, syndrome decoding, BCH codes, recent developments.

MATH 466 03(3-0-0). Abstract Algebra I. F. Prerequisite: MATH 360 or MATH 366 or MATH 369.

Comprehensive introduction to groups, rings, and fields

MATH 467 03(3-0-0). Abstract Algebra II. S. Prerequisite: MATH 369 or concurrent registration; MATH 466.

Advanced topics in abstract algebra: Euclidean domains, abstract vector spaces, extension fields, Galois theory.

MATH 469 03(3-0-0). Linear Algebra II. S. Prerequisite: MATH 369.

Abstract vector spaces, general theory of linear transformations, theory of determinants, canonical forms.

MATH 470 03(3-0-0). Euclidian and Non-Euclidian Geometry. S. Prerequisite: MATH 229 or MATH 369; MATH 261.

Topics from real Euclidean, affine metric and non-Euclidean geometries emphasizing methods and connections with other areas of mathematics.

***MATH 472 03(3-0-0). Introduction to Topology.** F. Prerequisite: MATH 317.

Topologies on sets, continuous functions, homeomorphisms. Sequences and convergence, metric spaces, Connectedness, path-connectedness. Separation properties. Compactness, Countability axioms.

°MATH 474 03(3-0-0). Introduction to Differential Geometry. S. Prerequisite: MATH 261; MATH 369.

Local and global geometry of curves and surfaces in Euclidean space, curvature, covariant differentiation, geodesics and the Gauss-Bonnet

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theorem.

MATH 476 03(3-0-0). Topics in Mathematics. F, S, SS. Prerequisite: Written consent of instructor.

Study experiences which deal with established content areas in mathematics.

MATH 484 Var [1-3]. Supervised College Teaching. F, S. Prerequisite: Written consent of instructor. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

MATH 487 Var [1-16]. Internship. Prerequisite: Written consent of instructor.

A work-learn experience integrating classroom theory with practical experience.

MATH 495 Var. Independent Study. Prerequisite: Written consent of instructor.

MATH 498 Var [1-3]. Undergraduate Research in Mathematics. Prerequisite: Written consent of instructor.

Research skills and techniques taught to suit student's level and interests. Includes both oral and written communication of results.

MATH 501 03(3-0-0). Combinatorics I. F. Prerequisite: MATH 301; MATH 360 or MATH 366.

Puzzles, numbers and counting, subsets, recurrence relations, generating functions, inversion, counting with symmetry, networks, matchings.

MATH 502 03(3-0-0). Combinatorics II. S. Prerequisite: MATH 501.

Graph algorithms, external set theory; partitions, Hadamard matrices, q-binomials, finite geometries, strongly regular graphs, triple systems, designs.

MATH 505 03. Teaching Problem Solving in Mathematics K-12. F, S. Prerequisite: Teacher licensure. Offered as telecourse only.

Problem-solving strategies, cooperative learning, and manipulatives for K-12 classroom. (NT-T)

MATH 510 03(3-0-0). Linear Programming and Network Flows. F, S, SS. Prerequisite: MATH 261 or MATH 315. Credit not allowed for both MATH 510 and ENGR 510.

Optimization methods; linear programming, simplex algorithm, duality, sensitivity analysis, minimal cost network flows, transportation problem. (NT-V)

MATH 517 03(3-0-0). Introduction to Real Analysis. F. Prerequisite: MATH 417; MATH 369.

Euclidean and metric spaces, compactness, continuity, sequences, series, multivariable differentiation, inverse and implicit function theorems.

MATH 519 03(3-0-0). Complex Variables I. S. Prerequisite: MATH 317.

Analytic functions, complex integration theory, singularities, elementary functions, and mappings.

MATH 520 03(3-0-0). Nonlinear Programming. S. Prerequisite: MATH 510.

Theoretical, computational, practical aspects of nonlinear programming (NLP); unconstrained, constrained NLP; quadratic programming; large-scale NLP.

***MATH 525 03(3-0-0). Optimal Control.** S. Prerequisite: MATH 340 or MATH 345.

Theory and application of optimal control and optimal estimation theory; continuous and discrete time systems; Pontryagin maximum principle.

MATH 530 04(4-0-0). Mathematics for Scientists and Engineers. F. Prerequisite: MATH 340 or MATH 345. Not for mathematics graduate students. Credit not allowed for both MATH 530 and MATH 332.

Proof-oriented linear algebra, ordinary and partial differential equations.

MATH 532 03(3-0-0). Mathematical Modeling of Large Data Sets. S.

Prerequisite: MATH 369 or MATH 530.

Mathematical theory and algorithms for modeling large data sets. Application to real world problems. Emphasis on geometric ideas.

MATH 535 03(3-0-0). Foundations of Applied Mathematics. F. Prerequisite: MATH 340 or MATH 345.

Calculus of variations, perturbation methods, models of continuum, dimensional analysis, stochastic models, integral equations, diffusion.

MATH 540 03(3-0-0). Dynamical Systems. F. Prerequisite: MATH 340 or MATH 345 or MATH 530.

Linear and nonlinear systems, orbits, phase space, flows of vector fields, stability, bifurcation theory, chaos, strange attractors and applications.

MATH 545 03(3-0-0). Partial Differential Equations I. F. Prerequisite: MATH 340 or MATH 345 or MATH 530.

Second order linear PDEs, elliptic and parabolic equations, equations of math physics, separation of variables, Fourier series.

MATH 546 03(3-0-0). Partial Differential Equations II. S. Prerequisite: MATH 545.

Distribution theory, Green's functions, Sobolev spaces, elliptic and parabolic equations.

MATH 550 03(3-0-0). Intro to Numerical Methods for PDEs. S. Prerequisite: MATH 340 or MATH 345 or MATH 530.

Finite elements, finite differences, spectral methods, method of lines, conservation laws; stability and convergence analysis for PDEs.

MATH 560 03(3-0-0). Linear Algebra. F. Prerequisite: MATH 369.

Finite dimensional vector spaces, inner products, dual spaces, transformations, projections, adjoints, norms, eigenvalues, eigenvectors.

MATH 561 04(4-0-0). Numerical Analysis I. S. Prerequisite: CS 156 or CS 160 or CS 253 or MATH 151; MATH 560.

Numerical linear algebra, solving nonlinear systems, least squares, and minimization.

MATH 566 03(3-0-0). Introduction to Abstract Algebra I. F. Prerequisite: MATH 366.

Analysis of algebraic structures including groups, rings, fields, and vector spaces.

MATH 567 03(3-0-0). Introduction to Abstract Algebra II. S. Prerequisite: MATH 566.

Field theory, Galois theory, and advanced linear algebra.

***MATH 570 03(3-0-0). Topology I.** F. Prerequisite: MATH 417 or MATH 472.

Point-set topology including basic set theory, continuity, product and quotient spaces, metrization, compactness, and connectedness.

***MATH 571 03(3-0-0). Topology II.** S. Prerequisite: MATH 566; MATH 570.

Fundamental group, free groups and presentations, and manifolds.

MATH 584 01(1-0-0). Supervised College Teaching. F, S. Prerequisite: Written consent of instructor.

MATH 592 01(0-0-1). Seminar in Mathematics. Prerequisite: Written consent of instructor.

MATH 601 03(3-0-0). Advanced Combinatorics I. F. Prerequisite: MATH 502; MATH 566.

Special numbers, mobius inversions, transversals, partial orders, different sets, codes, t-designs.

MATH 602 03(3-0-0). Advanced Combinatorics II. S. Prerequisite: MATH 601.

Hypergeometric functions, graph algorithms, hadamard matrices,

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strongly regular graphs, association schemes.

MATH 605A-C 03(3-0-0). Number Theory. S. Prerequisite: MATH 519 or concurrent registration; MATH 566; MATH 567.

A) Algebraic Number Theory. B) Arithmetic Geometry. C) Elliptic Curves.

MATH 617 04(4-0-0). Integration and Measure Theory. S. Prerequisite: MATH 517.

Riemann-Cauchy integration theory, sigma-algebras, Lebesgue theory of measure and integration, Fubini's Theorem, radon-Nikodym Theorem, L^p spaces.

MATH 618 03(3-0-0). Advanced Real Analysis. F. Prerequisite: MATH 560; MATH 617.

Normed linear spaces, Banach and Hilbert spaces, elements of functional analysis.

MATH 619 03(3-0-0). Complex Variables II. S. Prerequisite: MATH 519.

Infinite products, entire functions, analytic continuation, Riemann surfaces, other topics.

MATH 620 03(3-0-0). Variational Methods and Optimization I. F. Prerequisite: MATH 517; MATH 560.

Unconstrained and constrained infinite dimensional optimization, calculus of variations, applications.

MATH 621 03(3-0-0). Variational Methods and Optimization II. S. Prerequisite: MATH 620.

Unconstrained and constrained infinite dimensional optimization, variational inequalities, Lagrange multipliers, control, applications.

MATH 633 03(2-2-0). Industrial and Applied Mathematics. S. Prerequisite: MATH 530 or MATH 560 or MATH 561; preparedness to do programming in a standard language.

Team solution of problems arising in industrial and applied mathematics. Problem formulation, solution proposal, implementation and analysis.

MATH 640 03(3-0-0). Ordinary Differential Equations I. F. Prerequisite: MATH 340 or MATH 345 or MATH 530; MATH 369; MATH 517.

Existence and uniqueness, continuation, continuous dependence, linear systems, and stability.

MATH 641 03(3-0-0). Ordinary Differential Equations II. S. Prerequisite: MATH 640.

Topics selected from nonlinear boundary value problems, periodic phenomena, differential operators, and others.

MATH 645 03(3-0-0). Advanced Partial Differential Equations I. F. Prerequisite: MATH 546.

Abstract methods for linear partial differential equations.

MATH 646 03(3-0-0). Advanced Partial Differential Equations II. S. Prerequisite: MATH 645.

Problems in nonlinear partial differential equations.

MATH 651 04(4-0-0). Numerical Analysis II. F. Prerequisite: CS 156 or CS 160 or CS 253 or MATH 151; MATH 340 or MATH 345 or MATH 369 or MATH 530.

Interpolation, approximation, quadrature, initial and boundary value problems.

MATH 652 03(3-0-0). Advanced Numerical Methods for PDEs. F. Prerequisite: MATH 617 or MATH 456 or MATH 560.

Theory of numerical methods for solution of PDEs: convergence and stability properties; error estimation; approximation theory.

MATH 666 03(3-0-0). Advanced Algebra I. F. Prerequisite: MATH 567.

Theory of rings and algebras with applications.

MATH 667 03(3-0-0). Advanced Algebra II. S. Prerequisite: MATH 666. Advanced topics from algebra: representation theory, Wedderburn theory, bilinear forms, multilinear and homological algebra.

MATH 670 03(3-0-0). Introduction to Differential Manifolds. S. Prerequisite: MATH 517 or MATH 570.

Finite-dimensional differential manifolds, submanifolds, vector fields and flows, Lie groups and algebras.

MATH 672 03(3-0-0). Projective Geometry I. F. Prerequisite: MATH 567.

Algebraic sets in projective space, the Nullstellensatz, rational maps and functions, coordinate rings, Hilbert functions, dimension, degree.

MATH 673 03(3-0-0). Projective Geometry II. S. Prerequisite: MATH 672.

Topics selected from curves and surfaces, sheaf theory, algebraic geometry, singularity theory, vector bundles.

MATH 676 03(3-0-0). Topics in Mathematics. F, S, SS. May be taken up to 5 times for credit.

Advanced study experiences which deal with established content areas in mathematics.

MATH 687 Var [1-9]. Internship.

A work-learn experience integrating classroom theory with practical experience.

MATH 693 03(0-0-3). Seminar in Mathematics.

MATH 695 Var. Independent Study.

MATH 699 Var. Thesis.

MATH 717 03(3-0-0). Functional Analysis I. F. Prerequisite: MATH 618.

Topological vector spaces; Banach and Hilbert spaces.

MATH 718 03(3-0-0). Functional Analysis II. S. Prerequisite: MATH 717.

Spectral theory, operator theory, semigroups of transformations, and distribution theory.

MATH 750 03(3-0-0). Numerical Methods and Models I. F. Prerequisite: MATH 561.

Derivation of model equations, introduction to solution techniques and computing.

MATH 751 03(3-0-0). Numerical Methods and Models II. S. Prerequisite: MATH 561.

Convergence, stability, error estimates and computing.

MATH 793 Var. Seminar in Mathematics.

MATH 798 Var. Research.

MATH 799 Var. Dissertation.

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MECHANICAL ENGINEERING COURSES

Department of Mechanical Engineering

College of Engineering

MECH 100 01(1-0-0). Introduction to Mechanical Engineering. F. Prerequisite: Mechanical engineering freshmen majors only.

The profession of mechanical engineering; history, educational process, ethics, licensing, problem solving, technology.

MECH 102 03(3-0-0). Mechanical Engineering Problem Solving. F, S. Prerequisite: MATH 160; PH 141 or concurrent registration.

Programming and engineering problem solving techniques, algorithms and processes from physics and calculus first principles.

MECH 200 03(2-2-0). Introduction to Manufacturing Processes. F. Prerequisite: Mechanical engineering and engineering science majors only.

Engineering drawings, materials, manufacturing, and safety. Hand tools, cutting, drilling, the lathe, mill and numerical control. (\$)

MECH 201 02(1-2-0). Engineering Design I. F. Prerequisite: MECH 102 with a C or better.

Engineering design process and the roles of visual communication with emphasis on 3D physical solid modelers and Pro/ENGINEER.

MECH 202 03(2-2-0). Engineering Design II. S. Prerequisite: MECH 200 with a C or better or concurrent registration; MECH 201 with a C or better.

Engineering design process with emphasis on teamwork, ideation, decision-making, project planning applied to a group design project. (\$)

MECH 237 03(3-0-0). Introduction to Thermal Sciences. F, S. Prerequisite: MATH 160; PH 141.

First and second laws of thermodynamics, properties of materials, energy conversion, statistical aspects, heat transfer.

MECH 302 03(3-0-0). Engineering Design III. S. Prerequisite: CIVE 360 with a C or better; MECH 202 with a C or better; MECH 324 with a C or better; MECH 337 with a C or better; MECH 342 with a C or better.

Design fundamentals, including design processes, project planning, creativity, manufacturing, and human factors.

MECH 303 03(3-0-0). Energy Engineering. F. Prerequisite: CBE 310 or ECE 341 or MECH 237 or MECH 339 or PH 361.

Energy generation (coal, oil, natural gas, solar, wind, geothermal, hydropower, tidal, biofuel, nuclear), conversion, distribution, storage, efficiency.

MECH 307 04(3-3-0). Mechatronics and Measurement Systems. F, S. Prerequisite: CIVE 261 with a C or better; ECE 204 with a C or better; MATH 340 with a C or better.

Instrumentation and measurement system analysis and design; sensors and actuators; computer data acquisition and control. (\$)

MECH 324 04(3-2-0). Dynamics of Machines. F. Prerequisite: CIVE 261; MATH 340 with a C or better or concurrent registration.

Analysis and synthesis of moving machinery. (\$)

MECH 325 03(3-0-0). Machine Design. S. Prerequisite: CIVE 360 with a C or better.

Design of mechanical components to avoid failure during operation. Stress analysis, failure theories, and specific mechanical components in design context.

MECH 331 04(3-2-0). Introduction to Engineering Materials. F, S. Prerequisite: CHEM 111 with a C or better; CHEM 112 with a C or better; PH 142 with a C or better.

Characteristics of metallic, plastic, and ceramic material; basic principles which relate properties of materials to their atomic and microstructure. (\$)

MECH 337 04(3-0-1). Thermodynamics. F, S. Prerequisite: MATH 261

with a C or better; PH 141 with a C or better.

First and second laws, property relationships, characteristic functions, thermodynamics solver, various thermodynamics applications.

MECH 338 01(0-3-0). Thermosciences Laboratory. F, S. Prerequisite: Prerequisite: MECH 337 with a C or better; MECH 342 with a C or better.

Experimental methods in heat transfer, fluid flow, and thermodynamics.

MECH 342 03(3-0-0). Mechanics and Thermodynamics of Flow Processes. F. Prerequisite: MATH 340 with a C or better; MECH 337 with a C or better or concurrent registration; PH 141 with a C or better.

Engineering details of viscous flow with losses, measurements, compressibility, turbomachinery, convective heat transfer.

MECH 344 03(3-0-0). Heat and Mass Transfer. S. Prerequisite: MECH 342 with a C or better.

Transport and rate processes, conduction, convection, and radiation.

MECH 407 03(3-0-0). Laser Applications in Mechanical Engineering. F. Prerequisite: PH 142.

Review of electromagnetic waves; applications of lasers and optics in engineering, e.g. position sensing, flowfield measurement, cutting and welding.

MECH 408 03(2-0-1). Applied Engineering Economy. F. Prerequisite: MATH 161. Credit not allowed for both MECH 408 and MECH 410.

The basic principles and calculations of engineering economy with application to real problems, including energy and the environment.

MECH 410 01(0-0-1). Engineering Economy Principles/Calculations. F, S, SS. Prerequisite: MATH 161. Offered as an online course only.

Basic principles and calculation of engineering economy. (NT-O)

MECH 411 03(3-0-0). Manufacturing Engineering. S. Prerequisite: CIVE 360; MECH 331.

Casting, forming, machining, and welding processes used in manufacturing operations. (NT-V)

MECH 417 03(2-2-0). Control Systems. F. Prerequisite: MATH 340; MECH 307.

Feedback and forward loop control design and simulation; discrete time and frequency domain methods with implementation considerations.

MECH 424 03(3-0-0). Advanced Dynamics. S. Prerequisite: MECH 324.

Kinematics and dynamics of rigid bodies. Hamilton's principle and Lagrange's equations for lumped parameter extended bodies and distributed systems.

MECH 431 03(3-0-0). Metals and Alloys. F. Prerequisite: MECH 331.

Engineering metals and alloys, modification of properties by alloying, plastic deformation, and heat treatment. Fundamentals of physical metallurgy. (NT-V)

***MECH 432 03(3-0-0). Engineering of Nanomaterials.** F. Prerequisite: MECH 331.

Structure, properties and processing of extremely small (10^{-9} m) synthetic and natural materials.

MECH 437 03(2-0-1). Internal Combustion Engines. F. Prerequisite: MECH 344.

Application of thermodynamics, heat transfer, and fluid mechanics to internal combustion engines.

MECH 460 03(3-0-0). Aeronautics. S. Prerequisite: MECH 342.

Thermodynamics and fluid mechanics principles applied to the mechanics, aerodynamics, performance, stability, and control of airplanes.

MECH 463 03(3-0-0). Building Energy Systems. S. Prerequisite: MECH 344.

Comfort, psychrometrics, loads, solar radiation, heating and cooling

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system design, transport, solar system design, economics.

MECH 468 03(3-0-0). Space Propulsion and Power Engineering. F. Prerequisites: ECE 204; MECH 337; MECH 342.

Orbital mechanics and space missions; chemical, nuclear, and electric rockets; nuclear heat sources; thermoelectric and photovoltaic devices.

MECH 470/ BIOM 470 03(3-0-0). Biomedical Engineering. F. Prerequisite: MATH 155 or MATH 160; PH 141. Credit not allowed for both MECH 470 and BIOM 470.

Engineering application in human/animal physiology, diagnosis of disease, treatment, rehabilitation, human genome manipulation.

MECH 486A-B 04(1-12-0). Engineering Design Practicum.

Capstone engineering design project; transition experience to the mechanical engineering profession in industry and graduate education. **A) Practicum I.** F. Prerequisite: MECH 302 with a C or better; MECH 307 with a C or better; MECH 325 with a C or better; MECH 331 with a C or better; MECH 344 with a C or better. (\$) **B) Practicum II.** S. Prerequisite: CIVE 363 with a C or better; MECH 338 with a C or better; MECH 486A with a C or better. (\$)

MECH 495 Var. Independent Study.

MECH 498 Var[1-3]. Undergraduate Research. Var[1-3]. Prerequisite: Participation in the University Honors or instructor's permission. ***MECH 507 03(3-0-0). Laser Diagnostics for Thermosciences.** F. Prerequisite: PH 142.

Basics of optics, spectroscopy, and lasers. Physics and applications of laser diagnostic techniques used in thermosciences.

MECH 509 03(3-0-0). Design and Analysis in Engineering Research. S. Prerequisite: MATH 340; STAT 315.

Design, model building, analysis and reporting in engineering and manufacturing research and experimentation. (NT-O/V)

***MECH 510 02(1-0-1). Advanced Engineering Economy.** SS. Prerequisite: MECH 410; STAT 315.

Evaluation of independent and interrelated proposals with compound interest, discrete and continuous cash flows, complete and incomplete information. (NT-O/V)

MECH 512 03(3-0-0). Reliability Engineering. F. Prerequisite: MECH 513; STAT 315.

Models to predict time to failure of mechanical or electronic devices, reliability data analysis and case studies. (NT-O/V)

MECH 513 03(3-0-0) Simulation Modeling and Experimentation. F. Prerequisite: STAT 315.

Logic/analytic modeling in simulations. Event and transient entity-based simulation languages. Simulation design, experimentation and analysis. (NT-O)

°MECH 514 03(2-2-0). Manufacturing and Robotic Systems. S. Prerequisite: MECH 417.

Examination of electromechanical systems of manufacturing applications and robotics.

MECH 520 03(3-0-0). Finite Element Analysis in Mechanical Engr. S. Prerequisite: CIVE 360; MATH 340.

Application of FEA as a tool to analyze mechanical engineering problems.

MECH 523 03(3-0-0). Vehicle Energy Storage System Design. S. Prerequisite: MECH 331.

Develop vehicle system designs utilizing electrochemical energy storage systems such as batteries and capacitors.

MECH 524 03(3-0-0). Principles of Dynamics. F. Prerequisite: MECH 324.

Kinematics and dynamics of rigid body motion; Lagrangian and

Hamiltonian formulations of mechanics; applications to engineering problems. (NT-V)

***MECH 525/*BIOM 525 03(0-0). Cell and Tissue Engineering.** S. Prerequisite: BC 351 or BMS 300 or BMS 500/NB 501 or BZ 310. Credit allowed for only one of the following: BIOM 525, CBE 525, and MECH 525.

Cell and tissue engineering concepts and techniques with emphasis on cellular response, cell adhesion kinetics, and tissue engineering design.

MECH 526 03(3-0-0). Fundamentals of Vehicle Dynamics. S. Prerequisite: MECH 324.

Kinetics of vehicle suspensions, steady-state and transient stability and control, tires, wheel and suspension geometry and loads, dampers, steering.

MECH 527 03(3-0-0). Hybrid Electric Vehicle Powertrains. F. Prerequisite: MECH 307.

Hybrid powertrains and modeling including vehicle dynamics, internal combustion engine, electric motor, energy storage, and control.

°MECH 529 03(3-0-0). Advanced Mechanical Systems. S. Prerequisite: MECH 307.

Modeling, analysis, and synthesis of practical mechanical devices in which dynamic response is dominant consideration.

MECH 530 03(3-0-0). Advanced Composite Materials. F. Prerequisite: CIVE 360; MECH 331.

Materials aspects of advanced composite constituents and how their combination yields synergistic results. (NT-V)

MECH 531/BIOM 531 03(3-0-0). Materials Engineering. S. Prerequisite: MECH 331 or MECH 431. Credit not allowed for both MECH 531 and BIOM 531.

Selection of structural engineering materials by properties, processing, and economics; materials for biomedical and biotechnology applications. (NT-O)

MECH 532/BIOM 532 03(3-0-0). Materials Issues in Mechanical Design. F. Prerequisite: MECH 331. Credit not allowed for both MECH 532 and BIOM 532.

Failure mechanisms from materials viewpoint with emphasis on use in design. Fracture, creep, fatigue, and corrosion. (NT-V/O)

+MECH 536 03(3-0-0). Materials Applications in Renewable Energy. F. Prerequisite: MECH 331.

Materials science applied to renewable energy, transmission and storage; study of solar cells, fuel cells, Li-ion batteries and related technologies. Required field trips.

MECH 538 03(3-0-0). Mechanical Engineering Thermodynamics. F. Prerequisite: MECH 337.

First and second laws of thermodynamics applied to engineering devices and systems. Introduction to availability, energy, and lost work analysis.

MECH 539 03(3-0-0). Advanced Fluid Mechanics. F. Prerequisite: MECH 342 or CIVE 300.

Properties, kinematics; vorticity; exact solutions; instability; boundary layers; turbulence; wakes; compressible flow; supersonic flow; shockwaves.

°MECH 551 03(3-0-0). Physical Gas Dynamics I. F. Prerequisite: MECH 342.

Characteristics of real gases in reacting and nonequilibrium systems; equilibrium air; statistical mechanics; chemical thermodynamics.

°MECH 552 03(3-0-0). Applied Computational Fluid Dynamics. F. Prerequisites: CBE 331 or CIVE 300 or MECH 342.

Introductory theory of CFD, formulation of engineering problems for CFD analyses, mesh generation, solver settings, and postprocessing.

MECH 555 03(3-0-0). Ceramic Materials Engineering. S. Prerequisite: MECH 331.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Ceramic materials engineering and its application to materials technologies.

MECH 557 03(3-0-0). Turbomachinery. S. Prerequisite: MECH 337; MECH 342.

Application of fundamental principles of thermodynamics and fluid mechanics to turbomachinery.

***MECH 558 03(3-0-0). Combustion.** F. Prerequisite: MECH 342.

Combustion processes: explosions, detonations, flame propagation, ignition, generation of pollutants in moving and stationary energy conversion systems.

***MECH 561 04(4-0-0). Space Propulsion and Mission Analysis.** S. Prerequisite: MATH 340.

Analysis of space flight missions and propulsion systems.

***MECH 564 03(3-0-0). Fundamentals of Robot Mechanics and Controls.** S. Prerequisite: MECH 417.

Kinematics of robots, controls for robots.

°MECH 567 03(3-0-0). Broad-Beam Ion Sources. S. Prerequisite: MATH 340.

Physical processes in broad-beam electron-bombardment ion sources for space propulsion and ion machining applications.

***MECH 569*/ECE 569 03(3-0-0). Micro-Electro-Mechanical Devices.** S. Prerequisite: ECE 331 with a C- or better or MECH 344. Credit not allowed for both MECH 569 and ECE 569.

Micro-electro-mechanical processes and applications in sensors, optics, and structures. (NT-O)

MECH 570/BIOM 570 03(3-0-0). Bioengineering. S. Prerequisite: MECH 307; MECH 324. Credit not allowed for both MECH 570 and BIOM 570.

Physiological and medical systems analysis using engineering methods including mechanics, fluid dynamics, control, electronics, and signal processing. (NT-O)

MECH 573/BIOM 573 03(3-0-0). Structure and Function of Biomaterials. S. Prerequisite: MECH 331. Credit not allowed for both MECH 573 and BIOM 573.

Structure-function relationships of natural biomaterials; application to analysis of biomimetic materials and biomaterials used in medical devices. (NT-V/O)

MECH 575 03(3-0-0). Solar and Alternative Energies. F. Prerequisite: MECH 337; MECH 342; MECH 344.

Solar radiation, flat-plate collectors, energy storage, space heating and cooling, power generation, applications, simulation.

°MECH 609 03(1-0-2). Experimental Optimization. S, SS. Prerequisite: STAT 315.

Application of design of experiments, response surface and optimization methods to experimental investigations. (NT-O)

MECH 626 03(3-0-0). Race Car Vehicle Dynamics. F. Prerequisites: CIVE 562; MECH 524; MECH 526.

Quasi-static, steady-state and transient analyses of racing suspensions including modal analysis in roll, pitch, heave, yaw and warp.

***MECH 628 03(3-0-0). Applied Fracture Mechanics.** S. Prerequisite: CIVE 560.

Stress distribution near cracks; energy criteria for fracture; design criteria; fracture toughness testing. (NT-T)

°MECH 644 03(3-0-0). Conduction Heat Transfer. F. Prerequisite: MECH 344.

Linear and nonlinear, isotropic and nonisotropic conduction; analytical, numerical techniques; inverse methods.

***MECH 645 03(3-0-0). Radiation Heat Transfer.** S. Prerequisite: MECH 344.

Radiation fundamentals; properties; spectral, directional variations;

transfer between surfaces; participating media; numerical, Monte Carlo methods. (NT-V)

°MECH 646 03(3-0-0). Convection Heat Transfer. S. Prerequisite: MECH 344.

Fundamentals; conservation, constitutive equations; second law; forced, free convection; internal, external flows; laminar, turbulent flows. (NT-V)

MECH 650 03(3-0-0). Computational Materials from First Principles.

F. Prerequisite: CHEM 461 or MECH 331; CHEM 474 or MECH 337 or PH 361; MATH 340.

Ab initio calculations for molecules, clusters, solutions and solid state materials. Ab initio and classical molecular dynamics simulations.

°MECH 661 03(3-0-0). Theory/Control of Internal Combustion Engines. S. Prerequisite: MECH 437.

Theory and applications of internal combustion engines. Alternative fuels, engine control, and pollution prevention.

°MECH 671/BIOM 671 03(3-0-0). Orthopedic Tissue Biomechanics. F. Prerequisite: CIVE 560. Credit not allowed for both MECH 671 and BIOM 671 or for MECH 671/BIOM 671 and MECH 571/BIOM 571.

Linear elastic, finite deformation, and viscoelastic theories applied to the mechanical behavior of orthopedic tissues (bone, tendon, cartilage).

MECH 676 03(2-2-0). Building Energy Design. S. Prerequisite: MECH 575. Credit not allowed for both MECH 676 and MECH 463.

Design of space heating and cooling systems. Solar thermal electric power systems, industrial and agricultural process heat.

MECH 684 Var. Supervised College Teaching.

MECH 692 Var. Seminar. F, S.

MECH 695A-M Var. Independent Study.

A) Bioengineering. B) Energy conversion. C) Environmental engineering. D) Heat and mass transfer. E) Industrial and systems engineering. F) Mechanics and design. G) Computer-assisted engineering. H) Robotics. I) Solar engineering. J) Computational fluids. K) Materials. L) Plasma engineering. M) Motorsport engineering..

MECH 699A-M Var. Thesis.

A) Bioengineering. B) Energy conversion. C) Environmental engineering. D) Heat and mass transfer. E) Industrial and systems engineering. F) Mechanics and design. G) Computer-assisted engineering. H) Robotics. I) Solar engineering. J) Computational fluids. K) Materials. L) Plasma engineering. M) Motorsport engineering.

°MECH 721 Var. Special Topics in Design and Manufacturing. S. Prerequisite: MECH 514 or MECH 620.

Special topics in engineering design and manufacturing.

***MECH 727 03(3-0-0). Continuum Mechanics.** S. Prerequisite: CIVE 502.

Mechanics of continuous media; cartesian tensors, vector analysis, kinematics of deformation, balance of momentum, mass and energy, constitutive equations.

MECH 729 03(3-0-0). Special Topics in Mechanics and Materials. S. Prerequisite: MECH 524 or MECH 530.

Advanced topics in discipline of engineering mechanics and materials; associated analysis and manufacturing techniques.

MECH 784 Var. Supervised College Teaching.

MECH 799A-M Var. Dissertation.

A) Bioengineering. B) Energy conversion. C) Environmental

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engineering. **D**) Heat and mass transfer. **E**) Industrial and systems engineering. **F**) Mechanics and design. **G**) Computer-assisted engineering. **H**) Robotics. **I**) Solar engineering. **J**) Computational fluids. **K**) Materials. **L**) Plasma engineering. **M**) Motorsport engineering.

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MANAGEMENT COURSES

Department of Management College of Business

MGT 301 03(3-0-0). Supply Chain Management. F, S, SS. Prerequisite: AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160.

Concept of value-driven supply chains; design and management of effective supply chains; emphasis on current practice and recent trends.

MGT 305 03(3-0-0). Fundamentals of Management. F, S, SS. Credit not allowed for both MGT 305 and MGT 320.

Managerial process of planning, directing, and controlling inputs of an organization. Analysis, decision making, and survey of research literature. (NT-O)

MGT 310 03(3-0-0). Human Resource Management. F, S.

Principles and practices of employee management including hiring, development, compensation, and employee relations.

MGT 320 03(3-0-0). Contemporary Management Principles/Practices. F, S, SS. Prerequisite: BUS 300; AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160. Credit not allowed for both MGT 320 and MGT 305.

Principles of management in combination with practices of the new economy to achieve managerial goals. (NT-O)

MGT 325 03(3-0-0). Leadership Communication. F. Prerequisite: BUS 300.

Interpersonal communication for leaders and managers in organizational settings.

MGT 330 03(3-0-0). Corporate Innovation and Entrepreneurship. F, S. Prerequisite: ACT 210; MGT 320.

Process of creating new ventures and generating innovations within existing organizations.

MGT 340 03(3-0-0). Entrepreneurship in the Contemporary World. F, S, SS.

Concepts of entrepreneurship and role of entrepreneurs in the economy.

MGT 350 03(3-0-0). Employment Relations: The Legal Environment. F, S.

Legal principle and policy issues arising from the employment relationship.

MGT 360 03(3-0-0). Social and Sustainable Venturing. S.

Prerequisite: Junior standing or higher.

Entrepreneurship and economic opportunities in the transition to a socially and ecologically sustainable global economy.

MGT 375 03(3-0-0). Advanced Supply Management. F. Prerequisite: MGT 301.

Advanced design of purchasing and supply management within global supply chains.

MGT 410 03(3-0-0). Leadership and Organizational Behavior. F, S. Prerequisite: MGT 305 or MGT 320.

Behavior of people and groups as members of organizations.

MGT 411 03(3-0-0). Leading High Performance Teams. F, S. Prerequisite: MGT 305 or MGT 320.

Design, management, and leadership of teams in organizational settings.

MGT 420 03(3-0-0). New Venture Creation. F. Prerequisite: MGT 340.

Entrepreneurs and the entrepreneurial process. Growth of an independent business.

MGT 425 03(3-0-0). Organizational Communication Strategies. S. Prerequisite: FIN 300 or FIN 305; MGT 305 or MGT 320; MKT 300 or MKT 305.

Strategic communications in organizations; contribution that organizational members make whether acting as individual or group communicators.

MGT 430 03(3-0-0). Leadership and Social Responsibility. S.

Social responsiveness of managers as they face expectations in the firm's internal and external environment.

MGT 440 03(3-0-0). New Venture Management. S. Prerequisite: MGT 420.

Theories and skills necessary for managing startup and existing small firms.

MGT 450 02(2-0-0). Biomedical Entrepreneurship I. S. Prerequisite: BIOM 470/MECH 470 or MGT 340.

Commercialization process for biomedical inventions; market and competitor analysis, regulations, patents; preliminary feasibility study.

MGT 451 01(1-0-0). Biomedical Entrepreneurship II. F. Prerequisite: MGT 450.

Financing (especially regulatory financing) and operational issues.

MGT 470 03(3-0-0). Managerial Decisions-Issues and Analysis. F, S. Prerequisite: MGT 301; MGT 305 or MGT 320.

Investigation and application of managerial decision-making processes and methods to solve problems in business functions.

MGT 471 03(3-0-0). Micro Issues in Supply Chain Management. F. Prerequisite: MGT 301.

Managing the supply function (locally or globally) and the productive flow of materials in goods and services-producing supply chains.

MGT 472 03(3-0-0). Macro Issues in Supply Chain Management. S. Prerequisite: MGT 301.

Application of analytical and computer-based tools in the analysis and improvement of supply chains with variable demand and supply.

MGT 473 03(3-0-0). Employment Relations: Labor and Manpower. F, S.

Managerial decision making and action in labor-management relations as affected by labor legislation and administrative practices.

MGT 474 03(3-0-0). Human Resource Planning and Development. S. Prerequisite: MGT 310.

Human resource planning, recruitment, selection, training, and development.

MGT 475 03(3-0-0). International Business Management. F, S. Prerequisite: FIN 300 or FIN 305; MGT 305 or MGT 320; MKT 300 or MKT 305.

Multinational corporations: their scope, activities, managerial problems and decisions.

MGT 476 03(3-0-0). Negotiation and Conflict Management. F, S. Prerequisite: MGT 305 or MGT 320.

Principles and practice of negotiation and conflict management including bargaining as a social and managerial activity.

MGT 477 03(3-0-0). Advanced Logistics. S. Prerequisite: MGT 301; junior standing.

Advanced design and management of logistics and distribution operations within global supply chains.

MGT 486 03(1-4-0). Practicum in Supply Chain Management. S. Prerequisite: MGT 301; MGT 375 or MGT 477.

Research and recommend solutions to "real world" supply chain management problems.

MGT 487 Var. Internship.

MGT 495 Var. Independent Study.

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MGT 496 Var. Group Study.

MGT 498 Var [1-3]. Research.

MGT 600 03(3-0-0). Manufacturing Process and Systems Design. S.
Prerequisite: BUS 620; BUS 625.

Strategic understanding of alternate manufacturing processes and systems design support needed to manage those processes.

MGT 601/CIS 601 03(3-0-0). Enterprise Computing and Systems Integration. F. Prerequisite: Admission to one of the following programs: M.S. in Business, M.B.A., or Systems Engineering specialization in Master of Engineering. Credit not allowed for both MGT 601 and CIS 601.

Integrated extended enterprise planning and execution systems concepts including ERP, CRM, SCM, MRPII, business processes, front/back office systems. (NT-O)

MGT 610 03(3-0-0). Strategic Human Resource Management. S.
Prerequisite: Admission to masters program.

Strategic issues associated with recruiting, staffing, evaluating, compensating, and developing employees; leadership issues associated therein.

MGT 611 03(3-0-0). Management of Organization Development. S.
Prerequisite: MGT 305 or MGT 320.

Methods for managing organizational change.

MGT 612 03(3-0-0). Managing in a Global Context. F. Prerequisite: Admission to GSSE program.

Global management and HR development issues/practices. Cross-cultural issues in organization behavior, recruitment, selection, training, compensation.

MGT 620 03(3-0-0). Management. F, S.

Practices, policies, philosophies, and behavior.

MGT 625 03(3-0-0). Managerial Communication Practices. F.
Prerequisite: Admission to a masters program in business.

Internal, external, and managerial communication. Managerial speaking and writing skills enhancement.

MGT 640 02(2-0-0). Supply Chain Management Strategies. F.
Prerequisite: MGT 600.

How to create an effective supply chain management system to establish an efficient network for supplying final consumption.

MGT 667 03(3-0-0). Global Social Sustainable Entrepreneurship. F.
Prerequisite: Admission to GSSE program.

Global challenges-poverty, environmental degradation, public health, agriculture. Role of entrepreneurial management in private and public sector.

MGT 668 03(3-0-0). New Venture Development for Social Enterprise. S.
Prerequisite: ACT 501; MGT 667; MKT 601.

Early stages of a new venture, including creation of business plan. Additional study of social entrepreneurship and sustainable business strategies.

MGT 671 03(3-0-0). Labor Management Relations. S.

Collective bargaining process, administration of contract, and impact of public policy on industrial relations.

MGT 675 03(3-0-0). Service Operations/Supply Chain Management. S.
Prerequisite: Admission to a master's program in business.

Supply chain management (SCM) and operations function. Primary focus on service sector.

MGT 679 03(3-0-0). Principles of Strategic Management. S.
Prerequisite: Admission to a master's program in business.

Processes through which firms choose and implement strategies.

Formulation and implementation of strategic management process in variety of industries.

MGT 695 Var. Independent Study.

MGT 696 Var. Group Study.

MGT 699 Var. Thesis.

MICROBIOLOGY, IMMUNOLOGY, AND PATHOLOGY COURSES

Department of Microbiology, Immunology, and Pathology

College of Veterinary Medicine and Biomedical Sciences

MIP 101 03(3-0-0). Introduction to Human Disease. (GT-SC2, AUCC 3A). S.

Survey of human systems and diseases.

MIP 149 03(3-0-0). The Microbial World. F.

Importance of microbiology in daily life, with emphasis on positive and negative roles of microbes, infectious disease, and current microbiology issues.

MIP 192 02(0-0-2). Microbiology First-Year Seminar. F.

Introduction to microbiology major and faculty; academic and career planning; information sources in biomedical sciences.

MIP 260 03(3-0-0). The World of Parasites. S. Prerequisite: BZ 110 or LIFE 102; CHEM 111.

Introduction to general parasitology; evolution, ecology, epidemiology, physiology, and morphology of representative parasites of every group.

MIP 275 02(1-0-1). Microcomputing Applications in Microbiology. S.

Network software on MS-DOS microcomputers will be used to acquire and analyze data and information that are commonly encountered in microbiology.

MIP 298 Var [1-3]. Introductory Research. Prerequisite: Written consent of instructor.

Freshman/sophomore research experience in a working research environment.

MIP 300 03(3-0-0). General Microbiology. F, S, SS. Prerequisite: BZ 110 or BZ 120 or LIFE 102; CHEM 245 or concurrent registration or CHEM 341 or concurrent registration or CHEM 345 or concurrent registration.

Structure, function, development, physiology, and molecular biology of microorganisms emphasizing bacteria. (NT-O)

MIP 302 02(0-4-0). General Microbiology Laboratory. F, S. Prerequisite: MIP 300 or concurrent registration.

Laboratory skills and techniques for isolating, characterizing, and identifying bacteria. (\$)

MIP 303 01(0-0-1). General Microbiology--Honors Recitation. F, S. Prerequisite: Concurrent registration in MIP 300—Honors Section; participation in the Honors Program.

Research and present topics related to the material presented in MIP 300.

MIP 315A-B. Human and Animal Disease. F, S. Credit not allowed for both MIP 315A and MIP 315B.

Biological systems critical to mammalian physiology and how each is affected by metabolic, genetic, environmental, and infectious agents. **A)** 03(3-0-0). **B)** 04(3-0-1). Prerequisite: BMS 300 or BMS 305.

MIP 334 03(3-0-0). Food Microbiology. F. Prerequisite: LIFE 205 or MIP 300.

Microorganisms in production of foods, in preservation and spoilage, and in food-borne diseases. Control of microorganisms in foods.

MIP 335 02(0-4-0). Food Microbiology Laboratory. F. Prerequisite: LIFE 206 or MIP 302; MIP 334 or concurrent registration.

Laboratory skills and techniques related to the presence of microorganisms in food, production, and preservation.

MIP 342 04(3-0-1). Immunology. F, S. Prerequisite: CHEM 245 or concurrent registration or CHEM 341 or concurrent registration or CHEM 345 or concurrent registration; LIFE 201B or LIFE 210 or MIP 300.

Principles of immunology; components of the immune system, interactions of humoral and cellular elements, and clinical applications of basic concepts.

MIP 343 02(0-4-0). Immunology Laboratory. S. Prerequisite: MIP 302; MIP 342 or concurrent registration.

Techniques used in research and clinical immunology, including diagnostic problem solving and data analysis. (\$)

MIP 350 03(3-0-0). Microbial Diversity. S. Prerequisite: MIP 300.

Physiological, taxonomic, and phylogenetic aspects of microbial diversity. Yeasts and filamentous fungi as microbial entities.

MIP 351 03(3-0-0). Medical Bacteriology. S. Prerequisite: MIP 342.

Bacteria which cause human and veterinary diseases; host-parasite relationships; disease mechanisms, prevention, and therapy.

MIP 352 03(0-6-0). Medical Bacteriology Laboratory. S. Prerequisite: MIP 302; MIP 351 or concurrent registration.

Laboratory skills and techniques necessary for identifying medically important bacteria. (\$)

MIP 384 Var [1-5]. Supervised College Teaching. Prerequisite: Written consent of department. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

MIP 400A-G Capstones in Microbiology. F, S.

A) Medical microbiology 02(2-0-0). Prerequisite: MIP 342; MIP 351 or concurrent registration or MIP 420 or concurrent registration; written consent of instructor. **B)** Biotechnology 02(0-0-2). Prerequisite: BC 351 or BC 401; MIP 300. **C)** Immunology 02(2-0-0). Prerequisite: MIP 342; MIP 351 or concurrent registration or MIP 420 or concurrent registration. **D)** Microbial diversity, ecology 02(2-0-0). Prerequisite: MIP 342; MIP 351 or concurrent registration or MIP 420 or concurrent registration. **E)** Microbial genetics 02(2-0-0). Prerequisite: MIP 342; MIP 351 or concurrent registration or MIP 420 or concurrent registration. **F)** Virology. 02(2-0-0). Prerequisite: MIP 342; MIP 351 or concurrent registration or MIP 420 or concurrent registration. **G)** Service learning. 02(2-0-0). Prerequisite: MIP 342; MIP 351 or concurrent registration or MIP 420 or concurrent registration.

MIP 420 04(4-0-0). Medical and Molecular Virology. F. Prerequisite: BC 351 or concurrent registration or BC 401 or concurrent registration; MIP 342.

Principles of animal virology: structure, classification, assay, diagnosis, control, replication, genetics, host-parasite relationships.

MIP 425 02(0-4-0). Virology and Cell Culture Laboratory. F. Prerequisite: MIP 302; MIP 420 or concurrent registration.

Isolation and characterization of viruses. Viral diagnostic and cell culture techniques. (\$)

MIP 432 03(2-0-1). Microbial Ecology. S. Prerequisite: MIP 300.

Principles of microorganism interaction with their living and non-living environments: implication for the environment, plants and animals.

MIP 433 01(0-3-0). Microbial Ecology Laboratory. S. Prerequisite: MIP 432 or concurrent registration.

Experimental microbial ecology; the design, conduct and interpretation of experiments that illustrate basic principles of microbial ecology.

MIP 436 04(2-4-0). Industrial Microbiology. F. Prerequisite: LIFE 206 or MIP 302.

Use of microorganisms for producing commercially valuable products.

MIP 443 04(3-0-1). Microbial Physiology. S. Prerequisite: BC 351 or BC 401; MIP 300.

Structure, function of bacterial constituents; comparison with other

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organisms. Bacterial growth, energy production, biosynthesis.

MIP 450 03(3-0-0). Microbial Genetics. F. Prerequisite: BC 351 or concurrent registration or BC 401 or concurrent registration; MIP 300.

Principles of genetics at molecular level: mutation, recombination, complementation, suppression, control of gene expression, and recombinant DNA.

MIP 462/BZ 452/BSPM 462 05(3-4-0). Parasitology and Vector Biology. F. Prerequisite: BZ 110 or LIFE 103; BZ 212 or LIFE 206 or MIP 302. Credit allowed for only one of the following: MIP 462, BSPM 462, BZ 462.

Protozoa, helminthes, and insects and related arthropods of medical importance; systematics, epidemiology, host damage and control.

MIP 495 Var. Independent Study. Prerequisite: MIP 300; written consent of department.

MIP 496 Var [1-3]. Group Study. F, S. Prerequisite: Written consent of instructor.

Faculty-supervised investigation of areas of special interest in microbiology, virology, microbial physiology, or microbial genetics.

MIP 498 Var [1-3]. Research. Prerequisite: MIP 302; written consent of department.

***MIP 530 04(3-0-1). Advanced Molecular Virology.** S. Prerequisite: BC 351 or BC 401; BC 463 or MIP 450.

Virus-host interactions at the molecular and cellular level.

MIP 533/VS 533 03(2-0-1). Epidemiology of Infectious Diseases/Zoonoses. S. Prerequisite: MIP 300. Credit not allowed for both MIP 533 and VS 533.

Epidemiologic features of infectious and parasitic diseases that have a major impact on community medicine.

MIP 540 02(2-0-0). Biosafety in Research Laboratories. S. Prerequisite: MIP 300.

Practical applications of biosafety principles, including lab practices and regulatory aspects of research involving infectious microorganisms and rDNA.

°MIP 543 03(3-0-0). RNA Biology. F. Prerequisite: BC 351 or concurrent enrollment or BC 401 or concurrent enrollment.

Gene expression and regulation that occurs at the level of RNA (e.g., splicing, stability, export, translation, RNAi, etc.).

MIP 550 04(2-6-0). Microbial and Molecular Genetics Laboratory. S. Prerequisite: MIP 302; MIP 450; written consent of department.

Use of both in vivo genetics and in vitro molecular techniques to study gene structure, function, and regulation in bacteria. (\$)

MIP 555 03(3-0-0). Principles and Mechanisms of Disease. F. Prerequisite: BMS 300.

Principles of disease processes; emphasis on reactivity of the diseased cell, tissue, organ, or organism.

°MIP 563 03(3-0-0). Biology of Disease Vectors. S. Prerequisite: MIP 462/ BSPM 462/BZ 462.

Vector physiology and genomics, new strategies in vector control, and vector/host interactions.

MIP 570 03(2-2-0). Functional Genomics. F. Prerequisite: MIP 300; MIP 302; MIP 443; MIP 450.

State-of-the-art genomic tools with applications to studies of pathogenesis and pathophysiology of infectious diseases.

MIP 576/BSPM 576 03(3-0-0). Bioinformatics. F, S. Prerequisite: BC 463 or BZ 310 or BZ 350 or CM 501 or CS 155 or ERHS 332 or MIP 275 or MIP 300 or MIP 450 or STAT 307. Credit not allowed for both MIP 576 and BSPM 576.

Technical computing across platforms using bioinformatics tools in molecular analyses.

MIP 577/BZ 577 02(0-4-0). Computer Analysis in Population Genetics. F. Prerequisite: MIP 578/BZ 578 or concurrent registration. Credit not allowed for both MIP 577 and BZ 577.

Computational and statistical techniques and practical exercises in discrete and quantitative genetics.

MIP 578/BZ 578 04(3-0-1). Genetics of Natural Populations. F. Prerequisite: BZ 350 or LIFE 201A or LIFE 201B or SOCR 330; STAT 201 or STAT 301 or STAT 307. Credit not allowed for both MIP 578 and BZ 578.

Theoretical and empirical aspects of the genetics of natural populations; current molecular techniques and statistical analysis.

MIP 615 01(1-0-0). Ophthalmic Pathology. F.

Background in normal ocular histology as well as pathologic changes in the eye, taught through a combination of lectures and class discussions.

°MIP 624 02(1-0-1). Advanced Topics in Microbial Ecology. F. Prerequisite: MIP 300; MIP 432.

Recent conceptual developments in microbial ecology, emphasizing theoretical aspects of microbial ecology, particularly in an evolutionary context.

MIP 628 03(3-0-0). Immunity to Infection. S.

How microorganisms have evolved to counteract the immune system, and how the immune system has evolved to resist microbes.

***MIP 630 03(3-0-0). Advances in Microbial Physiology.** F. Prerequisite: MIP 443.

Contemporary developments in bacterial structure, function, metabolism, and genetics.

°MIP 636 04(3-0-1). Mechanisms of Viral Infection and Disease. S. Prerequisite: MIP 420 or MIP 530.

Cytopathic mechanisms, pathogenetic events in viral diseases; host response and antiviral immunity; cancer induction by DNA and RNA viruses.

MIP 651 03(3-0-0). Immunobiology. F. Prerequisite: MIP 342.

Structure, function, regulation of immunoglobulins and the immune system. Cellular immunity including transplantation and cancer.

MIP 654 01(1-0-0). Research Policies and Regulations. F.

Reviews CSU and federal policies, rules, and regulations on integrity, use of humans and animals, authorship, data, genetics, etc., using case studies.

***MIP 666 03(0-0-3). Writing Scientific Manuscripts.** F. Prerequisite: Written consent of instructor.

Writing biological science manuscripts for publication.

°MIP 670 03(3-0-0). Molecular Immunology and Immunogenetics. F. Prerequisite: MIP 651.

Molecular basis and genetics of immune response. Biochemistry of immunologically mediated diseases.

MIP 698 Var. Research. Prerequisite: M.S. candidates only.

MIP 699 Var. Thesis. Prerequisite: M.S. candidates only.

MIP 700 01(1-0-0). Topics in Microbiology. F, S. Prerequisite: MIP 300. Current literature in bacteriology, virology, genetics, and immunology.

°MIP 720 02(1-3-0). Methods in Carbohydrate Analysis. S. Prerequisite: CHEM 346.

Structural analysis of complex carbohydrates using gas chromatography, mass spectrometry, and nuclear magnetic resonance.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

°MIP 740 03(2-0-1). **Microbial and Molecular Genetics. S.** Prerequisite: MIP 450.

Molecular biology and genetics of prokaryotic and eukaryotic cells and their viruses; strategies for genetic manipulation.

°MIP 760 03(2-0-1). **Mechanisms of Bacterial Pathogenesis. F.** Prerequisite: BC 351; MIP 342.

Mechanisms of bacterium-host interaction at molecular and cellular levels in pathogenesis of bacterial disease.

°MIP 765 02(1-2-0). **Comparative Neuropathology. S.**

Spontaneous diseases of nervous system of domesticated, laboratory, and wild animals.

*MIP 778 03(3-0-0). **Pathobiology of Laboratory Animals. S.**

Unique natural biology and diseases of laboratory animal species emphasizing clinical, diagnostic, morphologic and clinical pathologic features.

MIP 784 Var. Supervised College Teaching. Prerequisite: Written consent of department.

MIP 786A-D Var. Practicum. Prerequisite: Post-DVM graduate students only.

A) Comparative gross and histologic pathology. **B)** Surgical pathology. **C)** Clinical pathology. **D)** Comparative medicine.

MIP 792A-E Var [1-3]. Seminar. Prerequisite: M.S. and Ph.D. candidates only. Maximum of 3 credits allowed per subtopic.

A) Histopathology. **B)** Research. **D)** Clinical pathology. **E)** Anatomic pathology.

MIP 795 Var. Independent Study. Prerequisite: Written consent of department.

MIP 796 Var. Group Study.

MIP 798 Var. Research. Prerequisite: Ph.D. candidates only.

MIP 799 Var. Dissertation. Prerequisite: Ph.D. candidates only.

MARKETING COURSES

Department of Marketing *College of Business*

MKT 300 03(3-0-0). Marketing. F, S, SS. Prerequisite: AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160. Credit not allowed for both MKT 300 and MKT 305.

Market and buyer analysis, product and service development, pricing, promotion, advertising, selling, and distribution.

MKT 305 03(3-0-0). Fundamentals of Marketing. F, S. Prerequisite: AREC 202 or ECON 101 or ECON 202. Credit not allowed for both MKT 305 and MKT 300.

Overview of marketing activities involved in provision of products and services to consumers, including target markets and managerial aspects. (NT-O)

MKT 310 03(3-0-0). Marketing Decision Making. F, S. Prerequisite: FIN 300 or FIN 305; MKT 300 or MKT 305.

Developing decision making skills including analysis and evaluation of alternatives, creativity, application of financial tools, persuasion.

MKT 320 03(3-0-0). Integrated Marketing Communications. F, S. Prerequisite: MKT 300 or MKT 305.

Principles and practices of managing promotional activities including advertising, sales promotion, and other major media.

MKT 330 03(3-0-0). Business Customer Relationships. F, S. Prerequisite: MKT 300 or MKT 305.

Managing relationships with distribution channel intermediaries and business customers.

MKT 360/DM 360 03(3-0-0). Retailing. F, S, SS. Prerequisite: MKT 300 or MKT 305. Credit not allowed for both MKT 360 and DM 360.

Retail markets, institutions, operations, and problems. (NT-O)

MKT 361 03(3-0-0). Buyer Behavior. F, S. Prerequisite: MKT 300 or MKT 305.

Marketing analysis of buying behavior of individuals, households, businesses, and not-for-profit organizations.

MKT 362 03(3-0-0). Professional Selling. F, S. Prerequisite: MKT 300 or MKT 305.

Persuasive personal communications in selling consumer and industrial products and services.

MKT 363 03(3-0-0). Sales Management. S. Prerequisite: MKT 300 or MKT 305.

Recruiting, selecting, training, compensating, motivating, supervising, and evaluating a sales force.

MKT 364 03(3-0-0). Product Development and Management. F. Prerequisite: MKT 300 or MKT 305.

Consumer and industrial product development and management issues as an integral part of the marketing mix.

MKT 365 03(3-0-0). International Marketing. F, S. Prerequisite: MKT 300 or MKT 305.

Analysis of international markets and development of strategic and tactical options for marketing across national boundaries.

MKT 366 03(3-0-0). Services Marketing. S, SS. Prerequisite: MKT 300 or MKT 305.

Customer service issues and unique challenges involved in marketing and management of services operations.

MKT 410 03(3-0-0). Marketing Research. F, S. Prerequisite: MKT 300

or MKT 305; STAT 204 or STAT 301 or STAT 307 or STAT 311 or STAT 315.

Role and methodology of research in business emphasizing selection of study's direction, collecting data, and choosing techniques for analyzing these data.

MKT 440 03(3-0-0). Pricing and Financial Analysis in Marketing. F, S. Prerequisite: MKT 300 or MKT 305.

Financial analysis involved in addressing marketing problems; advanced study of pricing strategy and tactics.

MKT 479 03(3-0-0). Marketing Strategy and Management. F, S. Prerequisite: MKT 310; MKT 410.

Marketing decisions involving integration of elements of the marketing mix.

MKT 487 03(0-9-0). Internship. Prerequisite: Written consent of instructor. Maximum of 3 credits allowed in course.

MKT 492 03(0-0-3). Seminar. Prerequisite: MKT 300 or MKT 305; written consent of instructor.

MKT 495 Var [1-5]. Independent Study. Prerequisite: 2.750 GPA or better.

MKT 496 Var [1-3]. Group Study.

MKT 498 Var [1-3]. Research.

MKT 600 03(3-0-0). Marketing Management and Strategy. S. Prerequisite: Admission to a master's program in business.

Processes of customer value creation and value capture; marketing strategy analysis.

MKT 601 03(3-0-0). Marketing for Social Sustainable Enterprises. F. Prerequisite: Admission to GSSE Program.

Customer and stakeholder value creation and capture. Marketing strategy with emphasis on social sustainable organizations.

MKT 692 03(0-0-3). Seminar.

Critical review and discussion of relevant marketing topics.

MKT 695 Var [1-3]. Independent Study. Prerequisite: 3.250 GPA or better.

MILITARY SCIENCE COURSES

Department of Military Sciences

Office of Provost and Executive Vice President

+MLSC 101 02(2-0-0). Leadership and Personal Development. F.

Leadership principles and techniques; first aid; weapons common to U.S. forces; rifle marksmanship; branches of the Army; physical fitness training. (\$)

+MLSC 102 02(2-0-0). Introduction to Tactical Leadership. S.

Small unit leadership; survival techniques; knots, rappelling; map reading, land navigation; plant/animal identification; physical fitness training. (\$)

MLSC 196 01(0-2-0). Military Science Group Study I. F. Prerequisite: concurrent registration in MLSC 101.

MLSC 197 01(0-2-0). Military Science Group Study II. S. Prerequisite: Concurrent registration in MLSC 102.

+MLSC 201 02(2-0-0). Innovative Team Leadership. F.

Leadership assessment; principles of war; small unit operations; basic management skills; oral communication; counseling/ behavioral evaluation techniques. (\$)

+MLSC 202 02(2-0-0). Foundations of Tactical Leadership. S.

Operation orders; theories of conflict; small unit operations; troop leading procedures; observing and classifying behavior; physical fitness training. (\$)

MLSC 250 Var [2-8]. Basic Camp Leader Internship. SS. Maximum of 8 credits allowed in course.

Practical leadership development and management skills in a military operations environment.

MLSC 294 Var [1-2]. Independent Study. Prerequisite: MLSC 101; MLSC 102.

MLSC 295 Var [1-2]. Independent Study.

MLSC 296 01(0-2-0). Military Science Group Study III. F. Prerequisite: Concurrent registration in MLSC201.

MLSC 297 01(0-2-0). Military Science Group Study IV. S. Prerequisite: Concurrent registration in MLSC 202.

+MLSC 301 03(3-0-0). Adaptive Tactical Leadership. F. Prerequisite: Concurrent registration in MLSC 396.

Leadership theory review; leadership assessment program to further develop leadership and management skills; physical fitness training. (\$)

+MLSC 302 03(3-0-0). Leadership in Changing Environments. S. Prerequisite: MLSC 301; concurrent registration in MLSC 397.

Command and staff functions; operations orders; tactical unit operations; military skills; physical fitness training; field training exercises. (\$)

MLSC 357/HIST 357 03(3-0-0). The American Military Experience. F, SS. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits.. Credit not allowed for both MLSC 357/HIST 357 and MS 401/HY 401.

Role of the armed forces in American society; development of military traditions, institutions, and practices.

MLSC 386 08(1-12-1). Advanced Camp Practicum. SS. Prerequisite: MLSC 301.

Leadership principles and skills applied to actual field situations.

MLSC 395 Var [1-3]. Independent Study.

Leadership theory and skills as applied to the military.

MLSC 396 01(0-2-0). Military Science Group Study V. F. Prerequisite: Concurrent registration in MLSC 301.

MLSC 397 01(0-2-0). Military Science Group Study VI. S. Prerequisite: Concurrent registration in MLSC 302.

+MLSC 401 03(3-0-0). Developing Adaptive Leaders. F. Prerequisite: MLSC 302; MLSC 357/HIST 357; concurrent registration in MLSC 496.

Role of the Army officer; ethics, professionalism; military justice; law of land warfare; preparation for active duty; physical fitness training. (\$)

+MLSC 402 03(3-0-0). Leadership in a Complex World. S. Prerequisite: MLSC 301; MLSC 302; concurrent registration in MLSC 497.

Military staff functions and issues in leadership. (\$)

MLSC 495 Var [1-3]. Independent Study.

MLSC 496 01(0-2-0). Military Science Group Study VII. F. Prerequisite: Concurrent registration in MLSC 401.

MLSC 497 01(0-2-0). Military Science Group Study VIII. Prerequisite: Concurrent registration in MLSC 402.

MUSIC COURSES

Department of Music, Theatre, and Dance *College of Liberal Arts*

MU 100 03(3-0-0). Music Appreciation. (GT-AH1, AUCC 3B). F, S, SS. Previous musical training not necessary.

Survey of music from a wide range of periods and styles. (\$, NT-O)

MU 111 03(3-0-0). Music Theory Fundamentals. (GT-AH1, AUCC 3B). F, S, SS. For non-music majors and majors needing basic skills.

Basic visual and aural fundamentals of music including intervals, scales, key and time signatures, chord construction, basic harmony, melodic writing. (\$)

MU 117 04(3-2-0). Music Theory I. F. Prerequisite: Satisfactory completion of placement examination.

Introduction to diatonic harmony and part-writing; basic sight singing, ear training, and keyboard harmony skills. (\$)

MU 118 04(3-2-0). Music Theory II. S. Prerequisite: MU 117.

Four-part diatonic writing; diatonic modulation; diatonic sight singing, ear training, and keyboard harmony skills. (\$)

MU 131 03(3-0-0). Introduction to Music History and Literature. (GT-AH1, AUCC 3B). F, S.

Landmarks of music history and literature from 1300 to the present.

MU 150 02(2-0-0). Piano Class I. F, S, SS.

Basic piano technique; keyboard harmony and music rudiments. (\$)

MU 151 02(2-0-0). Piano Class II. F, S. Prerequisite: MU 150.

Intermediate piano technique; introduction to ensemble playing. (\$)

MU 152 02(2-0-0). Piano Class III. F, S. Prerequisite: MU 151.

Advanced piano techniques; further development of technical skills. (\$)

MU 153 02(2-0-0). Piano Class IV. F, S. Prerequisite: MU 152.

Practical application of piano skills as a teaching tool in the classroom. (\$)

MU 154 01(0-2-0). Jazz Piano Class. S. Prerequisite: None.

Basic jazz piano skills that serve as the foundation for a jazz pianist or composer.

MU 155 02(2-0-0). Guitar Class I. F, S, SS.

Fundamental techniques for guitar emphasizing chord study and related literature.

MU 156 02(2-0-0). Guitar Class II. F, S. Prerequisite: MU 155.

Fundamentals of guitar emphasizing solo literature and accompaniment.

MU 157 02(2-0-0). Voice Class I. F, S.

Techniques of singing, emphasizing posture, breathing, tone production and diction, as applied to song literature.

MU 158 02(2-0-0). Voice Class II. F, S. Prerequisite: MU 157.

Techniques of singing, emphasizing resonance, articulation, projection, and repertoire.

MU 172A 02(1-2-0). Freshman Voice Studio—English/Italian. F. Prerequisite: Concurrent registration in any music ensemble.

Applied voice study and English/Italian diction in a group setting for freshman voice majors.

MU 172B 02(1-2-0). Freshman Voice Studio—German/French. S. Prerequisite: Concurrent registration in any music ensemble.

Applied voice study and German/French diction in a group setting for freshman voice majors.

MU 201 01(0-3-0). Men's Chorus. F, S.

Rehearsal and performance of a variety of types and styles of music for men's voices. (\$)

MU 202 01(0-3-0). University Chorus. F, S.

Rehearsal and performance of a variety of types and styles of music for mixed voices.

MU 204 01(0-5-0). Marching Band. F.

Marching routines utilizing popular and jazz musical idioms with performances at all home football games and other athletic events. (\$)

MU 205 01(0-3-0). Concert Band. S.

Rehearsal and performance of basic concert literature.

MU 206 01(0-3-0). Colorado State University Concert Orchestra. F, S.

Performance opportunity for music majors and non-music majors to perform standard orchestral literature.

MU 217 04(3-2-0). Music Theory III. F. Prerequisite: MU 118.

Harmonic and formal language of the 17th and 18th centuries; diatonic and chromatic sight singing, ear training, and keyboard harmony skills. (\$)

MU 218 04(3-2-0). Music Theory IV. S. Prerequisite: MU 217.

Late 18th and early 19th century harmonic and formal language; diatonic, chromatic and modal sight singing, ear training, and keyboard harmony skills. (\$)

MU 225 02(2-0-0). Jazz Theory. F. Prerequisite: MU 118.

Music theory as it pertains to the jazz idiom; the aural language of jazz.

MU 230 03(3-0-0). Music of Black Americans. S.

Music indigenous to or composed by Black Americans.

MU 231 03(3-0-0). Women in Music. F.

Examination of the role of women in music from historical and societal perspectives.

MU 241 03(3-0-0). Introduction to Music Therapy. F.

Overview of music therapy, related helping professions, and problems in human functioning; emphasizes basic skills for managing behavior problems. (\$)

MU 250 03(2-2-0). Music Therapy Practice. F.

Development of fundamental interactive and professional skills used in music therapy practice. (\$)

MU 251 01(0-2-0). Voice Techniques. S. Prerequisite: Instrumental music education majors only.

Basic voice production, exercises, materials and methods for teaching, including child and adolescent voice concerns.

MU 252A-D Var[1-2]. Instrumental Techniques. F, S.

Tone production, tuning, fingerings, care, materials, and teaching methods for brass, percussion, string, and woodwind instruments. **A)** Brass 02(1-2-0). **B)** Woodwinds 02(1-2-0). **C)** Strings 01(0-2-0). **D)** Percussion 01(0-2-0). (\$)

MU 254 02(2-0-0). Beginning Conducting. S. Prerequisite: MU 117.

Basic conducting patterns and techniques.

MU 272A-V Var [1-2]. Applied Music Instruction. F, S. Prerequisite: Concurrent registration in any music ensemble. One or two half-hour lessons per week and one hour weekly performance class. May be repeated up to 9 times for credit.

BRASS: **A)** Euphonium. (\$) **B)** French horn. (\$) **C)** Trombone. (\$) **D)** Trumpet. (\$) **E)** Tuba. (\$) **KEYBOARD:** **G)** Harpsichord. (\$) **H)** Organ. (\$) **I)** Piano. (\$) **PERCUSSION:** **J)** Percussion. (\$) **STRING:** **K)** Guitar. (\$) **L)** Harp. (\$) **M)** String bass. (\$) **N)** Viola. (\$) **O)** Violin. (\$) **P)** Violoncello.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

(S) VOICE: **Q**) Voice. (\$) WOODWIND: **R**) Bassoon. (\$) **S**) Clarinet. (\$) **T**) Flute. (\$) **U**) Oboe. (\$) **V**) Saxophone (Alto). (\$)

MU 273 Var [1-2]. Composition Instruction. F, S. Prerequisite: MU 118; MU 131.

One or two half-hour lessons per week.

MU 274A-G Var[1-2]. Applied Jazz Instruction. F, S. Prerequisite: Written consent of instructor. May be repeated up to 9 times for credit.

MU 286 01(0-2-0). Practicum-Music Education. (\$)

MU 300 01(0-3-0). Women's Chorus. F, S.

Rehearsal and performance of a variety of types and styles of music for women's voices. (\$)

MU 302 01(0-5-0). University Orchestra. F, S. Prerequisite: Audition required for this ensemble.

Rehearsal and performance of standard orchestral literature. (\$)

MU 304 01(0-3-0). Symphonic Band. F, S, SS. Prerequisite: Audition required for this ensemble.

Preparation for public performance of full symphonic instrumentation of concert band literature. (\$)

MU 305 01(0-5-0). Colorado State University Concert Choir. F, S. Prerequisite: Audition required for this ensemble.

Rehearsal and performance of choral literature emphasizing extended works with orchestral accompaniment. (\$)

MU 309 01(0-3-0). Jazz Ensemble. F, S. Prerequisite: Audition required for this ensemble.

Rehearsal and performance of jazz ensemble literature of standard and experimental types. (\$)

MU 310 01(0-2-0). Jazz Combo. F, S. Prerequisite: Audition required for this ensemble.

Small group jazz performance practice and standard jazz repertoire.

MU 317 02(1-2-0). Music Theory V. F. Prerequisite: MU 218.

Late 19th and 20th century systems of composition and analysis; chromatic, modal, and atonal sight singing, ear training, and keyboard harmony skills.

MU 318 02(2-0-0). Arranging and Orchestration. S. prerequisite: MU 218.

Techniques for writing music for the standard orchestral and band instruments; basic arranging skills for various instrumental and choral ensembles.

MU 320 01(0-2-0). Jazz Improvisation. F, S. Prerequisite: MU 118; written consent of instructor.

Jazz improvisation skills through training in jazz theory, ear training, and improvisatory concepts.

MU 325 02(2-0-0). Jazz Composition/Arranging. S. Prerequisite: MU 225.

Arranging jazz music for a variety of ensembles; composition of music in the jazz idiom.

MU 332 03(3-0-0). History of Jazz. S, SS.

Jazz since the 1880s emphasizing its various influences and developments. (NT-O)

MU 333 03(3-0-0). History of Rock and Roll. SS.

Historical overview of rock and roll with emphasis on listening skills, musical analysis, the artists, and the industry. (NT-O)

MU 334 03(3-0-0). Music History I. F, S. Prerequisite: MU 100 or MU 131; MU 118.

Music of the medieval, Renaissance, and baroque periods.

MU 335 03(3-0-0). Music History II. S. Prerequisite: MU 100 or MU 131; MU 118.

Music of the classical, Romantic, and contemporary periods.

MU 338 02(2-0-0). Opera History and Literature. S. Prerequisite: MU 131.

Historical and musical development of opera from its roots through the 20th century.

Private jazz instruction covering jazz improvisation and style, including articulation and phrasing.

MU 342 03(3-0-0). Psychology of Music. F. Prerequisite: PSY 100.

Psychological aspects of music: perception, psychoacoustics, aesthetics, musical function, communication, measurement, and affective responses.

MU 343 03(3-0-0). Research Methods in Music Therapy. S. Prerequisite: STAT 201.

Techniques of observing, measuring, and recording behavior. Basic experimental methods and procedures used in music therapy research.

MU 351A-C 02(2-0-0). String Pedagogy I. F, S.

A) Violin/viola. B) Violoncello. C) String bass.

MU 352A-C 02(1-2-0). String Pedagogy II. F, S. Prerequisite: MU 351.

A) Violin/viola. B) Violoncello. C) String bass.

MU 355 02(1-2-0). Choral Conducting and Literature. F. Prerequisite: MU 254.

Basic techniques of choral conducting and analysis of selected works as an aid to interpretation.

MU 356 02(1-2-0). Instrumental Conducting and Literature. S. Prerequisite: MU 254.

Essentials of instrumental conducting and analysis of selected works.

MU 365A-B 01(0-2-0). Advanced Diction. Prerequisite: MU 272Q.

Practical application of lyric diction through performance of art song and arias. A) Italian and English. F. B) French and German. S.

MU 400 01(0-5-0). Colorado State University Chamber Choir. F, S. Prerequisite: Audition required for this ensemble.

Performance of chamber choral literature from all musical periods ranging from madrigals to music in a contemporary idiom. (\$)

MU 401 Var [1-2]. Opera Theater. F, S, SS. Prerequisite: Audition required for this ensemble.

Performance of opera and/or operatic scenes emphasizing operatic singing and acting techniques. (\$)

MU 402 01(0-5-0). Theater/Chamber Orchestra. F, S, SS. Prerequisite: Audition required for this ensemble.

Performance of selected operas, musicals, oratorio, orchestral accompaniments, and chamber music. (\$)

MU 404 01(0-5-0). Symphonic Wind Ensemble. F, S. Prerequisite: Audition required for this ensemble.

Performance of wind ensemble and band literature emphasizing most challenging of repertoire, using a select ensemble of performers. (\$)

MU 407 01(0-3-0). Accompanying. F, S. Prerequisite: MU 272I.

Practical experience in the interpretation and execution of piano accompaniments. (\$)

MU 408 01(0-3-0). Chamber Music. F, S. Prerequisite: Written consent of instructor.

Performance literature for small instrumental ensembles: duets, trios, quartets, and quintets.

MU 415 02(1-2-0). Advanced Jazz Techniques. S. Prerequisite: MU 320.

Advanced jazz theory and rhythmic concepts, free improvisation and other modern performance techniques.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

MU 417 03(3-0-0). Counterpoint. F. Prerequisite: MU 218.

Contrapuntal techniques from the Middle Ages through the 20th century; development of compositional skills in counterpoint.

MU 418 02(2-0-0). Advanced Orchestration. S. Prerequisite: MU 318.

Advanced writing for modern orchestra and related ensembles; advanced study of traditional and contemporary writing for the individual instruments.

MU 419 02(2-0-0). Electronic Music Composition. S. Prerequisite: MU 218.

Fundamentals of electronic music composition, including hardware, software, digital audio, MIDI, and computer music.

MU 420 02(2-0-0). Marching Band Techniques. S. Prerequisite: MU 204.

Marching band conducting, design, and performance techniques. (\$)

MU 421 02(1-3-0). Orchestral Techniques. S. Prerequisite: MU 252C.

Orchestral conducting and rehearsal techniques.

MU 425 02(2-0-0). Jazz Pedagogy. F, S.

Jazz ensemble, instrumentation, literature, performance practice and rehearsal techniques.

MU 430 03(3-0-0). 20th Century Music. S.

Musical styles from 1900 to present; major 20th-century movements which reflect a changing society.

MU 431 03(3-0-0). American Music. S.

Sacred, patriotic, popular, and cultivated musical developments from the Pilgrims to 1900 including music on the Western frontier.

***MU 432 02(2-0-0). Hymnology.** F. Prerequisite: MU 100 or MU 131.

Hymns and congregational singing in the Christian tradition.

°MU 433 02(2-0-0). Music and Rites of Christian Liturgy. S. Prerequisite: MU 100 or MU 131.

History of the music and rites of Christian liturgy from its beginnings to the present.

°MU 434 02(2-0-0). Psalms in Music and Liturgy. F. Prerequisite: MU 100 or MU 131.

Musical traditions of the poetry and psalms of the Hebrew Bible, primarily from the perspective of Jewish and Christian liturgy.

***MU 435 02(2-0-0). Contemporary Liturgical Music in America.** S. Prerequisite: MU 100 or MU 131.

History and practice of contemporary liturgical music in America.

MU 437 02(1-2-0). History and Structure of the Organ. F. Prerequisite: MU 472H.

Physical structure, tonal disposition, acoustical surroundings, and historical development.

MU 440 03(3-0-0). Music Therapy Methods I. S. Prerequisite: MU 241; admission to professional curriculum.

Basic characteristics of handicapped children encountered in the music classroom; methods and materials for educating them in music. (\$)

MU 443 03(3-0-0). Music Therapy Methods II. S. Prerequisite: BMS 300; MU 241.

Relation of music to health; current and future music therapy scenes; and emphasis on cognitive, affective, and psychomotor approaches to therapy. (\$)

MU 444 03(3-0-0). Music Therapy Methods III. S. Prerequisite: Admission to professional curriculum.

Music therapy techniques: assessment, formulating objectives, designing and implementing programs, evaluation, problem solving, and creativity. (\$)

MU 445 02(2-0-0). Improvisation Techniques in Music Therapy. S. Prerequisite: Admission to professional curriculum.

Music/movement improvisation techniques with clinical populations. (\$)

MU 451A-C 02(1-2-0). String Pedagogy III. F, S. Prerequisite: MU 352.

A) Violin/viola. B) Violoncello. C) String bass.

MU 464A-C 02(2-0-0). String Literature. F, S.

A) Violin/viola. Prerequisite: MU 272N or MU 272O. B) Violoncello. Prerequisite: MU 272P. C) String bass. Prerequisite: MU 272M.

MU 465 02(1-2-0). Keyboard Literature. F.

Survey of early keyboard literature from pre-piano to early Romantic period; problems in present-day performance.

°MU 466 02(1-2-0). Song Literature. S.

Development of song as an art form from monody to German Lieder, French school, and contemporary songs of England and America.

°MU 467 02(2-0-0). Vocal Pedagogy. S. Prerequisite: MU 265A; MU 265B; concurrent registration in MU 472Q.

Pedagogical foundations, techniques, resources, methods, and terminology for teaching singing.

MU 468 02(1-2-0). Organ Literature. S. Prerequisite: MU 437.

Survey of literature from earliest known works to present; stylistic content and interpretation.

MU 469 02(1-2-0). Instrumental Literature. S.

Survey of literature for string, woodwind, and brass ensembles.

MU 471 01(0-0-1). Recital. F, S, SS. Prerequisite: Written consent of instructor.

Demonstration of individual musical proficiency through public performance.

MU 472A-V Var [1-2]. Applied Music Instruction. F, S. Prerequisite: MU 272A-V; concurrent registration in any music ensemble; successful completion of upper-division qualifying exam. One or two half-hour lessons per week and one hour weekly performance class, emphasizing pedagogical methods. May be repeated up to 9 times for credit.

BRASS: **A)** Euphonium. (**\$ B)** French horn. (**\$ C)** Trombone. (**\$ D)** Trumpet. (**\$ E)** Tuba. (**\$ KEYBOARD: G)** Harpsichord. (**\$ H)** Organ. (**\$ I)** Piano. (**\$ PERCUSSION: J)** Percussion. (**\$ STRING: K)** Guitar. (**\$ L)** Harp. (**\$ M)** String bass. (**\$ N)** Viola. (**\$ O)** Violin. (**\$ P)** Violoncello. (**\$ VOICE: Q)** Voice. (**\$ WOODWIND: R)** Bassoon. (**\$ S)** Clarinet. (**\$ T)** Flute. (**\$ U)** Oboe. (**\$ V)** Saxophone (Alto). (\$)

MU 473 Var [1-2]. Composition Instruction. F, S. Prerequisite: MU 273; successful completion of upper-division qualifying exam.

One or two half-hour lessons per week; emphasizing pedagogical methods.

MU 474 Var[1-2]. Applied Jazz Instruction. F, S. Prerequisite: MU 274A-G (any one subtopic); concurrent registration in any jazz ensemble; successful completion of upper division qualifying exam.

Private jazz instruction covering advanced aspects of jazz improvisation and performance.

MU 486A-B Var [1-3]. Practicum.

A) Music therapy. Prerequisite: Piano proficiency. (**\$ B)** Music education. Prerequisite: Admission to teacher licensure. (\$)

MU 487 Var. Internship. Prerequisite: Completion of all course work in the music therapy curriculum.

Six-month field experience that students must complete to become eligible for registration and board certification.

MU 495A-H Var [1-3]. Independent Study.

A) Composition and theory. **B)** Conducting. **C)** Improvisation. **D)** Music

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

history. **E)** Music literature. **F)** Music therapy. **G)** Pedagogy. **H)** Performance.

MU 496A-I Var [1-3]. Group Study.

A) Composition and theory. **B)** Conducting. **C)** Improvisation. **D)** Music education. **E)** Music history. **F)** Music literature. **G)** Music therapy. **H)** Pedagogy. **I)** Performance.

MU 498 Var [1-3]. Research in Music Therapy. Prerequisite: MU 241; MU 286.

Participation of undergraduate music therapy majors in departmental research projects.

MU 499 Var. Thesis. Prerequisite: Music majors only.

MU 510 03(3-0-0). Foundations of Music Education. F, SS. Prerequisite: MU 526A.

Cultural, philosophical, psychological, and historical applications of music education. (NT-O)

MU 517 02(2-0-0). Analytic Techniques I. F. Prerequisite: Satisfactory completion of placement examination.

Appropriate analytic techniques for Middle Ages, Renaissance, and baroque music.

MU 518 03(3-0-0). Analytic Techniques II. S. Prerequisite: Satisfactory completion of placement examination.

Appropriate analytic techniques for classical, Romantic, and 20th-century music. (NT-O)

MU 519 03(3-0-0). History of Music Theory. S. Prerequisite: MU 317.

Important authors, treatises, and texts dealing with acoustics, composition, counterpoint, harmony, notation, orchestration, thoroughbass, and tuning.

MU 520 03(3-0-0). Elementary School Music. F. Prerequisite: EDUC 450.

Musical concepts and teaching strategies for grades K-6; contemporary influences on music education.

MU 521 03(3-0-0). Junior and Senior High School Music. S. Prerequisite: EDUC 450.

Music for grades 7-12. General music classes, choral and instrumental organizations, common problems, practices, and new concepts.

MU 525A-C 03(1-0-2). Orff-Schulwerk Training Program. SS. Prerequisite: MU 590L.

A) Orff-Schulwerk Training I. **B)** Orff-Schulwerk Training II. **C)** Orff-Schulwerk Training III.

MU 526A-C 05(2-2-2). Kodaly Training Program. F, SS.

A) Level I. **B)** Level II. **C)** Level III.

+MU 527A 04(0-0-4). Conducting Seminar—Level 1. SS. Prerequisite: Audition and acceptance into the graduate school.

Music score analysis, preparation and conducting problems; various conducting projects to sharpen skills and increase gestures. Field trips required.

+MU 527B 04(0-0-4). Conducting Seminar—Level 2. SS. Prerequisite: MU 527A.

Further techniques learned in MU 527A; focuses on rehearsal techniques, performance practice, and asymmetrical meters. Field trips required.

MU 527C 04(0-0-4). Conducting Seminar—Level 3. SS. Prerequisite: MU 527B.

Further study from MU 527A-B; recitative technique through both operatic and choral examples; final project is a group conducted Broadway musical.

***MU 530 03(3-0-0). Music Through the Middle Ages.** F. Prerequisite: MU 334.

Music in Western civilization from its beginnings through Middle Ages.

°MU 531 03(3-0-0). Music of the Renaissance. F. Prerequisite: MU 334.

Music of 15th and 16th centuries.

MU 532 03(3-0-0). Music of the Baroque. SS. Prerequisite: MU 334.

Style and musical language of baroque from Gabriellis through Johann Sebastian Bach.

***MU 533 03(3-0-0). Music of the Classical Era.** S. Prerequisite: MU 335.

Vocal and instrumental music of middle and late 18th century.

MU 534 03(3-0-0). Music of the Romantic Era. F, S, SS. Prerequisite: MU 335.

Musical works, philosophies, and related arts of 19th century.(NT-O)

°MU 535 03(3-0-0). Contemporary Music. S. Prerequisite: MU 430.

20th-century music emphasizing stylistic and theoretical concepts.

MU 543 03(3-0-0). Advanced Research Methods in Music Therapy. S. Prerequisites: MU 241; MU 250.

Research techniques used in measuring and recording behavior. Advanced methods used in music therapy research.

MU 544 03(3-0-0). Advanced Techniques-Neurologic Music Therapy. S. Prerequisites: BMS 300; MU 241; MU 250.

Advanced neurologic music therapy techniques used with various clinical populations.

MU 545 03(2-2-0). Composition for Music Therapy Practitioners. S, SS.

Music composition techniques for the music therapy clinician. (NT-O)

MU 555 03(3-0-0). Choral Techniques, Style, and Interpretation. F. Prerequisite: MU 355.

Techniques for achieving expressive conducting, problems of tone and diction, musical style and interpretation, and rehearsal techniques.

MU 556 03(3-0-0). Advanced Instrumental Conducting and Techniques. S. Prerequisite: MU 356.

Score reading and analysis, preparation of instrumental scores for performance; expressive baton techniques, rehearsal methods and procedures.

***MU 564 03(3-0-0). Collaborative Piano Literature.** F.

Literature and historical performance practices of collaborative piano music.

MU 565 02(2-0-0). Piano Literature-1800 to Present. S. Prerequisite: MU 465.

Keyboard music representing Romantic and Impressionistic periods, nationalism, twelve-tone, and recent developments including aleatory elements.

MU 566 02(2-0-0). Choral Literature-Renaissance and Baroque. F, SS. Prerequisite: MU 355.

Analytical and comparative survey of choral literature from Renaissance to 1750.

MU 567 02(2-0-0). Choral Literature-1750 to Present. S, SS. Prerequisite: MU 356.

Analytical and comparative survey of choral literature from 1750 to present.

MU 569 02(1-2-0). Symphonic Literature. F. Prerequisite: MU 469.

Symphonic development from early classicism through Impressionism; emphasis on formal structure, thematic sources, and social and historical influence.

MU 590A-N Var [1-3]. Workshop. SS.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

A) Choral music. B) Conducting. C) Beginning guitar. D) Humanities. E) Music for exceptional children. F) Organ. G) Orff music. I) Kodaly. J) Beginning handbells. K) Computers in music education. L) Advanced handbells. N) Neurologic music therapy.

MU 608 01(0-3-0). Graduate Chamber Music. F, S. Prerequisite: Graduate standing; audition required

Graduate-level performance literature for small instrumental ensembles: duets, trios, quartets, and quintets.

MU 630 03(3-0-0). Methods of Music Research. F. Prerequisite: MU 317.

Research, documentation, and bibliography for music history, literature, performance, theory, acoustics, music education, and quantitative testing. (NT-O)

MU 647 03(3-0-0). Historical Foundations of Music Therapy. S.

Historical foundations of music therapy in the United States from 1750 to the present. (NT-O)

MU 648 03(3-0-0). Neuroscience/Music Foundations in Therapy. S.

Prerequisite: MU 544.

Historical and scientific foundations of neurologic music therapy. (NT-O)

MU 669 02(2-0-0). Instrumental Literature. S. Prerequisite: MU 469.

Solo and small ensemble literature for string, woodwind, and brass instruments.

MU 671 01(0-0-1). Graduate Recital. F, S. Prerequisite: Written consent of instructor.

Demonstration of graduate-level applied musical proficiency through public performance.

MU 672A-V Var [2-3]. Applied Music Instruction. F, S. Prerequisite: MU 472A-V. One or two half-hour lessons per week and one hour weekly performance class.

BRASS: A) Euphonium. (\$) B) French horn. (\$) C) Trombone. (\$) D) Trumpet. (\$) E) Tuba. (\$) KEYBOARD: G) Harpsichord. (\$) H) Organ. (\$) I) Piano. (\$) PERCUSSION: J) Percussion. (\$) STRING: K) Guitar. (\$) L) Harp. (\$) M) String bass. (\$) N) Viola. (\$) O) Violin. (\$) P) Violoncello. (\$) VOICE: Q) Voice. (\$) WOODWIND: R) Bassoon. (\$) S) Clarinet. (\$) T) Flute. (\$) U) Oboe. (\$) V) Saxophone (Alto). (\$)

MU 673 Var [2-3]. Composition Instruction. Prerequisite: MU 473.

One or two half-hour lesson per week.

MU 684 Var [1-3]. Supervised College Teaching.

Supervised assistance in instruction.

MU 686 03(0-6-0). Music Therapy Practicum. F, S. Prerequisite: Six credits of MU 486A.

Clinical practicum for graduate music therapy students. (NT-C) (\$)

MU 692 Var [1-3]. Seminar.

MU 695A-H Var [1-3]. Independent Study.

A) Composition and theory. B) Conducting. C) Improvisation. D) Music education. E) Music history. F) Music literature. G) Music therapy. H) Pedagogy.

MU 696A-I Var [1-3]. Group Study.

A) Composition and theory. B) Conducting. C) Improvisation. D) Music education. E) Music history. F) Music literature. G) Music therapy. H) Pedagogy. I) Performance.

MU 698 Var [1-3]. Research.

MU 699 Var. Thesis.

NEUROBIOLOGY COURSES

Nondepartmental, Interdisciplinary

Office of Provost and Executive Vice President

NB 500 01(0-0-1). Readings in Cellular Neurobiology. F. Prerequisite: One college-level course in each: biology, biochemistry, physics, calculus; concurrent registration in NB 501 or BMS 500.

Membrane properties of nerve and muscle; molecular mechanisms of synaptic function; neuro-muscular units.

NB 501 02(2-0-0). Cellular and Molecular Neurophysiology. F. Prerequisite: One college-level course in each: biology, biochemistry, physics, calculus. Credit not allowed for both NB 501 and BMS 500.

Membrane properties of nerve and muscle; molecular mechanisms of synaptic function; neuromuscular units.

NB 502/CM 502 02(1-3-0). Techniques in Molecular & Cellular Biology. F. Prerequisite: One college-level course with laboratory in each: biology, biochemistry, physics; written consent of instructor. Credit not allowed for both CM 502 and NB 502.

Current methods in molecular and cellular neurobiology.

NB 503/BMS 503 03(3-0-0). Developmental Neurobiology. S. Prerequisite: One college-level course in each: biology, biochemistry, physics, calculus. Credit not allowed for both NB 503 and BMS 503.

Molecular mechanisms involved in development of nervous system including differentiation, growth, pathfinding, and synaptogenesis.

NB 505/BMS 505 03(3-0-0). Neuronal Circuits, Systems and Behavior. S. Prerequisite: BMS 325 or BMS 500 or NB 501. Credit not allowed for both NB 505 and BMS 505.

Anatomical and physiological organization of the nervous system.

NB 586 01(0-2-0). Practicum-Techniques in Neuroscience II. S. Prerequisite: NB 501; NB 502/CM 502.

Current research projects in the laboratories of neuroscience faculty.

NB 600/PSY 600D 03(3-0-0). Advanced Psychology-Sensation and Perception. S. Prerequisite: PSY 456; fifteen credits in psychology. Credit not allowed for both NB 600 and PSY 600D.

Neural mechanisms of human perception; color and depth perception, pitch, loudness, and the effects of aging.

°NB 650 01(1-0-0). Computer Analysis of Neuronal Proteins. S.

Theory and practice of using computers to study proteins.

NB 660/BMS 660 01(1-0-0). Seizures, Neurodegeneration, and Epilepsy. F. Prerequisite: BMS 325 or NB 505. Credit not allowed for both NB 660 and BMS 660.

Analyzes molecular, cellular and network mechanisms underlying seizures and responsible for epilepsy

°NB 750 02(2-0-0). Physiology of Ion Channels. S. Prerequisite: BMS 500; written consent of instructor.

Physiological and structural analysis of membrane ion channels.

NB 771 01(1-0-0). Writing, Submitting and Reviewing Grants. F.

Preparation of NRSA fellowship proposals; proposal review; possible submission to NIH for funding.

NB 793 01(0-0-1). Neuroscience Seminar.

NB 795 Var. Independent Study.

NB 796A-E Var. Group Study.

A) Ion channels. **B)** Neuronal growth and regeneration. **C)** Topics in neurosciences. **D)** Seizures and epilepsy. **E)** Neuroendocrine mechanisms.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC-*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

NATURAL RESOURCES COURSES

Nondepartmental

Warner College of Natural Resources

NR 120A 03(3-0-0). Environmental Conservation. F, S. (GT-SC2, AUCC 3A). Credit not allowed for both NR 120A and NR 120B.

Overview of natural resources environmental concerns including population, pesticides, energy, and pollution. (NT-O)

NR 120B 04(3-3-0). Environmental Conservation. F, S. Prerequisite: Participation in University Honors Program. Credit not allowed for both NR 120B and NR 120B.

Overview of natural resources environmental concerns including population, pesticides, energy, and pollution.

+NR 130 03(3-0-0). Global Environmental Systems. (AUCC 3A) F, S, SS.

Studies of the earth's lithosphere, hydrosphere, atmosphere, and biosphere systems, and their interrelations with human dimensions. (\$)

NR 150 03(3-0-0). Oceanography. (AUCC 3A) F, S, SS.

Introduction to the geology, physics, chemistry, and biology of the world ocean; oceanic relationships with various human dimensions.

NR 192 02(0-0-2). First Year Seminar in Environmental Studies. F.

Introduction to the disciplines involved in natural resources through exposure to current issues.

+NR 220 05(2-6-0). Natural Resources Ecology and Measurements. SS. Prerequisite: BZ 110 and BZ 111 or BZ 120 or LIFE 103; MATH 118.

Ecology of Rocky Mountain ecosystems. Basic measurements and integrated management of natural resources. Pingree Park Campus. (\$)

NR 300 03(2-0-1). Biological Diversity. S. Prerequisite: NR 120A or NR 120B or one course in biology.

Biological diversity examined in context of species; extinction. Principles, techniques of conservation biology utilized to understand and resolve issues.

+NR 319 04(2-4-0). Geospatial Applications in Natural Resources. F, S. Prerequisite: Junior standing.

Introduction to global positioning systems (GPS), geographic information systems (GIS) and remote sensing (RS) with natural resource applications.

NR 320 03(3-0-0). Natural Resources History and Policy. (AUCC 3D). F, S.

History, values and institutions, and policy process guiding natural resources management and conservation.

NR 322 04(2-4-0). Introduction to Geographic Information Systems. F, S.

Fundamental concepts of spatial data handling and computer-assisted map analysis.

NR 323/GR 323 03(2-2-0). Remote Sensing and Image Interpretation. F. Credit allowed for only one of the following: NR323, GR 323, NR 503, GR 503.

Remote sensing systems and applications; characteristics of photographic, scanner and radar images; imagery interpretation.

NR 326 03(3-0-0). Forest Vegetation Management. F. Prerequisite: NR 220. Credit not allowed for both NR 326 and F 325.

Ecologically-based management to restore and manage forests.

NR 330 03(3-0-0). Human Dimensions in Natural Resources. F. Prerequisite: NR 120A or NR 120B.

Social, political, cultural, and economic considerations in natural

resource management.

NR 353/BZ 353 03(3-0-0). Global Change Ecology, Impacts and Mitigation. S. Prerequisite: LAND 220/LIFE 220 or LIFE 320. Credit not allowed for both BZ 353 and NR 353.

Ecological impacts of human-induced global change, and the strategies that can/are being used to adapt to and mitigate these impacts.

NR 355 03. Contemporary Environmental Issues. F, S, SS. Prerequisite: One course in biology. Offered as telecourse only.

Fundamental concepts of energy, population, and ecology applied to range of contemporary environmental issues. (NT-T)

NR 365 03(3-0-0). Environmental Education. F.

Principles of interpretation related to natural resource management and public informal education.

NR 367 03(3-0-0). Concepts in Vertebrate Nutrition. S. Prerequisite: CHEM 245.

Concepts in suborganismal and organismal vertebrate nutrition; introduction to nutritional ecology.

NR 375 01(1-0-0). Environment and Natural Resources Leadership. S.

Environment and natural resources leadership history, skills, and styles. Creation of leadership path and organization prescriptions.

+NR 383/AGRI 383 02(0-2-1). U.S. Travel-Integrated Resource Management. S. Credit not allowed for both NR 383 and AGRI 383.

Evaluation of integrated ranch management decision alternatives in conjunction with professional resource managers. (\$)

NR 387 01(1-0-0). Internship I.

Preparation for field experience in natural resources management.

NR 400 03(2-0-1). Public Relations in Natural Resources. F, S, SS. Prerequisite: NR 320.

Effective public relations and public information programs applicable to natural resource professions.

NR 401 02(0-4-0). Techniques in Public Relations. F, S. Prerequisite: SPCM 200.

Effective communications methods related to natural resource professions; preparation of graphics, organization of programs using slide show format.

+NR 420 04(3-3-0). Integrated Ecosystem Management. F,S. Prerequisite: LAND 220/LIFE 220 or LIFE 320; NR 220; NR 320; senior standing.

Natural resource management exercises; quantitative integration techniques, group dynamics. (\$)

NR 421 03(3-0-0). Natural Resources Sampling. S. Prerequisite: NR 220; STAT 201 or STAT 301.

Designs, techniques, problems in sampling natural resource populations; analysis, interpretation of data.

NR 422 04(2-4-0). GIS Applications in Natural Resource Management. S. Prerequisite: NR 322.

Development and implementation of GIS projects and problems in spatial data analysis.

NR 423 01(.5-1-0). Applications of Global Positioning Systems. F, S. Prerequisite: NR 322 or NR 505.

Introduction to concepts and use of global positioning systems with applications to natural resources.

NR 425 03(3-0-0). Natural Resource Policy and Sustainability. S. Prerequisite: F 325; NR 320.

Principles, concepts, and operating examples of sustainable resource management with a concentration on forest policies and practices.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

NR 432 01. Foundations of National Forest Lands Program. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

History of U.S. public land law and evolution of National Forests. Nature, policy, trend, and needs of lands program; its integration into management. (NT-C)

NR 433 04. Special Uses Management. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

Authorities, application, and administration; agriculture, aviation, community, public information, industrial, water, treasure trove, and cultural uses. (NT-C)

NR 434 03. Linear Uses and FERC Licenses. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

Rights-of-way authorities and management; road and trail grants and easements; communication uses; Federal Energy Regulatory Commission licenses. (NT-C)

NR 435 05. Valuation and Landownership Adjustment. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

Authorities, coordination, valuation, title; land purchase, donation, exchange, interchange, transfers, sales, condemnation, and negotiation. (NT-C)

NR 436 03. Right-of-Way Acquisition. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

Need, authority, policy, planning, acquiring, negotiating, and managing rights-of-way; cost-share agreements. (NT-C)

NR 437 03. Boundaries, Status, Claims, and Withdrawals. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

Administration of landownership status, title encumbrances, withdrawals, title claims, Native American rights and claims, property boundary management. (NT-C)

NR 440 03(2-2-0). Land Use Planning. F.

Integration of natural resource, social, institutional factors in regional resource planning. (NT-O)

NR 444 03(3-0-0). Fire Economics and Policy. S. Prerequisite: AREC 202 or ECON 202.

Development of wildlife and fuel management economics integrated with critical federal policies.

+NR 460 03(3-0-0). Wilderness Management. S. Prerequisite: LAND 220/LIFE 220; NRRT 231.

Management of wilderness in the U.S. National Wilderness Preservation System and equivalent international wildlands. (\$)

+NR 479 02(0-2-1), Restoration Case Studies. F. Prerequisite: LAND 220/LIFE 220 or LIFE 320; NR326 or F 311 or RS 300; written consent of instructor.

Analysis of ecological restoration projects. Required field trips one week prior to first day of semester.

NR 484 Var [1-5]. Supervised College Teaching. Prerequisite: Written consent of instructor. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

NR 492 Var. Seminar on Environmental Conservation.

NR 493 01(0-0-1). Seminar on GIS and Remote Sensing Applications. S. Prerequisite: NR 322 or NR 323/GR 323.

Techniques, use of remote sensing, GIS technologies for forest, range, wildlife, water, geology, recreation, and other resource management applications.

NR 495 Var. Independent Study.

NR 501 03. Leadership and Public Communications. F, S, SS.

Prerequisite: Introductory course to natural resource management fields, communication course (speech, writing, journalism). Offered as correspondence course only.

Two-way communication skills used to involve publics, write for various media, and understand role of leadership within natural resources profession. (NT-C/O)

NR 503/GR 503 04(3-3-0). Remote Sensing and Image Analysis. F. Credit allowed for only one of the following: NR503, GR 503, NR 323, GR 323.

Interpretation and analysis of photographic, multispectral scanner, and radar data; sensor systems; applications to resource management.

NR 504 04(2-6-0). Computer Analysis of Remote Sensing Data. S. Prerequisite: GR 323/NR 323 or GR 503/NR 503.

Computer-aided analysis techniques for extracting resource information from aerial and satellite remote sensing data.

NR 505 04(2-4-0). Concepts in GIS. F. Prerequisite: STAT 301 or STAT 511.

Concepts of geographic information systems and spatial data analysis.

NR 506 04(2-4-0). GIS Methods for Resource Management. S. Prerequisite: NR 505.

Current methods in applied geographic information systems and spatial data analysis.

NR 512 03(3-0-0). Spatial Statistical Modeling—Natural Resources. F. Prerequisite: NR 322; NR 323/GR 323; STAT 301.

Statistical techniques used to model natural and environmental resources; GIS, remote sensing and spatial statistics.

NR 515 03. Natural Resources Policy and Biodiversity. F, S, SS. Prerequisite: Political science, introductory course to natural resources management fields. Offered as correspondence course only.

Review evolution of natural resource policy, administration, and law emphasizing interdisciplinary concept of managing for biodiversity. (NT-C/O)

NR 520 03(3-0-0). Applied Optimization in Resource Management. S. Prerequisite: One course in each of the following subjects: calculus and economics.

Design optimization models to integrate economics, ecology, ecology and social concerns in natural resource management.

°NR 521 02(2-0-0). Natural Resource Administration. F. Prerequisite: NR 320.

Administration of forest and natural resource projects in developed and developing countries.

NR 522 03(0-6-0). Wilderness Ecosystem Planning. S. Prerequisite: Written consent of instructor.

Expertise developed in preparing effective implementation plans for park and wilderness ecosystems.

NR 523/STAT 523 03(3-0-0). Quantitative Spatial Analysis. S. Prerequisite: STAT 301 or STAT 307. Credit not allowed for both NR 523 and STAT 523.

Techniques in spatial analysis: point pattern analysis, spatial autocorrelation, trend surface and spectral analysis.

NR 525 03(3-0-0). World Natural Resources. S. Prerequisite: Written consent of instructor.

Interdisciplinary approach to overview global problems and solutions in natural resources.

NR 526 04(4-0-0). Techniques for Ecosystem Management. S. Prerequisite: Enrollment in Continuing Education in Ecosystem Management (CEEM) program. Offered only through the Division of

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Continuing Education.

Assessing the biophysical and sociopolitical environment and decision-making techniques used in ecosystem management. (NT)

NR 527 03(2-0-1). Methods-Human Dimensions of Natural Resources. SS. Prerequisite: B.S. degree; participant in Advancing Human Dimensions Expertise Among Fish and Wildlife Agencies training program.

Human dimensions research in areas of problem identification, research process, survey methods, sampling, validity and reliability.

NR 528 03(2-2-0). Analysis: Human Dimensions–Natural Resources. SS. Prerequisite: B.S. degree; participant in Advancing Human Dimensions Expertise Among Fish and Wildlife Agencies training program; STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315.

Human dimensions analysis techniques: codebook development and data entry, univariate statistics, and bivariate/multivariate statistics.

NR 529 02(2-0-0). Concepts: Human Dimensions-Natural Resources. SS. Prerequisite: B.S. degree; participant in Advancing Human Dimensions Expertise Among Fish and Wildlife Agencies training program.

Concepts guiding human dimensions research: motivations/satisfactions, attitudes, values, attitude/behavior change and norms.

NR 530 01(1-0-0). Human Dimensions-Application. SS. Prerequisite: B.S. degree; participant in Advancing Human Dimensions Expertise Among Fish and Wildlife Agencies training program.

Application of human dimensions information; incorporate information into decision-making process.

NR 531 01(1-0-0). Public Participation. SS. Prerequisite: B.S. degree; participant in Advancing Human Dimensions Expertise Among Fish and Wildlife Agencies training program.

Diagnostic tools for public involvement; appropriate methods for specific situations, issues, and stakeholders.

NR 535 03(0-0-3). Action for Sustainable Behavior. F, S, SS. Prerequisite: Graduate student or senior status; one course in human dimensions; one course in science. Offered as a correspondence course only.

Review sustainability issues and develop solutions considering environments; economics; psychology; sociology; law and politics; and administration. (NT-C/O)

NR 540A-D 02. Environmental Issues. F. Prerequisite: Admission to the Conservation Leadership program. Students must enroll in NR 540A-D concurrently.

A) Water Resources 02(1-2-0). B) Biological Diversity 02(1-2-0). C) Ecologic Reconciliation 02(1-2-0). D) Ecosystem Services 02(2-0-0).

NR 541 02(2-0-0). Conservation Policy, Finance, and Governance. F. Prerequisite: Admission to the Conservation Leadership program.

Overview of conservation policy, finance, and governance issues at the local, national, and international levels.

NR 542 02(2-0-0). Global Change and Conservation. F. Prerequisite: Admission to the Conservation Leadership program.

Potential ecological, societal, and economic impacts of global change across scales in the context of conservation.

NR 543A 02(2-0-0). Catalyzing Change: Conflict and Conservation. F. Prerequisite: Admission to the Conservation Leadership program.

Communication, conflict management, group decision-making theories and tools to effectively create change in the field of conservation.

NR 543B 02(2-0-0). Catalyzing Change: Collaborative Conservation. F. Prerequisite: Admission to the Conservation Leadership program.

Collaborative communication theories, methods, and tools to effectively create change in the field of conservation.

NR 544A-E. Conservation Methods. S. Prerequisite: Admission to the Conservation Leadership program. Students must enroll in NR 544A-E

concurrently.

A) Watershed sciences. 01(1-0-0). B) Ecological sciences. 01(1-0-0). C) Social sciences. 01(1-0-0). D) Spatial information. 01(1-0-0). E) Integrative field work. Var [2-4].

NR 545 02(2-0-0). Multi-level Views of Society and Conservation. S. Prerequisite: Admission to the Conservation Leadership program.

Myriad and often opposing views of societal and environmental problems across cultures and across scales.

NR 546 02(2-0-0). Human Ecosystem Context. SS. Prerequisite: Admission to the Conservation Leadership program.

Background for field site-specific conservation: ecosystems, peoples, politics, and development.

NR 547 02(2-0-0). Poverty and Sustainable Development. SS. Prerequisite: Admission to the Conservation Leadership program.

Theoretical and methodological tools to analyze the interactions between poverty and sustainable development in the field site country.

NR 548 02(2-0-0). Conservation Planning and Management. SS. Prerequisite: Admission to the Conservation Leadership program.

Fundamental theories and management practices of protected areas in the context of southern Mexico.

NR 549A Var[1-3]. Conservation/Systems Leadership., S, SS.. Prerequisite: Admission to the Conservation Leadership program.

Conservation leadership development by exposure to leadership models, theories, case studies, assessments and trainings.

NR 549B Var[1-3]. Conservation/Systems Leadership: Field. SS. Prerequisite: Admission to the Conservation Leadership program.

Effective environmental leadership across cultures through exposure to leadership models, theories, case studies, assessments and trainings.

NR 550 03(3-0-0). Sustainable Military Lands Management. F, S, SS. Prerequisite: Completed undergraduate degree.

Overview of military lands in the U.S.—historical, geographical, environmental—and evolution of military lands as part of the federal lands system. (NT-O)

NR 551 03(3-0-0). Cultural Resource Mgmt on Military Lands. F, S, SS. Prerequisite: Completed undergraduate degree; NR 550.

Intro to cultural resource laws and policies for broad range of heritage resources, prehistoric and historic, with emphasis on tools and techniques. (NT-O).

NR 552 03(3-0-0). Ecology of Military Lands. F, S, SS. Prerequisite: Completed undergraduate degree; NR 550.

Landscape ecology of military lands with emphasis on ecological processes and principles as related to militarily-induced disturbances. (NT-O)

NR 554/ANTH 554 03(2-2-0). Ecological and Social Agent-based Modeling. S. Prerequisite: Junior or senior standing. For upper level undergraduates. Credit not allowed for both NR 554 and ANTH 554.

Exploring the use and making of agent-based models featuring interacting individuals in ecological and social simulation, with examples and projects.

NR 555 02(2-0-0). Preparation of Grant Proposals. S. Prerequisite: STAT 301; one course in ecology.

Idea development, preparation, writing, and presentation of research proposals in natural resources.

NR 561 02(2-0-0). Habitat Evaluation Procedures. F, S, SS. Prerequisite: General biological, natural resources, or planning course work.

Rationale, philosophy, and use of habitat as a mechanism for conducting environmental impact assessments.

NR 575 04(3-2-0). Systems Ecology. F. Prerequisite: MATH 255; RS 452;

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

STAT 340.

Modeling and computer simulation for describing and integrating ecosystem concepts.

NR 578 03(3-0-0). Ecology of Disturbed Lands. S. Prerequisite: LAND 220/LIFE 220; SOCR 240. Credit not allowed for both RS 578 and NR 578.

Analysis of basic and applied ecological principles involved in the restoration of drastically disturbed lands.

NR 592 Var. Seminar in Natural Resources.

NR 600 02(1-0-1). Advanced Public Relations in Natural Resources. S. Prerequisite: NR 400.

Public relations aspects of current natural resource management programs; case history approach.

NR 621 03(1-4-0). Design of Geographic Information Systems. F. Prerequisite: CS 110; LAND 520 or NR 322

Algorithms, procedures, and applications of spatial data handling and spatial analysis.

NR 622 03(2-2-0). Analysis of Environmental Impact. F. Prerequisite: Written consent of instructor.

Preparation and evaluation of environmental impact statements.

***NR 625 03(0-0-3). Community-Based Natural Resource Management.** S. Prerequisite: 1 upper division course in natural resource ecology, management, or social science.

History, theory, practice, and evaluation of community-based natural resource management.

NR 660 03(3-0-0). Biogeochemical Cycling in Ecosystems. S. Prerequisite: CHEM 245; SOCR 240; one course in advanced ecology.

Biotic and abiotic processes responsible for distribution and fluxes of elements at ecosystem, landscape, and global scales.

NR 676 04(3-2-0). Ecological Models. S. Prerequisite: NR 575.

Model development for ecosystems, subsystems; deterministic, stochastic models; validation, sensitivity analysis.

NR 678 04(3-0-1). Advanced Ecological Restoration. S. Prerequisite: BZ 450 or F 311 or LAND 220/LIFE 220; SOCR 240. Credit not allowed for both RS 478 and NR 678.

Analysis of environmental factors influencing restoration of disturbed lands and practices for successful restoration of disturbed ecosystems.

NR 684 Var [1-5]. Supervised College Teaching. Prerequisite: Written consent of instructor.

NR 687 Var [1-8]. Natural Resources Internship. Prerequisite: Written consent of instructor.

Field experience and exercises in international natural resources management.

NR 693 Var[1-2]. Natural Resources Stewardship Seminar. F. Prerequisite: Must be enrolled in the Master of Natural Resources Stewardship (Plan C) program.

Invited speakers will present different perspectives on natural resources.

NR 793 01(0-0-1). Seminar on Remote Sensing and GIS. Prerequisite: NR 322 or NR 323/GR 323 or NR 503/GR 503 or NR 505.

Techniques, use of remote sensing, GIS technologies for forest, range, wildlife, water, geology, recreation, and other resource management applications.

NATURAL RESOURCE RECREATION AND TOURISM COURSES

Department of Human Dimensions of Natural Resources *Warner College of Natural Resources*

NRRT 100 03(3-0-0). Foundations of Recreation and Tourism. F.

Current concepts, terminology, suppliers, and the social, economic, and personal benefits from recreation, leisure, and tourism.

NRRT 231 03(3-0-0). Principles-Parks/Protected Area Management. F.

Tools and strategies used by managers in parks and protected areas.

NRRT 262 03(3-0-0). Principals of Environmental Communications. S.

Principals of environmental communication, education, and interpretation for managing natural and cultural resources.

NRRT 270 03(3-0-0). Principles of Natural Resource Tourism. F, SS.

Tourism and private commercial outdoor recreation industry in America. (NT_O)

NRRT 320 03(3-0-0). International Issues-Recreation and Tourism. F, S.

History, development, and preservation of international parks, preserves, tourist and historical sites. (NT-O)

NRRT 321 03(1-3-1). Travel Abroad-Marine Ecotourism-Bahamas. SS.

Prerequisite: Minimum GPA of 2.500; ability to swim; passport; three credit natural science course.

Environmental and socio-cultural aspects of marine ecotourism in the Bahamas.

NRRT 330 03(3-0-0). Social Aspects of Natural Resource Management. F, S.

Conceptual frameworks of human dimension research and its application to resource management decisions.

NRRT 331 03(2-3-0). Management of Parks and Protected Areas. S.

Prerequisite: NRRT 231; NRRT 330.

Comprehensive assessment of problems confronted by park professionals and the techniques and tools applied to their solution. (\$)

NRRT 350 03(2-2-0). Wilderness Leadership. F.

Practical and philosophical aspects of wilderness usage including safety, group dynamics, and backcountry skills.

NRRT 351 03(2-2-0). Wilderness Instructors. S.

Preparation to safely lead and instruct groups in outdoor wilderness programs; further refine skills including judgment and leadership.

NRRT 360 03(3-0-0). Group Decision Making. F. Prerequisite: NRRT 262.

Theoretical, critical, and practical approaches to group decision making, collaboration, and teamwork related to natural resource management.

NRRT 361 03(3-0-0). Natural Resources and the Media. S. Prerequisite: NRRT 262.

Representations of the environment in the media and strategies for effective media relations about natural resource issues.

NRRT 362 03(3-0-0). Environmental Conflict Management. F. Prerequisite: NRRT 262.

Theoretical, critical, and practical approaches to negotiation, mediation, and conflict management strategies related to natural resources.

NRRT 363 03(2-2-0). Outdoor Recreation Programming. F, S. Prerequisite: NRRT 231 or NRRT 270.

Develop administrative and program planning skills for private, public,

and nonprofit recreation/tourism organizations.

NRRT 370 03(3-0-0). Managing Tourism in the E-Commerce Era. F, S. Prerequisite: NRRT 270.

E-commerce foundations, business models, and practices in the recreation and travel industry.

NRRT 371 03(2-1-0). Techniques in Interpretation. F. Prerequisite: NRRT 262.

Intermediate techniques in interpretation including exhibit design and construction, personal program development and visitor studies.

NRRT 372 03(3-0-0). Tourism Promotion. F, S. Prerequisite: NRRT 270.

Planning development and implementation of marketing programs specifically applied to the recreation, travel, and tourism industries.

NRRT 375 03(2-2-0). Budgeting and Revenue Resources. F. Prerequisite: NRRT 231 or NRRT 270.

Budget development, presentation, types, techniques; computer-aided budgeting using spread sheets; revenue generating sources.

NRRT 376 03(2-2-0). Human Dimensions Research and Analysis. F, S. Prerequisite: STAT 201.

Application of human dimensions (recreation) research and analysis techniques to natural resource issues.

NRRT 384 Var. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

+NRRT 431 03(3-0-0). Park and Protected Area Management. S. Prerequisite: NRRT 231; NRRT 331.

Park management practices; preparation of park operation plans. (\$)

NRRT 432 01. Foundations of Forest Recreation. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

History, philosophy, role, and sources of information of the Forest Service and National Forest System. (NT-C)

NRRT 433 04. Meeting Needs of Recreation Users. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

Visitor behavior, communications and conflicts, working with volunteers, programs, partnerships, quality service, and role of interpretive services. (NT-C)

NRRT 434 03. Recreation Special Uses and Appeals. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

Special use benefits, authorities, planning, terms and conditions, administration and kinds, appeal review, discretionary review and decisions. (NT-C)

NRRT 435 03. Trails, Facility Design, Operation, Maintenance. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

Trail planning, development, maintenance; recreation site planning, design operation, maintenance; visitor and resource protection. (NT-C)

NRRT 436 02. Recreation, Visual, Cultural Resource Management. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

Economic analysis, recreation opportunity spectrum, visual and cultural resource management. (NT-C)

NRRT 437 02. Off-Road Vehicle, River, and Winter Recreation. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

History, authorities, planning, management, and coordination of off-road, river, and winter recreation. (NT-C)

NRRT 438 02. Management of Wilderness. F, S, SS. Prerequisite:

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Written consent of instructor. Offered as correspondence course only.

Forest Service role, management principles, legislative differences, components, public education, visitor management, and wilderness management skills. (NT-C)

NRRT 439 03(3-0-0). Open Space and Natural Area Management. S. Prerequisite: NR 440 or NRRT 331.

Acquisition of, planning for, and management of local government and private open space and natural areas.

NRRT 441 03(2-2-0). Spatial Analysis of Protected Areas. S. Prerequisite: NRRT 231.

Spatial analytical techniques used in planning and managing protected areas, including locating, managing, and assessing parks.

NRRT 442 03(3-0-0). Tourism Planning. F, S. Prerequisite: NRRT 270. Planning for regional tourism resources and programs.

NRRT 450 03. Wilderness Philosophy and Ethic Development. F, S, SS. Offered as correspondence course only.

History, philosophical origin, ethics, and international context of wilderness; history of conservation movement. (NT-C)

NRRT 451 03. National Wilderness Preservation System. F, S, SS. Prerequisite: NRRT 450. Offered as correspondence course only.

Early history and key components of the Wilderness Act, wilderness legislation since 1964, and related natural systems. (NT-C)

NRRT 452 04. Management of the Wilderness Resource. F, S, SS. Prerequisite: NRRT 451. Offered as correspondence course only.

Ecosystem characteristics, basic principles of wilderness management, and management of specific resources and nonconforming uses. (NT-C)

NRRT 453 03. Management of Recreation Resources. F, S, SS. Prerequisite: NRRT 451. Offered as correspondence course only.

Managing for quality visitor experiences and for minimal recreation impacts; techniques for wilderness education/information. (NT-C)

NRRT 454 03. Wilderness Management Planning. F, S, SS. Prerequisite: NRRT 451. Offered as correspondence course only.

Agency differences in planning, basic planning concepts, and the Limits of Acceptable Change. (NT-C)

NRRT 455 03. Wilderness Management Skills and Projections. F, S, SS. Prerequisite: NRRT 451. Offered as correspondence course only.

Using primitive means to achieve management objectives, no-trace camping methods and volunteers, and expectations for the future. (NT-C)

NRRT 457 03. Off-Highway Vehicle Recreation in America. F, S, SS. Offered as correspondence course only.

Overviews the supply and demand of off-highway vehicle recreation. (NT-C)

NRRT 458 03. Planning for Off-Highway Vehicle Recreation. F, S, SS. Prerequisite: NRRT 457. Offered as correspondence course only.

Develop working knowledge of the planning tools, concept, and process for off-highway vehicle recreation. (NT-C)

NRRT 459 03. Managing Off-Highway Vehicle Recreation. F, S, SS. Prerequisite: NRRT 457. Offered as correspondence course only.

Developing working knowledge of the management tools, techniques, trends, and challenges with off-highway vehicle recreation. (NT-C)

NRRT 460/RRM 460 03(3-0-0). Event and Conference Planning. S. Prerequisite: NRRT 270 or RRM 101. Credit not allowed for both NRRT 460 and RRM 460.

Foundation in planning, organizing, and producing special events and conferences. Functions and strategies necessary for effective event management.

NRRT 462 03(3-0-0). Environmental Communication-Natural

Resources. S. Prerequisite: NRRT 262.

Exploration and application of theories, concepts, and techniques for successful environmental communication in natural resources.

NRRT 463 03(3-0-0). Non-Profit Administration in Conservation. S. Prerequisite: NRRT 231; NRRT 262.

Role of NGOs in protected-area management and conservation education; models for development, including grant writing, in conservation.

NRRT 470 03(3-0-0). Tourism Impacts. F, S. Prerequisite: NRRT 270.

Social, cultural, physical, and economic impacts of tourism; techniques for assessing impacts.

NRRT 471 03(3-0-0). Starting and Managing Tourism Enterprise. F, S. Prerequisite: NRRT 231 or NRRT 262 or NRRT 270.

Aspects of starting and managing a tourism enterprise.

NRRT 473 03(3-0-0). Ski Area Management. F, S. Prerequisite: NRRT 270; senior status.

Ski area management; history and trends, ski area operations, human resource management, environmental issues, liability, resort planning and design.

NRRT 483 Var [1-18]. Off-Campus Study.

NRRT 487 Var. Internship.

NRRT 495A-C Var. Independent Study.

A) Administration. B) Management. C) Interpretation.

NRRT 496 Var. Group Study.

NRRT 499 Var. Senior Thesis.

Independent research project culminating in thesis presented to faculty mentor.

NRRT 504 02(2-0-0). Water-Based Recreation. S. Prerequisite: Written consent of instructor.

Identify issues and management strategies for recreation utilization of water resources.

NRRT 505 03(3-0-0). Environmental Education History and Theory. F, S, SS. Prerequisite: Upper-division course in natural resources.

History and theories, planning and instruction; outcomes; historical events; ecological literacy, experiential learning models. (NT-O)

NRRT 506 03(3-0-0). Methods in Environmental Education Research. F, S, SS. Prerequisite: Upper-division course in natural resources.

Research methods and designs; literature reviews, needs assessments and program evaluation of environmental education in informal settings. (NT-C)

NRRT 507 03(3-0-0). Environmental Education Planning. F, S, SS. Prerequisite: One upper-division course in natural resources, biological sciences, or ecology.

Informal learning theory; evaluation models focused on education in informal settings such as nature centers, zoos, etc. (NT-C)

NRRT 508 03(3-0-0). Current Issues in Environmental Education. F, S, SS. Prerequisite: One upper-division course in natural resources, biological sciences, or ecology.

Impact of current events, legislation, demographic changes, and other events on informal environmental education. (NT-C)

NRRT 509 03(3-0-0). Science Education in Informal Settings. S, SS. Prerequisite: Upper division course in natural resources or related field. NOTE: This course does not count towards State teacher licensure.

Theory, application of teaching environmental science in informal settings – nature centers, zoos, etc. Inquiry, safety, group management,

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

experience.

NRRT 550 03(3-0-0). Ecotourism. S. Prerequisite: NRRT 470.

Concept of ecotourism, impacts associated with ecotourism, and role of education/interpretation in mitigating these impacts.

NRRT 565 03(3-0-0). Research-Human Dimensions Natural Resources. F.

Theory, research, literature review, hypothesis development, scientific writing, proposal development.

NRRT 600 02(0-0-2). Tourism Industry Concepts and Practices. F.

Prerequisite: Graduate standing. Offered only as an online course. This is a partial semester course.

Primary conceptual issues of contemporary tourism important to comprehend the practice of tourism. (NT-O)

NRRT 601 02(0-0-2). Tourism Quantitative Analysis I. S. Prerequisite:

STAT 312; graduate student standing. Offered only as an online course. This is a partial semester course.

Statistical techniques used by researchers to inform and support tourism decision-making. (NT-O)

NRRT 602 02(0-0-2). Tourism Quantitative Analysis II. S. Prerequisite:

Graduate student standing. Offered only as an online course. This is a partial semester course.

Explores the domestic and international sources of data and their applications for decision-making in tourism. (NT-O)

NRRT 605 03(3-0-0). Human Dimensions of Natural Resources Theory.

S.

Application of theories and conceptual approaches from social sciences to study of recreation behavior and natural resource issues.

NRRT 610 02(0-0-2). Natural Resource Management and Tourism. F.

Prerequisite: Graduate student standing. Offered only as an online course. This is a partial semester course.

Connection between the management of tourism resources and the changing conditions of the natural world. (NT-O)

NRRT 615 02(0-0-2). Sustainable Tourism Development Foundations.

F. Prerequisite: Graduate student standing. Offered only as an online course. This is a partial semester course.

Theory, practice, history, terminology and issues surrounding sustainable tourism development. (NT-O)

NRRT 625 02(0-0-2). Communication/Conflict Management in Tourism. S. Prerequisite: Graduate student standing. Offered only as an

online course. This is a partial semester course.

Negotiation tools for effective organizational communication/conflict management in tourism.

(NT-O)

NRRT 655 02(0-0-2). Tourism Marketing Concepts and Applications.

F. Prerequisite: Graduate student standing. Offered only as an online course. This is a partial semester course.

Marketing processes as they apply to travel and tourism. (NT-O)

NRRT 662 02(0-0-2). Global Tourism Policy. S. Prerequisite: Graduate

student standing. Offered only as an online course. This is a partial semester course.

Major global policies, trends, and challenges facing the travel and tourism industry. (NT-O)

NRRT 665 03(2-2-0). Survey Research and Analysis. S. Prerequisite:

NRRT 565; STAT 301.

Survey research, design, and analysis in human dimensions of natural resources.

NRRT 666 03(3-0-0). Qualitative Research in NRRT. Prerequisite:

NRRT 565.

Qualitative approaches to tourism research and techniques from a range

of disciplinary backgrounds; methodological aspects.

NRRT 671 02(0-0-2). Strategic Management for Travel and Tourism.

S. Prerequisite: Graduate standing. Offered only as an online course. This is a partial semester course.

Factors, tools, and techniques for strategic management of a travel and tourism business or organization. (NT-O)

NRRT 679A-B 01(0-0-1). Current Topics in Nature-Based Tourism. F.

S. Prerequisite: Graduate standing. Students will enroll in this course during both the Fall and Spring semesters.

Current topics in nature-based travel and tourism.

A) Fall. B) Spring.

NRRT 695A-D Var. Independent Study.

A) Administration. B) Management. C) Interpretation. D) Landscape planning.

NRRT 698 Var. Research.

NRRT 699 Var. Thesis.

NRRT 765 03(2-2-0). Applied Multivariate Analysis. F. Prerequisite:

NRRT 665.

Application and interpretation of multivariate statistics to human dimensions in natural resources, recreation, and tourism.

NRRT 784 Var. Supervised College Teaching.

NRRT 798 Var. Research.

NRRT 799 Var. Dissertation.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

NATURAL SCIENCES COURSES

Nondepartmental

College of Natural Sciences

NSCI 192 02(0-0-2). Introductory Seminar. F.

Introduction to the culture and values of science and the College of Natural Sciences.

NSCI 295 Var [1-3]. Independent Study-Natural Sciences. Prerequisite: Written consent of Natural Sciences Dean's Office.

NSCI 296 Var [1-3]. Group Study-Natural Sciences. Prerequisite: Written consent of Natural Sciences Dean's Office.

NSCI 298 Var [1-3]. Undergraduate Research-Natural Sciences. Prerequisite: Written consent of Natural Sciences Dean's Office.

NSCI 384 Var [1-3]. Supervised College Teaching. F, S. Prerequisite: Written consent of instructor. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Supervised experience in computer lab.

NSCI 487 Var [1-3]. Internship-Natural Sciences. Prerequisite: Written consent of Natural Sciences Dean's Office.

NSCI 495 Var [1-3]. Independent Study-Natural Sciences. Prerequisite: Written consent of Natural Sciences Dean's Office.

NSCI 496 Var [1-3]. Group Study-Natural Sciences. Prerequisite: Written consent of Natural Sciences Dean's Office.

NSCI 498 Var [1-3]. Undergraduate Research-Natural Sciences. Prerequisite: Written consent of Natural Sciences Dean's Office.

NSCI 579/VS 579 03(3-0-0). Animal Behavior in Captive Populations. F, S. Prerequisite: Enrollment in the M.P.N.S., Zoo, Aquarium and Shelter Management specialization, or BZ 300. Credit not allowed for both NSCI 579 and VS 579.

How animals learn, perceive their world, and behave, and how all of those intersect to alter behavior in captive settings.

NSCI 590A-G. Workshop in Instruction.

A) Science instruction in rural Colorado. Var [1-3]. Concurrent registration not allowed in NSCI 590A-B and EDUC 591B. **B)** Mathematics instruction in rural Colorado. Var [1-3]. Concurrent registration not allowed in NSCI 590A-B and EDUC 591B. **C)** Small-scale science-teachers as researchers. 04(2-4-0). **D)** Colorado science teacher enhancement project. 07(7-0-0). **E)** Summer mathematics. 03(3-0-0). **G)** Small-scale chemistry. 02(1-2-0).

NSCI 596 Var [1-3]. Small-Scale Science Group Study.

NSCI 610 03(2-2-0). Team Research in Quantitative Ecology. S. Prerequisite: Written consent of instructor.

Interdisciplinary team-based research aimed at studying real life models in quantitative ecology using mathematical and statistical tools.

NSCI 619 03(1-3-1). Physics for Science Educators. F, S, SS. Prerequisite: Admission into the MNS program.

Materials and energy transduction for grade 6-12 science teachers, with emphasis on optics, acoustics, and electromagnetism. (NT-O)

NSCI 620 03(1-3-1). Chemistry for Science Educators. F, S, SS. Prerequisite: Admission into the MNS program.

Theoretical and experimental chemistry for grade 6-12 science teachers, with emphasis on water chemistry. (NT-O)

NSCI 630 03(1-3-1). Spectroscopy for Science Educators. F, S, SS. Prerequisite: Admission into the MSN program.

Theory and applications of spectroscopy for grade 6-12 science teachers. (NT-O)

NSCI 640 03(1-3-1). Energetics for Science Educators. F, S, SS. Prerequisite: Admission into the MNS program.

Production and use of energy for grade 6-12 science teachers, with emphasis on chemical and biological systems. (NT-O)

NSCI 650 03(1-3-1). Pollution and Environmental Biology for Educators. F, S, SS. Prerequisite: Admission to the MNS program. (NT-O)

NSCI 660 03(0-0-3). Evolutionary Biology for Educators. F, S, SS. Prerequisite: Admission to Master of Natural Sciences Education (M.N.S.E.) degree program.

Evolutionary theory, with an emphasis on innovative methods for teaching evolutionary biology in grades 6-12. (NT-O)

NSCI 693 01(0-0-1). Seminar --MPNS. F, S, SS. Prerequisite: Enrollment in the MPNS program.

Students will present and discuss current research relevant to their specializations and present results of their internships and group projects.

NSCI 695 03(0-0-3). Independent Study for the MNSE, SS. Prerequisite: NSCI 698 and written consent of instructor.

Independent study based on review of the primary scientific literature in biology, chemistry, or physics.

NSCI 696A-C Var[1-6]. Group Study. F, S, SS..

A) Science and Mathematics Education. Prerequisite: Enrollment in the MNSE program. **B)** MPNS Internship Preparation. Prerequisite: Enrollment in the MPNS program. **C)** MPNS Internship-related Project. Prerequisite: Enrollment in the MPNS program.

NSCI 698 07(0-0-7). Research Experience in Natural Sciences. SS. Prerequisite: Nine credits MNSE program coursework.

Research experience in biology, chemistry, or physics.

OCCUPATIONAL THERAPY COURSES

Department of Occupational Therapy College of Applied Human Sciences

OT 110 03(3-0-0). Introduction to Occupational Therapy. F, S, SS.
Roles and activities in occupational therapy. (NT-O)

OT 215 01(0-0-1). Medical Terminology. F, S.
Definition and use of medical terms. (NT-O)

OT 355 02(1-0-1). Handicapped Individual in Society. F, S. Prerequisite: PSY 100 or SOC 100.
Description and exploration of handicapping conditions; review of support systems including legal and financial implications.

OT 450 03(0-6-0). Biomechanics of Human Occupation. S, SS.
Prerequisite: Minimum of 4 credits of either combined anatomy and physiology or human anatomy at the 200-level or higher; concurrent registration allowed.

Exploration of performance of the activities of daily living in context as impacted by function/dysfunction of the human musculoskeletal system. (NT-O)

OT 590 Var [1-9]. Workshop.

OT 597 Var. Group Study.

OT 601 03(1-0-2). Occupation and Rehabilitation Science I. F.
Prerequisite: Admission to master's degree program in occupational therapy.

Multidisciplinary perspectives on human performance and participation in everyday occupations.

OT 602 03(2-0-1). Theory and Models of Practice. S. Prerequisite: Admission to program.

Critical analysis of occupational therapy theory base including history, philosophy, and models of practice.

OT 606 02(0-0-2). Occupation and the Individual. F. Prerequisite: Admission to program.

Exploration and study of human occupation and activity, humans as occupational beings, health and well-being across the life span. (\$)

OT 607 02(0-0-2) Indirect Intervention and Consultation. S.
Prerequisite: OT 608; OT 609.

Delivery of OT using educational and consultative approaches.

OT 608 03(3-0-0). Occupational Therapy Process. F. Prerequisite: Concurrent registration in OT 609.

Professional reasoning and skills associated with the design and delivery of occupational therapy services.

OT 609 01(0-2-0). Occupational Therapy Process Laboratory. F.
Prerequisite: Concurrent registration in OT 608.

Application of OT reasoning and skills associated with the design and delivery of OT services defined as the OT process.

OT 610 03(0-2-2). Professional Decision Making. F. Prerequisite: Admission to master's degree program in occupational therapy.

Exploration of the thought processes occupational therapists use when determining how best to address clients' needs.

OT 611 03(0-0-3). Reflective and Evidence-Based Practice. F.
Prerequisite: OT 687 or sufficient exposure in fieldwork to contribute to and complete course requirements.

Development of reflective and evidence-based practice skills through integrating and synthesizing fieldwork experiences in OT practice.

OT 612 03(3-0-0). Psychosocial Intervention I. S. Prerequisite:

Concurrent registration in OT 613.

Evaluation and treatment principles embedded within practice models that address psychiatric occupational therapy I.

OT 613 01(0-2-0). Psychosocial Intervention Laboratory I. S.
Prerequisite: Concurrent registration in OT 612.

Application of practice models for psychiatric occupational therapy I.

OT 614 03(3-0-0). Psychosocial Intervention II. F. Prerequisite: OT 612; concurrent registration in OT 615.

Evaluation and treatment principles embedded within practice models that address psychiatric occupational therapy II.

OT 615 01(0-2-0). Psychosocial Intervention Laboratory II. F.
Prerequisite: OT 612; concurrent registration in OT 614.

Application of practice models for psychiatric occupational therapy II.

OT 620 03(3-0-0). Research to Practice I. F. Prerequisite: Admission to master's degree program in occupational therapy.

Critically evaluate qualitative and quantitative research processes pertaining to individuals.

OT 621 03(1-2-1). Occupational Performance: Infancy-Childhood. F.
Prerequisite: OT 687.

Optimizing occupational performance and participation for infants and children within a contextual framework.

OT 622 03(3-0-0). Biomechanical Intervention I. F. Prerequisite: Course in gross human anatomy; concurrent registration in OT 623.

Occupational therapy principles related to the analysis and assessment of human movement and occupational performance. (\$)

OT 623 01(0-2-0). Biomechanical Intervention Laboratory I. F.
Prerequisite: Course in gross human anatomy; concurrent registration in OT 622.

Application of occupational therapy biomechanical principles and techniques related to the assessment of human movement and occupational performance. (\$)

OT 624 03(3-0-0). Biomechanical Intervention II. S. Prerequisite: OT 622; concurrent registration in OT 625; evidence of professional liability insurance..

Theory and practice related to occupational performance, assessment, and intervention for individuals with biomechanical impairments. (\$)

OT 625 01(0-2-0). Biomechanical Intervention Laboratory II. S.
Prerequisite: OT 622; concurrent registration in OT 624.

Application of theory related to occupational performance and occupational therapy process for individuals with biomechanical impairments. (\$)

OT 630 03(1-2-1). Occupational Performance: Adult to Old Age I. S.
Prerequisite: OT 610; OT 620. Corequisite: OT 660 and OT 686C must be taken concurrently.

Optimizing performance for adults and older adults with attention to roles, satisfaction, competence and activities.

OT 631 03(0-0-3). Program Assessment and Development. F.
Prerequisite: OT 687.

Assessment of program strengths and needs, followed by development of proposals to support occupational performance and participation.

OT 632 03(3-0-0). Neurobehavioral Intervention I. F. Prerequisite: OT 608; concurrent registration in OT 633.

Application of theory and practice concepts related to occupational performance, assessment and intervention with children with neurological deficits.

OT 633 01(0-2-0). Neurobehavioral Intervention Laboratory I. F.
Prerequisite: OT 608; concurrent registration in OT 632.

Application of concepts related to occupational performance,

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

assessment, and intervention with children who have various neurological deficits. (\$)

OT 634 03(3-0-0). Neurobehavioral Intervention II. S. Prerequisite: OT 632; concurrent registration in OT 635.

Theory and practice related to occupational performance, assessment, intervention, and prevention for adults with neurological deficits. (\$)

OT 635 01(0-2-0). Neurobehavioral Intervention Laboratory II. S. Prerequisite: OT 632; concurrent registration in OT 634; evidence of professional liability insurance.

Application of theory and practice concepts related to occupational performance, assessment, and intervention for adults with neurological deficits.

OT 640 03(3-0-0). Research to Practice II. S. Prerequisite: OT 620.

Critically evaluate qualitative and quantitative research processes pertaining to groups and systems.

OT 641 03(1-0-2). Occupation and Rehabilitation Science II. S.

Prerequisite: OT 601; OT 621; OT 631.

Explore historical evolution of topics and the link to future implications for and growth of occupation and rehabilitation science.

OT 645 03(0-0-3). Leadership and Administration. F. Prerequisite: OT 646 or degree in occupational therapy.

Leadership and administration processes applied in occupational therapy.

OT 646 03(0-0-3). Program Development, Funding and Evaluation. S.

Conducting needs assessments for programs, developing new programs, obtaining funding and designing and conducting program evaluation.

OT 650 03(3-0-0). Research Methods I. F. Prerequisite: Admission to M.S. program.

Quantitative and qualitative research methodologies as applied in occupational therapy.

OT 651 03(3-0-0). Research Methods II. S. Prerequisite: OT 650.

Data analysis, interpretation of research in occupational therapy and related fields.

OT 660 03(1-2-1). Occupational Performance: Adult to Old Age II. S.

Prerequisite: OT 610; OT 620. Corequisite: OT 630 and OT 686C must be taken concurrently.

Optimizing occupational performance for adults and older adults with attention to activities and skills.

OT 661 03(1-2-1). Occupational Performance: Adolescent-Young Adult. S.

Prerequisite: OT 621. Corequisite: OT 686D must be taken concurrently.

Optimizing occupational performance and participation for youth and young adults within a contextual framework.

OT 670 03(3-0-0). Evidence-Based Practice Research. F, S. Prerequisite: OT 651.

Participating in an instructor-driven research project through experiential learning in a teamwork context. (\$)

OT 684 Var. Supervised College Teaching. F, S.

OT 686A-E, Fieldwork I. Prerequisite: Evidence of professional liability insurance.

Level I fieldwork in various settings.

A) OT Process Var[1-4]. F, S, SS. Prerequisite: Admission to OT master's degree program. B) Seminar 03(0-2-2). F, S. Prerequisite: Successful completion of all first year courses. C) Adult to Old Age Var[1-4]. S, SS. Prerequisite: OT 686A; OT 610. Corequisite: OT and OT 660 must be taken concurrently. D) Infancy to Young Adult Var[1-4]. S. Prerequisite: OT 687; OT 621. Corequisite: OT 661 must be taken concurrently. E) Special Interest Var[1-4]. F, S, SS. Prerequisite: OT

686A.

OT 687A-T Var[1-12]. Fieldwork IIA. F, S, SS. Prerequisite: Evidence of professional liability insurance; successful completion of first year of OT master's courses and approval of department head.

Level II fieldwork in various settings.

A) Acute In-Patient. B) Rehab In-Patient. C) SNF/Acute LTC. D) General Rehab Out-Patient. E) Hand Therapy Hospital Out-Patient. F) Hand Therapy Private Out-Patient. G) Psych In-Patient. H) Combined Practice. M) Behavioral Health Community. N) Older Adult Community. O) Older Adult Day Program. P) Adult Day Program. Q) Home Health. T) Other.

OT 688A-T Var[1-12]. Fieldwork IIB. F, S, SS. Prerequisite: Evidence of professional liability insurance; successful completion of all coursework and approval of department head or degree in Occupational Therapy.

A) Acute In-Patient. B) Rehab In-Patient. C) Skilled Nursing Facility/Acute Long-Term Care. D) General Rehab Out-Patient. E) Hand Therapy Hospital Out-Patient. F) Hand Therapy Private Out-Patient. G) Psych In-Patient. H) Combined Practice. I) Pediatric Hospital/Unit. J) Pediatric Hospital Out-Patient. K) Pediatric Community. L) Pediatric Out-Patient Clinic. M) Behavioral Health Community. N) Older Adult Community. O) Older Adult Day Program. P) Adult Day Program. Q) Home Health. R) School Early Intervention. S) School (P-12). T) Other.

OT 690 Var [1-9]. Workshop.

OT 692 Var. Seminar.

OT 694 Var. Independent Study.

OT 696 Var. Group Study.

OT 698 Var. Research.

OT 699 Var. Thesis.

OT 701 03(0-0-3). Occupation and Rehabilitation Science III. F. Prerequisite: OT 640 or 3 credits quantitative and 3 credits qualitative research; OT 641.

Investigation of the intersection of occupational science and rehabilitation science research situated in various paradigms.

OT 710 03(0-0-3). Teaching Occupation and Rehab Science. S. Prerequisite: Written consent of instructor.

Design and implementation of teaching and learning philosophies and approaches in occupation and rehabilitation science contexts.

OT 784 Var[1-4]. Supervised College Teaching. F, S, SS. Prerequisite: Admission into a PhD program.

OT 786 Var[1-9]. Practicum. F, S, SS. Prerequisite: Concurrent enrollment in OT 620 or 3 credits of qualitative research.

OT 792 Var[1-3]. Seminar. F, S, SS. Prerequisite: Admission into a PhD program.

OT 794 Var[1-6]. Independent Study. F, S, SS. Prerequisite: Admission into a PhD program.

OT 796 Var[1-6]. Group Study. F, S, SS. Prerequisite: Admission into a PhD program.

OT 799 Var[1-15]. Dissertation. F, S, SS. Prerequisite: None.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

PERFORMING ARTS COURSES

Department of Music, Theatre, and Dance *College of Liberal Arts*

PF 110 03(2-0-1). Performing Arts Around the World. F.

Music, theatre, and dance traditions via exploration of a broad range of representative cultures.

PF 250 02(1-3-0). Performing in Musical Theatre. S. Prerequisites: MU 272Q; TH 151 or D 120A or D 120B or D 120C.

Skills and techniques used in music, theatre, and dance. Brief history and technical production overview of musical theatre.

PHYSICS COURSES

Department of Physics *College of Natural Sciences*

PH 110 03(3-0-0). Descriptive Physics. (GT-SC2, AUCC 3A). F, S, SS. Credit not allowed for both PH 110 and PH 121.

Conceptual aspects of physics applied to phenomena in everyday life and to problems in other fields of science.

PH 111 01(0-2-0). Descriptive Physics Laboratory. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: PH 110 or concurrent registration.

Experiments dealing with basic physics concepts including explorations of everyday phenomena.

PH 121 05(3-2-1). General Physics I. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: MATH 125 or concurrent registration. Credit not allowed for both PH 121 and PH 110; or for both PH 121 and PH 141.

Concepts of force, torque, energy, momentum, work used to cover fluids, waves, sound, temperature, heat; biological, physical examples (noncalculus). (GT-SC1)

PH 122 05(3-2-1). General Physics II. (GT-SC1, AUCC 3A). F, S. Prerequisite: PH 121. Credit not allowed for both PH 122 and PH 142.

Electricity including electrostatics and simple circuits; magnetism; optics; nuclear physics; radiation; biological, physical examples (noncalculus).

PH 141 05(3-2-1). Physics for Scientists and Engineers I. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: (MATH 126 or concurrent registration; MATH 155 or concurrent registration) or MATH 160 or concurrent registration. Credit not allowed for both PH 141 and PH 121.

Forces, energy, momentum, angular momentum, oscillations, waves, heat, thermodynamics (calculus based).

PH 142 05(3-2-1). Physics for Scientists and Engineers II. (GT-SC1, AUCC 3A). F, S. Prerequisite: MATH 161 or concurrent registration or MATH 255 or concurrent registration; PH 141. Credit not allowed for both PH 142 and PH 122.

Electricity and magnetism, circuits, light, optics (calculus based).

PH 160 03. Basic Physics and Physical Worldview. F, S, SS. Prerequisite: High school algebra or MATH 118; MATH 126. Offered as telecourse only.

Physics, cultural and historical background of physical thought, humans' relationship to physical world. (NT-T)

PH 192 02(0-0-2). The Flying Circus of Physics. F.

Richness and variety of physical phenomena; physical world view including appreciation for the academic community.

PH 245 03(2-3-0). Introduction to Electronics. F. Prerequisite: MATH 161; PH 142.

AC circuits, physical bases and applications of electronic devices.

PH 293 01(1-0-0). Selected Topics in Physics. F, S, SS. Prerequisite: PH 142.

Selected topics in physics with emphasis on depth of understanding.

PH 298 Var [1-6]. Introductory Research. Prerequisite: Written consent of instructor.

PH 314 04(4-0-0). Introduction to Modern Physics. S. Prerequisite: MATH 261 or concurrent registration; PH 142.

Relativity; quantum mechanics; atomic structure; applications to solid-state, nuclear, and elementary particle physics.

PH 315 02(0-4-0). Modern Physics Laboratory. S. Prerequisite: PH 314 or concurrent registration.

Experiments in modern physics.

PH 341 04(4-0-0). Mechanics. F. Prerequisite: MATH 340; PH 141.

Particle dynamics, translation and rotation of rigid bodies, moving coordinate systems, Lagrangian mechanics, matrix and tensor methods.

PH 351 04(4-0-0). Electricity and Magnetism. S. Prerequisite: MATH 340; PH 142.

Electrostatics, magnetostatics, currents, time-dependent electric and magnetic fields, radiation.

PH 353 04(3-3-0). Optics and Waves. F. Prerequisite: MATH 261; PH 142.

Geometrical optics; wave optics; interference, diffraction, and polarization; quantum optics.

PH 361 03(3-0-0). Physical Thermodynamics. S. Prerequisite: MATH 261; PH 142.

Laws of thermodynamics; thermodynamic potentials; applications such as fluids, phase transitions, electrical and magnetic systems, binary mixtures.

PH 384 Var [1-5]. Supervised College Teaching. Prerequisite: PH 121 or PH 141; written consent of department head. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Participation as a physics tutor.

PH 425 02(0-4-0). Advanced Physics Laboratory. S. Prerequisite: PH 315; PH 451.

Advanced experiments in electricity and magnetism, statistical physics and quantum mechanics.

PH 451 03(3-0-0). Introductory Quantum Mechanics I. F. Prerequisite: MATH 340; PH 314.

Schrodinger's theory of wave mechanics, potential wells, harmonic oscillators, wave packets, operators, angular momentum.

PH 452 03(3-0-0). Introductory Quantum Mechanics II. S. Prerequisite: PH 451.

Approximation techniques, perturbation theory, identical particles and spin, structure and spectra of atoms and molecules, hydrogen atom.

PH 462 03(3-0-0). Statistical Physics. F. Prerequisite: MATH 340; PH 314; PH 361.

Maxwell-Boltzmann, Fermi-Dirac, and Bose-Einstein distribution functions; kinetic theory; applications to solids, metals, semiconductors, and gases.

PH 492 01(0-0-1). Seminar. S. Prerequisite: Written consent of instructor. Preparation and presentation of seminars on selected modern topics.

PH 495 Var [1-6]. Independent Study. Prerequisite: Written consent of instructor.

PH 498 Var [1-6]. Research. Prerequisite: Written consent of instructor.

PH 521 03(3-0-0). Introduction to Lasers. S. Prerequisite: CHEM 476 or PH 451; MATH 340; PH 353.

Stimulated emission; laser resonators; theory of laser oscillation; specific laser systems; applications.

PH 522 01(0-2-0). Introductory Laser Laboratory. S. Prerequisite: PH 521 or concurrent registration.

Experiments providing hands-on experiences with lasers.

PH 531 03(3-0-0). Introductory Solid State Physics. S. Prerequisite: PH 361; PH 451.

Crystal structures and bonding, electronic levels and vibrations, dielectric, optical and magnetic properties, quasiparticles, superconductivity.

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PH 541 03(3-0-0). Classical Physics. S. Prerequisites: PH 341; PH 351.

Linear and orbital motions, rotation, moment-of-inertia matrix, electrostatics, images, magnetostatics, induction, Maxwell's equations.

PH 551 03(3-0-0). Modern Physics. F. Prerequisite: PH 452; PH 462 or concurrent registration.

Wave functions, energy levels, harmonic oscillator, transmission and reflection, perturbation theory, thermodynamic potentials, partition function.

PH 561 03(3-0-0). Elementary Particle Physics. S. Prerequisite: PH 451.

Particle interactions and detection techniques. Quark model, scattering models and standard model of electroweak interactions, physics of colliders.

PH 571 03(3-0-0). Mathematical Methods for Physics I. F. Prerequisite: MATH 340.

Vector analysis, eigenvalues and eigenvectors, infinite series, method of Frobenius, complex variables, contour integration.

PH 572 03(3-0-0). Mathematical Methods for Physics II. S. Prerequisite: PH 571.

Partial differential equations, Sturm-Liouville theory, special functions, Green's functions, Fourier series, Fourier and Laplace transforms.

PH 621 03(3-0-0). Classical Mechanics. F. Prerequisite: PH 341; PH 571 or concurrent registration.

Central forces, scattering, noninertial reference frames, Coriolis force, Lagrange's and Hamilton's equations, small oscillations, continuum mechanics.

PH 631 03(3-0-0). Solid State Physics. S. Prerequisite: PH 531.

Electronic band structure and conduction phenomena; cohesive energy; lattice dynamics and thermal properties; metals; insulators; semiconductors.

PH 641 03(3-0-0). Electromagnetism I. F. Prerequisite: PH 351; PH 572.

Electrostatics in a vacuum and a medium, general solution of Laplace's equation, Green's functions, magnetostatics in a vacuum and a medium.

PH 642 03(3-0-0). Electromagnetism II. S. Prerequisite: PH 641.

Maxwell's equations, electromagnetic waves, radiation by accelerated charges, special relativity, Lagrangian formulation of electromagnetism.

PH 651 03(3-0-0). Quantum Mechanics I. F. Prerequisite: PH 452; PH 571 or concurrent registration.

WKB theory, Heisenberg picture, 3D wells, hydrogen atom, time-independent perturbation theory, angular momentum and spin, Clebsch-Gordan coefficients.

PH 652 03(3-0-0). Quantum Mechanics II. S. Prerequisite: PH 651.

Wigner-Eckhart theorem, symmetries, density matrix, identical particles, interaction picture, time-dependent perturbation theory, scattering.

PH 671 03(3-0-0). Statistical Mechanics II. F. Prerequisite: PH 452; PH 462; PH 571 or concurrent registration.

Canonical and grand-canonical ensembles; Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics; density operator; Bose-Einstein condensation.

PH 672/ECE 672 03(3-0-0). Principles of Semiconductors. S. Prerequisite: ECE 471 or PH 531. Credit not allowed for both PH 672 and ECE 672.

Electronic properties of semiconductors: band structure, statistics, transport properties, photoelectronic properties, potential barriers, interfaces.

PH 692 01(0-0-1). Seminar.

PH 693 03(0-0-3). Current Topics in Physics Research. Prerequisite: Written consent of instructor.

PH 698 Var. Research. Prerequisite: Written consent of instructor.

PH 699 Var. Thesis. Prerequisite: Written consent of instructor.

PH 722 03(3-0-0). Quantum Electronics. S. Prerequisite: PH 521.

One- and two-photon spectroscopy; broadening mechanisms; nonlinear optics; coherent phenomena; experimental methods.

***PH 731 03(3-0-0). Condensed Matter Theory.** F. Prerequisite: PH 462; PH 531; PH 652.

Second quantization; electrons; phonons; electron-phonon interaction; superconductivity; magnetism; spin waves; density-functional methods; symmetry.

***PH 762 03(3-0-0). Elementary Particle Theory.** S. Prerequisite: PH 561; PH 652.

Symmetries, electrodynamics, renormalization, and the running coupling constant. Hadron structure, QCD, gauge symmetry and electroweak interaction.

PH 770 03(3-0-0). Quantum Theory. F. Prerequisite: PH 652.

Formal scattering theory; relativistic quantum mechanics, quantum theory of radiation, symmetries and statistics, many-body theory.

PH 784 Var [1-5]. Supervised College Teaching. Prerequisite: Written consent of instructor.

Supervised teaching of general physics laboratory and recitation sections.

PH 793A-E Var [1-5]. Seminar. Prerequisite: Written consent of instructor.

A) Condensed matter physics. B) Laser spectroscopy/quantum electronics. C) Statistical mechanics. D) Mathematical physics. E) High energy physics.

PH 795 Var [1-6]. Independent Study. Prerequisite: Written consent of instructor.

PH 799 Var. Dissertation. Prerequisite: Written consent of instructor.

PHILOSOPHY COURSES

Department of Philosophy *College of Liberal Arts*

PHIL 100 03(3-0-0). Appreciation of Philosophy. (GT-AH3, AUCC 3B). F, S, SS.

Basic issues in philosophy including theories of knowledge, metaphysics, ethics, and aesthetics.

PHIL 103 03(3-0-0). Moral and Social Problems. (GT-AH3, AUCC 3B). F, S, SS.

Contemporary ethical issues in the United States, such as abortion, euthanasia, and genetic engineering. (NT-O)

PHIL 106 03(3-0-0). Wisdom of the East-Oriental Philosophy. F, S.
Major philosophical issues and world views of the Orient.

PHIL 110 03(3-0-0). Logic and Critical Thinking. (GT-AH3, AUCC 3B). F, S, SS. Credit not allowed for both PHIL 110 and PHIL 101.

Identify, analyze, and evaluate real arguments in everyday life, politics, the sciences, and the professions.

PHIL 112 03(3-0-0). Reasoning and Problem Solving. F.

Creative and critical techniques in problem solving and decision making.

PHIL 120 03(3-0-0). History and Philosophy of Scientific Thought. (GT-AH3, AUCC 3B). F, S.

Historical development of western, scientific world view from ancient times to the 20th century.

PHIL 130 02(2-0-0). Bioethics and Society. S.

Major issues in bioethics.

PHIL 170 03(3-0-0). World Philosophies. (GT-AH3, AUCC 3E). F, S.

Philosophies of North America, Mesoamerica, West Africa, South Asia, and East Asia.

PHIL 171 03(3-0-0). Religions of the West. F, S.

Major religions of the Near East and West emphasizing their classical development; Judaism, Zoroastrianism, Christianity, Islam.

PHIL 172 03(3-0-0). Religions of the East. F, S.

Major religions of India and the Far East emphasizing their classical development; Hinduism, Buddhism, Confucianism, Taoism.

PHIL 173 03(3-0-0). Philosophy of Traditional Judaism. F.

Concepts and essentials of Jewish philosophy and Judaism, including overview of Jewish lifecycle, history, law, literature, ethics, and mysticism

PHIL 205 03(3-0-0). Introduction to Ethics. F, S. Prerequisite: Sophomore standing or higher.

Problems and theories concerning values and standards, right action, and the good life.

PHIL 206 03(3-0-0). Knowledge and Existence-An Introduction. F, S. Prerequisite: Sophomore standing or higher.

Problems and theories concerning knowledge, being, nature of the world.

PHIL 210 03(3-0-0). Introduction to Formal Logic. F, S. Prerequisite: Sophomore standing or higher.

Elementary principles, techniques in propositional and predicate logic.

PHIL 240 03(3-0-0). Philosophies of Peace and Nonviolence. F.

Classic and contemporary religious and philosophical work on peace

and nonviolence.

PHIL 251 03(3-0-0). Feminist Philosophies. F.

Conceptual, moral, and social analysis of women's issues from a variety of philosophical feminist perspectives.

PHIL 270 03(3-0-0). Issues in the Study of Religion. F, S. Prerequisite: Sophomore standing or higher.

Contemporary religion, its nature, types, forms of expression.

PHIL 295 Var [1-3]. Independent Study.

PHIL 297 Var [1-3]. Group Study.

PHIL 300 03(3-0-0). Ancient Greek Philosophy. F, S, SS. Prerequisite: PHIL 205 or PHIL 206 or PHIL 210.

Philosophy of ancient Greece emphasizing Plato and Aristotle.

PHIL 301 03(3-0-0). 17th and 18th Century European Philosophy. S. Prerequisite: PHIL 206 or PHIL 210 or PHIL 300.

Philosophy from the scientific revolution through Kant.

PHIL 302 03(3-0-0). 19th-Century Philosophy. F. Prerequisite: PHIL 301.

Major figures, movements, concepts in Europe and America from about 1800 to early 20th century.

PHIL 305A-F 03(3-0-0). Philosophical Issues in the Professions. May be repeated for credit with consent of department head.

Philosophical problems, theories relevant to specific professions. **A)** Business ethics. F, S. **B)** Medical-life science. F, S. ***C)** Caring professions. S. **D)** Engineering. F, S, SS. **E)** Animal science. F. **F)** Information science. F, S.

PHIL 310 03(3-0-0). Writing and Reasoning. F, S, SS. Prerequisite: CO 150; PHIL 110 or PHIL 210.

Logic-based, analytic and critical writing and reading of complex argument and explanation types.

PHIL 315 03(3-0-0). Philosophy of Language. S. Prerequisite: PHIL 205 or PHIL 206 or PHIL 210 or any upper-division course in philosophy. Basic concepts and principles in the theory of language.

PHIL 318 03(3-0-0). Aesthetics-Visual Arts. F, S.

Central, traditional, and contemporary theories of the nature of visual arts.

+PHIL 320 03(3-0-0). Ethics of Sustainability. F, S.

Ethical and conceptual issues surrounding creation of sustainable societies and lifestyles. Required field trips.

PHIL 325 03(3-0-0). Philosophy of Natural Science. F. Prerequisite: PHIL 210; one course in natural sciences. May be repeated for credit with consent of department head.

Structure of theories; basic concepts and assumptions; methods of explanation and confirmation; emphasis varies between physical and life sciences.

PHIL 327 03(3-0-0). Philosophy of Behavioral Sciences. S. Prerequisite: PHIL 120 or PHIL 205 or PHIL 206 or PHIL 210 or any upper-division course in philosophy. May be repeated for credit with consent of department head.

Structure of theories; basic concepts; explanation and confirmation; reductionism and values; emphasis varies between psychology and social sciences.

PHIL 330/AGRI 330 03(3-0-0). Agricultural Ethics. S. Credit not allowed for both PHIL 330 and AGRI 330.

Basic concepts in ethics and their application to agriculture.

PHIL 335 03(3-0-0). Islam: Cosmology and Practice. F.

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Cosmological, spiritual, ritual, and practical aspects of Islam.

PHIL 345 03(3-0-0). Environmental Ethics. F, S. Prerequisite: Sophomore standing or higher.

Scientific, philosophical, and religious concepts of nature as they bear on human conduct; an ecological perspective.

°**PHIL 348 03(3-0-0). Philosophy of Literature and the Arts.** S.

Aesthetic and philosophical issues in literature and the arts.

PHIL 349 03(3-0-0). Philosophies of East Asia. S. Prerequisite: Sophomore standing or higher.

Philosophical traditions of East Asia, including Confucianism, Daoism, and Zen Buddhism.

PHIL 350 03(3-0-0). Social and Political Philosophy. F, S. Prerequisite: PHIL 205 or PHIL 206 or any upper-division course in philosophy.

Moral relationships between persons and institutions.

PHIL 351 03(3-0-0). Interpreting the New Testament. S.

Contemporary methods of New Testament interpretation.

°**PHIL 355 03(3-0-0). Philosophy of Religion.** F. Prerequisite: PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270.

Philosophical analysis of nature of religion and structure of meaning in religious discourse.

°**PHIL 359 03(3-0-0). Philosophy of Human Nature.** F. Prerequisite: PHIL 105 or PHIL 205 or PHIL 206 or any upper-division course in philosophy.

Philosophical study of theories of human nature.

PHIL 360 03(3-0-0). Topics in Asian Philosophy. S. Prerequisite: Sophomore standing or higher.

Examination of major philosophical topics from ethics, sociopolitical philosophy, metaphysics, aesthetics.

PHIL 366 03(3-0-0). Philosophy of Aging. S.

Philosophical problems related to experience of growing old.

PHIL 370 03(3-0-0). Contemporary Western Religious Thought. F. Prerequisite: PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270.

Contemporary interpretations of significant Western religious traditions.

°**PHIL 371 03(3-0-0). Contemporary Eastern Religious Thought.** S.

Transformation of Indian and Chinese religious thought in the modern period.

***PHIL 372 03(3-0-0). Meaning and Truth in Religion.** F. Prerequisite: PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270.

Nature, variety, functions, interpretation, evaluation of religious language.

PHIL 375 03(3-0-0). Science and Religion. S. Prerequisite: PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270.

Encounter of religious belief with Western science, influences on each other, present relations.

PHIL 379 03(3-0-0). Mysticism East and West. F. Prerequisite: PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270.

Varieties of mystical experience in selected Eastern and Western representatives.

PHIL 384 Var [1-5]. Supervised College Teaching. F, S. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Teaching basic philosophy courses.

PHIL 407 03(3-0-0). Phenomenology and Existentialism. F. Prerequisite: PHIL 205 or PHIL 206 or PHIL 300 or PHIL 301.

Methods, epistemology, metaphysics, axiology, ethics of 20th-century phenomenologists and existentialists.

PHIL 409 03(3-0-0). 20th-Century Philosophy. S. Prerequisite: PHIL 301.

Major figures, trends, and concepts in 20th-century philosophy.

PHIL 410 03(3-0-0). Formal Logic. F, S. Prerequisite: PHIL 210 or CS 270.

Quantification theory; axiomatic systems; rigorous axiomatization of some logical or mathematical theory.

PHIL 415 03(3-0-0). Logic and Scientific Method. F, S.

Approaches to analysis, assessment of scientific inference, problems of induction; applications to natural, behavioral, social sciences.

PHIL 425 03(3-0-0). Epistemology. S. Prerequisite: PHIL 210 or PHIL 300 or PHIL 301.

Concepts, problems, and theories of knowledge.

PHIL 435 03(3-0-0). Metaphysics. F. Prerequisite: PHIL 210 or PHIL 300 or PHIL 301.

Philosophical problems concerning nature, structure, and basic constituents of reality.

°**PHIL 438 03(3-0-0). Philosophy of Mind.** S. Prerequisite: PHIL 300 or PHIL 301 or PHIL 302 or PHIL 315 or PHIL 325 or PHIL 327 or PHIL 359.

Nature and status of mind, mental states, mental activity; the mind-body problem, mind and human sciences, mind and self, nature of human action.

PHIL 447 03(3-0-0). Ethical Theory. F. Prerequisite: PHIL 205 or PHIL 300 or PHIL 301.

Fundamental problems and options in ethical theory.

PHIL 455 03(3-0-0). Islamic Philosophy. S. Prerequisite: PHIL 206; PHIL 210.

Development of philosophical thought in early, middle, and late Muslim civilization.

PHIL 460 03(3-0-0). Seminar in Great Philosophers. F. Prerequisite: PHIL 300 or PHIL 301 or PHIL 302. Maximum of 9 credits allowed in course.

Works of one major figure in the history of philosophy.

PHIL 461 03(3-0-0). Seminar in Philosophical Issues and Problems. S. Prerequisite: PHIL 300 or PHIL 301 or PHIL 302.

Thorough examination of a major philosophical problem or issue.

PHIL 462 03(0-0-3). Capstone Seminar. F, S. Prerequisite: Senior standing; any two of the following courses: PHIL 300, PHIL 301, PHIL 302, PHIL 409.

In-depth, integrative study of major topics, texts, and problems in both philosophy and religion.

PHIL 463 03(0-0-3). Seminar in Religious Studies. F, S, SS.

PHIL 479 03(3-0-0). Topics in Comparative Religions. F. Prerequisite: PHIL 171 or PHIL 172 or PHIL 270; 300-level religious studies course.

Comparative study of topics in world religions and philosophy or religion.

PHIL 495 Var [1-9]. Independent Study.

PHIL 497 Var [1-9]. Group Study.

PHIL 499 03(0-0-3). Thesis. Prerequisite: Written consent of department head.

PHIL 500 03(0-0-3). Seminar in Major Philosophical Texts. F. Prerequisite: Admitted graduate student.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC-*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Intensive study of one or two major works in the history of philosophy.

PHIL 501 03(0-0-3). Seminar: Topics in History of Philosophy. S.

Selected figures and periods from the history of western philosophy, from ancient to modern. Topics change from semester to semester.

PHIL 525 03(0-0-3). Seminar in Epistemology. F. Prerequisite: PHIL 425.

Analysis of contemporary theories of knowledge.

PHIL 527 03(0-0-3). Seminar in Philosophy of Science. S. Prerequisite: PHIL 325 or PHIL 327 or PHIL 415.

Systematic survey of major 20th-century philosophies of science.

PHIL 535 03(0-0-3). Seminar in Metaphysics. S. Prerequisite: PHIL 500.

Contemporary topics philosophical metaphysics.

PHIL 545 03(3-0-0). Concept of Natural Value. S. Prerequisite: PHIL 345.

Philosophical analysis of nature as a value carrier. Types of value associated with nature, their interrelations.

PHIL 547 03(0-0-3). Seminar in Meta-Ethics. S. Prerequisite: PHIL 447.

Systematic and historical overview of contemporary theories of meta-ethics.

PHIL 550/IE 550 03(3-0-0). Ethics and International Development. F. Prerequisite: Written consent of instructor. Credit not allowed for both PHIL 550 and IE 550.

Ethical reflection applied to development goals, strategies of Third World countries; relations between developed and developing countries.

***PHIL 555 03(0-0-3). Seminar in Philosophical Models of Nature. F.** Prerequisite: Written consent of instructor.

Comparative inquiry into the "nature" of nature as viewed by philosophers of the past and present.

***PHIL 564 03(0-0-3). Seminar in Animal Rights. S.** Prerequisite: Written consent of instructor.

Contemporary issues concerning nature and moral status of nonhuman animals.

PHIL 565 03(0-0-3). Seminar in Environmental Philosophy. F. Prerequisite: Written consent of instructor.

Aesthetic appreciation of nature, duties concerning fauna, flora, endangered species, ecosystems.

PHIL 566 03(0-0-3). Seminar in Applied Philosophy. S. Prerequisite: Written consent of instructor.

Application of philosophical ideas and methods to analyze practical problems such as distributive justice, abortion, human rights conflicts.

PHIL 570 03(0-0-3). Seminar in Contemporary Philosophical Theory. S. Prerequisite: PHIL 500.

Major concepts and problems in current philosophical theory.

PHIL 593 03(0-0-3). Seminar.

PHIL 662 03(0-0-3). Seminar.

PHIL 666/CM 666 03(3-0-0). Science and Ethics. S. Credit not allowed for both PHIL 666 and CM 666.

Ethical issues of research on humans and animals; biosafety; fraud and deception in science; genetic engineering.

PHIL 684 Var [1-5]. Supervised College Teaching. F, S.

PHIL 695 Var [1-9]. Independent Study.

PHIL 697 Var [1-9]. Group Study.

PHIL 698 Var[1-6]. Research. F, S, SS.

PHIL 699 Var [1-9]. Thesis.

POLITICAL SCIENCE COURSES

Department of Political Science *College of Liberal Arts*

POLS 101 03(3-0-0). American Government and Politics. (GT-SS1, AUCC 3C). F, S, SS.

Principles, structures, and processes of American national government. (NT-O)

POLS 103 03(3-0-0). State and Local Government and Politics. (GT-SS1, AUCC 3C). F, S.

Principles, organization, and operation of American state and local government. (NT-O)

POLS 131 03(3-0-0). Current World Problems. (GT-SS1, AUCC 3E). F, S.

Background and nature of international political events.

POLS 232 03(3-0-0). International Relations. (GT-SS1, AUCC 3E). F, S.

Basic concepts and approaches in international relations.

POLS 241 03(3-0-0). Comparative Government and Politics. (GT-SS1, AUCC 3E). S.

Major foreign political systems stressing cross-national comparison of political forces, parties, ideologies, and institutions. (NT-O)

POLS 302 03(3-0-0). U.S. Political Parties and Elections. F. Prerequisite: POLS 101.

Foundational, institutional, and behavioral features of American political parties and elections. (NT-O)

POLS 303 03(3-0-0). Politics of Organized Interests. F. Prerequisite: POLS 101.

Role of interests in varied forms: social movements, institutions, associations, and membership groups in American politics.

POLS 304 03(3-0-0). Legislative Politics. F, S. Prerequisite: POLS 101.

Structure, organization, behavior, processes, and policy implications of U.S. legislatures.

POLS 305 03(3-0-0). Judicial Politics. F. Prerequisite: POLS 101.

Allocation of powers among judicial structures in American federal system.

POLS 306 03(3-0-0). Executive Politics. F. Prerequisite: POLS 101.

Structure, organization, behavior, processes, and policy implications of U.S. executive leadership.

POLS 309 03(3-0-0). Urban Politics. F, S. Prerequisite: POLS 101 or POLS 103.

Governmental structures and political processes in urban government.

POLS 320 03(3-0-0). Empirical Political Analysis. F, S.

Methods of empirical political inquiry.

POLS 321 01(0-2-0). Empirical Political Analysis Laboratory. F, S. Prerequisite: Concurrent registration in POLS 320.

Laboratory applications of empirical research methods.

POLS 331 03(3-0-0). Politics and Society Along Mexican Border. F, S.

Analysis of U.S.-Mexican relations and domestic politics as these affect regional characteristics and development of U.S.-Mexican border region.

POLS 332/ECON 332 03(3-0-0). International Political Economy. F, S. Prerequisite: AREC 202 or ECON 202; POLS 232. Credit not allowed for both POLS 332 and ECON 332.

Theories on relations between international politics and economics. Policy implications of different theories and case studies.

POLS 341 03(3-0-0). Western European Government and Politics. F. Prerequisite: POLS 241.

Politics in Western European countries such as Britain, France, and Germany, and countries influenced by European traditions.

POLS 345 03(3-0-0). Russian, Central, and East European Politics. S. Prerequisite: POLS 241.

Political structures and processes in Russia, Central and East Europe, and selected post-Communist countries.

POLS 351 03(3-0-0). Public Administration. F, S, SS. Prerequisite: POLS 101.

Government organization and management; decision processes; political and intergovernmental relations in administration.

POLS 361 03(3-0-0). U.S. Environmental Politics and Policy. F, S, SS. Prerequisite: POLS 101.

Public and contemporary issues relating to U.S. environmental policy. (NT-O)

POLS 362 03(3-0-0). Global Environmental Politics. F, S, SS. Prerequisite: POLS 232 or POLS 241.

Cross-national and international contexts of environmental politics and policy.

POLS 371 03(3-0-0). U.S. Space Policy. F.

Analysis of U.S. space politics, space law, and space policy making. (NT-O)

POLS 405 03(3-0-0). Race and Ethnicity in U.S. Politics. S. Prerequisite: POLS 101.

Relationships among American racial/ethnic groups, political attitudes, behavior; race and ethnicity roles in elections; implications for public policy.

POLS 409 03(3-0-0). Urban and Regional Politics. F, S. Prerequisite: POLS 101 or POLS 103.

Governance processes and public policies in metropolitan regions.

POLS 410 03(3-0-0). American Constitutional Law. F. Prerequisite: POLS 101.

Allocation of powers among structures in American federal system.

POLS 413 03(3-0-0). U.S. Civil Rights and Liberties. S, SS. Prerequisite: POLS 101.

U.S. Constitutional provisions and cases pertaining to the rights and liberties of individuals.

POLS 420 03(3-0-0). History of Political Thought. F, S.

Issues and texts related to tradition of political thought from the ancient through the modern period. (NT-O)

POLS 421 03(3-0-0). Contemporary Political Theories. F.

Major political theories and ideologies of contemporary times.

POLS 423 03(3-0-0). American Political Theories. S. Prerequisite: POLS 101.

Major American theories and ideologies: their development and present uses.

POLS 431 03(3-0-0). International Law. F, S. Prerequisite: POLS 232.

Rules and obligations for conduct of relations among states and other international entities.

POLS 433 03(3-0-0). International Organization. F, S. Prerequisite: POLS 232.

History, development, structure, process, and activity of selected public international organizations.

POLS 435 03(3-0-0). United States Foreign Policy. F, S, SS. Prerequisite: POLS 232.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Institutions, responsibilities, processes, and issues in formulation and execution of U.S. foreign policy.

POLS 436 03(3-0-0). Comparative Foreign Policy. S. Prerequisite: POLS 232; POLS 241.

Effect of varying international and domestic contexts on foreign policy choices and outcomes across different countries, cultures, issues, and time.

POLS 437 03(3-0-0). International Security. F, S.

Examines the conditions that make for war and peace in international relations. (NT-O)

POLS 443 03(3-0-0). Comparative Social Movements. F, S. Prerequisite: POLS 241.

Reviews major works dealing with conceptual and theoretical foundations of social movements and examines a number of cases across regions.

POLS 444 03(3-0-0). Comparative African Politics. S, SS. Prerequisite: POLS 241.

African political systems focusing on precolonial, colonial influences; rise of nationalism; approaches to new political order; influences of development.

POLS 445 03(3-0-0). Comparative Asian Politics. F, SS. Prerequisite: POLS 241.

East and South Asian political systems emphasizing issues of development, political culture, and institutional change.

POLS 446 03(3-0-0). Politics of South America. F, S. Prerequisite: POLS 241.

South American political actors and institutions with emphasis on themes of development, democracy, revolution, and international affairs.

POLS 447 03(3-0-0). Politics in Mexico, Central America, Caribbean. F, S. Prerequisite: POLS 241.

Mexican politics with comparison to one or more Central American and Caribbean countries.

POLS 448 03(3-0-0). Comparative Racial/Ethnic Politics. F, S. Prerequisite: POLS 241.

Comparative examination of politics of race and ethnicity and role it plays in formation of nation-states.

POLS 449 03(3-0-0). Middle East Politics. F, S. Prerequisite: POLS 241.

Political issues of the Middle East, including the Palestinian-Israeli conflict, Islamism, and democratization.

POLS 460 03(3-0-0). Public Policy Process. F, S. Prerequisite: POLS 101.

Explanations of policy formation, implementation, and impact.

POLS 462 03(3-0-0). Globalization, Sustainability, and Justice. F, S, SS. Prerequisite: POLS 232 or POLS 241.

Public and private policies to promote sustainability and social justice in a globalizing world.

POLS 486A-B. Practicum.

+A) Legislative politics 06(0-8-2). (\$ B) Government Var [1-6].

POLS 492 03(0-0-3). Capstone Seminar. Prerequisite: Upper-division course in at least four subfields of political science.

POLS 495 Var. Independent Study.

POLS 500 03(3-0-0). Governmental Politics in the U.S. F, S. Prerequisite: Three upper-division credits in American politics with a B or better.

Selected primary source materials on performance of government officials and institutions at federal, state, and local levels.

POLS 501 03(3-0-0). Citizen Politics in the U.S. F, S. Prerequisite: Three upper-division credits in American politics with a B or better.

Selected primary source materials on behavior of individuals and groups in American politics.

POLS 509 03(3-0-0). Gender and the Law. F, S. Prerequisite: POLS 410 or POLS 413.

Relationship between gender and the law and the changing nature of that relationship over time.

POLS 520 03(3-0-0). Theories of Political Action. F, S. Prerequisite: POLS 420 or POLS 421.

Intensive review of primary material on Western political thought.

POLS 530 03(3-0-0). International Relations. F, S. Prerequisite: Nine credits in international relations or related studies.

Theory and methodology utilized in different approaches to international relations.

POLS 531 03(3-0-0). Policy Making, Diplomacy, and World Politics. F, S. Prerequisite: Three upper-division credits in international relations with a B or better.

Theories of policy making and bargaining in international politics as applied to different countries, organizations, and historical periods.

POLS 532 03(3-0-0). Governance of the World Political Economy. F, S. Prerequisite: 9 upper division credits in international relations with a B or better.

Theoretical and practical debates on the organization and governance of the world political economy.

POLS 540 03(3-0-0). Comparative Politics. F, S. Prerequisite: Three upper-division credits in comparative politics with a B or better.

Theories, methods, and approaches to study of comparative politics.

POLS 541 03(3-0-0). Political Economy of Change and Development. F, S. Prerequisite: Three upper-division credits in comparative politics with a B or better.

Responses of the state and its institutions to political, economic, and social change.

POLS 542 03(3-0-0). Democracy and Democratization. F, S.

Theoretical foundations of democracy and democratization across world regions.

POLS 544/ETST 544 03(3-0-0). National Identities and Nation Building. F. Credit not allowed for both POLS 544 and ETST 544.

How statist conceptions of race and ethnicity have been mobilized in nation-building projects.

POLS 550 03(3-0-0). Advanced Public Administration. F, S. Prerequisite: POLS 351; written consent of instructor.

Overview of study of public administration; recent developments in theory and practice.

POLS 552A-C 03(3-0-0). Topics in Public Administration. F, S. Prerequisite: POLS 351; GPA of 3.000 or better.

A) Personnel. B) Budgeting and finance. C) Regulation.

POLS 620 03(3-0-0). Approaches to the Study of Politics. F. Prerequisite: Fifteen credits in political science.

POLS 621 03(3-0-0). Qualitative Methods in Political Science. S. Prerequisite: POLS 620 or concurrent registration or SOC 311. Credit not allowed for both POLS 621 and SOC 610.

Research design, data gathering and organization, ethical issues, and computer applications in qualitative political research.

POLS 624 03(3-0-0). Scope and Methods of Political Science. F, S. Prerequisite: 15 credits of upper division (300-level and above) coursework

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

in Political Science.

Graduate survey of the scope of the Political Science discipline and the range of research designs and methods in the discipline.

POLS 625 03(3-0-0). Quantitative Methods of Political Research. S.
Prerequisite: POLS 320.

Quantitative approaches and methods for study of political life.

POLS 626 01(0-2-0). Political Research Laboratory. S. Prerequisite:
POLS 321; concurrent registration in POLS 625.

POLS 652 03(0-0-3). Public Organization Theory. F. Prerequisite: POLS
351.

Theories of behavior of individuals and organizations in government bureaucracies.

POLS 660 03(3-0-0). Theories of the Policy Process. F, S. Prerequisite:
POLS 351 or POLS 460.

Recent developments in policy analysis.

POLS 670 03(3-0-0). Politics of Environment and Sustainability. F.
Prerequisite: Written consent of instructor.

Domestic, international, and comparative dimensions of environment and natural resource politics and policy.

POLS 684 Var [1-3]. Supervised College Teaching. Prerequisite: One
year of graduate work.

POLS 692 03(0-0-3). Seminar in Environmental Policy.

Topics in domestic and/or global environmental policy.

POLS 695 Var. Independent Study.

POLS 699 Var. Thesis.

POLS 709 03(3-0-0). Environmental Politics in the U.S. F, S.
Prerequisite: POLS 500 or POLS 501; POLS 670.

Selected primary materials on governmental performance, groups, and mass public in American environmental politics.

POLS 729 03(3-0-0). Political Theory and the Environment. F, S.
Prerequisite: POLS 520; POLS 670.

Political thought applied to questions of the environment.

POLS 739 03(3-0-0). International Environmental Politics. F, S.
Prerequisite: POLS 530; POLS 670.

Theories and methodologies used in analyzing international environmental politics and policy.

POLS 749 03(3-0-0). Comparative Environmental Politics. F, S.
Prerequisite: POLS 540 or POLS 541; POLS 670.

Application of comparative political theory to analysis of environmental politics.

POLS 759 03(3-0-0). Environmental Policy and Administration. F, S.
Prerequisite: POLS 670.

Effects of regulation, intergovernmental relations, and resource availability on federal environmental programs in U.S.

POLS 795 Var. Independent Study.

POLS 799 Var. Dissertation.

PSYCHOLOGY COURSES

Department of Psychology

College of Natural Sciences

PSY 100 03(3-0-0). General Psychology. (GT-SS3, AUCC 3C). F, S, SS.

Principles of psychology emphasizing empirical approaches; theories and research on learning, individual differences, perception, social behavior. (NT-O/T)

PSY 121 01(1-0-0). Health and the Mind. F, S.

Maintenance of positive mental health.

PSY 175/HDFS 175 03. Developmental Psychology Across the Life Span. F, S, SS. Credit not allowed for both PSY 175 and HDFS 175. Offered as telecourse only.

Theory and research on physical, cognitive, and psychosocial human development across the life span. (NT-T)

PSY 192 01(0-0-1). Psychology First-Year Seminar. F, S. Prerequisite: none.

Special topics in psychology.

PSY 210 03(3-0-0). Psychology of the Individual in Context. F, S, SS. Prerequisite: PSY 100.

Psychological explanations of cultural, social, and individual differences in behavior.

PSY 228 03(3-0-0). Psychology of Human Sexuality. F, S, SS.

Physiology, psychology of human sexuality; cross cultural issues, development, social perspectives, values, sexual dysfunction. (NT-C/O)

PSY 250 04(4-0-0). Research Methods in Psychology. F, S, SS. Prerequisite: PSY 100.

Design, analysis, and reporting of psychological research.

PSY 252 03(3-0-0). Mind, Brain, and Behavior. F, S, SS. Prerequisite: PSY 100.

Psychological, physiological, and evolutionary explanations of perception, cognition, and behavior.

PSY 260 03(3-0-0). Child Psychology. F, S, SS. Prerequisite: PSY 100.

Description and explanation of development of human behavior emphasizing theory and research concerned with infant and child.

PSY 292 Var[1-3]. Seminar. F, S, SS. Prerequisite: Psychology major.

Special topics in psychology.

¹**PSY 295 Var [1-3]. Independent Study.** Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

Individual investigation of a special topic in psychology under direction of faculty.

¹**PSY 296 Var [1-3]. Group Study.** Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

¹Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

Collective investigation of a special topic in psychology under direction of faculty.

PSY 305 03(3-0-0). Psychology of Religion. F, S, SS. Prerequisite: PSY 100.

Survey of research on religion from a psychological perspective. (NT-O)

PSY 310 03(3-0-0). Basic Counseling Skills. S. Prerequisite PSY 100.

Psychologically-based interpersonal communication skills; rapport thinking, gathering information and bringing about change in others.

PSY 311A-B 02(0-4-0). Basic Counseling Skills Laboratory. Prerequisite: PSY 100; PSY 310 or concurrent registration. Credit not allowed for both PSY 311A and PSY 311B.

A) CACI. Application of psychologically-based interpersonal skills in drug addiction treatment, for students seeking CACI certification. **B)** Non-CACI. Application of psychologically-based interpersonal communication skills.

PSY 315 03(3-0-0). Social Psychology. F, S, SS. Prerequisite: PSY 100.

Social psychological theory and research findings emphasizing research methodology; applications to contemporary social problems. (NT-O)

PSY 316 03(3-0-0). Environmental Psychology. F, S, SS. Prerequisite: PSY 100.

Social psychological theory and research on effects of behavior on the environment; environmental influences on behavior. (NT-C)

PSY 317 02(0-4-0). Social Psychology Laboratory. F, S, SS. Prerequisite: PSY 250; PSY 315 or concurrent registration.

Review of research techniques in social psychology. Computer simulations with applications to contemporary social problems.

PSY 320 03(3-0-0). Abnormal Psychology. F, S, SS. Prerequisite: PSY 100.

Definition and description of behavior pathology; theory and research on factors in etiology and treatment of behavior disorders. (NT-T)

PSY 325 03(3-0-0). Psychology of Personality. F, S, SS. Prerequisite: PSY 100.

Theory and research related to personality as a psychological concept; analytic, phenomenological, and behavioristic views. (NT-O)

PSY 327 03(2-0-1). Psychology of Women. S, SS. Prerequisite: PSY 100.

Contemporary theory and research focusing on emotional, cognitive, biosocial, and interpersonal contributions to female identity and sex role.

***PSY 330 03(3-0-0). Clinical and Counseling Psychology.** S. Prerequisite: PSY 100.

Specialty areas, conceptualization of clients, assessment, intervention techniques for behavior change, research methods, ethical issues.

PSY 335 03(3-0-0). Forensic Psychology. F, S, SS. Prerequisite: PSY 100; junior or senior standing.

The psychology of crime and criminal behavior, including theory on deviance, the criminal mind, and the root causes of violence in society.

PSY 340 03(3-0-0). Organizational Psychology. F. Prerequisite: PSY 250; concurrent registration in PSY 341; STAT 301 or STAT 311.

Theories and research on interpersonal relations, work group processes, decision making, power, and change strategies within organizations.

PSY 341 01(0-2-0). Organizational Psychology Laboratory. F. Prerequisite: Concurrent registration in PSY 340.

Application of organizational psychology through simulations and field involvements.

^oAlternate year offering (odd); ^{*} Alternate year offering (even); ⁺ Field trips; ^{\$} Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

PSY 350 03(3-0-0). Applied Research Methods in Psychology I. F. Prerequisite: PSY 250; STAT 311; enrollment in University Honors Program.

Application of research methods concepts to design and conduct experiments.

PSY 352 03(3-0-0). Learning and Memory. F, S, SS. Prerequisite: PSY 252.

Research, theory, and applications regarding conditioning, learning, and retention in animals and humans.

PSY 354 03(3-0-0). Human-Computer Interaction. S. Prerequisite: PSY 100; PSY 250; PSY 252.

Theoretical and applied areas of psychology and computer science in the area of human-computer interaction.

PSY 360 03(3-0-0). Psychology of Drug Addiction Treatment. S, SS. Prerequisite: PSY 100; PSY 320.

Psychological theory and method for treating substance use addictions.

PSY 362 03(3-0-0). Professional Issues in Addiction Treatment. F, SS. Prerequisite: PSY 360 or concurrent registration.

Diversity, ethno-cultural, and ethical issues in drug addiction treatment.

PSY 364 03(0-0-3). Infectious Diseases and Substance Use. F, S, SS. Prerequisite: PSY 100.

Infectious disease transmission/progression related to substance use, risk assessment and treatment of substance users in alcohol and drug treatment. (NT-O)

PSY 370 03(3-0-0). Psychological Measurement and Testing. F, S, SS. Prerequisite: PSY 100; concurrent registration in PSY 371; STAT 301 or STAT 311.

Measurement theory including scale properties, reliability, and validity; construction and evaluation of psychological tests.

PSY 371 01(0-2-0). Psychological Measurement and Testing Laboratory. F, S. Prerequisite: Concurrent registration in PSY 370.

Exercises and problems in test administration, norming, reliability, validity, and scale construction.

¹PSY 384 Var [1-3]. Supervised College Teaching. Prerequisite: PSY 100; written consent of department head. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements. Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

Supervised teaching, training, and discussion leadership in undergraduate courses.

^{*}PSY 392 02(0-0-2). Honors Seminar: Current Topics in Psychology. F. Prerequisite: PSY 100; PSY 250; enrollment in University Honors Program.

Research areas in psychology; reading and discussing current journal articles.

PSY 401 03(3-0-0). History and Systems of Psychology. F, S. Prerequisite: PSY 250; junior or senior standing.

Philosophical and scientific underpinnings of psychology; major historical developments in psychology; schools of psychological thought.

PSY 410 03(3-0-0). Psychobiology of Addictions. F. Prerequisite: PSY 250, PSY 252.

Biological basis of the psychology of addictions.

PSY 437 03(3-0-0). Psychology of Gender. F. Prerequisite: PSY 210.

Psychology of gender in cultural context.

PSY 440 03(3-0-0). Industrial Psychology. F, S, SS. Prerequisite: PSY 250; concurrent registration in PSY 441; STAT 301 or STAT 311.

Problems and procedures in selection and classification of personnel; work motivation; job satisfaction; leadership. (NT-O)

PSY 441 01(0-2-0). Industrial Psychology Laboratory. F. Prerequisite: Concurrent registration in PSY 440.

Laboratory and field experiences in job analysis, selection strategies, performance appraisal, and criterion development.

PSY 450 04(3-2-0). Applied Research Methods in Psychology II. S. Prerequisite: PSY 350; enrollment in University Honors Program.

Interpretation and reporting of psychological research findings.

PSY 452 03(3-0-0). Cognitive Psychology. F, S, SS. Prerequisite: PSY 252.

Human thinking processes as related to perception, attention, memory, knowledge representation, reasoning, decision making, and problem solving. (NT-C)

PSY 453 02(0-4-0). Cognitive Psychology Laboratory. F, S, SS. Prerequisite: PSY 250; PSY 452 or concurrent registration.

Exercises in laboratory research in perceptual processes, attention, memory, language, problem solving, and decision making.

PSY 454 03(3-0-0). Biological Psychology. F, S, SS. Prerequisite: PSY 252.

Research and theory on the biological basis of behavior.

PSY 455 02(0-4-0). Biological Psychology Laboratory. F, S, SS. Prerequisite: PSY 250; PSY 454 or concurrent registration.

Laboratory exercises in biological psychology.

PSY 456 03(3-0-0). Sensation and Perception. F, S, SS. Prerequisite: PSY 252.

Review of research on physiological substrates of sensation; methods of scaling sensory experience; role of perception in behavioral adaptation.

PSY 457 02(0-4-0). Sensation and Perception Laboratory. F, S, SS. Prerequisite: PSY 250; PSY 456 or concurrent registration.

Review of research on physiological substrates of sensation; methods of scaling sensory experience; role of perception in behavioral adaptation.

PSY 458 03(3-0-0). Cognitive Neuroscience. F, SS. Prerequisite: PSY 252.

Review of human brain and its mediation of cognitive processes.

PSY 459 02(0-4-0). Cognitive Neuroscience Laboratory. F, SS. Prerequisite: PSY 250; PSY 458 or concurrent registration.

Laboratory exercises in cognitive neuroscience.

PSY 460 03(3-0-0). Child Exceptionality and Psychopathology. F, S, SS. Prerequisite: PSY 100.

Definition and description of child exceptionality and psychopathology; theory and research in etiology, educational implications, and treatment. (NT-O)

PSY 465 03(3-0-0). Adolescent Psychology. F, SS. Prerequisite: PSY 100.

Contemporary theory and research on adolescence including physiological and psychological changes, social influences.

¹PSY 486 Var [1-3]. Practicum. Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

Supervised work experience in approved psychological setting with

^oAlternate year offering (odd); ^{*} Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

periodic consultation of faculty.

¹PSY 488 Var [1-3]. Field Placement. Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

Supervised affiliation with and/or service work in approved psychological setting.

PSY 492A-F Var[1-3]. Seminar. F, S, SS. Prerequisite: None.

A) Applied Social Psychology. B) Cognitive Psychology. C) Counseling/Clinical Psychology. D) Industrial/Organizational Psychology. E) Perceptual and Brain Sciences. F) Special Topics in Psychology.

¹PSY 495A-F Var [1-3]. Independent Study. F, S, SS. Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

Individual investigation of a special topic in psychology under direction of faculty.

A) Applied Social Psychology. B) Cognitive Psychology. C) Counseling/Clinical Psychology. D) Industrial/Organizational Psychology. E) Perceptual and Brain Sciences. F) Special Topics in Psychology.

¹PSY 496A-F Var [1-3]. Group Study. F, S, SS. Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

Collective investigation of a special topic in psychology under direction of faculty.

A) Applied Social Psychology. B) Cognitive Psychology. C) Counseling/Clinical Psychology. D) Industrial/Organizational Psychology. E) Perceptual and Brain Sciences. F) Special Topics in Psychology.

¹PSY 498A-F Var [1-3]. Research. F, S, SS. Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

Independent research project culminating in formal research paper.

A) Applied Social Psychology. B) Cognitive Psychology. C) Counseling/Clinical Psychology. D) Industrial/Organizational Psychology. E) Perceptual and Brain Sciences. F) Special Topics in Psychology.

¹PSY 499A-F Var [1-6]. Thesis. F, S, SS. Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

Independent research project culminating in a thesis presented to a faculty committee.

A) Applied Social Psychology. B) Cognitive Psychology. C) Counseling/Clinical Psychology. D) Industrial/Organizational Psychology. E) Perceptual and Brain Sciences. F) Special Topics in Psychology.

⁰PSY 515 03(0-0-3). Women's Health. F.

Current issues in women's health.

PSY 516A-C 01(1-0-0). Public Health Practice. Prerequisite: Admission to MPH degree program.

A) History. F. B) Competencies. S. C) Oversight. SS.

***PSY 517/*IE 517 03(0-0-3). Perspectives in Global Health.** S. Credit not allowed for both PSY 517 and IE 517.

Science, skills, and beliefs directed at the maintenance and improvement of health for all people.

PSY 595A-F Var[1-3]. Independent Study. F, S, SS.

Individual investigation of a special topic in psychology under direction of faculty.

A) Applied Social Psychology. B) Cognitive Psychology. C) Counseling/Clinical Psychology. D) Industrial/Organizational Psychology. E) Perceptual and Brain Sciences. F) Special Topics in Psychology.

PSY 596A-F Var[1-3]. Group Study. F, S, SS.

Collective investigation of a special topic in psychology under direction of faculty.

A) Applied Social Psychology. B) Cognitive Psychology. C) Counseling/Clinical Psychology. D) Industrial/Organizational Psychology. E) Perceptual and Brain Sciences. F) Special Topics in Psychology.

PSY 600A-M 03(3-0-0). Advanced Psychology. F, S.

A) History. B) Physiological. C) Neuropsychology. D) /NB 600 Sensation and perception. Credit not allowed for both PSY 600D and NB 600. E) Animal learning. F) Human learning and memory. G) Social. H) Lifespan Development. I) Personality. K) Measurement. L) Human performance: motor and intellectual capacities. M) Cognitive processes.

⁰PSY 601 01(0-2-0). Measurement Laboratory. S. Prerequisite: PSY 600K or concurrent registration.

Laboratory experience using measurement concepts and procedures.

PSY 605 03(0-0-3). Applied Measurement Theory. S. Prerequisite: Admission to the Plan C graduate program in Applied Industrial/Organizational Psychology. Credit not allowed for both PSY 605 and PSY 600K. PSY 605 offered only through Division of Continued Education. (NT-O)

PSY 610 03(3-0-0). Counseling and Clinical Pre-practicum I. F. Prerequisite: Written consent of instructor.

Basic assessment and intervention skills; accurate observation, conceptualization, and response.

PSY 611 03(3-0-0). Counseling and Clinical Pre-practicum II. S. Prerequisite: PSY 610.

Counseling and clinical techniques; assessment and intervention strategies; special applications.

PSY 643 03(3-0-0). Industrial/Organizational Psychology I. F.

Integration of multiple perspectives for examining work organizations, roles, and relationships, and organizational entry and socialization.

PSY 644 03(3-0-0). Industrial/Organizational Psychology II. S.

Multiple perspectives for examining individual and organizational development, orientation to organizations, and science and practice in industrial/organizational psychology.

PSY 645 02(2-0-0). Industrial/Organizational Psychology at Work I. F.

Integrating theory, research, and practice in industrial/organizational settings. Assessment and development of applications of psychology in organizations.

PSY 646 02(2-0-0). Industrial/Organizational Psychology at Work II. S.

Development and application of scientific, ethical, and professional standards and competencies in applying psychology in industrial/organizational settings.

PSY 647 03(0-0-3). Applied Industrial Psychology. F. Prerequisite: Admission to the Plan C graduate program in Applied Industrial/Organizational Psychology. Offered only through Division of Continuing Education.

Applications of theory and methods for recruitment, selection, training, and performance management within organizations. (NT-O)

PSY 648 03(0-0-3). Applied Organizational Psychology. S. Prerequisite: Admission to the Plan C graduate program in Applied Industrial/Organizational Psychology. Offered only through Division of Continued

⁰Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Education. (NT-O)

PSY 652 04(3-2-0). Methods of Research in Psychology I. F.

Prerequisite: One 300- or 400-level STAT course

Psychological research emphasizing hypothesis testing and simple research designs, introducing general linear model approach.

PSY 653 04(3-2-0). Methods of Research in Psychology II. S.

Prerequisite: PSY 652.

Advanced research designs emphasizing general linear model approach.

PSY 655A-B 03(3-0-0). Research Issues and Models in Psychology. S.

Generation and development of research ideas, evaluating approaches, interpreting and reporting findings. **A)** Applied. **B)** Experimental.

PSY 660 03(0-0-3). Applied Cross-Cultural I/O Psychology. S.

Prerequisite: Admission to the Plan C graduate program in Applied I/O Psychology; PSY 647 or PSY 648.

Cultural differences in the application of individual and organizational interventions to improve human and organizational effectiveness. (NT-O)

PSY 661 03(0-0-3). Applied Organizational Development. SS.

Prerequisite: Admission to the Plan C graduate program in I/O Psychology; PSY 648.

Techniques and interventions for developing, improving and effecting change in organizations through diagnosis, planned change, and survey feedback.

PSY 662 04(0-0-4). Applied Psychological Research Methods I. F.

Prerequisite: Admission to the Plan C graduate program in Applied I/O Psychology; any upper division statistics course. Credit not allowed for both PSY 662 and PSY 652. Offered only through the Division of Continuing Education.

Psychological research emphasizing hypothesis testing and simple research designs, the general linear model approach with emphasis on application. (NT-O)

PSY 663 04(0-0-4). Applied Psychological Research Methods II. S.

Prerequisite: Admission to the Plan C graduate program in I/O Psychology; PSY 662. Credit not allowed for both PSY 663 and PSY 653. Offered only through Division of Continuing Education.

Advanced research designs emphasizing general linear model approach with emphasis on application. (NT-O)

PSY 665 03(0-0-3). Applied Psychological Research Design. SS.

Prerequisite: Admission to the plan C graduate program in Applied I/O Psychology; any graduate applied statistics course. Credit not allowed for both PSY 655C and PSY 665. Offered only through Division of Continuing Education.

Review of scientific method, generation of hypotheses, and design of laboratory and field research studies. (NT-O)

PSY 666 03(0-0-3). Succession Planning/Leadership Development. SS.

Prerequisite: Admission to the Plan C graduate program in Applied I/O Psychology; PSY 648.

Examines modern theories of leadership, strategies for succession planning; training, coaching, mentoring, professional development for leadership. (NT-O)

PSY 667 03(0-0-3). Competency Modeling and Criterion Development. F.

Prerequisite: Admission to the Plan C graduate program in I/O Psychology; PSY 647.

Conducting job analyses and competency modeling within organizations, application of the results of those processes to criterion development. (NT-O)

PSY 668 03(0-0-3). Workforce Training and Development. S.

Prerequisite: Admission to the Plan C graduate program in I/O Psychology; PSY 647.

An overview of adult learning theory, emphasizing the role of I/O psychology in identifying, designing, transferring, and evaluating training. (NT-O)

PSY 670 03(3-0-0). Psychological Measurement-Personality. F.

Construction, administration, interpretation of objectionable measures of personality including aptitudes, abilities, interests.

PSY 672 03(3-0-0). Psychological Assessment. S. Prerequisite: PSY 610; PSY 670.

Use of test data to determine cognitive functioning and predict behavior; supervised test administration and interpretation.

PSY 675 03(3-0-0). Ethics and Professional Psychology Practice. F.

Prerequisite: PSY 611.

Ethical practice of psychology, duty-to-warn statutes, Colorado law, problematic ethical situations.

PSY 684 Var [1-3]. Supervised College Teaching.

Supervised teaching, training, and discussion leadership in undergraduate courses.

PSY 686A-G Var. Practicum.

A) Counseling and diagnosis I. Prerequisite: PSY 611. **B)** Public health.

Prerequisite: PSY 516A; PSY 516B; concurrent registration in PSY 516C.

C) Industrial-organizational I. Prerequisite: PSY 692B. **D)** School I.

Prerequisite: PSY 692B. **E)** Applied social I. Prerequisite: PSY 611. **F)**

Perceptual and brain sciences I. Prerequisite: PSY 611. **G)** Cognitive I.

Prerequisite: PSY 611.

PSY 692A-F Var. Seminar. F, S, SS.

A) Applied social psychology. **B)** Cognitive psychology. **C)** Counseling

psychology. **D)** Industrial/organizational psychology. **E)** Perceptual and

brain sciences. **F)** Special topics in psychology.

PSY 699A-E Var. Thesis. F, S, SS.

A) Applied Social Psychology. **B)** Cognitive Psychology. **C)**

Counseling/Clinical Psychology. **D)** Industrial/Organizational Psychology.

E) Perceptual and Brain Sciences.

PSY 720 03(3-0-0). Psychopathology. F. Prerequisite: Psychology

graduate students only.

Adult and child behavior pathology; theory, research, and methods related to etiology, defining characteristics, and maintaining causes.

PSY 722 03(3-0-0). Empirically Validated Therapies. S. Prerequisite:

PSY 720.

Outline of major empirically validated approaches to assessment and treatment including cognitive-behavioral therapies, interpersonal therapy.

PSY 727 03(3-0-0). Theories of Vocational Development. S, SS.

Prerequisite: Psychology graduate students only.

Nature and current status of vocational development theory with implications for career counseling.

PSY 729 03(3-0-0). Counseling and Psychotherapy II. S. Prerequisite:

PSY 722.

Theory and practice of group psychotherapy and counseling.

***PSY 754 03(3-0-0). Multivariate Analysis in Behavioral Sciences. S.**

Prerequisite: PSY 653.

Multivariate analysis, including factor and component analysis, applied to psychological research.

PSY 775 03(3-0-0). Diversity Issues in Counseling. F. Prerequisite: PSY

611.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Diversity issues in clients and counselors such as gender, race, age, sexual orientation, education, religion, disability, socioeconomic status.

PSY 784 Var. Supervised College Teaching. F, S.

Philosophy, approaches, and techniques of college-level instruction; supervised teaching with consultation of faculty.

PSY 786A-J Var. Advanced Practicum. Prerequisite: Appropriate subtopic of PSY 686A-G.

A) Counseling and diagnosis II. **C)** Industrial-organizational II. **D)** School II. **E)** Clinical. **F)** Supervision. **G)** Applied social II. **H)** Perceptual and brain sciences II. **I)** Cognitive II. **J)** Group psychotherapy. Prerequisite: PSY 610; PSY 727.

PSY 787 Var. Internship.

Supervised work experience under departmental guidelines in approved psychological agency or setting.

PSY 792A-F Var. Seminar. F, S, SS.

A) Applied Social Psychology. **B)** Cognitive Psychology. **C)** Counseling/Clinical Psychology. **D)** Industrial/Organizational Psychology. **E)** Perceptual and Brain Sciences. **F)** Special Topics in Psychology.

PSY 795A-F Var[1-3]. Independent Study. F, S, SS.

Individual investigation of a special topic in psychology under direction of faculty.

A) Applied Social Psychology. **B)** Cognitive Psychology. **C)** Counseling/Clinical Psychology. **D)** Industrial/Organizational Psychology. **E)** Perceptual and Brain Sciences. **F)** Special Topics in Psychology.

PSY 799A-E Var. Dissertation. F, S, SS.

A) Applied Social Psychology. **B)** Cognitive Psychology. **C)** Counseling/Clinical Psychology. **D)** Industrial/Organizational Psychology. **E)** Perceptual and Brain Sciences.

BUSINESS MANAGEMENT SCIENCE COURSES

Department of Computer Information Systems College of Business

QNT 270 03(2-2-0). Basic Business Statistics. F, S, SS. Prerequisite: STAT 204.

Statistical tools applied to business conditions and functions.

QNT 375 03(2-2-0). Models and Applications in Management Science. F, S. Prerequisite: STAT 204.

Introduction and application of operations research techniques to business decision problems.

QNT 570 03(3-0-0). Statistical Decision Making. F, SS. Prerequisite: QNT 270.

Classical statistical techniques including hypothesis testing and multiple regression; model building, control charts, time series and forecasting.

REAL ESTATE COURSES

Department of Finance and Real Estate College of Business

REL 360 03(3-0-0). Real Estate Principles. F, S, SS. Prerequisite: ECON 204.

Broad survey of real estate emphasizing land use, urban structure and growth, market analysis, real estate finance and valuation, and property rights.

REL 367 03(3-0-0). Real Estate Law. S. Prerequisite: BUS 205 or BUS 260 or HDFS 403.

Legal regulations applicable to real property ownership and transfer, to real estate agents, and to use of real property.

REL 430 03(3-0-0). Real Estate Market Analysis and Valuation. F. Prerequisite: REL 360.

Valuation, capital market, regional economic base, real estate cycles, real estate equilibrium models applied to major property types.

REL 435 03(3-0-0). Real Estate Marketing and Brokerage. S. Prerequisite: REL 360.

Practitioner focus including legal forms, valuation, sales techniques, escrow, fiduciary requirements, start-to-finish real estate project.

REL 440 03(3-0-0). Real Estate Development. S. Prerequisite: FIN 300; REL 360; REL 460.

Development process including urban dynamics, architecture, construction, law, public approvals, financing, marketing, and property management.

REL 460 03(3-0-0). Real Estate Finance and Investment. F. Prerequisite: FIN 300 or FIN 305; REL 360.

Financing of real estate resources: real estate financial markets, policies; use of leverage and real estate investment analysis in real estate investment programs.

REL 487 Var [1-3]. Real Estate Internship. Maximum of 3 credits allowed in course.

REL 495 Var [1-3]. Real Estate Independent Study. Maximum of 3 credits allowed in course.

REL 496 Var [1-3]. Real Estate Group Study. Maximum of 3 credits allowed in course.

RESTAURANT/RESORT MANAGEMENT COURSES

Department of Food Science and Human Nutrition *College of Applied Human Sciences*

RRM 101 03(3-0-0). Hospitality Industry. F, S.

Food service, lodging, and tourism industries; exploration of various industry segments and career opportunities.

RRM 200 03(3-0-0). Hotel Operations. F, S. Prerequisite: RRM 101.

Front office and room management as related to resorts and hotels. Computer application, financial controls, employee and guest relations.

RRM 310 03(3-0-0). Food Service Systems-Operations. F, S, SS.

Technical operations: menu planning, evaluation; recipe standardization; forecasting, food cost, sanitation, hospital food distribution systems. (NT-O)

RRM 311 03(3-0-0). Food Service Systems-Production and Purchasing. F, S, SS. Prerequisite: RRM 310.

Quantity food production principles, purchasing specifications, market channels. (NT-O)

RRM 330 02(2-0-0). Alcohol Beverage Control and Management. S. Prerequisite: CHEM 103 or CHEM 107.

Classification, production, and service of controlled beverages; management of facilities and people; safe service training; financial controls.

RRM 350 03(3-0-0). Restaurant and Resort Marketing. F. Prerequisite: RRM 101.

Restaurant and resort operations marketing, including planning, promotion, and special industry considerations.

RRM 400 03(2-0-1). Food and Society. S. Prerequisite: SOC 100; must have completed category 3D and 3E AUCC requirements.

Exploration of the influence of food, dining, and nutrition on cultural aspects of the human experience.

RRM 415 03(0-6-0). Catering Techniques and Culinary Arts. F, S. Prerequisite: RRM 311.

Management of advanced techniques in culinary technique; catering of food and beverages for special functions. (\$)

RRM 440 04(0-8-0). Restaurant Operations. F, S. Prerequisite: RRM 101 or concurrent registration.

Principles, practices, philosophies, systems for daily operations of casual or fine dining restaurant; focus on developing solutions to problems.

RRM 460/NRRT 460 03(3-0-0). Event and Conference Planning. F, S. Prerequisite: NRRT 270 or RRM 101. Credit not allowed for both RRM 460 and NRRT 460.

Foundation in planning, organizing, and producing special events and conferences. Functions and strategies for effective event management.

RRM 487 Var[1-15]. Internship: Restaurant and Resort Management. F, S, SS. Prerequisite: RRM 200; RRM 311.

RRM 492 03(0-0-3). Seminar on Hospitality Management. F, S. Prerequisite: MKT 305.

Applying and synthesizing service knowledge and management functions; project discussions, benchmark presentations, execution of a capstone project.

RRM 500 03(3-0-0). Understanding Food. F. Prerequisite: RRM 400.

Role of food in the creation of identity, as driver of technology, prominent role food plays in the media.

RRM 604 03(3-0-0). Research Methods in Food and Nutrition. S. Prerequisite: ERDM 606 or STAT 301 or STAT 311.

Research techniques used in food and nutrition disciplines. Emphasis on design, preparation, and evaluation of research.

RRM 686 01(0-4-0). Practicum-Food Service Management.

Food production, menu planning, nutritional analysis, and food costing.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

RANGELAND ECOSYSTEM SCIENCE COURSES

Department of Forest and Rangeland Stewardship Warner College of Natural Resources

RS 300 03(3-0-0). Rangeland Conservation and Stewardship. F. Prerequisite: BZ 120 or LIFE 102.

Conservation and management of rangeland-ecosystem values using sustainable practices. (NT-O)

RS 310/F 310 03(2-2-0). Forest and Rangeland Ecogeography. F, S. Prerequisite: BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 102.

Distribution of wildland plant communities and identification of important grasses, forbs, shrubs and trees common in North America.

RS 312 01(0-2-0). Rangeland Plant Identification Lab. F. Prerequisite: Concurrent registration in RS 310.

Identification of characteristic grasses, forbs, and shrubs common to North American rangelands.

RS 329 01(0-3-0). Rangeland Assessment. SS. Prerequisite: SOCR 240; RS 300; RS 331.

Five-day intensive field-based course on principles of rangeland ecosystem assessment.

+RS 331 03(2-2-0). Wildland Plants and Plant Communities. F. Prerequisite: BZ 223 or F 210 or NR 220.

Distribution of non-forested wildland plant communities and important plant species in the western United States. (NT-O)

+RS 351 03(2-2-0). Wildland Ecosystems in a Changing World. F. Prerequisite: LAND 220/LIFE 220 or LIFE 320; SOCR 240.

Understanding and conserving non-forested wildland ecosystems, processes, and services under changing environmental conditions.

RS 400 02(2-0-0). Rangeland Improvements. F. Prerequisite: RS 300 or SOCR 320.

Improvement of rangelands through biological and cultural methods; management of improved rangelands.

RS 420 03(1-4-0). Grass Taxonomy. S. Prerequisite: BZ 223.

Anatomy, morphology, and identification of grasses.

+RS 432 02(1-3-0). Rangeland Measurements and Monitoring. F. Prerequisite: NR 220 or RS 331; RS 300 or concurrent registration; STAT 201 or STAT 301 or STAT 307.

Vegetation sampling and field measurements emphasizing applications for monitoring and adaptive management. (\$)

+RS 452 03(3-0-0). Rangeland Herbivore Ecology and Management. F, S, SS. Prerequisite: RS 300; LAND 220/LIFE 220. Voluntary field trips.

Ecology and management of large ungulate herbivores including consumer functions at organismal and ecosystem levels. (NT-O)

RS 470 02(2-0-0). Rangeland Economics and Analysis. F. Prerequisite: AREC 202 or ECON 202; RS 300.

Economics of rangeland resource use; analytical techniques for allocation of rangeland resources.

RS 471 02(2-0-0). Rangeland Planning and Grazing Management. F. Prerequisite: RS 300 or SOCR 320.

Definition of grazing management, grazing systems. Synthesis of animal, plant responses to grazing management. Structure, function of rangeland planning.

+RS 472 04(1-6-0). Rangeland Ecosystem Planning. S. Prerequisite: RS 471.

Range allotment, ranch and restoration planning. (\$)

RS 478 03(3-0-0). Ecological Restoration. S. Prerequisite: BZ 450 or F 311 or LAND 220/LIFE 220; SOCR 240. Credit not allowed for both RS 478 and NR 678.

Analysis of environmental factors influencing restoration of disturbed lands and practices for successful restoration of disturbed ecosystems.

RS 495 Var. Independent Study-Rangeland Ecosystem.

RS 496 Var. Group Study-Rangeland Ecosystem.

RS 500 03(3-0-0). Advanced Rangeland Management. F, S, SS. Prerequisite: One course in basic ecology.

Rangeland management concepts. (NT-O)

RS 501 03(3-0-0). Range Habitat Manipulation. F. Prerequisite: RS 300 or SOCR 320.

Improvement of range habitats and effects on ecosystem components.

***RS 520 02(2-0-0). Range Issues and Policy.** F. Prerequisite: RS 300; SOCR 320.

Explores and evaluates current issues and policies concerning range use.

RS 531 03(2-3-0). World Grassland Ecogeography. F. Prerequisite: BZ 223

Distribution, climate, and structure of the world's major grasslands with emphasis on North America. (NT-O)

+RS 532 03(1-3-1). Rangeland Ecosystem Sampling. F. Prerequisite: STAT 301; one ecology course. Credit not allowed for both RS 532 and RS 432.

Measurement, analysis techniques for rangeland vegetation. Applications to management emphasized.

(\$)

RS 552 04(3-0-1). Range Animal Production and Management. F, S, SS. Prerequisite: One course in ecology; one course in animal or wildlife management.

Biological and ecological basis for production of meat from rangelands. (NT-O)

+RS 565 03(2-2-0). Riparian Ecology and Management. S. Prerequisite: LAND 220 or LIFE 220 or LIFE 320.

Analysis of interactions among biotic and abiotic processes as relates to the ecology and management of riparian systems, emphasizing case studies. Field trips required.

RS 630 03(3-0-0). Ecology of Grasslands and Shrublands. F. Prerequisite: One course in ecology.

Distributions and climatic controls on grassland and shrubland plant communities.

***RS 640 03(3-0-0). Vegetation-Environment Analysis.** F. Prerequisite: STAT 301.

Multivariate analyses and ecological interpretations of vegetation communities.

RS 651 04(3-2-0). Primary Production and Decomposition. F. Prerequisite: One course in plant physiology; one course in soils.

Energy transformations within primary producer compartment; dissipation of ecosystem biomass by decomposers, mineralization. (NT-O).

RS 693 01(1-0-0). Seminar.

RS 695 Var. Independent Study-Rangeland Ecosystem.

RS 696 Var. Group Study-Rangeland Ecosystem.

RS 698 Var. Research.

RS 699 Var. Thesis.

RS 793 01(0-0-1). Seminar.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

RS 795 Var. Independent Study-Rangeland Ecosystem.

RS 798 Var. Research.

RS 799 Var. Dissertation.

STUDY ABROAD

Nondepartmental

Office of International Programs

Office of Provost and Executive Vice President

SA 482 [Var] Study Abroad. (AUCC 3E).

Students participating in a semester study abroad program register for SA 482. This is not a course for credit.

SA 682 {Var} Graduate Study Abroad. Prerequisite: Approval of graduate committee, Graduate School, and International Programs.

Vehicle to allow graduate students to enroll in a study program abroad as part of their approved program. This is not a course for credit.

SOCIOLOGY COURSES

Department of Sociology *College of Liberal Arts*

SOC 100 03(3-0-0). General Sociology. (GT-SS3, AUCC 3C). F, S, SS.
Analysis of human societies in the U.S. and abroad; major institutions, groups, and interaction patterns from the sociological perspective. (NT-O)

SOC 105 03(3-0-0). Social Problems. (GT-SS3, AUCC 3C). F, S.
Analysis of global and domestic social problems. (NT-O)

SOC 192 03(0-0-3). Civic Culture and Social Responsibility. S.
Erosion of civility in society with particular emphasis on civic culture on the university campus.

SOC 205 03(3-0-0). Contemporary Race-Ethnic Relations. (GT-SS3, AUCC 3E). F, S.
People of color and white ethnic groups in the U.S. and internationally. (NT-O)

SOC 210 03(3-0-0). Quantitative Sociological Analysis. F, S.
Prerequisite: One credit of 100-level mathematics except MATH 133 and MATH 135.
Application of quantitative concepts and methodology to investigation of social problems.

SOC 220 03(3-0-0). Global Environmental Issues. F, S.
Relationship between human societies around the world and the larger natural environment.

SOC 253 03(3-0-0). Introduction to Criminal Justice. F, S, SS.
Criminal justice as a system. History, philosophy, components and administration of criminal justice.

SOC 301 03(3-0-0). Development of Sociological Thought. F, S.
Prerequisite: SOC 100 or SOC 105.
Central themes in sociological thought from Enlightenment to present. (NT-O)

SOC 302 03(3-0-0). Contemporary Sociological Theory. F, S, SS.
Prerequisite: SOC 100 or SOC 105.
Theoretical approaches and models in sociology.

SOC 311 03(3-0-0). Methods of Sociological Inquiry. F, S, SS.
Prerequisite: SOC 100 or SOC 105; MATH 118.
Application of sociological concepts to sociological problems including problem formulation, data gathering, and research design. (NT-O)

SOC 313 01(1-0-0). Computer Methods in Sociology. F. Prerequisite: SOC 210.
Experimental introduction to typical uses of computers in sociology with emphasis on data analysis. (NT-O)

SOC 320 03(3-0-0). Population-Natural Resources and Environment. F.
Prerequisite: SOC 100 or SOC 105.
Population studies; world growth patterns and their relationship to natural resources and environment.

SOC 321 03(3-0-0). Soil, Environment, and Society. F, S. Prerequisite: SOC 100 or SOC 105.
Role of soil in our environment and its value as it relates to the social and economic well-being of society.

SOC 322 03(3-0-0). Introduction to Environmental Justice. F, S.
Prerequisite: SOC 100 or SOC 105.
Unequal distribution of environmental risks, benefits, policies and regulatory practices across different populations.

SOC 330 03(3-0-0). Social Stratification. F. Prerequisite: SOC 100 or

SOC 105.

Theories of social inequality and mobility and their ramifications in American society. (NT-O)

SOC 331 03(3-0-0). Community Dynamics and Development. F.
Prerequisite: SOC 100 or SOC 105; SOC 311.
Nature of community: its institutions, problems and processes, including growth, disintegration, and development.

SOC 332 03(3-0-0). Comparative Majority-Minority Relations. S.
Prerequisite: SOC 100 or SOC 105.
Discrimination, ideology, power, policy issues in the U.S. and selected societies; application of basic concepts in student's self appraisal. (NT-O)

SOC 333 03(3-0-0). Gender Roles in Society. F. Prerequisite: SOC 100 or SOC 105.
Analysis of social organization of gender in contemporary society, emphasizing roles and institutional linkages.

SOC 340 03(3-0-0). Bureaucracy and Modern Organizations. S.
Prerequisite: SOC 100 or SOC 105.
Structure and function of large-scale organization: coordination of activities between organizations and society.

SOC 341 03(3-0-0). Sociology of Rural Life. S. Prerequisite: SOC 100 or SOC 105.
Rural life in U.S. and Third World societies: analysis of sociocultural systems, social differentiation, social institutions, and problems of social change. (NT-T)

SOC 342 03(3-0-0). Leisure and Society. F, S, SS. Prerequisite: SOC 100 or SOC 105.
Nature and purpose of leisure and work in society; influences of culture and social structure on leisure values and behavior.

SOC 343 03(3-0-0). Sport and Society. F, S.
Sport as a microcosm of American society focusing on sport and values, socialization, institutions, stratification, race, and gender.

SOC 352 03(3-0-0). Criminology. F, S, SS. Prerequisite: SOC 100 or SOC 105.
Crime in contemporary society; behavioral, causation, prevention, and justice issues.

SOC 353 03(3-0-0). Criminal Investigations. F, S. Prerequisite: SOC 100 or SOC 105.
Examination of the social, organization, and applied facets of the criminal investigation process.

SOC 354 03(3-0-0). Law Enforcement and Society. F, S. Prerequisite: SOC 100 or SOC 105; SOC 253.
Rise and development of law enforcement as a societal reaction to crime.

SOC 358 03(3-0-0). Correctional Organizations. S. Prerequisite: SOC 100 or SOC 105; SOC 253.
Social and organizational issues in the administration of punishment and correction.

SOC 360 03(3-0-0). Political Sociology. S. Prerequisite: SOC 100 or SOC 105.
Analysis of power as a sociological concept, emphasizing competing theories of the state and power.

SOC 362 03(3-0-0). Social Change. S. Prerequisite: SOC 100 or SOC 105.
Sources of stability and stress in changing societies, consequences of planned and unplanned change; future trends.

SOC 364 03(3-0-0). Agriculture and Global Society. S. Prerequisite: SOC 100 or SOC 105.
Analysis of relationships between global agriculture and social change.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SOC 366 03(3-0-0). Peoples and Institutions of Latin America. F. Prerequisite: SOC 100 or SOC 105.

Change in the cultures and institutions of contemporary Latin America.

SOC 371 03(3-0-0). Symbolic Interaction. F, S. Prerequisite: SOC 100 or SOC 105.

Basic concepts and issues in sociological perspective of social action and interactionism.

SOC 372 03(3-0-0). Sociology of Deviance. F, S, SS. Prerequisite: SOC 100 or SOC 105.

Description, comparison, and analysis of theories and research of deviance.

SOC 375 03(3-0-0). Sociology of Religion and Medicine. F. Prerequisite: SOC 100 or SOC 105.

Descriptions and analyses of the roles and relationships of religion and medicine as modern social institutions.

SOC 403 03(0-0-3). Capstone Seminar. F, S. Prerequisite: SOC 210; SOC 301 or SOC 302; SOC 311; SOC 313.

Student demonstration of central concepts and procedures currently employed in sociology discipline.

***SOC 422/*ANTH 422 03(3-0-0). Comparative Legal Systems.** S. Prerequisite: ANTH 100 or SOC 100. Credit not allowed for both SOC 422 and ANTH 422.

Traditional approaches to law, competing concepts of law in the global system and experiences of minorities in state legal systems.

°SOC 429 03(3-0-0). Comparative Urban Studies. S. Prerequisite: SOC 100 or SOC 105.

World urbanization and metropolitan development, measurement of growth and change in cities, and sociological perspective in planning.

SOC 444/ETST 444 03(3-0-0). Federal Indian Law and Policy. S. Credit not allowed for both SOC 444 and ETST 444.

Indian policy processes and their impact on Native lives and culture, particularly Native sovereignty.

SOC 450 03(3-0-0). Gender, Crime, and Criminal Justice. F. Prerequisite: SOC 100 or SOC 105; SOC 253.

Issues related to women as offenders, victims, and professionals in the criminal justice system.

SOC 455 03(3-0-0). Sociology of Law. F. Prerequisite: SOC 100 or SOC 105; SOC 253.

Social origins, functions, and procedures of law in society.

SOC 460 03(3-0-0). Society and Environment. S. Prerequisite: SOC 100 or SOC 105.

Technology as a social phenomenon interacting with social organization and the natural environment.

SOC 461 03(3-0-0). Water, Society, and Environment. F, S, SS. Prerequisite: SOC 100 or SOC 105.

Social aspects of water resource utilization; interface of social organization with physical environment. (NT-O)

SOC 462 03(3-0-0). Applied Social Change. S. Prerequisite: SOC 100 or SOC 105.

Applied sociology with a focus on research and practice designed to foster social change.

SOC 463 03(3-0-0). Sociology of Disaster. S. Prerequisite: SOC 100 or SOC 105.

Determinants and consequences of behavior and response to environmental extremes including floods, earthquakes, wind, severe storms, and technological emergencies.

°SOC 474 03(0-0-3). Social Movements and Collective Behavior. S. Prerequisite: SOC 100 or SOC 105.

Theory and research on causes, organizational structure, and outcomes of social movements and collective behavior.

SOC 482A-B 03(2-0-1). Travel Abroad. SS. International and comparative issues in sociology. A) Comparative Criminal Justice. B) Crime and Deviance.

SOC 487 03(0-9-1). Internship. Prerequisite: SOC 210; SOC 301 or SOC 302; SOC 311; SOC 313.

Academic-based work experience with selected organizations or agencies. Supervised application of sociological principles and seminar participation.

SOC 492 01(0-0-1). Seminar. F, S, SS. Prerequisite: SOC 210; SOC 301 or SOC 302; SOC 311; SOC 313; concurrent registration in SOC 487.

Examination of work-oriented instruction in seminar setting where sociological principles are analyzed using internship experience.

SOC 495 Var. Independent Study.

SOC 500 01(1-0-0). The Sociological Profession I. F. Prerequisite: Fifteen credits in sociology.

Examination of issues and values affecting sociology as a profession.

SOC 501 03(3-0-0). The Sociological Profession II. F. Prerequisite: Fifteen credits in sociology.

Examination of the activities and procedures critical to the socialization of professional sociologists.

SOC 502 03(3-0-0). Foundations of Theoretical Sociology. F. Prerequisite: SOC 500 or concurrent registration.

Contributions of major sociological theorists prior to mid-20th century.

***SOC 503 03(3-0-0). Contemporary Sociological Theory.** S. Prerequisite: SOC 502.

Contributions of major sociological theorists since mid-20th century.

***SOC 510 03(3-0-0). Sociological Methods I.** F. Prerequisite: SOC 210 or SOC 311.

Linkage of sociological theory and conceptual models; case studies; data-gathering techniques.

***SOC 511 03(3-0-0). Sociological Methods II.** S. Prerequisite: SOC 510.

Linkage of sociological theory and conceptual models; case studies; data-gathering techniques.

SOC 540 03(3-0-0). Community Sociology. F. Prerequisite: SOC 500.

Intellectual roots of community sociology and contemporary community studies.

SOC 555 03(0-0-3). Society, Deviance, and Crime. F. Prerequisite: 12 credits of sociology at the 300 level or above.

Sociological perspectives and research in the areas of deviance and crime, including classical, positivist, and critical approaches.

SOC 562/AGRI 562 03(2-0-1). Sociology of Food Systems and Agriculture. F, S.

How agricultural choices generate intended and unintended consequences for human communities and the natural environment.

SOC 564 03(3-0-0). Environmental Justice. S. Prerequisite: SOC 100 or SOC 105.

Unequal distribution of environmental risks, benefits, policies and regulatory practices across different populations.

°SOC 566/°AREC 566 03(3-0-0). Contemporary Issues of Developing Countries. S. Prerequisite: Two or more courses in AREC or ECON or SOC. Credit not allowed for both SOC 566 and AREC 566.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Social, economic, and technological factors in developing countries.

***SOC 610 03(0-0-3). Seminar in Methods of Qualitative Analysis.** S. Prerequisite: POLS 620 or concurrent registration or SOC 311. Credit not allowed for both SOC 610 and POLS 621.

Examination and application of qualitative techniques of analysis.

***SOC 612 03(0-0-3). Seminar in Methods of Evaluational Research.** S. Prerequisite: SOC 511.

Quantitative and qualitative techniques of evaluating social action programs.

°SOC 613 03(0-0-3). Seminar in Multiple Regression and Path Analysis. F. Prerequisite: SOC 511.

Analysis and application of techniques for multiple regression and path analysis.

***SOC 614 03(3-0-0). Comparative Sociology.** S. Prerequisite: SOC 500.

Examination of problems and prospects in extending and carrying out sociological research across social systems.

***SOC 630 03(3-0-0). Social Stratification.** S. Prerequisite: SOC 500.

Theory and research on class structure, status attainment, ideology, and social change.

***SOC 631 03(3-0-0). Sociology of Rural Development.** F. Prerequisite: SOC 500.

Rural social organization and development, modernization, and social change as it relates to rural social systems; underdeveloped regions of world.

°SOC 633 03(3-0-0). Theories of Modern Organizations. S. Prerequisite: SOC 340.

Comparison of various theoretical perspectives on functioning of modern large-scale organizations.

***SOC 639/CIVE 639 03(3-0-0). Technology Assessment and Social Forecasting.** F. Prerequisite: SOC 500. Credit not allowed for both SOC 639 and CIVE 639.

Interrelationship between technology and society emphasizing procedures for evaluating impacts and forecasting alternatives.

***SOC 660 03(3-0-0). Theories of Development and Social Change.** F. Prerequisite: SOC 500.

Central concepts, issues, and approaches in sociology of development.

°SOC 661 03(0-0-3). Gender and Global Society. S. Prerequisite: SOC 500.

Gender relations and social change in global society.

SOC 662 03(0-0-3). Seminar in Sociological Policy Analysis. S. Prerequisite: SOC 500.

Examination of sociological perspectives on formulation and impact of policies to deal with social problems.

***SOC 663 03(3-0-0). Sociology of Sustainable Development.** S. Prerequisite: SOC 500.

Social dimensions of sustainable Third World development and implications for policy.

°SOC 664 03(3-0-0). Sociology of Water Resources. F. Prerequisite: SOC 500.

Social organization, conflict, and power in arid environments.

SOC 665 03(3-0-0). Sociology of Science and Technology. F. Prerequisite: Ten credits of undergraduate natural sciences; SOC 100.

Examination of connections among science, technology, and social development in national and global context.

***SOC 666 03(0-0-3). Globalization and Socioeconomic Restructuring.** S. Prerequisite: SOC 500.

Sociological theories and issues in globalization; socioeconomic restructuring of the world economy.

°SOC 667 03(3-0-0). Theories of State, Economy, and Society. S. Prerequisite: SOC 500.

Major classical and contemporary sociological theories of state-economy-society relations emphasizing development.

SOC 668 03(3-0-0). Environmental Sociology. S. Prerequisite: SOC 500.

Connections between social organizations, the environment, and science and technology.

SOC 669 03(0-0-3). Global Inequality and Change. F. Prerequisite: SOC 500.

Major issues in global inequality and change from a historical and contemporary perspective.

SOC 671 03(0-0-3). Metatheoretical Issues in Sociology. F. Prerequisite: SOC 502.

Analysis of metatheoretical concepts and issues in sociological theory.

SOC 693A-D 03(0-0-3). Seminar. S. Prerequisite: SOC 602.

A) Structural theory. B) Cultural theory. C) Middle range theory. D) Metatheory.

SOC 695 Var. Independent Study.

SOC 696 Var [1-3]. Group Study. Maximum of 8 credits allowed in course.

SOC 699 Var. Thesis.

°SOC 752 03(0-0-3). Seminar in Utopian Thought. F. Prerequisite: SOC 602.

Sociological analysis of major utopian writings.

SOC 784 Var. Supervised College Teaching.

SOC 787 Var. Internship.

***SOC 793A-D 03(0-0-3). Seminar.** S. Prerequisite: SOC 511.

A) Quantitative data collection. B) Quantitative data analysis. C) Advanced ethnographic methods. D) Comparative methods.

SOC 795 Var. Independent Study.

SOC 799 Var. Dissertation.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SOIL AND CROP SCIENCES COURSES

Department of Soil and Crop Sciences College of Agricultural Sciences

SOCR 100 04(3-2-0). General Crops. F.

Production and adaptation of cultivated crops; principles affecting growth, development, management, and utilization.

SOCR 171/HORT 171 03(2-0-1). Environmental Issues in Agriculture. (GT-SS3, AUCC 3E). F. Credit not allowed for both SOCR 171 and HORT 171.

Historical development of agriculture; environmental consequences of modern food production and other cultural approaches to agriculture.

SOCR 177 01(1-0-0). Applied Information Technology in Agriculture. S.

Introduction to database and project management, GIS/GPS, and remote sensing as they apply to agriculture, the environment, and business management.

SOCR 192 03(0-0-3). Water in the West. F.

History and current status of water resources management and policy in the western United States.

SOCR 200 01(0-2-0). Seed Anatomy and Identification. F, S, SS. Prerequisite: BZ 104 or BZ 110 or BZ 120 or HORT 100 or LIFE 102 or SOCR 100.

Principles of seed anatomy including reproduction, identification, and seed characteristics of plant families. (NT-C/O)

SOCR 201 01(0-2-0). Seed Development and Metabolism. F, S, SS. Prerequisite: BZ 104 or BZ 110 or BZ 120 or HORT 100 or LIFE 102 or SOCR 100.

Basic processes controlling seed development, maturation, dormancy, storage, germination, and how these factors relate to seedling growth. (NT-C/O)

SOCR 240 04(3-2-0). Introductory Soil Science. F, S. Prerequisite: CHEM 107 or CHEM 111.

Formation, properties, and management of soils emphasizing soil conditions that affect plant growth.

SOCR 300 02(0-4-0). Seed Purity Analysis. F, S, SS. Prerequisite: SOCR 201 or written consent of instructor.

Fundamentals for determining physical purity of a seed lot using established rules and procedures. (NT-C/O)

SOCR 301 02(0-4-0). Seed Germination and Viability. F, S, SS. Prerequisite: SOCR 201 or written consent of instructor.

Seed viability tests including standard germination and tetrazolium, seed viability, dormancy, parameters of viability and evaluation. (NT-C/O)

***SOCR 304 03(2-2-0). Seed Production, Conditioning, and Marketing.** S. Prerequisite: SOCR 100.

Scientific principles of seed development, maturation and testing including harvesting, conditioning, and marketing of seed crops.

SOCR 310 02(0-4-0). Agronomic Plant and Seed Identification. S. Prerequisite: BZ 104 or BZ 110 or BZ 120 or HORT 100 or LIFE 102 or SOCR 100.

Evaluate characteristics needed to identify agronomic plant and seed species.

SOCR 320 03(3-0-0). Forage and Pasture Management. S. Credit not allowed for both SOCR 320 and RS 320.

Fundamentals of establishment, management, and utilization of cultivated forages including hay, silage, and pasture production.

SOCR 322 03(3-0-0). Principles of Microclimatology. S. Prerequisite: Three credits in PH.

Principles of microclimatology including energy balance concepts for soil and vegetation surfaces, and their application.

SOCR 330 03(3-0-0). Principles of Genetics. F, S, SS. Prerequisite: BZ 110 or BZ 120 or LIFE 102.

Transmission, population, and molecular genetics; practical applications.

SOCR 331 01(0-2-0). Genetics Laboratory. F, S. Prerequisite: SOCR 330 or concurrent registration.

Experimental techniques in transmission and molecular genetics.

***SOCR 341 01(1-0-0). Microbiology for Sustainable Agriculture.** S. Prerequisite: SOCR 240.

Functional roles and management of soil organisms in organic agriculture, emphasis on ecological interactions with plants and plant pathogens.

***SOCR 342 01(1-0-0). Organic Soil Fertility.** S. Prerequisite: SOCR 240; SOCR 341; SOCR 350.

Organic soil fertility management in framework of holistic organic farming system.

***SOCR 343 01(1-0-0). Composting Principles and Practices.** F. Prerequisite: SOCR 240; SOCR 350.

Fundamentals of compost production, use, and regulation.

***SOCR 344 01(1-0-0). Crop Development Techniques.** S. Prerequisite: BZ 120 or LIFE 102 or LIFE 103.

Conventional and transgenic approaches to crop variety development.

***SOCR 345/*HORT 345 02(0-4-0). Diagnosis and Treatment in Organic Fields.** SS. Prerequisite: BSPM 302 or BSPM 308 or BSPM 361; HORT 100 or SOCR 100; SOCR 240. Credit not allowed for both SOCR 345 and HORT 345.

Field experience in diagnosis of pest and nutrient problems on organic farms and development of treatment recommendations. (\$)

SOCR 350 03(3-0-0). Soil Fertility Management. F. Prerequisite: SOCR 240.

Managing soil fertility and fertilizers to meet plant nutrient requirements in an environmentally sound manner with emphasis on nutrient cycling.

SOCR 351 01(0-2-0). Soil Fertility Laboratory. F. Prerequisite: SOCR 350 or concurrent registration.

Soil chemical analyses and development of fertilizer recommendations for crops.

SOCR 370 02(2-0-0). Irrigation Principles. S. Prerequisite: HORT 100 or SOCR 100 or BZ 120; SOCR 240.

Determination of irrigation water requirements based on the estimation of storage and movement of water in the soil-plant-atmospheric system.

+SOCR 371 01(1-0-0). Irrigation of Field Crops. F. Prerequisite: SOCR 370.

Management of irrigation systems for field crops with emphasis on irrigation methods, irrigation scheduling and strategies for water conservation. Required field trips.

+SOCR 377 03(2-2-0). Geographic Information Systems in Agriculture. F. Prerequisite: Three credits in SOCR or CS. Credit allowed for only one of the following: SOCR 377 or CIVE 377 or SOCR 577.

Introduction to geographic information systems and global positioning systems with applications to agriculture. (\$)

SOCR 384 Var [1-5]. Supervised College Teaching. F, S, SS. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

+SOCR 400 03(2-2-0). Soils and Global Change: Science and Impacts. F. Prerequisite: LIFE 220 or LIFE 320; SOCR 240. Required field trips.

Foundations on the science of global change and its impact on soil processes and biota.

SOCR 410 01(1-0-0). Seed Processes: Storage and Deterioration. F, S, SS. Prerequisite: BZ 104 or BZ 105 or BZ 120.

Environmental conditions and management factors influencing storage and deterioration of seeds, including physiological and biochemical changes. (NT-C/O)

SOCR 411 01(1-0-0). Large Seeded Legume Seed Production. F, S, SS. Prerequisite: BZ 104 or BZ 105 or BZ 120.

Principles for seed production of large-seeded legume crops with emphasis on common bean, peanut and soybean. (NT-C/O)

SOCR 412 01(1-0-0). Seed Processes: Separation and Conditioning. F, S, SS. Prerequisite: SOCR 100.

Understanding the physical process required to separate pure seed from contaminants and maintain viability. (NT-C/O)

SOCR 414 03(2-3-0). Agricultural Experimental Design. S. Prerequisite: STAT 201 or STAT 301. Credit allowed for only one of the following: SOCR 414, SOCR 514, STAT 350, or STAT 514.

Design of agricultural experiments and statistical analysis of resulting data.

SOCR 420 03(3-0-0). Crop and Soil Management Systems I. S. Prerequisite: HORT 100 or SOCR 100; SOCR 240.

Principles of crop, soil management emphasizing environmental factors influencing crop growth and development, interactions with soil organic matter.

SOCR 421 04(3-2-0). Crop and Soil Management Systems II. F. Prerequisite: HORT 100 or SOCR 100; SOCR 240.

Principles of crop and soil management with emphasis on soil erosion control, water conservation, and plant-water relationships. (\$)

***SOCR 424/*HORT 424 03(3-0-0). Topics in Organic Agriculture.** S. Prerequisite: AREC 202 or ECON 202; AREC 328; HORT 100 or SOCR 100; SOCR 171/HORT 171; SOCR 240. Credit not allowed for both SOCR 424 and HORT 424.

Examination of issues specific to organic food production systems and marketing.

***SOCR 430 03(3-0-0). Applications of Plant Biotechnology.** S. Prerequisite: SOCR 330.

Current and potential applications of DNA-based biotechnology in crop agriculture and other plant disciplines.

SOCR 440 04(2-3-1). Pedology. F.

Process of soil formation, characterization, classification of soils; soil survey methods. (\$)

SOCR 441 03(2-3-0). Soil Ecology. S. Prerequisite: SOCR 455.

An integrative, hands-on experience in the theory and application of ecology principles to the soil environment.

SOCR 442 03(3-0-0). Forest and Range Soils. F

Soil and water relationships in forest and rangeland ecosystems; significant properties in their management.

***SOCR 446 02(2-0-0). Physiology of Seeds.** S. Prerequisite: BZ 440.

Effects of environmental factors on germination, dormancy, and longevity of seeds.

***SOCR 448/*ANEQ 448 03(2-2-0). Livestock Manure Management and Environment.** F. Prerequisite: 3 credits 100-level chemistry. Credit not allowed for both ANEQ 448 and SOCR 448.

Manure management; maximizing benefits to soils and crops; minimizing air and water quality hazards; complying with regulations.

SOCR 455 03(3-0-0). Soil Microbiology. F. Prerequisite: MIP 300 or SOCR 240.

Microbial activities in agricultural, forest, and grassland soils; in soil-plant relationships; and in maintenance of environmental quality.

SOCR 456 01(0-3-0). Soil Microbiology Laboratory. F. Prerequisite: SOCR 455 or concurrent registration.

Techniques used in study of ecology and activities of soil microorganisms.

***SOCR 460/*HORT 460 03(2-0-1). Plant Breeding.** F. Prerequisite: BZ 350 or concurrent registration or LIFE 201A or concurrent registration or SOCR 330 or concurrent registration. Credit not allowed for both SOCR 460 and HORT 460.

Theory and practice of plant breeding using principles of genetics and related sciences.

***SOCR 461/*HORT 461 01(0-2-0). Plant Breeding Laboratory.** F. Prerequisite: SOCR 460/HORT 460 or concurrent registration. Credit not allowed for both SOCR 461 and HORT 461.

Techniques and procedures used in public and commercial plant breeding programs.

SOCR 467 03(3-0-0). Soil and Environmental Chemistry. S. Prerequisite: CHEM 335.

Fundamental principles of soil chemistry with respect to environmental reactions between soils and other natural materials and priority pollutants.

SOCR 470 03(3-0-0). Soil Physics. F. Prerequisite: SOCR 240 or GEOL 232.

Physical properties of soils emphasizing mechanical composition, moisture, aeration, temperature, and structure related to management, plant growth.

SOCR 471 01(0-3-0). Soil Physics Laboratory. F. Prerequisite: SOCR 470 or concurrent registration.

Familiarization of techniques and equipment used in evaluation of soil physical properties.

***SOCR 475 03(3-0-0). Global Challenges in Plant and Soil Science.** S. Prerequisite: SOCR 240 or GEOL 122; LIFE 102 or BZ 120.

Evaluation of case studies to define problems and develop solutions to address global challenges in plant and soil science.

SOCR 478 03(3-0-0). Environmental Soil Sciences. S. Prerequisite: SOCR 467 or concurrent registration; SOCR 470.

Chemical, biological, and physical aspects of prevention and remediation of soil and water pollution; environmental impact assessment.

SOCR 479 01(0-3-0). Environmental Soil Science Laboratory. S. Prerequisite: SOCR 478 or concurrent registration.

Laboratory and field studies of soil and groundwater contamination, including monitoring and remediation.

SOCR 486 Var[1-4]. Practicum. Prerequisite: Written consent of instructor.

Directed experiences in the application of soil and crop science principles.

SOCR 487 Var [1-12]. Internship.

SOCR 492 01(0-0-1). Seminar.

SOCR 495 Var. Independent Study.

SOCR 496 Var. Group Study.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC-*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SOCR 498 Var. [1-6]. Undergraduate Research. Prerequisite: Written consent of instructor.

Research in soil and crop sciences.

SOCR 514/STAT 514 04(3-3-0). Agricultural Experimental Design and Analysis. S. Prerequisites: STAT 201 or STAT 301 or STAT 307. Credit allowed for only one of the following: SOCR 414, SOCR 514, STAT 350, or STAT 514.

Design and implementation of agricultural experiments and statistical analysis of resulting data.

SOCR 522 03(3-0-0). Micrometeorology. S. Prerequisite: Three credits in PH.

Microenvironments; physics of environmental variables; plant canopy microclimate; evapotranspiration; surface-atmosphere exchange; instrumentation.

SOCR 530/BSPM 530 01(1-0-0). Scientific Writing. S. Credit not allowed for both SOCR 530 and BSPM 530.

Skills necessary to prepare complete scientific journal articles including writing, editing, and literature searching and assessment.

***SOCR 535 03(3-0-0). Origin and Evolution of Cultivated Plants.** F. Prerequisite: SOCR 330.

Origin of crops from viewpoints of archaeology, history, botany, and taxonomy, and continued evolution of plants under cultivation.

***SOCR 540 03(3-0-0). Soil-Plant-Nutrient Relationships.** S. Prerequisite: SOCR 350.

Soil and plant factors affecting nutrient uptake, mechanistic models of uptake, availability and functions of essential elements, diagnostic techniques.

***SOCR 548/*ANEQ 548 04(2-2-1). Issues in Manure Management.** F. Prerequisite: Three credits 100-level chemistry. Credit allowed for only one of the following: SOCR 548, ANEQ 448, and ANEQ 548.

Manure management practices maximizing benefits to soils and crops while minimizing hazards to air and water quality and complying with regulations.

***SOCR 550 03(3-0-0). Advanced Soil Genesis.** S. Prerequisite: SOCR 440.

Modern concepts of specific mechanisms involved in formation of genetic soil groups and their relationship to environmental factors.

SOCR 560 03(3-0-0). Chemical Equilibria in Soils. F. Prerequisite: SOCR 240 or nine credits of chemistry.

Chemical reactions, solubility relationships, speciation in solution, mineral weathering, redox reactions, metal chelation, fixation of nutrients.

°SOCR 564 03(3-0-0). Soil Chemical Analysis. S. Prerequisite: CHEM 335; SOCR 240.

Theory and applications of soil testing. Total and available nutrients, CEC, salinity, isotopes, and instrumentation.

SOCR 567 04(3-0-1). Environmental Soil Chemistry. S. Prerequisite: CHEM 335. Credit not allowed for SOCR 467 and SOCR 567.

The chemistry of terrestrial environments and the interactions of soil constituents with bacteria, nutrients, and pollutants.

+SOCR 577 03(2-2-0). Principles/Components: Precision Agriculture. F. Prerequisite: Three credits in SOCR or CS. Credit allowed for only one of the following: CIVE 377 or SOCR 377 or SOCR 577.

Principles and components of precision agriculture, including GPS, GIS, remote sensing, and their applications in soil and crop management. (\$)

°SOCR 620 03(2-3-0). Modeling Ecosystem Biogeochemistry. F. Prerequisite: MATH 155 or MATH 160; LAND 220/LIFE 220 or SOCR 240 or ECOL 505.

Design and build biogeochemical process and ecosystem models with

GUI-based software. Analyze and test models and interpret experimental data.

°SOCR 640 01(1-0-0). Crop Physiology. F. Prerequisite: BZ 440.

Developmental, physiological, and biochemical determinants of crop yields as controlled by genetic and environmental effects.

°+SOCR 670 03(2-2-0). Terrestrial Ecosystems Isotope Ecology. S.

Isotopes distribution in biogeochemical cycles; research topics in biosphere-atmosphere interactions; lab experience with isotope techniques. Field trips required.

SOCR 675 01(1-0-0). Presentations for Scientific Audiences. F.

Organization and presentation of scientific information to audiences in oral and poster format.

SOCR 699 Var. Thesis.

SOCR 720A-B 02(2-0-0). Advanced Plant Breeding. Prerequisite: HORT 460/SOCR 460; 3 credits in STAT.

*A) Methods. F (even years). Historical perspectives in plant breeding, plant reproduction, genetic gain, breeding and selection systems in self- and cross-pollinated plants. °B) Tools. S (odd years). Plant breeding strategies, genotype x environment interaction, field plot and genomic tools, breeding for pest resistance, stress tolerance, quality.

***SOCR 725 03(2-2-0). Quantitative Inheritance in Plant Breeding.** S.

Quantitative genetic structure of populations, recognition of genetic, environmental variance. Methods of dealing with quantitatively inherited traits.

SOCR 730 01(1-0-0). Topics in Plant Breeding and Genetics. F.

Current literature regarding mechanisms used for plant improvement.

***SOCR 731 01(1-0-0). Plant Breeding Data Management.** F.

Prerequisite: Three credits in computer science.

Principles and best practices for optimal data management for plant breeding and other data-intensive research programs.

°SOCR 740/°BSPM 740 03(3-0-0). Plant Molecular Genetics. F. Prerequisite: BC 351; SOCR 330. Credit not allowed for both SOCR 740 and BSPM 740.

Advances in study of organization and function of nuclear and organellar genomes, gene expression in higher plants, and plant- microbe interactions.

***SOCR 755 03(3-0-0). Advanced Soil Microbiology.** S. Prerequisite: MIP 624 or SOCR 455.

Ecology of soil microorganisms emphasizing population and activity relationships, nitrogen fixation, and microbe-pesticide interactions.

°SOCR 760 03(3-0-0). Advanced Soil Chemistry. F. Prerequisite: Four semesters of chemistry; one course in computer science; one semester of calculus.

Surface chemistry of soils, electrical double layer models of surface charge and potential, colloid stability, computer modeling of adsorption.

***SOCR 770 04(3-2-0). Advanced Soil Physics.** S. Prerequisite: MATH 261 or SOCR 470.

Description and analysis of principles of storage and movement of water, solutes, heat, and gases in soils.

SOCR 784 Var. Supervised College Teaching.

SOCR 792 01(0-0-1). Seminar.

SOCR 795 Var. Independent Study.

SOCR 796 Var. Group Study.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SOCR 799 Var. Dissertation.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SOCIAL WORK COURSES

School of Social Work

College of Applied Human Sciences

SOWK 110 03(2-0-1). Contemporary Social Welfare. (GT-SS3, AUCC 3C). F, S, SS.

Principles, values and institutions of U.S. social welfare in context of human need within family, groups, and society.

SOWK 150 03(3-0-0). Introduction to Social Work. F, S. Prerequisite: PSY 100 or concurrent registration; SOC 100 or concurrent registration or SOC 105 or concurrent registration.

Introduction to social work; history of social welfare in the U.S.; overview of knowledge, values, skills, practice settings, and populations served. (NT-T)

SOWK 233 03(3-0-0). Human Behavior in the Social Environment. F, S. Prerequisite: HDFS 101 or concurrent registration; SOWK 150 or concurrent registration.

Understanding human behavior theory relevant to social work practice.

SOWK 286A-B 03(0-3-2). Practicum. Prerequisite: SOWK 233 or concurrent registration.

Introductory social work practice skills in communication, relationship development, and professional behavior. **A)** Practicum I. **B)** Practicum II.

SOWK 330 03(3-0-0). Human Diversity Practice Issues. F, S. Prerequisite: SOWK 233 or concurrent registration.

Knowledge about human differences and similarities essential for social work practice.

SOWK 340 03(0-0-3). Generalist Practice-Individuals and Families. F, S. Prerequisite: SOWK 286B or concurrent registration; progression into the major.

Knowledge and techniques used in applying the generalist planned change process to individual and family system assessments and interventions.

SOWK 341 03(0-0-3). Generalist Practice-Small Groups. F, S. Prerequisite: SOWK 340 or concurrent registration.

Within a generalist framework, focuses on the knowledge, skills, and competencies needed for the planned change process in groups.

SOWK 342 03(1-0-2). Generalist Practice-Organizations/Communities. F, S. Prerequisite: SOWK 340 or concurrent registration.

Knowledge regarding the planned change process with organizations and communities.

SOWK 350 03(0-0-3). Legal Issues in Human Services. SS.

Legal principles, procedures, and issues relevant to social work including policy research and courtroom testimony. (NT-O)

SOWK 352/ETST 352 03(3-0-0). Indigenous Women, Children and Tribes. F. Credit not allowed for both SOWK 352 and ETST 352.

Historical and contemporary lives of women, children, and tribal communities.

SOWK 371A-E 03(3-0-0). Social Work with Selected Populations.

Application of practice processes with selected populations. **A)** Children and families. F, S. **B)** Juvenile offenders. F. **C)** Adult offenders. **S. D)** Substance abusers. **S. E)** Social gerontology. F, S.

SOWK 384 Var [1-5]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements. Assist instructor in teaching selected classes, group training, or discussion group leadership.

SOWK 410 03(2-0-1). Social Welfare Policy. F, S. Prerequisite: SOWK 342 or concurrent registration.

Issues and processes shaping social welfare institutions; definitions of social welfare policy; analytical framework for policy analysis.

SOWK 450/IE 450 03(3-0-0). International Social Welfare and Development. F. Credit not allowed for both SOWK 450 and IE 450.

Framework of social welfare and development in international area; social need with focus on cultures/countries in transition.

SOWK 488 Var [5-10]. Field Placement. F, S, SS. Prerequisite: AHS 300 or concurrent registration; SOWK 330; SOWK 341; SOWK 342; SOWK 410 or concurrent registration. Maximum of 10 credits allowed in course.

Engagement, assessment, interventions, and evaluation at multiple levels of service as well as mastery of foundation practice roles.(\$)

SOWK 490A-B Var [1-3]. Workshop.

A) Family centered work I. **B)** Family centered work II.

SOWK 492 03(2-0-1). Seminar. Prerequisite: SOWK 488 or concurrent registration.

Integrates theory with social work core competencies and practice behaviors while in field placement.

SOWK 495 Var [1-12]. Independent Study.

SOWK 496 Var [1-12]. Group Study.

SOWK 500 03(3-0-0). Principles and Philosophy of Social Work. F, S, SS. Prerequisite: Admission to the MSW program.

Knowledge, values, history, and philosophy of social work. (NT-T)

SOWK 511 03(0-0-3). Generalist Practice-Small Client Systems. F. Prerequisite: SOWK 500 or concurrent registration; concurrent registration in SOWK 515.

Generalist practice perspective. Practice knowledge and skills related to intervention with individuals and families within a systems framework.

SOWK 512 01(0-2-0). Small Client Systems Skills Laboratory. F. Prerequisite: SOWK 511; concurrent registration in SOWK 588.

Application of communication and relationship skills for professional practice.

SOWK 515 04(3-0-1). Theoretical Foundations for Social Work. F. Prerequisite: SOWK 500 or concurrent registration.

Socio-behavioral principles relevant to generalist social work practice.

SOWK 520 03(2-0-1). Social Welfare Policy Analysis. F. Prerequisite: Admission to the MSW program.

Historical analysis and impact of social welfare policy..

SOWK 550 03(2-0-1). Animal Assisted Therapy/Human-Animal Bond. SS.

Nature of human-animal bond and animal assisted therapy as an intervention method.

SOWK 551 03(1-0-2). Fundamentals of Mediation. F, S, SS.

Knowledge and skills essential to the successful application of mediation for a wide variety of interpersonal conflicts.

SOWK 552 03(1-0-2). Conflict Management in Healthcare Settings. F, S, SS. Prerequisite: SOWK 551. Offered as an online course only.

Knowledge, values, and skills necessary for the practice of conflict resolution in health care and elder care settings. (NT-O)

SOWK 554 03(1-0-2). Conflict Resolution in the Workplace. F, S, SS. Prerequisite: SOWK 551. Offered as an online course only.

Knowledge, values, and skills necessary for the practice of conflict resolution in the workplace. (NT-O)

SOWK 556 03(1-0-2). Divorce and Family Mediation. F, S, SS. Prerequisite: SOWK 551.

Knowledge and skills essential to the practice of family mediation including divorce and child custody. (NT-O)

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SOWK 558 03(1-0-2). Arbitration. F, S, SS. Prerequisite: SOWK 551. Offered as an online course only.

Knowledge, values, and skills necessary for the practice of arbitration as a component of the arbitration-mediation continuum. (NT-O)

SOWK 560 03(2-0-1). Social Work Practice in Schools. F, S, SS.

Knowledge and skills essential to practice of social work in educational settings.

SOWK 561 03(0-0-3). School/Community: People with Disabilities. F, SS.

Teamwork approach to serving persons with special needs values, issues, and best practices related to creating desirable futures for them. (NT-O)

SOWK 571 03(2-0-1). Small Client Systems: Theory and Practice. SS. Prerequisite: admission to MSW program.

Theories and practice principles relevant to social work practice with small client systems.

SOWK 572 03(2-0-1). Large Client Systems: Theory and Practice. SS. Prerequisite: Admission to MSW Program.

Theories and practice principles relevant to social work practice with large client systems.

SOWK 588 Var [1-6]. Field Placement. S. Prerequisite: SOWK 512 or concurrent registration; SOWK 601 or concurrent registration; SOWK 611 or concurrent registration. Maximum of 6 credits allowed in course.

Supervised professional practice. (\$)

SOWK 590 Var [1-6]. Workshop.

SOWK 600 03(3-0-0). Methods of Research I. F. Prerequisite: Concurrent registration in SOWK 520; STAT 201.

Social work research: role of practitioners as consumers and initiators of research.

SOWK 601 03(3-0-0). Methods of Research II. S. Prerequisite: SOWK 600.

Data analysis, computer processing in social work research, and methods for evaluating one's own practice.

SOWK 602A-B 02(0-0-2). Macro-Level Social Work Practice Research. A) F. B) S. Prerequisite: Concurrent registration in SOWK 688. A) SOWK 601. B) SOWK 602A.

Design and implementation of needs assessment, program implementation, and community research.

SOWK 603A-B 02(0-0-2). Direct Practice Assessment and Evaluation.

Selection and application of techniques for monitoring and evaluating interventions with individuals, families, and groups. A) F. Prerequisite: SOWK 601; concurrent registration in SOWK 688. B) S. Prerequisite: SOWK 603A; concurrent registration in SOWK 688.

SOWK 611 03(1-0-2). Generalist Practice-Large Client Systems. S. Prerequisite: SOWK 511.

Practice knowledge and skills related to intervention with task groups, coalitions, organizations, and communities.

SOWK 630 02(1-0-1). Advanced Generalist Practice with Individuals. F, S. Prerequisite: SOWK 601; (SOWK 571; SOWK 572) or (SOWK 588; SOWK 611).

Knowledge and skills appropriate for clinical assessments and interventions with individuals focusing on contemporary theoretical constructs.

SOWK 631 02(1-0-1). Advanced Practice with Communities. F, S. Prerequisite: SOWK 601; (SOWK 571; SOWK 572) or SOWK 588.

Knowledge, skills, and values regarding the planned change process with communities.

SOWK 632 02(0-0-2). Advanced Practice: Manager/Administrator. F, S, SS. Prerequisite: SOWK 601; (SOWK 571; SOWK 572) or SOWK 588.

Knowledge, values, skills of organizational practice for a social work manager/administrator.

SOWK 633 02(0-0-2). Advanced Practice: Social Welfare Policy. F, S, SS. Prerequisite: SOWK 601; (SOWK 571; SOWK 572) or (SOWK 520; SOWK 588; SOWK 611).

Application of social welfare policy analysis models; normative aspects of policy analysis and assessment skills.

SOWK 634 03(1-0-2). Advanced Practice with Families and Groups. F, S, SS. Prerequisite: SOWK 630.

Apply engagement, assessment, and intervention skills, theoretical models, and evidence-based practice approaches in work with families and groups.

SOWK 684 Var [1-5]. Supervised College Teaching. Maximum of 10 credits allowed in course.

SOWK 688 Var[1-8]. Field Placement. F, S. Prerequisite: SOWK 511, SOWK 571; SOWK 572; SOWK 601. Maximum of 15 credits.

Integrates and applies competencies and measurable practice behaviors comprising knowledge, values, and skills in social work practice.

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SOWK 695 Var. Independent Study. F, S, SS. (NT)

SOWK 696 Var. Group Study. F, SS, S. (NT)

SOWK 698 Var [1-6]. Research. Prerequisite: SOWK 601. Maximum of 6 credits allowed in course.

SOWK 699 Var. Thesis. Maximum of 6 credits allowed in course.

***SOWK 701 03(1-0-2). Contemporary Issues-Social Work Education.** S. Prerequisite: Master's degree in social work.

Issues and trends currently impacting professional education for social work practice.

***SOWK 702 03(1-0-2). Social Welfare Policies in Selected Countries.** S. Prerequisite: SOWK 701.

Social welfare policy analysis and impact on professional social work practice.

***SOWK 703 03(1-0-2). Theoretical Analysis of Social Work Practice.** SS. Prerequisite: SOWK 701.

Social work practice theories; building, evaluating, and teaching for social work educators.

SOWK 704 03(1-0-2). Theoretical Foundations of Social Work. F. Prerequisite: SOWK 701.

Nature and processes of theory building in social work. Issues of epistemology, logic, politics and moral philosophy.

SOWK 784 Var [1-3]. Supervised College Teaching.

SOWK 786 03(0-0-3). Research Practicum. F, S, SS. Prerequisite: EDRM 700; EDRM 704; SOWK 701.

SOWK 792 03(0-0-3). Seminar. F, S, SS. Prerequisite: SOWK 701.

SOWK 795 Var. Independent Study.

SOWK 799 Var. Dissertation.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SPEECH COMMUNICATION COURSES

Department of Communication Studies

College of Liberal Arts

SPCM 100 03(3-0-0). Communication and Popular Culture. (GT-AH1, AUCC 3B). F, S, SS.

Classical tradition of speech communication, its extension to broadcasting, and integration of both in contemporary culture.

SPCM 130 03(2-0-1). Relational and Organizational Communication. F, S, SS.

Basic communication processes and skills central to relating and organizing in interpersonal, small group, and organizational contexts.

SPCM 200 03(3-0-0). Public Speaking. (AUCC 2A). F, S, SS.

Fundamentals of public speaking emphasizing content, organization, delivery, audience response.

SPCM 201 03(3-0-0). Rhetoric in Western Thought. (GT-AH3, AUCC 3B). F, S.

Major concepts of Western rhetoric from Greece to modern times and their relationship to present-day approaches to communication.

SPCM 207 03(3-0-0). Public Argumentation. F, S, SS. Prerequisite: SPCM 200.

Key communication principles for democracy, including issue analysis, evidence, reasoning, decision-making, debate, dialogue, and deliberation.

SPCM 231 03(3-0-0). Performance Studies. F, S.

Analysis and reading of rhetorical and poetic writing leading to understanding, appreciation, and expressive communication.

SPCM 232 03(3-0-0). Group Communication. F, S. Prerequisite: SPCM 200.

Principles and methods of group communication emphasizing face-to-face and electronically mediated problem solving and decision making.

SPCM 278A-G 01(1-0-0). Communication Skills. F, S, SS. A maximum of 3 credits are allowed for SPCM 278A-G.

Applied communication skills in specific contexts.

A) Convention Planning. F, S. B) Interviewing. F. C) Film Festivals. F. D) Friendship. S. E) Intercultural Competence. F. F) Virtual Communication. F, S. G) Parliamentary Procedure. F, S, SS.

SPCM 300 03(0-0-3). Advanced Public Speaking. F, S, SS. Prerequisite: SPCM 200; SPCM 207.

Advanced technique in public speaking; emphasis on argument construction and refutation, style, and manuscript delivery.

SPCM 311 03(3-0-0). Historical Speeches on American Issues. F.

Significant speeches and speakers as they reflected and affected American issues from colonial period through early 20th century.

SPCM 331 03(3-0-0). Nonverbal Communication. S.

Non-language symbols in communication; systems and functions of nonverbal communication behaviors.

SPCM 332 03(3-0-0). Interpersonal Communication Skills. F, S, SS.

Analysis, exploration, and skill enhancement strategies for interpersonal communication in friendship, couple, family, and business relationships.

SPCM 333 03(3-0-0). Professional Communication. F, S. Prerequisite: SPCM 200.

Technological, interpersonal, and ethical dimensions of professional communication, emphasizing interviews, teams, and presentations at work.

SPCM 334 03(3-0-0). Co-Cultural Communication. F, SS.

Cultural concerns of communication among co-cultures of United States;

diversity; self-awareness as cultural imperative for enhanced communication.

SPCM 335 03(3-0-0). Gender and Communication. F.

Analysis and exploration of communication as it relates to gender and women's and men's roles and identities. (NT-O)

SPCM 341 03(3-0-0). Evaluating Contemporary Television. F.

Rhetorical standards applied to content, ethical, and artistic aspects of American televised discourse; emphasizing nonentertainment programming. (NT-O)

SPCM 342 03(3-0-0). Critical Media Studies. F, S.

Analysis of communication media; history; structure, regulation, policy, and impact upon society.

SPCM 346 03(2-2-0). Virtual Culture and Communication. F, S. Prerequisite: SPCM 100 or SPCM 342.

Rhetorical theory applied to planning, producing, and evaluating computer-mediated messages.

SPCM 347 03(3-0-0). Visual Communication. S. Prerequisite: SPCM 100 or SPCM 342.

Media/visual aesthetics and literacy and the symbolic and affective dimensions of the codes, conventions, and formulas of media.

SPCM 349 03(3-0-0). Freedom of Speech. F, S.

Historical and philosophical precedents to freedom of speech; development of free speech principles in the U.S.; ethical obligations of speakers. (NT-O)

SPCM 350 03(2-3-0). Evaluating Contemporary Film. S. Prerequisite: None.

Theory and development of film criticism; application of critical approaches to modern fiction and nonfiction film. (NT-O)

SPCM 354 03(2-3-0). History and Appreciation of Film. F.

Screening and evaluation of landmark fiction and nonfiction films; assessment of cinema as an art form and a social force.

SPCM 357 03(2-3-0). Film and Social Change. F. Prerequisite: None.

Ways in which the medium of motion pictures has sparked significant social changes at home and abroad.

SPCM 378 03(0-0-3). Virtual Workplace Communication. F, S, SS.

Interpersonal/organizational dimensions and communicative processes underpinning virtual/remote/distributed workers and workplaces. (NT-O)

SPCM 384 Var [1-3]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements. Open only to undergraduate students who are invited to assist in teaching selected courses.

SPCM 387 01(1-0-0). Communication Internship. Prerequisite: SPCM 100 or SPCM 342; SPCM 200; SPCM 201; SPCM 207; 2.000 GPA.

SPCM 401 03(3-0-0). Rhetoric in Social Movements. F.

Case studies of campaigns and social movements; genesis, leadership, and use of traditional and electronically mediated rhetoric to achieve objectives.

SPCM 407 03(3-0-0). Public Deliberation. F, S. Prerequisite: SPCM 200; SPCM 207.

Communication in collaborative decision-making and community problem-solving, examined through the lens of deliberative democracy.

SPCM 408 03(3-0-0). Applied Deliberative Techniques. F, S. Prerequisite: Written consent of instructor.

Skills development and direct experience in convening, facilitating, and reporting public forums tied to Center for Public Deliberation activities.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SPCM 411 03(3-0-0). Contemporary Speeches on American Issues. S.

Significant speeches and speakers as they reflect and affect issues, 1930 to present.

SPCM 412 03(3-0-0). Evaluating Contemporary Rhetoric. S.

Exploration and evaluation of contemporary persuasive communication in order to understand and assess a variety of forms of messages and symbols.

SPCM 415 03(3-0-0). Rhetoric and Civility. F. Prerequisite: None.

Relationship between rhetoric and civility historically and in contemporary times.

SPCM 420 03(3-0-0). Political Communication. F.

Rhetoric of political campaigns. (NT-O)

SPCM 429 03(3-0-0). Environmental Discourse. F, S.

Environmental communication in advocacy campaigns, media representations of science, encounters with nature, and public policy.

SPCM 431 03(3-0-0). Communication, Language, and Thought. S.

Influence of rhetoric, ranging from spoken language to electronically mediated communication, on human understanding and Western thought.

SPCM 433 03(3-0-0). Communication and Organizations. F.

Communication theory and strategy for empowerment of non-supervisory and supervisory personnel.

SPCM 434 03(3-0-0). Intercultural Communication. F, S, SS.

Cultural influences on communication between people of different nations; communication rules/norms in specific cultures; cultural adaptation.

SPCM 436 03(3-0-0). Conflict Management and Communication. S.

Theories and principles of communication in conflict management; application to conflict resolution situations.

SPCM 437 03(3-0-0). Studies in Persuasion. S.

Rhetorical and behavioral theories of persuasion applied to persuasive practice in public and interpersonal arenas of social influence.

SPCM 454/ETST 454 03(2-2-0). Chicano/a Film and Video. F. Credit not allowed for both SPCM 454 and ETST 454.

Emergence of Chicano/a cinema from a place of displacement, resistance, and affirmation found in contemporary Chicano/a film, video.

SPCM 455/LB 455 03(2-3-0). Narrative Fiction Film as a Liberal Art. S. Prerequisite: Senior standing. Credit not allowed for both SPCM 455 and LB 455.

Narrative fiction film and its role in human history, culture, and social interaction.

SPCM 479 03(3-0-0). Capstone: Life in Postmodernity. F, S.

Prerequisite: Seniors in communication studies only.

Issues of communication with postmodernity.

SPCM 486 Var. Practicum.

Directed experience of communication techniques and procedures in the community with periodic faculty consultation.

SPCM 495 Var. Independent Study.

SPCM 496 Var. Group Study.

***SPCM 520 03(3-0-0). Rhetoric and Public Affairs. F.** Prerequisite: Graduate standing or 15 additional 300- and 400 level credits in communication studies.

Rhetoric's role in contemporary politics and civil society.

SPCM 523 03(3-0-0). Feminist Theories of Discourse. S. Prerequisite:

Graduate standing or SPCM 335 or WS 200 and 12 additional 300-400 level credits in communication studies.

Exploration and evaluation of contemporary feminist theories of rhetoric and discourse.

SPCM 532 03(3-0-0). Theories of Interpersonal Communication. S.

Prerequisite: Graduate standing or SPCM 332 and 12 additional 300-400 level credits in communication studies.

Theories of communication in development, maintenance, and deterioration of friendship, couple, family, group, and business relationships.

***SPCM 533 03(3-0-0). Discourse, Work, and Organization. F.**

Prerequisite: Graduate standing or SPCM 433 and 12 additional 300- and 400-level credits in communication studies.

How organizing processes and discursive practices create, maintain, and destroy diverse forms of work in society.

***SPCM 534 03(3-0-0). Communication and Cultural Diversity. S.**

Prerequisite: Graduate standing or SPCM 434 and 12 additional 300-400 level credits in communication studies.

Ethnographic approach to communication issues and concerns in a global context.

SPCM 538 03(3-0-0). Communicating in the Health Clinic. S.

Organizational, interpersonal, and intercultural dimensions of communicating in public health clinical settings.

SPCM 539 03(3-0-0). Communication Theory. F. Prerequisite: Graduate

standing or fifteen 300- and 400-level credits in communication studies and/or English.

Examination of communication philosophies and perspectives; analysis of modern theories of face-to-face communication.

SPCM 540/ 03(3-0-0). Rhetoric, Race and Identity. F. Prerequisite:

Graduate status or SPCM 412 and 12 additional 300-400 SPCM credits. Credit not allowed for both SPCM 540 and ETST 540.

Critical race theory and its relevance to rhetorical studies.

***SPCM 547 03(3-0-0). Media Industries. F.** Prerequisite: Graduate

standing or 15 300-400 level credits in communication studies or English.

Political economy of the media both in the U.S. and globally, including how the media system operates and with what effects.

***SPCM 548 03(3-0-0). Media Texts. S.** Prerequisite: Graduate standing or

fifteen 300- and 400-level credits in communication studies or English.

Practical and theoretical implications for criticism in treating media products as texts; various approaches to textual or discourse analysis.

***SPCM 549 03(3-0-0). Media Audiences. F.** Prerequisite: Graduate

standing or fifteen 300- and 400-level credits in communication studies or English.

Theoretical and methodological issues concerning how audiences use and interpret media.

***SPCM 550 03(3-0-0). Contemporary Issues in Media. S.** Prerequisite:

Graduate standing or fifteen 300- and 400-level credits in communication studies or English.

Ever-changing media culture and landscape and how it affects personal, professional, and public lives.

SPCM 570 03(3-0-0). Instructional Communication Theory,

Practice. F, S, SS.

Communication theory and research in instructional contexts.

Designed for current or prospective teachers. (NT-O)

***SPCM 592 03(0-0-3). Seminar-Topics in Speech Communication. S.**

Prerequisite: Graduate standing or fifteen 300-400 level credits in communication studies or English.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SPCM 601 03(3-0-0). History of Rhetorical Theory. F. Prerequisite: Fifteen 300- and 400-level credits in communication studies and/or English.

Rhetorical theories and theorists from the classical period to the present.

SPCM 604 03(3-0-0). Rhetoric of Everyday Life. S. Prerequisite: Graduate standing or SPCM 412 and 12 additional 300-400 SPCM credits.

Contemporary theories of rhetoric and of everyday life.

***SPCM 611 03(3-0-0). Topics in Public Address.** F. Prerequisite: Graduate standing or either SPCM 311 or SPCM 411 with additional 300- and 400-level credits in communication studies, history, or English.

Theoretical and methodological issues in public address research; analysis of public discourse of selected movements or periods in U.S. history.

SPCM 612 03(3-0-0). Rhetorical Criticism. F. Prerequisite: Fifteen 300-400 level credits in communication studies and/or journalism.

Traditional and contemporary methods for analyzing persuasive discourse.

SPCM 638 03(3-0-0). Communication Research Methods. S.

Historical and philosophical context of communication research; relationship between theory and method; dominant forms of communication research.

SPCM 646 03(3-0-0). Media Theory. F. Prerequisite: Fifteen 300-400 level credits in communication studies, English, or journalism.

Survey of the broad range of rhetorical/qualitative theories that inform media studies.

SPCM 675 03(3-0-0). Speech Communication Pedagogy. F. Prerequisite: Admission to communication studies master's program.

Instructional practices and theories in speech.

SPCM 684 Var [1-3]. Supervised College Teaching.

SPCM 692 Var. Seminar.

SPCM 695 Var. Independent Study.

SPCM 696 Var. Group Study.

SPCM 699 Var. Thesis.

APPLIED STATISTICS COURSES

Department of Statistics

College of Natural Sciences

STAA 551 02(2-0-0). Regression Models and Applications. F. Prerequisite: Admission to the M.A.S. program or written consent of instructor. This is a partial-semester course.

Estimation/hypothesis testing methods: t-test, ANOVA, regression, residual analyses, transformations, goodness of fit, interactions, confounding. (NT-V)

STAA 552 02(2-0-0). Generalized Regression Models. F. Prerequisite: STAA 551 or written consent of instructor. This is a partial-semester course.

Nonlinear regression, iteratively reweighted least squares, dose-response models, count data, multi-way tables, survival analysis. (NT-V)

STAA 553 02(2-0-0). Experimental Design. S. Prerequisite: (STAA 552 and STAA 562) or written consent of instructor. This is a partial-semester course.

Design/analysis of experiments. Emphasis on balanced design; use of computing packages SAS and R. Example based presentation, rather than theoretical. (NT-V)

STAA 554 02(2-0-0). Mixed Models. S. Prerequisite: STAA 553 or written consent of instructor. This is a partial-semester course.

Topics in linear, generalized linear, and nonlinear models with fixed and random predictors, balanced and unbalanced cases. (NT-V)

STAA 556 03(3-0-0). Statistical Consulting. SS. Prerequisite: (STAA 554; STAA 562) or written consent of instructor.

Effective consulting to meet with clients, analyze real data, and prepare reports. (NT-V)

STAA 561 02(2-0-0). Probability with Applications. F. Prerequisite: Admission to the M.A.S. program or written consent of instructor. This is a partial-semester course.

Random variables, continuous and discrete distributions, expectations, joint and conditional distributions, transformations. (NT-V)

STAA 562 02(2-0-0). Mathematical Statistics with Applications. F. Prerequisite: STAA 561 or written consent of instructor. This is a partial-semester course.

Theory and applications of estimations, testing, and confidence intervals. Computer simulations, sampling from the normal distribution.(NT-V)

STAA 565 01(1-0-0). Quantitative Reasoning. F. Prerequisite: Concurrent registration in STAA 551 or written consent of instructor. This is a partial-semester course.

Confounding, types of bias such as selection bias and regression effect bias, Simpson's paradox, experiments versus observational studies. (NT-V)

STAA 566 01(1-0-0). Computational and Graphical Methods. F. Prerequisite: Admission to the M.A.S. program or written consent of instructor. This is a partial-semester course.

Exploratory data analysis using graphics, effective communication with graphs, data reduction methods. (NT-V)

STAA 567 01(1-0-0). Computational and Simulation Methods. S. Prerequisite: (STAA 551; STAA 561) or written consent of instructor. This is a partial-semester course.

Methods to estimate probability distribution of nonstandard test statistics, find estimators, test hypotheses, and compute confidence intervals.(NT-V)

STAA 568 01(1-0-0). Topics Industrial/Organizational Statistics. S. Prerequisite: (STAA 551; STAA 561) or written consent of instructor. This is a partial-semester course.
Quality management, process control, reliability, decision making. (NT-V)

STAA 571 02(2-0-0). Survey Statistics. F. Prerequisite: Admission to the M.A.S. program or written consent of instructor. This is a partial-semester course.

Survey design, simple random, stratified, and cluster samples. Estimation and variance estimation. (NT-V)

STAA 572 02(2-0-0). Nonparametric Methods. F. Prerequisite: (STAA 551; STAA 561) or written consent of instructor. This is a partial-semester course.

Rank-based methods, nonparametric inferential techniques, scatterplot smoothing, nonparametric function estimation, environmental applications. (NT-V)

STAA 573 02(2-0-0). Analysis of Time Series. S. Prerequisite: (STAA 551; STAA 561) or written consent of instructor. This is a partial-semester course.

Moving average and auto-regression correlation structures, estimation and forecasting, modeling seasonality. Financial and environmental applications. (NT-V)

STAA 574 02(2-0-0). Methods in Multivariate Analysis. S. Prerequisite: (STAA 551; STAA 561) or written consent of instructor. This is a partial-semester course.

Multivariate ANOVA, principal components, factor analysis, cluster analysis, discrimination analysis. (NT-V)

STAA 575 02(2-0-0). Applied Bayesian Statistics. S. Prerequisite: (STAA 552; STAA 562) or written consent of instructor. This is a partial-semester course.

Bayesian analysis of statistical models, prior and posterior distributions, computing methods, interpretation.(NT-V)

STAA 576 02(2-0-0). Methods in Environmental Statistics. S. Prerequisite: (STAA 552; STAA 561) or written consent of instructor. This is a partial-semester course.

Statistical methodologies used in environmental/ecological studies. Topics in spatial statistics, abundance estimation for biological populations. (NT-V)

STATISTICS COURSES

Department of Statistics College of Natural Sciences

STAT 101 03(2-2-0). Activity Based Statistics. F, SS. Credit not allowed for students who have already taken any 200-level or higher statistics course.

Population, sample, variation, data, relationships, probability and risk, polls, prediction, margin of error, critical assessment of studies.

STAT 110 03(2-0-1). Statistical Thinking: Concepts and Applications. S. Credit not allowed for students who have already taken any 200-level or higher statistics course.

Use of statistical tools in real-life problems using computer packages; integration of critical thinking skills using case studies.

STAT 192 01(0-0-1). First-Year Seminar in Mathematical Sciences. S.

Richness and variety of problems encountered in the mathematical sciences.

STAT 201 03(2-0-1). General Statistics. F, S, SS. Prerequisite: Mathematics placement exam or one credit of 100-level mathematics. Credit not allowed for both STAT 201 and STAT 204. Intended as a one semester terminal course.

Graphs, descriptive statistics, confidence intervals, hypothesis tests, correlation and simple regression, tests of association.

STAT 204 03(2-2-0). Statistics for Business Students. F, S, SS. Prerequisite: Mathematics placement exam or one credit of 100-level mathematics. Credit not allowed for both STAT 204 and STAT 201.

Surveys, sampling, descriptive statistics, confidence intervals, contingency tables, control charts, regression, exponential smoothing, forecasting.

STAT 301 03(3-0-0). Introduction to Statistical Methods. (GT-MA1) F, S, SS. Prerequisite: MATH 117 or MATH 118 or MATH 124 or MATH 125 or MATH 126 or MATH 141 or MATH 155 or MATH 160. Credit allowed for only one of the following: ERHS 307, STAT 301, STAT 307, STAT 311, or STAT 315.

Techniques in statistical inference; confidence intervals, hypothesis tests, correlation and regression, analysis of variance, chi-square tests. (NT-V)

STAT 303/ECE 303 03(3-0-0). Introduction to Communications Principles. F. Prerequisite: ECE 311 or concurrent registration; MATH 261. Credit not allowed for both STAT 303 and ECE 303.

Basic concepts in design and analysis of communication systems.

STAT 305 03(3-0-0). Sampling Techniques. F. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Sample designs: simple random, stratified, systematic, cluster, unequal probability, two phase; methods of estimation and sample size determination.

STAT 307 03(3-0-0). Introduction to Biostatistics. F, S, SS. Prerequisite: MATH 117 or MATH 118 or MATH 124 or MATH 125 or MATH 126 or MATH 141 or MATH 155 or MATH 160. Credit allowed for only one of the following: ERHS 307, STAT 301, STAT 307, STAT 311, or STAT 315.

Biostatistical methods; confidence intervals, hypothesis tests, simple correlation and regression, one-way analysis of variance.

STAT 311 03(3-0-0). Statistics for Behavioral Sciences I. F, S. Prerequisite: MATH 117 or MATH 118 or MATH 124 or MATH 125 or MATH 126 or MATH 141 or MATH 155 or MATH 160. Credit allowed for only one of the following: ERHS 307, STAT 301, STAT 307, STAT 311, or STAT 315.

Classification, descriptive statistics; inference, testing, estimation; categorical data analysis; odds ratio.

STAT 312 03(3-0-0). Statistics for Behavioral Sciences II. F, S. Prerequisite: STAT 311.

One-way analysis of variance, factorial designs, blocked designs, multiple comparisons of means, and multiple regression.

STAT 315 03(3-0-0). Statistics for Engineers and Scientists. F, S, SS. Prerequisite: MATH 161 or MATH 255. Credit allowed for only one course: ERHS 307, STAT 301, STAT 307, STAT 311, STAT 315.

Calculus-based probability and statistics: distribution theory, estimation, hypothesis testing, applications to engineering and the sciences. (NT-V)

STAT 321 03(3-0-0). Elementary Probabilistic-Stochastic Modeling. S. Prerequisite: CS 156 or CS 160 or MATH 151 or MATH 152; MATH 155 or MATH 160.

Probabilistic and stochastic models of real phenomena; distributions, expectations, correlations; averages; simple Markov chains and random walks.

STAT 340 03(3-0-0). Multiple Regression Analysis. S, SS. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Estimation and testing for linear, polynomial, and multiple regression models; analysis of residuals; selection of variables; nonlinear regression.

STAT 350 03(3-0-0). Design of Experiments. F, SS. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Analysis of variance, covariance; randomization; completely randomized, randomized block, latin-square, split-plot, factorial and other designs.

STAT 372 03(3-0-0). Data Analysis Tools. F. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Data analysis principles and practice, statistical packages and computing; ANOVA, regression and categorical data methods.

STAT 420 03(3-0-0). Probability and Mathematical Statistics I. F. Prerequisite: MATH 255 or MATH 261.

Probability, random variables, distribution functions, and expectations; joint and conditional distributions and expectations; transformations.

STAT 430 03(3-0-0). Probability and Mathematical Statistics II. S. Prerequisite: STAT 420.

Theories and applications of estimation, testing, and confidence intervals; sampling distributions including normal, gamma, beta X^2 , t, and F.

STAT 460 03(3-0-0). Applied Multivariate Analysis. S. Prerequisite: STAT 340.

Principles for multivariate estimation and testing; multivariate analysis of variance, discriminant analysis; principal components, factor analysis. (NT-V)

STAT 472 03(0-0-3) Statistical Consulting. S. Prerequisite: STAT 372.

Statistical consulting skills including data analysis, problem solving, report writing, oral communication, and planning experiments.

STAT 495 Var. Independent Study. Prerequisite: Written consent of instructor.

STAT 498 Var [1-3]. Undergraduate Research in Statistics. Prerequisite: Written consent of instructor.

Research skills and techniques; include both oral and written communication of results.

STAT 500 01(0-2-0). Statistical Computer Packages. S. Prerequisite: STAT 340; STAT 350.

Comparison, evaluation, and use of computer packages for univariate and multivariate statistical analyses.

STAT 501 01(1-0-0). Statistical Science. F.

Overview of statistics: theory; use in agriculture, business, environment,

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engineering; modeling; computing; statisticians as researchers/consultants.

STAT 511 04(3-0-1). Design and Data Analysis for Researchers I. F. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Statistical methods for experimenters and researchers emphasizing design and analysis of experiments. (NT-V)

STAT 512 04(3-0-1). Design and Data Analysis for Researchers II. S. Prerequisite: STAT 511.

Statistical methods for experimenters and researchers emphasizing design and analysis of experiments.

STAT 514/SOCR 514 04(3-3-0). Agricultural Experiment Design and Analysis. S. Prerequisites: STAT 201 or STAT 301 or STAT 307. Credit allowed for only one of the following: SOCR 414, SOCR 514, STAT 350, or STAT 514.

Design and implementation of agricultural experiments and statistical analysis of resulting data.

STAT 515 03(2-2-0). Statistical Science and Process Improvement. S. Prerequisite: QNT 570 or STAT 511 or STAT 540.

Statistical methods in process design; statistical methods; measurement processes; customer evaluation.

STAT 520 04(4-0-0). Introduction to Probability Theory. F. Prerequisite: MATH 369; MATH 261; MATH 317.

Probability, random variables, distributions, expectations, generating functions, limit theorems, convergence, random processes.

STAT 521 03(3-0-0). Stochastic Processes I. S. Prerequisite: STAT 520.

Characterization of stochastic processes, Markov chains in discrete and continuous time, branching processes, renewal theory, Brownian motion.

STAT 522 03(3-0-0). Stochastic Processes II. F, SS. Prerequisite: STAT 521.

Martingales and applications, random walks, fluctuation theory, diffusion processes, point processes, queueing theory.

STAT 523/NR 523 03(3-0-0). Quantitative Spatial Analysis. S. Prerequisite: STAT 301 or STAT 307. Credit not allowed for both STAT 523 and NR 523.

Techniques in spatial analysis: point pattern analysis, spatial autocorrelation, trend surface and spectral analysis.

STAT 524/FIN 524 03(3-0-0). Financial Statistics. F. Prerequisite: MATH 345; STAT 420, or Admission to MSBA program with Financial Risk Management specialization.

Probability and statistical concepts and quantitative tools used in financial modeling and decision-making.

STAT 525 03(3-0-0). Analysis of Time Series I. F. Prerequisite: STAT 430.

Trend and seasonality, stationary processes, Hilbert space techniques, spectral distribution function, fitting ARIMA models, linear prediction.

STAT 526 03(3-0-0). Analysis of Time Series II. S, SS. Prerequisite: STAT 525.

Spectral analysis; the periodogram; spectral estimation techniques; multivariate time series; linear systems, optimal control; Kalman filtering, prediction.

STAT 530 03(3-0-0). Mathematical Statistics. S. Prerequisite: STAT 520.

Sampling distributions, estimation, testing, confidence intervals; exact and asymptotic theories of maximum likelihood and distribution-free methods.

STAT 540 03(3-0-0). Data Analysis and Regression. F. Prerequisite: Six credits of upper-division statistics courses.

Introduction to multiple regression and data analysis with emphasis on graphics and computing.

STAT 544/ERHS 544 03(3-0-0). Biostatistical Methods for Quantitative Data. S. Prerequisite: STAT 301 or STAT 307. Credit not allowed for both STAT 544 and ERHS 544.

Regression and analysis of variance methods applied to both observational studies and designed experiments in the biological sciences.

STAT 547/CIVE 547 03(3-0-0). Statistics for Environmental Monitoring. S. Prerequisite: STAT 301. Credit not allowed for both STAT 547 and CIVE 547.

Applications of statistics in environmental pollution studies involving air, water, or soil monitoring; sampling designs; trend analysis; censored data.

STAT 548/CS 548 04(3-2-0). Bioinformatics Algorithms. F. Prerequisite: STAT 301 or STAT 307 or STAT 315; knowledge of a contemporary programming language.

Computational methods for analysis of DNA/protein sequences and other biological data.

STAT 560 03(3-0-0). Applied Multivariate Analysis. F, S. Prerequisite: STAT 520; STAT 540.

Multivariate analysis of variance; principal components; factor analysis; discriminant analysis; cluster analysis. (NT-O/V)

STAT 570 03(3-0-0). Nonparametric Statistics. S, SS. Prerequisite: STAT 430.

Distribution and uses of order statistics; nonparametric inferential techniques, their uses and mathematical properties. (NT-V)

STAT 586 01(0-2-0). Practicum in Consulting Techniques. F, S, SS. Prerequisite: STAT 540.

Instruction on planning studies, writing reports, and interacting with clients. Attend and critique consulting sessions.

STAT 592 01(0-0-1). Seminar.

STAT 600 03(3-0-0). Statistical Computing. F, S. Prerequisite: STAT 520; STAT 540.

Optimization and integration in statistics; Monte Carlo methods; simulation; bootstrapping; density estimation; smoothing.

STAT 604/BUS 604 02(2-0-0). Managerial Statistics. F. Prerequisite: Admission to the MBA Program. Credit not allowed for both STAT 604 and BUS 604.

Introduction to statistical thinking and methods used to support managerial-decision making. (NT-V)

STAT 605 03(3-0-0). Theory of Sampling Techniques. S. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315; STAT 430.

Survey designs; simple random, stratified, cluster samples; theory of estimation; optimization techniques for minimum variance or costs.

STAT 640 04(4-0-0). Design and Linear Modeling I. S. Prerequisite: MATH 369; STAT 540.

Introduction to linear models; experimental design; fixed, random, and mixed models.

STAT 645 03(3-0-0). Categorical Data Analysis and GLIM. S. Prerequisite: Concurrent registration in STAT 640.

Generalized linear models, binary and polytomous data, log linear models, quasilielihood models, survival data models.

STAT 650 03(3-0-0). Design and Linear Modeling II. F. Prerequisite: STAT 640.

Mixed factorials; response surface methodology; Taguchi methods; variance components.

STAT 675A-L Var [1-3]. Topics in Statistical Methods. F, S, SS. Prerequisite: STAT 430.

A) Sampling. B) Design. C) Multivariate and regression methods. D)

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Computer intensive methods. **F)** Robustness and nonparametric methods. **I)** Industrial statistical methods. **J)** Reliability. **K)** Bayesian statistics. (NT-O) **L)** Medical/pharmaceutical statistical methods (NT-V).

STAT 684 Var [1-3]. Supervised College Teaching. Prerequisite: Enrollment in M.S./Ph.D. program in statistics.

Guidance and instruction in effective teaching of college courses in statistics.

STAT 695 Var. Independent Study.

STAT 699 Var. Thesis.

STAT 720 04(4-0-0). Probability Theory. S. Prerequisite: MATH 517; STAT 520.

Measure theoretic probability, characteristic functions; convergence; laws of large numbers; central limit, extreme value, asymptotic theory.

STAT 721 03(3-0-0). Applied Probability and Stochastic Processes I. F, S. Prerequisite: STAT 720.

General theory of processes; Markov processes in discrete, continuous time; review of martingales, random walks; renewal and regenerative processes.

STAT 722 03(3-0-0). Applied Probability and Stochastic Processes II. F, S, SS. Prerequisite: STAT 720.

Brownian motion, diffusion, stochastic differential equations; weak convergence, central limit theorems. Applications in engineering, natural sciences.

STAT 725 03(3-0-0). Time Series and Stationary Processes. F, S, SS. Prerequisite: STAT 720; STAT 730.

Spectral theory of multivariate stationary processes; estimation, testing for spectral, linear, AR-MA representations; best linear predictors, filters.

STAT 730 04(4-0-0). Advanced Theory of Statistics I. F. Prerequisite: STAT 530; STAT 720.

Minimal sufficiency, maximal invariance; Neyman-Pearson theory; Fisher, Kullback-Leibler information; asymptotic properties of maximum-likelihood methods.

STAT 731 03(3-0-0). Advanced Theory of Statistics II. S, SS. Prerequisite: STAT 730.

Decision-theory model; Bayes, e-Bayes, complete, and admissible classes; applications to sequential analysis and design of experiments.

STAT 740 03(3-0-0). Advanced Statistical Methods. F, S. Prerequisite: STAT 640; concurrent registration in STAT 730.

Generalized additive models; recursive partitioning regression and classification; graphical models and belief networks; spatial statistics.

STAT 750 03(3-0-0). Advanced Theory of Design. F, S. Prerequisite: STAT 650.

Information theory; design evaluation, factorial designs and optimal designs, orthogonal and balanced arrays, designs with discrete/continuous factors.

STAT 760 03(3-0-0). Theory of Multivariate Statistics. F, SS. Prerequisite: STAT 640; concurrent registration in STAT 730.

Theory of multivariate normal; maximum-likelihood inference, union-intersection testing for single sample; theory of a multivariate linear model.

STAT 770 03(3-0-0). Approximation Theory and Methods. F, S. Prerequisite: STAT 730.

Edgeworth expansions, saddlepoint methods; applications of weak convergence and other approximation methods in mathematical statistics.

STAT 792 01(0-0-1). Seminar.

STAT 793 03(3-0-0). Seminar on Advanced Statistical Methods. F, S. Prerequisite: STAT 640; concurrent registration in STAT 730. May be

taken up to two times for credit.

STAT 795 Var. Independent Study.

STAT 796 Var. Group Study.

Methodology, stochastic processes, experimental design, multidimensional statistics.

STAT 799 Var. Dissertation.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

THEATRE COURSES

Department of Music, Theatre, and Dance *College of Liberal Arts*

+TH 141 03(3-0-0). Introduction to Theatre. (GT-AH1, AUCC 3B). F, S, SS.

Theatre as an art and one of the humanities, its impact upon society, and its relationship to other art forms. (\$)

TH 150 03(1-0-2). Introduction to Performance. F, S.

Imagination as the actor's primary resource: acting exercises, compositions, improvisations to acquire the basic approach to text through action.

TH 151 03(2-2-0). Beginning Acting. F, S.

Beginning scene study with an emphasis on exploring action/objective and the given circumstances of a selected text.

TH 152 03(2-3-0). Theatrical Makeup. S. Prerequisite: TH 151.

Stage makeup. Individual skill in character analysis, application in pigment, plastic, hair, makeup, and selection and use of theatrical makeup.

TH 160 03(3-0-0). Introduction to Production Design. F, S.

Concepts and practices in the visual arts of the theatre; studio processes and technical production; elementary work in theatre design and production.

TH 161 03(2-2-0). Technical Theatre: Stagecraft. F, S. Prerequisite: TH 160.

Skills and craft of technical theatre. Knowledge of tools, materials, and techniques essential to production realization.

°TH 163 03(1-4-0). Costume Construction for the Theatre. S. Prerequisite: TH 160.

Technical side of costuming for live stage performances with an emphasis on all aspects of construction.

+TH 192 03(0-03). From Page to Stage: Freshman Theatre Seminar. F, S, SS.

Collaborative creative processes required to transfer literature to theatrical performances with faculty artists/scholars. (\$)

TH 241 03(3-0-0). Text Analysis for Performance. F, S.

Reading, researching and discussing representative play types to foster an understanding of concepts used in theatrical staging.

TH 251 03(2-2-0). Intermediate Acting. S. Prerequisite: TH 151.

Study in the application of the given circumstances to a text and development of characterization. Selection and preparation of audition material.

TH 261 03(1-4-0). Drawing and Drafting for the Theatre. F. Prerequisite: TH 160.

Fundamental drawing, drafting, and rendering techniques needed by theatrical designers to effectively communicate their visual ideas.

TH 262 03(3-0-0). Stage Management I. F. Prerequisite: TH 151; TH 161.

Duties and responsibilities of stage managers. Communication, rehearsal, performance techniques. Conceptual approaches to theatre.

TH 263 03(2-2-0). Costume Design I. F. Prerequisite: TH 160.

Basic theory and technique for visualization of theatrical characters through costume.

TH 264 03(2-2-0). Lighting Design: Fundamentals. F. Prerequisite: TH 160; TH 161.

Essential principles and theory for stage lighting including design process, control, equipment, and lighting aesthetics.

TH 265 03(3-0-0). Scenic Design: Fundamentals. F. Prerequisite: TH 160; TH 161.

Theory and techniques for designing scenery for the stage.

TH 266 03(2-2-0). Sound Design for the Theatre. S. Prerequisite: TH 160; TH 161.

Equipment, process, and recording techniques used in sound design for live performance.

TH 275 03(1-0-2). Playwrights' Workshop. F.

Understanding the craft of the playwright. Practical exercises in character, conflict, structure, setting, dialogue, and the process of rewriting.

TH 286 01(0-3-0). Practicum. Maximum of 4 credits allowed in course.

Practical experience in mounting theatrical productions.

+TH 324 03(1-6-0). Teaching Creative Drama for Children. F. Prerequisite: TH 251. Required field trips.

Theoretical and practical experience in teaching creative drama.

TH 341 03(3-0-0). History of Theatre in Performance. F. Prerequisite: TH 141; TH 241.

Theatre in performance from its origins through the modern era.

TH 342 03(3-0-0). Contemporary Plays in Performance. S. Prerequisite: TH 341.

History of theatre, Restoration to present.

***TH 350 03(2-2-0). Voice and Speech for the Stage.** F. Prerequisite: TH 251.

Linklater and Skinner approaches to voice and speech for the theatre actor.

TH 351 03(2-2-0). Advanced Acting. F. Prerequisite: TH 251.

Contemporary acting methods in a wide range of dramatic texts.

TH 352 02(1-0-1). Acting for Singers. F. Prerequisite: MU 401 or concurrent registration.

Acting class specifically for singers: improv, beginning scene work, harnessing given circumstance and augmenting physical character life onstage.

TH 353 03(2-2-0). Experimental Performance. SS.

Artistic exploration of experimental performance via radical innovations in dance, theatre, music, literature, film, art, and performance art.

°TH 361 03(1-4-0). Technical Theatre: Technical Direction. F. Prerequisite: TH 161.

Advanced training and techniques in construction management and technical production for the theatre.

°TH 362 03(3-0-0). Advanced Stage and Production Management. S. Prerequisite: TH 262.

Stage and production management practices and procedures of theatre in the U.S.

***TH 363 03(1-4-0). Advanced Costume Design.** S. Prerequisite: TH 263.

Theory and practice of advanced costume design techniques.

***TH 364 03(2-2-0). Advanced Lighting Design.** S. Prerequisite: TH 264.

Principles and theory for stage lighting including advanced programming, tour preparation, and presentation techniques.

***TH 365 03(2-2-0). Advanced Scenic Design.** S. Prerequisite: TH 265.

The practice of scenic design from text to idea to realized work. Advanced scenic design techniques in divergent and increasingly complex situations.

***TH 366 03(2-2-0). Digital Media Design for the Stage.** F. Prerequisite: TH 266.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Training, content creation and presentation techniques for sound and projection design for live performance.

°**TH 367 03(1-6-0). Scenic Painting.** F. Prerequisite: Theatre majors only.

Basic techniques and practical applications in scenic painting for the theatre. (\$)

TH 400 03(1-4-0). Theatre Production Workshop. F, S. Prerequisite: One of the following: TH 266, TH 342, TH 351, TH 361, TH 362, TH 363, TH 364, TH 366. May be taken twice for credit in the major.

Explores both the practical and dramaturgical essences of the production of a play.

***TH 450 03(2-2-0). Professional Actor Preparation.** F. Prerequisite: TH 351.

Portfolios, casting, breakdowns, reels, agents, managers, interviews, cold reading techniques, on-camera work, marketing.

TH 451 03(2-2-0). Advanced Topics in Acting. S. Prerequisite: TH 351. May be taken three times for credit.

Author-specific actor challenges (e.g., Brecht, Beckett, Shakespeare, Chekhov, Moliere, and contemporary writers).

TH 455 04(2-0-2). Directing Process. S. Prerequisite: TH 262; TH 341; TH 342; TH 351; TH 363 or TH 365.

Intensive practical experience in direction of scenes focusing on specific directorial problems posed by various types of plays.

***TH 460 03(2-2-0). Design Portfolio and Professional Preparation.** F. Prerequisite: Theatre major; two of the following: TH 363, TH 364, TH 365, TH 366, TH 367.

Creating effective portfolio and design presentations, hard copy and digital, storyboarding, communicating design concept in collaboration, interviews.

***TH 467 03(1-4-0). Advanced Scenic Painting.** S. Prerequisite: TH 367.

Advanced linear perspective, sculpture, texture techniques, creating translucent effect, painting various materials.

TH 470A-I 02(0-6-0). Applied Theatre Production. F, S. Prerequisite: Written consent of instructor.

Advanced topics in applied theatre production. Challenges in developing and mounting a theatrical performance. Each may be taken once for credit.

A) Acting. **B)** Stage Management. **C)** Costume Design. **D)** Scenic Design and Production. **E)** Lighting Design. **F)** Digital Media Design. **G)** Property Design and Scenic Painting. **H)** Dramaturgy. **I)** Directing.

TH 475 03(2-0-1). Advanced Playwriting: Theatre. S. Prerequisite: TH 275.

Advanced techniques of writing for the stage.

TH 482 03(0-0-3). Theatre in London—Travel Abroad. SS. Prerequisite: Good academic and disciplinary standing.

Study abroad in and around London to foster research into theatre as an evolving art form with rich historical and artistic traditions.

TH 484 Var. [1-3]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

TH 486 01(0-3-0). Practicum. Prerequisite: TH 286. Maximum of 4 credits allowed in course.

Practical experience in the supervisory capacities involved in mounting theatrical productions.

TH 487 Var. [1-12]. Theatre Internship.

Adviser-approved position at a professional regional theatre, a professional training program, or professional summer theatre.

TH 491 Var. Repertory Theatre Workshop. Prerequisite: Audition only.

Principles and practice of repertory theatre operation; practical experience offered.

TH 495 Var. Independent Study.

TH 499 Var[3-6]. Thesis. Prerequisite: TH 341, TH 342; performing arts-theatre majors only.

Comprehensive project in performance, production, or scholarship directed by a faculty mentor.

TH 695 Var. Independent Study.

VETERINARY MEDICINE COURSES

Nondepartmental

College of Veterinary Medicine and Biomedical Sciences

VM 603 01(1-0-0). Veterinary Science: Research and Methods. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Conduct of responsible research, contributions of research to the practice of veterinary medicine, and career opportunities.

VM 606 03(3-0-0). Veterinary Immunology. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Infectious agents, immune-mediated diseases, immune deficiencies, and principles of vaccination.

VM 610 01(.5-1.5-0). Foundations of Veterinary Medicine I. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Development of professional skills (ethics, communication, physical exam, surgical skills) necessary for the practice of veterinary medicine.

VM 611 01(.5-1.5-0). Foundations of Veterinary Medicine II. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Development of professional skills (ethics, communication, physical exam, surgical skills) necessary for the practice of veterinary medicine.

VM 616 08(4-9-1). Functional Anatomy. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Embryonic development and organogenesis are incorporated to improve understanding of normal anatomy and common developmental pathologies.

VM 618 07(5-6-0). Veterinary Physiology and Histology. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Gross microscopic anatomy and physiology of gastrointestinal, cardiovascular, respiratory, hemopoietic, urinary systems in selected domestic animals.

VM 619 04(3-3-0). Veterinary Neurobiology. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Structural and functional foundations of nervous system activity; introduction to clinical neurology.

VM 621 02(1-2-0). Exotic Animal Anatomy and Husbandry. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Applied veterinary anatomy and husbandry of birds, reptiles, amphibians, and fish.

VM 623 02(2-0-0). Veterinary Nutrition and Metabolism. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Intermediary metabolism, nutrients, and animal nutrition.

VM 624 03(2-2-0). Veterinary Feeds and Feeding. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Description, advantages, and limitations of feedstuffs fed to domestic livestock; nutrient requirements and formulation of rations for various needs.

VM 625 02(2-0-0). Principles of Diagnostic Imaging. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses

must be taken in prescribed sequence in the PVM program.

Diagnostic film and digital radiography, computed tomography, ultrasound, magnetic resonance, nuclear medicine, and radiographic and sonographic anatomy.

VM 637 03(3-0-0). Veterinary Bacteriology and Mycology. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Biology of bacterial and fungal pathogens of animals with emphasis on common infectious diseases encountered in veterinary practice.

VM 638 02(2-0-0). Veterinary Parasitology. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Biology of helminths, arthropod, and protozoan pathogens of animals with emphasis on common infectious diseases encountered in veterinary practice.

VM 639 02(2-0-0). Veterinary Virology. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Biology of viral pathogens of animals with emphasis on common infectious diseases encountered in veterinary practice.

VM 640 05(4-0-1). Biology of Disease I. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Introduction to mechanisms of subcellular, cellular, tissue, and organ response to injury and associated pathological processes.

VM 648/VS 648 02(2-0-0). Food Animal Production and Food Safety. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program. Credit not allowed for both VM 648 and VS 648.

Basic orientation to food animal production units, herd health concepts, and issues of food safety from preharvest through processing and distribution.

VM 707 01(1-0-0). Emerging Issues in Infectious Disease. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Influence of microbial, host, and environmental changes on the emergence, control, and prevention of infectious disease of veterinary importance.

VM 710 01(.5-1.5-0). Foundations of Veterinary Medicine III. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Development of professional skills (ethics, communication, physical exam, surgical skills) necessary for the practice of veterinary medicine.

VM 711 01(.5-1.5-0). Foundations of Veterinary Medicine II. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Development of professional skills (ethics, communication, physical exam, surgical skills) necessary for the practice of veterinary medicine.

VM 712 04(4-0-0). Practice Management/Professional Development. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Veterinary practice management including marketing, finance, information systems, personnel issues, and client relations.

VM 714 04(4-0-0). Veterinary Preventive Medicine. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Principles of health promotion and disease prevention in populations.

VM 716 01(1-0-0). Principles of Shelter Veterinary Medicine. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Introduces the principles of veterinary shelter medicine. Emphasis on

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management of small animals with herd health concepts.

VM 720 01(1-0-0). Alternative and Complementary Therapeutics. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Mechanisms and efficacy of alternative and complementary therapeutics used in veterinary medicine.

VM 721 02(0-0-2). Non-Mammalian Vertebrate Medicine. F, S. Prerequisite: VM 621; admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Diagnosis and treatment of diseases of non-mammalian vertebrates.

VM 722 04(4-0-0). Veterinary Pharmacology. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Basic and clinical pharmacology, therapeutic practice, and pharmacy management.

VM 724 06(4-0-2). Bioanalytical Pathology. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Mechanisms, interpretation, and applications of laboratory analyses for solving diagnostic problems.

VM 726 02(1-0-1). Principles of Imaging Interpretation I. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Clinical indications and interpretation for imaging modalities in examination of body systems.

VM 728 02(2-0-0). Principles of Imaging Interpretation II. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Interpretation of clinical imaging techniques used in diagnosis of specific diseases of organ systems.

VM 730 02(2-0-0). Applied Animal Behavior. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Identification, characterization, and treatment of common disorders of animal behavior encountered by practicing veterinarians.

VM 731 02(2-0-0). Biology and Diseases of Small Mammals. F, S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Diagnosis and treatment of diseases of small mammals.

VM 733 02(2-0-0). Principles of Surgery. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Principles and concepts of general and orthopedic surgery.

VM 737 03(2-0-1). Principles of Anesthesia. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Integration of physiological and pharmacological principles in clinical anesthesia.

VM 741 04(3-0-1). Biology of Disease II. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Pathogenesis of organ system diseases and integrated systemic pathology.

VM 742 01(0-0-1). Biology of Disease III. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Pathogenesis of disease in organ systems, systemic pathology.

VM 744 03(2-2-0). Theriogenology. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Reproductive function and disease, including mammary gland and endocrine regulation of reproduction and lactation.

VM 745 05(5-0-0). Clinical Sciences I. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Diagnostic approaches to common medical problems of cardiovascular, urinary, and digestive-hepatic systems.

VM 747 05(5-0-0). Clinical Sciences II. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Diagnostic approaches to common medical problems of organ systems.

VM 749 05(5-0-0). Clinical Sciences III. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Diagnostic approaches to common medical problems of organ systems.

VM 751 02(2-0-0). Veterinary Clinical Toxicology. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Common toxicants and poisonous plants encountered by companion and farm animal species, their pathophysiological effects, and clinical treatments.

VM 753 05(5-0-0). Clinical Sciences IV. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Diagnostic approaches to common medical problems of organ systems.

VM 757 03(3-0-0). Bovine Herd Medicine. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Health management, and diagnosis and treatment of diseases of food animals.

VM 763 05(5-0-0). Equine Medicine and Surgery. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Health management, and diagnosis and treatment of diseases of horses.

VM 773 04(4-0-0). Small Animal Medicine and Surgery I. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Health management, and diagnosis and treatment of diseases of dogs and cats.

VM 774 04(4-0-0). Small Animal Medicine and Surgery II. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Health management, and diagnosis and treatment of diseases of dogs and cats.

VM 786A-B Var [1-22]. Practicum. Prerequisite: A-B) Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

A) Junior practicum Var [6-8]. B) Senior practicum.

VM 795 Var [1-18]. Independent Study. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

VM 796J-R. Group Study. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

J) Swine medicine 01(1-0-0). R) Food animal clinical problems 03(3-0-0).

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°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

CLINICAL SCIENCES COURSES

Department of Clinical Sciences College of Veterinary Medicine and Biomedical Sciences

VS 300 03(3-0-0). Prevention and Control of Livestock Diseases. F.

Common ailments of livestock; sanitation and disease prevention and control.

VS 320 03(3-0-0). Birds of Prey-Health Care and Natural History. S, SS. Prerequisite: BZ 110 or LIFE 103.

Natural history of birds of prey; health care for field or clinic. Designed for wildlife, zoology, interpretation, and preveterinary medicine students.

VS 331 04(3-2-0). Histology. F, S, SS. Prerequisite: BMS 230 or BMS 300. Credit allowed for only one of the following: BMS 330, BMS 331, VS 331.

Analysis of animal cells, tissues and organs emphasizing light microscopy. (NT-O)

VS 333 04(3-3-0). Domestic Animal Anatomy. F, S, SS. Prerequisite: LIFE 102 or BZ 110. Credit not allowed for both VS 333 and BMS 305.

Comparative functional anatomy of the dog, horse, and cow. (NT-O)

VS 479/BZ 479 03(3-0-0). Biology and Behavior of Dogs. F, S. Prerequisite: BZ 110 or LIFE 103. Credit not allowed for both VS 479 and BZ 479.

Interactions of physiology, neurobiology, and genetics on behavior of domestic dogs, and how evolution and domestication influence behavioral traits. (NT-O)

VS 495 Var. Independent Study. F, S, SS.

VS 533/MIP 533 03(2-0-1). Epidemiology of Infectious Diseases/Zoonoses. S. Prerequisite: MIP 300. Credit not allowed for both VS 533 and MIP 533.

Epidemiologic features of infectious and parasitic diseases that have a major impact on community medicine.

VS 562 03(3-0-0). Applied Data Analysis. S. Prerequisite: STAT 301 or STAT 307.

Data management, application and interpretation of statistical analysis, and reporting of results for students in health science fields.

VS 570/AGRI 570 02(2-0-0). Issues in Animal Agriculture. F. Credit not allowed for both VS 570 and AGRI 570.

Issues that have a major impact on the direction of changes in animal agriculture.

VS 579/NSCI 579 03(3-0-0). Animal Behavior in Captive Populations. F, S. Prerequisite: Enrollment in the M.P.N.S., Zoo, Aquarium and Shelter Management specialization, or BZ 300. Credit not allowed for both VS 579 and NSCI 579.

How animals learn, perceive their world, and behave, and how all of those intersect to alter behavior in captive settings.

VS 602 02(1-0-1). Critical Evaluation of Scientific Literature. F.

Method of evaluating scientific literature. Students present critiques of papers they have chosen.

¹VS 605 02(2-0-0). Comparative Anesthesiology. S.

Techniques in anesthesia for large and small animals.

¹VS 606 01(0-3-0). Comparative Anesthesiology Laboratory. S. Prerequisite: Concurrent registration in VS 605.

Techniques in anesthesia for large and small animals.

VS 612 02(2-0-0). Plastic and Reconstructive Surgery. F. Prerequisite: DVM or equivalent.

Advances in surgical patient care, surgical instrumentation, and reconstruction.

VS 613 01(0-3-0). Plastic and Reconstructive Surgery Laboratory. F. Prerequisite: VM 786B.

Advances in surgical patient care, surgical instrumentation, and reconstruction.

¹VS 626 02(2-0-0). Infertility and Genital Disease. F.

Infectious and noninfectious causes of reproductive failure in food animals.

VS 628 03(3-0-0). Physiology and Pathophysiology. F. Prerequisite: DVM degree, or BMS 500 and BMS 501.

Overview of the normal physiology and pathophysiology of disease states of mammalian organ systems.

¹VS 630 03(3-0-0). Orthopedic Surgery. F.

Techniques, devices, and prosthetic materials in rehabilitating musculoskeletal problems.

¹VS 631 01(0-3-0). Orthopedic Surgery Laboratory. F. Prerequisite: VS 630 or concurrent registration; VM 786A or VM 786B.

Procedures applied to skeletal preparations and living animals.

VS 642 05(4-2-0). Ophthalmology. F.

Instrumentation, ocular therapeutics, and clinical ophthalmology.

¹VS 645 03(2-3-0). Surgery of the Eye. S.

Techniques, indications, and complications.

VS 648/VM 648 02(2-0-0). Food Animal Production and Food Safety. S. Prerequisite: Enrollment in Food Science/Safety Graduate Interdisciplinary Studies Program. Credit not allowed for both VS 648 and VM 648.

Basic orientation to food animal production units, herd health concepts, and issues of food safety from preharvest through processing and distribution.

¹VS 650 03(3-0-0). Comparative Abdominal Surgery. F.

New techniques in surgery of abdominal viscera.

¹VS 651 01(0-3-0). Comparative Abdominal Surgery Laboratory. F. Prerequisite: DVM or equivalent.

Reparative and reconstructive abdominal surgical procedures.

^oVS 655 03(2-3-0). Echocardiography in Veterinary Medicine. F. Prerequisite: Earned DVM degree or equivalent professional medicine degree.

Technical proficiency in obtaining echocardiographic images; fundamental understanding of diagnostic criteria for common cardiac disease in dogs and cats.

¹VS 660 03(3-0-0). Neurology and Neurosurgery. S.

Diagnostic and surgical techniques for the nervous system.

¹VS 661 01(0-3-0). Neurology and Neurosurgery Laboratory. S. Prerequisite: DVM or equivalent.

Production and correction of surgically amenable lesions in central and peripheral nervous system; electrodiagnosis.

¹VS 673 03(3-0-0). Thoracic and Cardiovascular Surgery. F. Prerequisite: DVM or equivalent.

Surgical approaches to the thorax and the central and peripheral cardiovascular system.

¹VS 674 01(0-3-0). Thoracic and Cardiovascular Surgery Laboratory. F. Prerequisite: VS 673 or concurrent registration; VM 786A or VM 786B.

Surgical procedures applied to the chest, heart, and vessels.

¹Offered every third year.

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VS 699 Var. Thesis.

¹VS 701 Var [1-3]. Postgraduate Medicine I. F.

Comprehensive review, update of immunology, emergency medicine, dermatology, and endocrinology.

¹VS 702 Var [1-3]. Postgraduate Medicine II. S.

Comprehensive review, update of neurology, gastroenterology, and ophthalmology.

¹VS 703 Var [1-3]. Postgraduate Medicine III. F.

Comprehensive review, update of oncology, cardiology, reproduction, ophthalmology, and radiology.

¹VS 704 Var [1-3]. Postgraduate Medicine IV. S.

Comprehensive review, update of hematology, nephrology, urology, respiratory, hepatic, and pancreatic.

VS 716 02(2-0-0). Advanced Studies in Reproduction. S.

Biochemical and physiological basis for problems in reproduction.

VS 718 02(0-0-4). Cancer Biology Clinical Practicum. SS.

Prerequisite: ERHS 510.

Exposes graduate students engaged in laboratory cancer research to cancer from a clinical perspective, through VTH clinical rotations.

^oVS 733 04(4-0-0). Advanced Veterinary Epidemiology. S.

Prerequisite: ERHS 532; ERHS 542 or ERHS 544 or STAT 511 or STAT 512 or VS 662.

Advanced epidemiological and statistical techniques for the design and analysis of research projects.

***VS 750 02(2-0-0). Clinical and Applied Pharmacology. S. Prerequisite:**

BMS 450 or DVM or equivalent degree.

Factors involved in drug dosing and variability of drug response. Applications in veterinary and human medicine.

VS 784 Var. Supervised College Teaching.

VS 792 Var. Seminar.

VS 795A-T Var [1-5]. Independent Study. Maximum of 5 credits allowed per subtopic.

A) Small animal medicine. **B)** Large animal medicine. **C)** Small animal surgery. **D)** Equine surgery. **G)** Equine orthopedics. **H)** Large animal reproduction. **I)** Anesthesiology. **J)** Cardiology. **K)** Neurology. **L)** Dermatology. **N)** Ophthalmology. **O)** Herd health management. **P)** Equine lameness. **S)** Epidemiology. **T)** Human-animal bond.

VS 796 Var. Group Study-Medicine.

VS 798 Var. Research.

VS 799 Var. Dissertation.

WATERSHED SCIENCE COURSES

Department of Ecosystem Science and

Sustainability

Warner College of Natural Resources

WR 304 03(3-0-0). Principles of Watershed Management. (AUCC 3A). F, S.

Effects of land use practices on watersheds: hydrology, soil loss, and water quality.

+*WR 406 03(2-3-0). **Seasonal Snow Environments.** S. Prerequisite: Junior or senior standing.

Evaluation of the physical environment; characteristics of snow; methods of studying snow; snow safety. (\$)

WR 416 03(3-0-0). Land Use Hydrology. F. Prerequisite: (GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or SOCR 240); (CIVE 202 or STAT 201 or STAT 301 or STAT 307 or STAT 315); PH 110 or PH 121 or PH 141).

Fundamental concepts in hydrology and effects of land use on hydrologic processes.

+WR 417 03(2-3-0). **Watershed Measurements.** F. Prerequisite: Concurrent registration in WR 416.

Instrument and field techniques in watershed science. Project design and data analysis. (\$)

WR 418 03(3-0-0). Land Use and Water Quality. S. Prerequisite: (CHEM 103; CHEM 104) or (CHEM 107; CHEM 108) or (CHEM 111; CHEM 112).

Physical, chemical, biological water quality parameters affecting land use; land management to maintain water quality; water quality standards, legislation.

WR 419 02(0-4-0). Water Quality Laboratory for Wildland Managers. S. Prerequisite: Concurrent registration in WR 418.

Sampling and determination of water quality parameters. (\$)

+WR 440 03(2-2-0). **Watershed Problem Analysis.** S. Prerequisite: CIVE 322/ENVE 322; WR 416.

Hydrologic analysis and problem solving in watershed management. (\$)

WR 465 04(3-3-0). Eolian and Fluvial Transport Processes. F. Prerequisite: PH 141.

Fundamental physical principles of eolian and fluvial transport processes.

WR 474 03(3-0-0). Snow Hydrology. F.

Snowfall, accumulation, distribution, physical processes in the snowpack, energy balance, ablation and runoff, measurement methods, runoff forecasting.

+WR 486 02(0-6-0). **Watershed Field Practicum.** F. Prerequisite: Junior year standing.

Field visits to watershed management projects and sites of significant field studies. (\$)

WR 492 Var. Seminar.

WR 495 Var. Independent Study in Watershed Resources.

WR 510 02(2-0-0). Watershed Management in Developing Countries. F. Prerequisite: CIVE 322/ENVE 322 or WR 304.

Watershed management problems, approaches, and solutions in developing countries.

°WR 516 03(2-0-1). **Cumulative Effects and Watershed Analysis.** S. Prerequisite: WR 416; WR 417.

Definition, casual processes, and modeling of cumulative watershed effects; comparison and evaluation of current watershed analysis procedures.

WR 520 02(2-0-0). Evapotranspiration. S. Prerequisite: PH 122.

Theory, estimation, measurement, simulation, and application of evapotranspiration processes in hydrology.

°WR 524/°CIVE 524 03(2-2-0). **Modeling Watershed Hydrology.** S. Prerequisite: CIVE 322/ENVE 322 or WR 416; CIVE 202 or STAT 301 or STAT 315. Credit not allowed for both WR 524 and CIVE 524.

Development and application of watershed models: structure, calibration, evaluation, sensitivity analysis, simulation.

*WR 574 04(3-0-1). **Advanced Snow Hydrology.** F. Prerequisite: CIVE 322/ENVE 322 or WR 416.

Snow processes in hydrologic cycle; physical and conceptual methods of modeling; techniques for measuring different states and change rates.

WR 575 01(0-2-0). Snow Hydrology Field Methods. S. Prerequisite: Enrollment in a graduate program.

Field course offering hands-on experience in snow hydrology. (\$)

*WR 616 03(1-0-2). **Hillslope Hydrology and Runoff Processes.** S. Prerequisite: CIVE 322/ENVE 322 or WR 416.

Hillslope hydrology and runoff processes in different environments; implications for management and modeling.

*WR 674 03(3-0-0). **Data Issues in Hydrology.** S. Prerequisite: WR 574.

Types of data, data sources, data quality, missing data, spatial data, data usage, sensitivity in models, error, presentation of data and results.

WR 692 Var. Seminar.

WR 695 Var. Independent Study.

WR 696 Var. Group Study.

WR 698 Var. Research.

WR 699 Var. Thesis.

*WR 712 03(2-2-0). **Watershed Systems.** F. Prerequisite: CIVE 322/ENVE 322 or WR 416; STAT 340.

Dynamic simulation of watershed behavior; application and evaluation of current hydrologic models.

*WR 714 03(3-0-0). **Water Quality for Wildland Managers.** F. Prerequisite: WR 418.

Sampling, statistics of sampling, concepts of ionic equilibrium, water quality modeling, instream flow requirements.

WR 798 Var. Research.

WR 799 Var. Dissertation.

WOMEN'S STUDIES COURSES

Department of Ethnic Studies

College of Liberal Arts

WS 200 03(3-0-0). Introduction to Women's Studies. F.

Examination of gender roles in work, education, spirituality, relationships, health, institutions, and organizations.

WS 397 03(3-0-0). Group Study.

WS 472 03(3-0-0). Seminar in Women's Studies-Social Sciences. F, S.

Prerequisite: Enrolled in Women's Interdisciplinary Studies Program.

WS 495 Var [1-3]. Independent Study. Prerequisite: Approval of Women's Studies Director and relevant department head(s).

WS 692 03(0-0-3). Seminar in Women's Studies. Prerequisite: One semester of enrollment in Women's Interdisciplinary Graduate Studies Program.

WS 695 Var [1-3]. Independent Study. Prerequisite: Approval of Women's Studies Director and relevant department head.

WS 699 Var [3-6]. Thesis. Prerequisite: Approval of Women's Studies Program Board.

ASTRONOMY COURSES

Department of Physics

College of Natural Sciences

AA 100 03(3-0-0). Introduction to Astronomy. (GT-SC2, AUCC 3A). F, S, SS.

Description of the various objects found in the heavens as well as the principles and techniques employed in investigations of these objects.

AA 101 01(0-2-0). Astronomy Laboratory. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: AA 100 or concurrent registration.

Observations of the various objects found in the heavens with 5-inch reflecting telescopes.

AA 150 03(2-3-0). Observational Astronomy. SS.

Astronomical objects in the night and day sky; observation with 16-inch telescope.

°**AA 301 05(4-2-0). Astrophysics I.** F. Prerequisite: MATH 124; MATH 126; PH 110 or PH 121 or PH 141.

Celestial mechanics, earth-moon systems, planets and satellites, interplanetary medium, origin of solar system.

°**AA 302 05(4-2-0). Astrophysics II.** S. Prerequisite: MATH 124; MATH 126; PH 110 or PH 121 or PH 141.

Properties of sun and stars, variable stars, binary and multiple star systems, star clusters, interstellar medium, stellar evolution.

***AA 303 05(4-2-0). Astrophysics III.** F. Prerequisite: MATH 124; MATH 126; PH 110 or PH 121 or PH 141.

Properties of the Milky Way, galaxies, quasars and related objects; special and general relativity; cosmology.

AA 495 Var [1-6]. Independent Study in Astrophysics. Prerequisite: Written consent of instructor.

ACCOUNTING COURSES

Department of Accounting

College of Business

ACT 205 03(3-0-0). Fundamentals of Accounting. F, S, SS. For nonbusiness majors. Credit not allowed for both ACT 205 and ACT 210.

Understanding of financial statements to support financial and managerial decision making. (NT-O)

ACT 210 03(3-0-0). Introduction to Financial Accounting. F, S, SS. Prerequisite: BUS 100 or HONR 192 or KEY 192. Credit not allowed for both ACT 210 and ACT 205.

Use of accounting information by decision makers; development of the basic accounting model, and issues concerning income and cash flows.

ACT 220 03(3-0-0). Introduction to Managerial Accounting. F, S, SS. Prerequisite: ACT 205 or ACT 210; BUS 150 or concurrent registration or CS 110 or concurrent registration.

Use of accounting information in internal decision making.

ACT 310 03(3-0-0). Financial Statement Analysis. F, S. Prerequisite: ACT 220. For business majors. Credit not allowed for both ACT 310 and ACT 311.

Analysis of balance sheet and income statement accounts.

ACT 311 03(3-0-0). Intermediate Accounting I. F. Prerequisite: ACT 205 with grade of B- or better or ACT 210 with grade of B- or better; ACT 220 with grade of B- or better. Credit not allowed for both ACT 311 and ACT 310.

Asset and liability accounting.

ACT 312 03(3-0-0). Intermediate Accounting II. F, S. Prerequisite: ACT 311 with a C or better.

Equity structure of corporations; analysis and interpretation of accounting data.

ACT 321 03(3-0-0). Cost Management. F. Prerequisite: ACT 220.

Utilizing budgetary and cost accounting information for planning, controlling, and decision-making.

ACT 330 03(3-0-0). Introduction to Taxation. F, S. Prerequisite: ACT 205 or ACT 210.

Introduction to U.S. taxation, with emphasis on federal income tax; impact of taxation on business decisions.

ACT 350 03(3-0-0). Accounting Information Systems. F, S. Prerequisite: ACT 220; ACT 321.

Design, administration and control of accounting information systems; use of accounting systems software.

ACT 411 03(3-0-0). Advanced Accounting. F, S. Prerequisite: ACT 312.

Accounting for branches and subsidiaries, partnerships, and business combinations. Accounting for multinational business transactions.

ACT 421 03(3-0-0). Management Control Systems. S. Prerequisite: ACT 220.

Business transaction cycles. Laws and regulations regarding responsibility for internal control. Performance measurement systems and controllership.

ACT 430 03(3-0-0). Income Tax Accounting. F, S. Prerequisite: ACT 330.

Basic structure of federal income tax law; impact of taxes on decision making; social security taxes.

ACT 431 03(3-0-0). Corporate Taxation. F. Prerequisite: ACT 220;

ACT 330.

Federal income tax principles pertaining to formation and operation of corporate entities.

ACT 441 03(3-0-0). Auditing Practices. F, S. Prerequisite: ACT 312; ACT 350.

Environment, professional standards, and practices involved in auditing financial statements and performance of other assurance services.

ACT 442 03(3-0-0). International Accounting. SS. Prerequisite: ACT 220. Credit not allowed for both ACT 442 and ACT 642.

International accounting issues facing multi-national enterprises.

ACT 487 Var. Internship.

Supervised work experience in public, industry, or governmental accounting.

ACT 495 Var. Independent Study.

ACT 496 Var. Group Study.

ACT 498 Var [1-3]. Research.

ACT 501 03(3-0-0). Accounting for Global Sustainable Enterprise. F. Prerequisite: Admission to GSSE program.

Basics of U.S. and international financial reporting; accounting issues of not-for-profit enterprises; budgeting; managerial decision making.

ACT 511 03(3-0-0). Advanced Accounting I. F. Prerequisite: ACT 312.

Accounting for business combinations and consolidations in corporate restructuring and alternative organizational forms.

ACT 540 03(3-0-0). Professional Ethics and Responsibilities. S. Prerequisite: ACT 311.

Ethical practice of professional accounting.

ACT 541 03(3-0-0). Forensic Accounting and Fraud Auditing. S. Prerequisite: ACT 441; graduate standing.

Professional practices for addressing the related areas of forensic accounting and fraud. (NT-O)

ACT 550 03(3-0-0). Electronic Commerce Accounting Issues. F. Prerequisite: ACT 350.

Best practices for technology use in organizational accounting processes, including advanced skills in spreadsheet and database technologies.

ACT 561 03(3-0-0). Legal and Regulatory Issues in Accounting. F, S. Prerequisite: BUS 205 or BUS 260; graduate standing or written consent of instructor.

Contracts, ownership, bankruptcy (debtor/creditor relationship), formation of business entities, regulation of accounting profession. (NT-V)

ACT 570 03(3-0-0). Government and Nonprofit. F. Prerequisite: ACT 441 or concurrent registration; graduate standing or written consent of instructor.

Theory and practical application of accounting principles and auditing standards to governmental entities and not-for-profit organizations. (NT-V)

ACT 600 03(3-0-0). Accounting for Managers. F. Prerequisite: Admission to a master's program in business.

Cost management, budgeting, profitability analysis, and decision making.

ACT 601A-B 03(3-0-0). Professional Practice.

Management of accounting practice; professional ethics and regulation; research techniques. A) Taxation. F. Prerequisite: ACT 330.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC-*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

(NT-O) **B) Auditing.** S. Prerequisite: ACT 612. (NT-O)

ACT 612 03(3-0-0). Contemporary Financial Accounting Issues. F. Prerequisite: ACT 312.

Historical development of accounting; controversial issues involved in calculations and disclosure of enterprise periodic income. (NT-O)

ACT 622 03(3-0-0). Advanced Cost and Managerial Accounting. S. Prerequisite: ACT 321.

Contributions of cost accounting to decision making and planning. (NT-O)

ACT 630 03(3-0-0). Tax and Accounting Research. F. Prerequisite: ACT 220.

Research aspects of professional accounting and tax practices; development of oral and written communication skills.

ACT 631 03(3-0-0). Corporate Taxation. F. Prerequisite: ACT 220; ACT 330.

Federal income tax principles pertaining to formation and operation of corporate entities. (NT-V)

ACT 633 03(3-0-0). Flow-Through Entities. S. Prerequisite: ACT 220.

Federal income tax principles and problems pertaining to flow-through entities. (NT-V)

ACT 635 03(3-0-0). State and Local Taxation. F. Prerequisite: ACT 220.

Tax planning and compliance issues for entities doing business in multijurisdictional locales. (NT-O)

ACT 636 03(3-0-0). Taxation of Corporations and Shareholders. SS. Prerequisite: ACT 220.

Federal income tax principles and problems relating to reorganization, consolidation, and termination of corporations. (NT-V)

ACT 639 03(3-0-0). Special Topics in Taxation. S. Prerequisite: ACT 601A; ACT 631.

Taxation of not-for-profit entities; international tax issues; other contemporary topics. (NT-O)

ACT 641 03(3-0-0). Contemporary Auditing. F. Prerequisite: ACT 441.

Seminar exploring various facets of the assurance services environment. (NT-V)

ACT 642 03(3-0-0). International Accounting. SS. Prerequisite: ACT 220. Credit not allowed for both ACT 642 and ACT 442.

Preparation for work with multinational companies in coordinating operations to adhere to global regulations and customs. (NT-O)

ACT 650 03(3-0-0). Advanced Accounting Information Systems. F. Prerequisite: ACT 350.

Research and review of best practices for technology in organizational accounting processes, including advanced skills in spreadsheets and databases.

ACT 679A-B 03(3-0-0). Capstone Seminar. F, S, SS.

Final project integrating material from prior courses. **A) Taxation.** Prerequisite: ACT 601A; ACT 631. (NT-O) **B) Financial accounting.** Prerequisite: ACT 601B. (NT-O)

ACT 695 Var. Independent Study.

ACT 696 Var. Group Study.

AGRICULTURAL EDUCATION COURSES

*Department of Agricultural and Resource
Economics
College of Agricultural Sciences*

AGED 241 02(1-2-0). Plumbing and Electrical Applications in Ag Ed. F, S, SS.

Development of technical competencies for educators relating to plumbing and electrical applications in secondary agricultural education classrooms.

AGED 244 02(1-2-0). Small Gas Engine Repair and Maintenance. F, S, SS.

Offered only off-campus. (NT)

AGED 487 Var[1-6]. Internship.

AGED 495 Var[1-6]. Independent Study.

AGED 496 Var[1-12]. Group Study.

AGRICULTURE COURSES

Nondepartmental

College of Agricultural Sciences

AGRI 116/IE 116 03(2-0-1). Plants and Civilizations. (GT-SS3, AUCC 3E). F, S. Credit not allowed for both AGRI 116 and IE 116.

Plant origins and their relationships with cultures/civilizations as food, spices, perfumes, and medicines and in art, religion, wars, slavery, etc.

AGRI 140 03(0-0-3). Technology in Agriculture. F, S, SS.

Computer concepts and terminology. PC operating systems, Web tools, e-mail, presentation technology, word processing, spreadsheet, and database. (NT-O)

AGRI 192 01(0-0-1). Orientation to Agricultural Systems. F, S.

Freshman inquiry course in agriculture. Information and skills necessary to succeed in majors in the agricultural sciences.

AGRI 270/IE 270 03(3-0-0). World Interdependence-Population and Food. (GT-SS3, AUCC 3E). S. Credit not allowed for both AGRI 270 and IE 270.

Survey of world population and food; emphasis on understanding the problems and opportunities in a world context.

AGRI 292 01(1-0-0). Transfer Seminar. F, S. Prerequisite: Transfer student.

The university and its resources, college success skills, careers in the various disciplines of agriculture; current issues in agriculture.

AGRI 300 02(2-0-0). Issues in Agriculture. F. Credit not allowed for both AGRI 300 and AGRI 500.

Scientific, technical, cultural, and social issues facing agriculture, and their interrelationships. (NT-O)

AGRI 320A-F 01(0-2-0). Computer Applications in Agriculture. S. Prerequisite: AGRI 140 or BUS 150 or CS 110.

A) Optimization. B) Data base. (NT-O) C) Communications. (NT-O) D) Project management. (NT-O) E) Spreadsheets. (NT-O) F) Presentation technology. (NT-O)

AGRI 330/PHIL 330 03(3-0-0). Agricultural Ethics. S. Credit not allowed for both AGRI 330 and PHIL 330.

Basic concepts in ethics and their application to agriculture.

+AGRI 383/NR 383 02(0-2-1). U.S. Travel-Integrated Resource Management. S. Credit not allowed for both AGRI 383 and NR 383.

Evaluation of integrated ranch management decision alternatives in conjunction with professional resource managers. Required field trips.(\$)

AGRI 374 01(0-0-1). Professional Development Seminar. F, S, SS. Prerequisite: Junior or senior standing.

Assess personal workplace skills and strengths, including teamwork and decision-making, for use in career planning.

AGRI 465 03. Pesticide Management. F, S, SS. Offered as correspondence course only.

Reasons for and safe correct pesticide use. (NT-C)

AGRI 466 01. Management of On-Farm Stored Grain. F, S, SS. Offered as correspondence course only.

Basic principles of grain storage and management strategies for insects and fungi; chemical controls and safe pesticide use. (NT-C)

AGRI 467 02. Management and Control of Wood-Destroying Pests. F, S, SS. Offered as correspondence course only.

Wood-destroying agents; wood preservative chemicals and treatment; industry regulations; labels; safety; environmental concerns. (NT-C)

AGRI 468 03. Management and Control of Turfgrass Pests. F, S, SS. Offered as correspondence course only.

Classification of turfgrass pests; pest management, control; environmental concerns, industry regulations; safety, skill in pesticide applications. (NT-C)

AGRI 487A-B Var [1-12]. Internship. F, S, SS. Prerequisite: None. No more than a total of 12 credits allowed for AGRI 487.

A) Domestic. (NT-O) B) International. (NT-O)

AGRI 492 Var [1-3]. Seminar.

AGRI 495 Var [1-12]. Independent Study.

AGRI 496A-B Var [1-12]. Group Study.

A) General. B) Agricultural ambassadors.

AGRI 500 03(2-0-1). Advanced Issues in Agriculture. F. Credit not allowed for both AGRI 500 and AGRI 300.

Scientific, technical, cultural, and social issues facing agriculture, and their interrelationships. (NT-O)

***AGRI 545 02(2-0-0). Plant Tissue Culture.** F. Prerequisite: BZ 440.

Theory, technology, and techniques of cell, organ, tissue, and protoplast culture of plants.

AGRI 546 03(3-0-0). Principles of Cooperative Extension. F, S, SS.

Traditional and contemporary delivery systems of Cooperative Extension emphasizing structures of nonformal education. (NT-C/O)

AGRI 547 04(2-0-2). Delivery of Cooperative Extension Programs. S. Prerequisite: Written consent of instructor.

Methods, techniques, and procedures in planning, implementation, and delivery of Cooperative Extension programs. (NT-C/V/O)

AGRI 562/SOC 562 03(2-0-1). Sociology of Food Systems and Agriculture. F, S. Prerequisite: SOC 100 or SOC 105. Credit not allowed for both AGRI 562 and SOC 562.

How agricultural choices generate intended and unintended consequences for human communities and the natural environment.

***AGRI 570/*VS 570 02(2-0-0). Issues in Animal Agriculture.** F.

Credit not allowed for both AGRI 570 and VS 570.

Issues that have a major impact on the direction of changes in animal agriculture.

AGRI 587A-B Var [1-12]. Internship. F, S, SS. No more than a total of 12 credits allowed for AGRI 587.

A) Domestic. (NT-O) B) International. (NT-O)

+AGRI 601/ENGR 601 03(2-2-0). Bioenergy Technology. F.

Science and engineering aspects of bioenergy production, including plant biology, fermentation, and biofuel properties. Required field trips.

AGRI 630 03(3-0-0). Integrated Decision Making/Management Skills. F.

Motivation for management, decision making, introduction to systems, information management, introduction to statistics. (NT-O)

AGRI 631 03(3-0-0). Building the Business. F, S.

Skills required to organize and implement a modern business enterprise with focus on land-based operations. (NT-O)

AGRI 632 03(2-2-0). Managing for Ecosystem Sustainability. F, S.

Impacts of ecological processes, use of mechanism-based understanding, and tools used to manage the ecosystem for sustainability. (NT-O)

AGRI 633 03(2-2-0). Understanding and Managing Animal Resource.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

F, S.

Evaluating nutritional requirements of a variety of animals, how and why requirements vary according to level of production. (NT-O)

AGRI 634 03(2-2-0). Animal Production Systems. F, S.

Developing animal management systems for a variety of animal species in a forage-based environment. (NT-O)

+AGRI 635 03(3-0-0). Integrated Forage Management. F.S.

Development of management plans that integrate diverse forage resources including native rangeland and cultivated forages. Required field trips. (NT-O)

AGRI 636 03(3-0-0). Analyzing and Managing the Business. F, S.

Assimilating, preparing, and analyzing records; reading financial statements to manage a land-based business. (NT-O)

AGRI 637 03(3-0-0). Understanding Policy and Emerging Issues. F, S.

Origination, purpose, and policy effects of policy on land-based enterprises; policy effects on management decisions. (NT-O)

+AGRI 638 03(3-0-0). Ecosystem Services on Agricultural Lands. F, S.

Within an economics framework, explores the unique management challenges involved in a modern, diversified agricultural operation. Required field trips. (NT-O)

AGRI 639 03(3-0-0). Products to Profit. F, S.,

Marketing all aspects of the enterprise, beginning with land and forage resource and tracking all revenue generation. (NT-O)

AGRI 640 03(3-0-0). Integrated Resource Management Plan. F, S.

Formulation of an optimal land management plan for a specific site based on specific goals and objectives. (NT-O)

AGRI 684 Var [1-2]. Supervised College Teaching. Maximum of 4 credits allowed in course.

AGRI 692 01(0-0-1). Seminar.

AGRI 695 Var [1-12]. Independent Study. F, S, SS. (NT-O)

AGRI 698 Var [1-6]. Research. (NT-O)

APPLIED HUMAN SCIENCES COURSES

Nondepartmental

College of Applied Human Sciences

AHS 192 02(0-0-2). Applied Human Sciences First Year Seminar. F, S, SS.

Concepts and topics integral to applied human sciences; development of community; enhancement of reading, critical thinking, and communication skills.

AHS 201 03(3-0-0). Perspectives in Gerontology. F, S. Prerequisite: HDFS 101 or PSY 100 or SOC 100.

Using multidisciplinary perspectives to explore a variety of issues in human aging; emphasis on applied gerontology. (NT-O)

AHS 300 03(3-0-0). Research in Applied Professions. F, S, SS.

Application of social science research methodology to applied professions including problem formulation, research design, and data collection.

AHS 426 03(3-0-0). Responsible Promotion of Food and Apparel. F. Offered as online course only.

Socially responsible decision-making and regulatory processes in the advertising and promotion of food, apparel, and related products. (NT-O)

AHS 484 02(0-0-2). Supervised College Teaching. F, S, SS. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

AHS 487 Var [1-16]. Internship in Human Services. Prerequisite: Written consent of instructor.

Application of skills learned in interdisciplinary program or major to a variety of human service settings.

AHS 490 Var [1-5]. Workshop.

AHS 492 Var [1-5]. Seminar.

AHS 495 Var [1-5]. Independent Study.

AHS 590 Var [1-5]. Workshop.

AHS 668 03(3-0-0). Program Design, Implementation and Evaluation. F, S. Offered only as online course as part of the Great Plains Interactive Distance Education Alliance.

Principles and methods of program design, implementation, and outcome. (NT-O)

AHS 692 Var [1-5]. Seminar.

AHS 695 Var [1-5]. Independent Study.

AHS 697 Var [1-6]. Group Study. Offered as an online course only. (NT-O)

APPAREL AND MERCHANDISING COURSES

Department of Design and Merchandising College of Applied Human Sciences

AM 101 03(3-0-0). Fashion Industries. F, S, SS.

Development, organization, and trends of domestic and foreign fashion industries. (NT-O)

AM 110 03(2-2-0). Apparel and Merchandising Digital Technology. F, S. Prerequisite: None.

Introduction to computer technologies used in apparel and merchandising industries.

AM 130 03(3-0-0). Design Foundation-Apparel and Merchandising. F, S.

Impact of elements and principles of design on apparel and merchandising within 20th century art. (NT-O)

AM 143 04(2-4-0). Introduction to Apparel Design. S. Prerequisite: Acceptance into the Apparel Design and Production program concentration.

Apparel and garment-pattern development, construction, quality; skill development in technical drawing and rendering. (\$)

AM 240 03(0-6-0). Computer-Aided Apparel Design. S. Prerequisite: AM 143; portfolio review.

Apparel design using the computer to generate drawings for fabric, graphic logo, and apparel. (\$)

AM 241 03(1-4-0). Apparel Production. F. Prerequisite: AM 143; MATH 117 with a B or better; MATH 118 with a B or better; MATH 124 with a B or better; portfolio review.

Production processes of sewn textile products, flat pattern, pattern grading, marker making, and writing specifications. (\$)

AM 243 03(3-0-0). Adobe Photoshop for Textile Design. F, S, SS. Offered as online course only.

Textile design using Adobe Photoshop to generate drawings for surface and structural textile design. (NT-O)

AM 244 03(1-4-0). Illustration for Apparel Design. F. Prerequisite: AM 143; portfolio review. Credit not allowed for both AM 244 and AM 343.

Illustration skills using traditional media/CAD applications and analysis of visual communication.

AM 250 03(3-0-0). Clothing, Adornment and Human Behavior. (GT-SS3, AUCC 3E). F, S.

Psychological, sociological, and cultural factors influencing clothing and adornment.

AM 270 03(3-0-0). Merchandising Processes. S. Prerequisite: AM 101 with a C- or better; AM 130 with a C- or better; DM 120 with a C- or better; MATH 117 with a B or better; MATH 118 with a B or better; MATH 124 with a B or better.

Forecasting, planning, evaluating, and presenting merchandise lines to meet target market demands. (NT-O)

AM 290 Var. Workshop.

AM 321 03(3-0-0). Advanced Textiles. S. Prerequisite: DM 120.

Textile product serviceability; effect of fiber structure on properties and performance; new developments.

AM 330 03(3-0-0). Textile and Apparel Economics. F. Prerequisite: AM 270 with a C- or better; DM 120 with a C- or better; DM 272 with a C- or better; AREC 202 with a C- or better or ECON 202 with a C- or better.

Manufacture of textile and apparel products; structure of the industries; international trade and consumption.

AM 341 03(1-4-0). Computer-Aided Apparel Production. S. Prerequisite: AM 241.

Computer-aided design technology used in apparel sketching, pattern drafting, grading, and marker making. (\$)

AM 342 03(0-6-0). Computer-Aided Textile Design. F. Prerequisite: AM 110.

Computer-aided technology and multicultural research used to create repeat fabric designs; fabric printing using silkscreen. (\$)

AM 344 03(3-0-0). Adobe Illustrator for Apparel Designers. F, S, SS. Prerequisite: AM 243 or concurrent registration. Offered only through the Division of Continuing Education.

Apparel design using Adobe Illustrator to generate drawings for garment technical sketching, fashion illustration, and graphic logos. (NT-O)

AM 345 03(0-6-0). Draping Design. S. Prerequisite: AM 241.

Apparel designing through basic draping techniques. (\$)

AM 363 03(3-0-0). Historic Costume. S.

Influence of social, political, and economic conditions on costume of predynastic Egypt to present time.

AM 364 03(3-0-0). History of Fashion Designers/Manufacturers. F, S, SS. Offered as online course only.

Fashion designers and manufacturers who established the field and their contemporaries. (NT-O)

AM 366 03(3-0-0). Merchandising Promotion. F. Prerequisite: AM 270 or MKT 300 or MKT 305.

Activities used to influence sale of merchandise and services; to promote trends and ideas.

AM 370 03(3-0-0). Fashion Trend Analysis and Forecasting. F, S. Prerequisite: AM 270.

Fashion trend analysis and forecasting between markets and products; the direction of fashion.

AM 371 04(3-2-0). Merchandising Systems. F, S. Prerequisite: ACT 205 or ACT 210; AM 270 with a C- or better.

Business mathematics and current practices related to acquisition, negotiation, distribution, and sale of merchandise.

AM 375 03(2-2-0). Product Design and Development. F, S. Prerequisite: DM 272; AM 270.

Product design and development for apparel and other soft goods through industry-driven projects. (\$)

AM 384 Var [1-3]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

AM 421 03(1-4-0). Textile Analysis. F. Prerequisite: DM 120.

Performance evaluation of selected fabrics through standard testing procedures; individual projects. (\$)

***AM 430 03(3-0-0). International Retailing.** S. Prerequisite: AM 330; DM 360/MKT 360.

Application of retail principles to analyze the internationalization process of retailing.

AM 446 03(1-4-0). Apparel Design and Production. F. Prerequisite: AM 341; AM 342.

Computer-aided design technology used in apparel sketching, pattern drafting, grading and marker making; final portfolio preparation and review. (\$)

°AM 450 03(3-0-0). Social-Psychological Aspects of Clothing. S. Prerequisite: AM 250; PSY 100 or SOC 100.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Psychological and social factors influencing clothing and its effect on others.

AM 460 03(3-0-0). Historic Textiles. F.

Historic development of textiles from a global perspective, focusing on textiles produced by diverse cultures.

°AM 466 03(2-2-0). Retail Environment Design and Planning. S.
Prerequisite: AM 130; AM 270.

Application of design/merchandising principles to retail selling environments, including traditional store design/layout, direct mail, and websites.

AM 479 03(3-0-0). Merchandising Policies and Strategies. F, S.
Prerequisite: AM 270; AM 330; AM 366; AM 371; DM 360/MKT 360.

Examination of merchandising environment as influenced by its structure, and economic, legal, demographic, and psychographic trends.

AM 495A-D Var [1-3]. Independent Study.

A) Merchandising. B) Apparel design and production. (\$) D) Textiles and clothing. (\$)

AM 496A-D Var. Group Study.

A) Merchandising. B) Apparel design. C) Apparel production. D) Textiles and clothing.

AM 500 01(1-0-0). Apparel Supply Chains/Social Responsibility. F.
Offered as online course only.

Challenges for social responsibility in the context of the structure, relationships, and long-standing practice of the apparel industry. (NT-O)

AM 501 01(1-0-0). Apparel Consumers and Social Responsibility. S.
Offered as online course only.

Role of consumers in improving working conditions, labor standards, and environmental stewardship in apparel factories worldwide. (NT-O)

AM 502 01(1-0-0). Initiatives for Apparel Labor Compliance. F.
Offered as online course only.

Effectiveness of current initiatives for improving working conditions and labor standards in factories around the world. (NT-O)

AM 503 01(1-0-0). Sustaining Global Apparel Supply Chains. S.
Offered as online course only.

Responsibility for sustaining economic/social development in the global apparel industry; historical perspective and current issues. (NT-O)

AM 504 01(1-0-0). Apparel Worker-Centric Social Responsibility. F.
Offered as online course only.

Rights of workers and obstacles in meeting and methods for assuring worker rights, including freedom of association. (NT-O)

AM 505 01(1-0-0). Socially Responsible Apparel: Global Policy. S.
Offered as online course only.

Political and profit interests that influence socially responsible decisions and policy for the global textile and apparel industry. (NT-O)

AM 506 01(1-0-0). Culture and Work in the Apparel Industry. F.
Offered as online course only.

Cultural characteristics, employment/work practices and social responsibility; practices that reflect the effects of culture on business practices. (NT-O)

AM 507 01(1-0-0). Redesigning Green Apparel. S. Offered as online course only.

Challenges to environmental stewardship in the design, sourcing, and packaging of apparel, textiles, and footwear products. (NT-O)

AM 508 01(1-0-0). Producing Environmentally Responsible Apparel. F.

Offered as online course only.

Environmentally responsible apparel production and practices as philosophy, process, and competitive business strategy. (NT-O)

AM 509 01(1-0-0). Corporate Culture-Socially Responsible Apparel. S.
Offered as online course only.

Importance of leadership, role of inspirational leadership, and opportunities for making a difference are explored, analyzed, and applied. (NT-O)

***AM 525 03(1-2-1). Application of Textile Technology to Design.** S.
Prerequisites: AM 321 or AM 421.

Advanced study of textile technology in apparel, merchandising and interior design; recent advances in the field.

***AM 546 03(1-2-1). Theoretical Apparel Design Solutions.** F.

Applications of theoretical frameworks and computer-aided design techniques for the development of wearable and fiber art. (\$)

***AM 550 03(0-0-3). Appearance, Self, and Society.** S. Prerequisite: AM 450 or six credits in psychology and/or sociology.

Analysis of social science theories and concepts as they apply to appearance and dress research.

°AM 572 03(0-0-3). Merchandising Theories and Strategies. S.
Prerequisite: Graduate student standing.

Theoretical perspective on the design and development of merchandising strategies for U.S. and global production, distribution, and consumption.

AM 590B Var. Workshop-Apparel.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

AMERICAN STUDIES COURSES

Department of English

College of Liberal Arts

AMST 100 03(3-0-0). Self/Community in American Culture, 1600-1877.
(GT-AH2, AUCC 3D). F.

Meaning and development of American culture, 1600-1877, through themes of self and community, in art, politics, society, and religion.

AMST 101 03(3-0-0). Self/Community in American Culture Since 1877.
(GT-AH2, AUCC 3D). S.

Meaning and development of American culture since 1877, through themes of self and community, in art, politics, society, and religion.

AMST 300/E 300 03(3-0-0). American Lives-Methods in American Studies. F, S. Prerequisite: AMST 100; AMST 101. Credit not allowed for both AMST 300 and E 300.

Methods and changing approaches of American studies since 1950s using autobiography as organizing theme.

AMST 492 03(3-0-0). Seminar in American Studies. Prerequisite: AMST 300/E 300.

AMST 495 Var [1-3]. Independent Study in American Studies.
Prerequisite: Written consent of instructor.

Individually guided studies in interdisciplinary work in American culture.

AMST 499 03. Thesis in American Studies. Prerequisite: AMST 492.

ANIMAL SCIENCE COURSES

Department of Animal Sciences

College of Agricultural Sciences

ANEQ 100 03(3-0-0). History of Food Animal Agriculture. S. Prerequisite: Non-Animal Science majors with a freshman or sophomore standing.

History of animal agriculture; understanding of modern agricultural systems.

+ANEQ 101 03(3-0-0). Food Animal Science. F, S.

Development, organization, trends, and management of the livestock industry; emphasis on applying science to the production of food and fiber. (\$)

+ANEQ 102 04(3-2-0). Introduction to Equine Science. F.

Equine physiology, production systems and management systems as it pertains to the equine industry and management. (\$)

ANEQ 201A-B 02(0-4-0). Preparation of Horses for Competition. F, S.

Prerequisite: Written consent of instructor.

Development of skills to prepare and present horses in competitions aimed at enhancing their value. **A)** Western. (\$) **B)** English. (\$)

ANEQ 202 01(1-0-0). Safety in Horse Handling. F.

Horse handling safety skills. (\$)

ANEQ 203 02(1-2-0). Equine Management. S. Prerequisite: ANEQ 102.

Equine management and care techniques with hands-on experience. (\$)

ANEQ 220 02(2-0-0). Feeds and Feeding. F, S. Prerequisite: ANEQ 101 or ANEQ 102.

Advantages and limitations of feedstuffs; nutrients and their functions; and feed practices for all physiological stages of livestock.

ANEQ 230 03(3-0-0). Farm Animal Anatomy and Physiology. F, S.

Prerequisite: Three credits of 100-level LIFE.

Basic concepts of farm animal anatomy and physiology; emphasis on growth, digestion, and reproduction.

ANEQ 249 01(0-2-0). Introduction to the Trail Riding Industry. F, S.

Prerequisite: Written consent of instructor.

Emphasis on horse care, regulations, first aid, health, training, and hosting a trail ride. (\$)

ANEQ 250 03(1-4-0). Live Animal and Carcass Evaluation. F, S.

Prerequisite: ANEQ 101 or ANEQ 102.

Growth, development, and value-determining characteristics of market animals. (\$)

ANEQ 286 02(1-2-0). Livestock Practicum. F, S. Prerequisite: ANEQ 101 or ANEQ 102.

Livestock breed and terminology; classification of feedstuffs; livestock handling and care; basic animal management techniques, hands-on experience. (\$)

ANEQ 292 01(1-0-0). Equine Industry Seminar. S. Prerequisite: ANEQ 102. May be offered as a partial semester course.

Overview of the equine industry and industry careers. (NT-B)

ANEQ 300A-W. Topics in Animal Sciences. F, S.

A) Livestock handling 01(1-0-0). **B)** /BSPM 300. Livestock entomology 01(1-0-0). Prerequisite: 3 credits of BZ or LIFE at the 100-level. Credit not allowed for both ANEQ 300B and BSPM 300. **E)** Family ranching 01(1-0-0). Prerequisite: ANEQ 101 or ANEQ 102. **L)** Quality Assurance 02(2-0-0). Prerequisite: ANEQ 101 or ANEQ 102. **N)** Seed-stock merchandising 02(2-0-0). **F)** Prerequisite: Junior or senior standing. Overview of beef seedstock industry, including hands-on selection,

management, and marketing of cattle. Course required to apply for seedstock team. **+R)** Calves and Calf Care 02(1-2-0). Prerequisite: ANEQ 310; ANEQ 478. Required field trips. (\$) **T)** Event, fair, and show management 01(1-0-0). Prerequisite: ANEQ 101 or ANEQ 102. Credit not allowed for both ANEQ 300T and ANEQ 358. **U)** Seedstock sale management 02(2-0-0). Prerequisite: ANEQ 300N. **S)** Equine manure management 01(1-0-0). **S)** Prerequisite: ANEQ 101 or ANEQ 102.

ANEQ 310 03(3-0-0). Animal Reproduction. F, S, SS. Prerequisite: ANEQ 230 or BMS 300.

Anatomy and physiology of the reproductive system; causes of reproductive failure in farm animals; methods of improving reproductive performance. (NT-O)

ANEQ 312 02(1-2-0). Animal Ultrasonography. F. Prerequisite: ANEQ 230; ANEQ 310.

Fundamentals and application of using ultrasound in farm animals; basic reproductive technologies; utilizing ultrasound as a management tool. (\$)

ANEQ 315 02(1-2-0). Equine Behavior. S. Prerequisite: ANEQ 102; sophomore or higher standing.

Equine behaviors related to training and learning.

+ANEQ 320 04(3-3-0). Principles of Animal Nutrition. F, S. Prerequisite: ANEQ 230 or BMS 300 or BMS 360; 3 credits 100-level chemistry.

Understanding of nutrients and nutrient function required to support animal life through all physiological states. Required field trips. (\$)

ANEQ 322 02(2-0-0). Pet Nutrition. F, S, SS. Prerequisite: ANEQ 320; ANEQ 345; FSHN 350. Offered as correspondence course or online course only.

Nutrients, nutrient requirements, feeding practices, food sources and management for companion animals (dogs, cats, birds, fish, reptiles, etc.). (NT-C/O)

ANEQ 323 02(2-0-0). Zoo Nutrition. F, S, SS. Prerequisite: ANEQ 320; ANEQ 345; FSHN 350. Offered as correspondence course or online course only.

Unique nutritional requirements of mammalian, avian, and reptile captive wild animals; management protocols needed. (NT-C/O)

ANEQ 325 02(2-0-0). Equine Exercise Physiology. S. Prerequisite: ANEQ 230 or BMS 300.

Overview of the main aspects of equine exercise physiology. (\$)

ANEQ 330 03(3-0-0). Principles of Animal Breeding. S. Prerequisite: BZ 350 or SOCR 330; 3 credits of 200- to 300- level statistics.

Genetic principles underlying animal improvement; elementary population genetics; heritability; selection response; mating systems; DNA markers.

ANEQ 334 02(2-0-0). Principles of Equine Genetics. S. Prerequisite: ANEQ 102; SOCR 330 or BZ 350 or MIP 450; STAT 301 or STAT 307 or STAT 315.

Principles of breeding and genetic improvement of horses, including qualitative and quantitative traits.

ANEQ 340 03(0-6-0). Horse Training and Sale Preparation I. F. Prerequisite: Written consent of instructor.

Practical training skills using a yearling or two year old: in-hand, restraint, ground driving, longeing, first rides, stable management. (\$)

ANEQ 341 03(0-6-0). Horse Training and Sale Preparation II. S. Prerequisite: ANEQ 340.

Skills in training for specific riding maneuvers, conditioning, fitting for sale. Additional time outside of class required on weekends.(\$)

ANEQ 344 04(3-2-0). Principles of Equine Reproduction. F. Prerequisite: ANEQ 102; ANEQ 230 or BMS 300.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Principles of reproduction and reproductive management of the mare and stallion. (\$)

ANEQ 345 03(3-0-0). Principles of Nutrition: Equine Applications. F, S. Prerequisite: ANEQ 102; ANEQ 230 or BMS 300; three credits 100-level chemistry; three credits of mathematics.

Principles of nutrition; application in feeding horses in different physiological states to promote health and well-being. (NT-O)

ANEQ 346 04(3-2-0). Equine Disease Management. F. Prerequisite: ANEQ 230 or BMS 300.

Normal and abnormal body structures and functions of major systems of the horse. Recognition of main diseases, causes, prevention and treatments. (\$)

ANEQ 348 02(1-2-0). Equine Training Techniques. S. Prerequisite: ANEQ 315.

Training techniques in multiple riding disciplines.

ANEQ 349 02(1-2-0). Packing and Outfitting. F, S. Prerequisite: ANEQ 102; written consent of instructor.

Business aspects of outfitting/packing the horse; hitches, knots, horse care; planning pack trips, setting up camp. Overnight pack trip. (\$)

ANEQ 351 02(1-2-0). Techniques in Therapeutic Riding. F, S. Prerequisite: ANEQ 102.

Equine assisted activities: therapeutic horseback riding, hippotherapy, driving/vaulting, mental health treatments, programs for youth at risk. (\$)

¹**ANEQ 352 02(0-4-0). Introduction to Horse Evaluation.** S. Prerequisite: ANEQ 102.

Criteria and techniques for evaluation of horses; development of logical decision processes for establishing comparative value.

¹**ANEQ 353 03(0-6-0). Advanced Horse Evaluation.** F. Prerequisite: ANEQ 352.

Advanced criteria/techniques for horse evaluation; logical decision process development to establish comparative value; intercollegiate competition.

¹**ANEQ 354 03(0-6-0). Introduction to Livestock Evaluation.** F. Prerequisite: ANEQ 101.

Criteria and techniques for evaluation of livestock; development of logical decision processes for establishing comparative value.

¹**ANEQ 355 01(0-9-0). Advanced Livestock Evaluation.** F, S. Prerequisite: ANEQ 354. Course may be taken twice for a maximum of 2 credits.

Advanced criteria and techniques for evaluation of livestock; establishing comparative value; participating in intercollegiate competition.

¹**ANEQ 356 03(0-6-0). Introduction to Dairy Evaluation.** S.

Criteria and techniques for evaluation of dairy cattle; development of logical decision processes for establishing comparative value.

¹**ANEQ 357 02(0-4-0). Advanced Dairy Evaluation.** F. Prerequisite: ANEQ 356.

Advanced criteria and techniques for evaluation of dairy cattle; establishing comparative value; participating in intercollegiate competition.

ANEQ 358 02(2-0-0). Equine Event and Sales Management. F. Prerequisite: ANEQ 102. Credit not allowed for both ANEQ 358 and ANEQ 300T.

Skills necessary to produce, organize, and promote equine related

events. (\$)

ANEQ 359 02(0-4-0). Equine Sales Management II. S. Prerequisite: ANEQ 358; written consent of instructor.

Emphasizes skills necessary to host and evaluate an equine sale.

ANEQ 360 03(3-0-0). Principles of Meat Science. F. Prerequisite: Three credits 100-level chemistry.

Structure, composition, and biology of muscle and associated tissues; wholesomeness, nutritive value, and palatability of beef, pork, and lamb.

¹**ANEQ 361 03(0-6-0). Introduction to Meat Product Evaluation.** F.

Criteria and techniques for evaluation of meat products; development of logical decision processes for establishing comparative value.

¹**ANEQ 362 01(0-4-0). Advanced Meat Production Evaluation.** F, S. Prerequisite: ANEQ 361. Course may be taken twice for a maximum of 2 credits.

Criteria and techniques for evaluation of meat products; establishing comparative value; participating in intercollegiate competition.

¹**ANEQ 363 01(0-2-0). Introduction to Wool and Fiber Evaluation.** F.

Criteria and techniques for evaluation of wool; development of logical decision processes for establishing comparative value.

¹**ANEQ 364 01(0-2-0). Advanced Wool and Fiber Evaluation.** S. Prerequisite: ANEQ 363.

Criteria and techniques for evaluation of wool; establishing comparative value; participating in intercollegiate competition.

¹**ANEQ 384 Var [1-5]. Supervised College Teaching.** F, S, SS. Prerequisite: Written consent of instructor. Maximum of 6 credits allowed in course. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

ANEQ 386A-C. Equine Practicum.

A) Equine training and management 02(1-2-0). Prerequisite: ANEQ 102.

B) Equine reproductive management 02(1-2-0). Prerequisite: ANEQ 344. (\$) C) Equine farrier management 01(0-2-0). Prerequisite: ANEQ 102. (\$)

ANEQ 440 03(3-0-0). Equine Industry and Issues. F, S. Prerequisite: Any two of the following: ANEQ 334, ANEQ 344, ANEQ 345, ANEQ 346.

For students planning a career in the horse industry; management of facilities, production systems, personnel, marketing, and biological systems.

ANEQ 441 02(2-0-0). Integrated Equine Science. F, SS. Prerequisite: ANEQ 334; ANEQ 345; ANEQ 346.

Describe, understand, and integrate the newest scientific principles in equine sciences with equine management.

ANEQ 442 02(0-4-0). Riding Instructor Training. F, S. Prerequisite: ANEQ 102; written consent of instructor..

Teaching techniques; theory; handling of large mounted groups, beginner through advanced levels. (\$)

⁺**ANEQ 443 02(1-2-0). Applied Equine Nutrition.** S. Prerequisite: ANEQ 345.

Applying principles of nutrition to feeding horses in different physiological states in an effort to promote their health and well-being. Required field trips.

⁺**ANEQ 444 02(2-0-0). Equine Business Management.** S, SS. Prerequisite: ANEQ 440.

"Real life" equine industry experience and the ins and outs of managing an equine facility/business. Field trips required.

ANEQ 445 02(1-3-0). Foaling Management. S. Prerequisite: ANEQ 344 or PVM sophomore status.

¹For Animal Science and Equine Science majors, a maximum of five credits is allowed for ANEQ 350A-E, ANEQ 352, ANEQ 353, ANEQ 354, ANEQ 355, ANEQ 356, ANEQ 357, ANEQ 361, ANEQ 362, ANEQ 363, and ANEQ 364. A maximum of 12 credits is allowed for any combination of the following: ANEQ 350A-E, ANEQ 352, ANEQ 353, ANEQ 354, ANEQ 355, ANEQ 356, ANEQ 357, ANEQ 361, ANEQ 362, ANEQ 363, ANEQ 364, ANEQ 384, ANEQ 487, ANEQ 495, and ANEQ 496.

[°]Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Management of the foaling mare and newborn foal; monitoring techniques, preventative and emergency care procedures. (\$)

***ANEQ 448*/SOCR 448 03(2-2-0). Livestock Manure Management and Environment.** F. Prerequisite: Three credits 100-level chemistry. Credit allowed for only one of the following courses: ANEQ 448, ANEQ 548, SOCR 448, SOCR 548.

Manure management; maximizing benefits to soils and crops; minimizing air and water quality hazards; complying with regulations.

ANEQ 460 02(2-0-0). Meat Safety. F. Prerequisite: Three credits 100-level chemistry.

Meat safety; food born pathogens; hazard analysis critical control points (HACCP) and total quality management (TQM) practices.

ANEQ 470 04(3-2-0). Meat Processing Systems. F. Prerequisite: ANEQ 360; senior standing.

Advanced understanding of the manufacturing, packaging, distribution, storage, and cooking of meat products. (\$)

ANEQ 472 03(2-2-0). Sheep Systems. S. Prerequisite: Senior status.

Sheep production under farm and ranch conditions; breeds, breeding, nutrition, reproduction, and management systems.

ANEQ 473 03(2-3-0). Dairy Systems. F. Prerequisite: ANEQ 230 or BMS 300; ANEQ 310; ANEQ 320; Senior status.

Integration of nutrition, genetics, physiology, and economics for management decisions of dairy farm operations and production and marketing of milk.

ANEQ 474 03(2-2-0). Swine Systems. S. Prerequisite: Senior status.

Production of purebred and commercial swine; breeds, breeding, feeding, marketing, and management. (\$)

ANEQ 475 02(2-0-0). Travel Abroad-Animal Agriculture. F, S, SS. Prerequisite: Written consent of instructor.

Onsite evaluation of international animal agriculture systems with emphasis on production, marketing, and management.

ANEQ 476 03(3-0-0). Feedlot Systems. S. Prerequisite: Senior status.

Feedlot facilities; nutrition; procurement, merchandising, handling, processing cattle; health care; custom feeding; managerial duties.

ANEQ 478 03(2-2-0). Beef Systems. F. Prerequisite: Senior status.

Beef production as related to consumer through seedstock segments. Major emphasis on cow-calf management. (\$)

¹**ANEQ 487 Var. Internship.** Prerequisite: Written consent of instructor. Maximum of 6 credits allowed in course.

¹**ANEQ 495 Var. Independent Study.** Prerequisite: Written consent of instructor. Maximum of 6 credits allowed in course.

¹**ANEQ 496 Var [1-5]. Group Study.** Prerequisite: Written consent of instructor. Maximum of 6 credits allowed in course.

ANEQ 500 Var [1-6]. Recent Developments. SS. Prerequisite: Graduate status.

Recent developments in animal science, avian science, and food technology. (\$)

ANEQ 510 04(3-2-0). Bovine Reproduction Management. F. Prerequisite: ANEQ 310.

Role of reproduction in economic efficiency of cattle production

systems. Causes of delayed breeding and nonpregnancy, abortion and perinatal mortality. (\$)

***ANEQ 520 03(3-0-0). Applied Comparative Nutrition.** F. Prerequisite: ANEQ 320 or FSHN 550 and FSHN 551.

Comparative digestion strategies and mechanisms of nutrient utilization for terrestrial vertebrates: livestock, pets, wildlife, and zoo animal models.

ANEQ 522 03(3-0-0). Animal Metabolism. F. Prerequisite: CHEM 245 and CHEM 246 or CHEM 346.

Nutrient digestion, absorption, transport and metabolism in monogastric and ruminant domestic species as affected by physiological changes.

***ANEQ 548*/SOCR 548 04(2-2-1). Issues in Manure Management.** F. Prerequisite: Three credits 100-level chemistry. Credit allowed for only one of the following courses: ANEQ 448, ANEQ 548, SOCR 448, SOCR 548.

Manure management practices maximizing benefits to soils and crops while minimizing hazards to air and water quality and complying with regulations.

ANEQ 550A-B 02(1-2-0). Basic Research Surgery.

Basic principles and techniques of animal surgery to meet ACUC requirements for experimental procedures. **A) Farm animal.** F. Prerequisite: ANEQ 230 or BMS 300 or BMS305; junior, senior, or graduate status. (\$) **B) Rodent.** S. Prerequisite: ANEQ 230 or BMS 230 or BMS 300 or BMS 305 or VS 333; junior, senior, or graduate status. (\$)

ANEQ 551 02(1-2-0). Field Necropsy. F, S. Prerequisite: ANEQ 230 or BMS 300; ANEQ 346 or MIP 315A-B or VS 300; junior or senior status.

Field necropsy techniques for collection of animal tissues for submission to a diagnostic laboratory. (\$)

ANEQ 565 03(3-0-0). Interpreting Animal Science Research. S. Prerequisite: ANEQ 101 or ANEQ 102; 3 credits statistics.

Designing, conducting, analyzing, and reporting of animal science research.

ANEQ 567 02(2-0-0). HACCP Meat Safety. S. Prerequisite: ANEQ 460.

Control of health problems in meat products through hazard analysis critical control point (HACCP) and total quality management (TQM) practices.

^o**ANEQ 575 03(2-2-0). Computational Biology in Animal Breeding.** F. Prerequisite: Graduate standing.

Numerical analysis and use of computers to solve problems in animal improvement.

ANEQ 587 Var [1-9]. Internship. Prerequisite: Written consent of instructor.

^o**ANEQ 610 02(2-0-0). Hormonal Regulation of Growth.** S. Prerequisite: BMS 501.

Cellular and molecular regulation of animal growth by hormones and growth factors.

***ANEQ 621 03(3-0-0). Vitamin and Mineral Metabolism.** S. Prerequisite: Graduate status.

Vitamin and mineral metabolism in domestic animals.

***ANEQ 631 03(2-0-1). Selection Index Theory.** S. Prerequisite: Graduate status.

Quantitative methods for genetic evaluation: selection index theory and introduction to best linear unbiased prediction.

ANEQ 660 01(1-0-0). Topics in Meat Safety. F, S. Prerequisite: ANEQ 567.

Topics of current concern in meat safety.

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^oAlternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

°ANEQ 676 03(1-4-0). **Molecular Approaches to Food Safety.** F. Prerequisite: MIP 300 or MIP 334.

Molecular subtyping, tracking, and control; molecular ecology and evolution of food-borne pathogens; molecular pathogenesis of food-borne diseases. (\$)

ANEQ 699 Var. Thesis. Prerequisite: Written consent of instructor.

°ANEQ 720 03(3-0-0). **Nutritional Energetics.** F. Prerequisite: Graduate status.

Dietary energy use to meet animal requirements for maintenance, growth, pregnancy, and lactation; environmental, nutritional, and physiological effects.

°ANEQ 725 03(3-0-0). **Rumen Metabolism.** S. Prerequisite: Graduate status.

Microbial degradation, transformation, and synthesis of ingested nutrients, feed particle passage kinetics in the rumen.

°ANEQ 730 03(3-0-0). **Advances in Cattle Breeding.** S. Prerequisite: Graduate status.

Literature and research methods in beef cattle breeding.

°ANEQ 731 03(3-0-0). **Advanced Genetic Prediction.** S. Prerequisite: ANEQ 575; graduate standing.

Models and methods for prediction of genetic merit in livestock population.

ANEQ 784 Var. Supervised College Teaching. F, S, SS. Prerequisite: Graduate status; written consent of instructor.

ANEQ 792A-F 01(0-0-1). Seminar. Prerequisite: Graduate status.

A) General. B) Breeding/genetics. C) Physiology. D) Meat sciences. E) Nutrition. F) Livestock Management Systems.

ANEQ 795 Var. Independent Study. Prerequisite: Graduate status; written consent of instructor.

ANEQ 799 Var. Dissertation. Prerequisite: Graduate status; written consent of instructor.

ANTHROPOLOGY COURSES

Department of Anthropology *College of Liberal Arts*

ANTH 100 03(3-0-0). Introductory Cultural Anthropology. (GT-SS3, AUCC 3C). F, S.

Human societies and their cultural settings; variation in beliefs, social customs, and technologies; human differences in anthropological terms. (NT-O)

ANTH 120 03(3-0-0). Human Origins and Variation. (GT-SC2, AUCC 3A). F, S.

Mechanisms of evolution; genetics. Living primate biology, behavior, and history. Human evolutionary history. Human variation and adaptation. (NT-O)

ANTH 121 01(0-2-0). Human Origins and Variation Laboratory. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: ANTH 120 or concurrent registration.

Labs demonstrating genetic and evolutionary processes, comparative skeletal anatomy, human evolution through fossil casts, and modern human variation. (NT-O) (\$)

ANTH 140 03(3-0-0). Introduction to Prehistory. (GT-H11, AUCC 3D). F, S, SS.

Origins of human society from the Stone Age to urban civilization using architecture, art, tools, and other material remains. (NT-O)

ANTH 200 03(3-0-0). Cultures and the Global System. (GT-SS3, AUCC 3E). F, S.

Analyze diversity, cultural responses, and adaptations of smaller-scale societies to emerging global trends. (NT-O)

ANTH 260 02(1-2-0). Introduction to Field Archaeology. F, S, SS. Prerequisite: ANTH 140.

Field methods including map preparation and interpretation, site location and recording, site excavation, and stratigraphy.

ANTH 295 Var [1-3]. Independent Study.

***ANTH 310 03(3-0-0). Peoples and Cultures of Africa.** S. Prerequisite: ANTH 100.

Sub-Saharan life styles including marriage and family, traditional government, religion and magic, ecology and economy, art, music, and literature.

°ANTH 312 03(3-0-0). Modern Indian Culture and Society. S. Prerequisite: ANTH 100 or ANTH 200.

Anthropological contributions to the understanding of contemporary India.

***ANTH 314 03(3-0-0). Southeast Asian Cultures and Societies.** S. Prerequisite: ANTH 100 or ANTH 200.

Colonial and post-colonial cultures, globalization processes, and changing ethnic and gender identities in Southeast Asian societies.

***ANTH 318/*ETST 318 03(3-0-0). Peoples and Cultures of the Southwest.** F, S. Prerequisite: ANTH 100. Credit not allowed for both ANTH 318 and ETST 318.

Analyze development of cultures of the American Southwest; colonialism, migration, political incorporation, and socioeconomic processes. (NT-O)

ANTH 319/ETST 319 03(3-0-0). Latin American Peasantries. F, S. Credit not allowed for both ANTH 319 and ETST 319. Prerequisite: (ANTH 100; ANTH 200) or ETST 100.

Sociocultural, economic, and political responses of Latin American peasantries to poverty and global processes.

°ANTH 322 03(3-0-0). Religion, Culture, and Mind. F. Prerequisite: ANTH 100 or ANTH 200.

Major anthropological theories and descriptions of religious beliefs and practices. Intersection of religion, culture, and human psychology.

ANTH 324 03(3-0-0). Folk Religion. S.

European folk beliefs and their carry-over into America; ghosts, vampires, trolls, elves, saints, rituals, witchcraft, sorcery, folk cures.

°ANTH 329 03(3-0-0). Cultural Change. F. Prerequisite: ANTH 100 or ANTH 200.

Cultural change and effects of directed global forces; colonial origins of underdevelopment on small-scale societies.

***ANTH 330 03(3-0-0). Human Ecology.** F. Prerequisite: ANTH 100 or ANTH 200; ANTH 120 or BZ 101 or LAND 220/LIFE 220.

Roles of technology, economics, social organization, and ideology in human adaptations to and survival in natural and cultural environments.

ANTH 334 04(3-2-0) Narrative Traditions and Social Experience. S. Prerequisite: ANTH 100 or ANTH 200 or E 140 or SOC 100.

Relationship between narrative traditions and social contexts of their creation.

ANTH 335 03(3-0-0). Language and Culture. F, S.

Human language and primate communication, nonverbal channels, sociolinguistics, and language change.

°ANTH 338 03(3-0-0). Gender and Anthropology. S. Prerequisite: ANTH 100 or ANTH 200.

Theory, themes, and debates in anthropological gender studies, ethnographic survey of women and men cross-culturally. (NT-O)

ANTH 340 03(3-0-0). Medical Anthropology. F. Prerequisite: ANTH 100 or ANTH 200.

Cultural adaptation to disease; non-Western theories of health and disease: categories, causes, cures; learned roles of patients and healers.

°ANTH 350 03(3-0-0). Archaeology of North America. S. Prerequisite: ANTH 140.

Native American life, tools, architecture, religion, food-getting from cultures of 12,000 years ago or earlier until European contact.

***ANTH 351 03(3-0-0). Archaeology of Europe and Africa.** S. Prerequisite: ANTH 140.

Human culture, tools, art, religion, social life, subsistence, and paleoecology from 4 million B.C. to 1200 B.C. in the Old World.

ANTH 352 03(3-0-0). Geoarchaeology. S. Prerequisite: ANTH 140.

Analytical techniques, concepts, and field methodologies from the earth sciences to better understand the archaeological record.

ANTH 359 03(2-0-1). Colorado Prehistory. F.

Human behavioral responses to environmental diversity, cultural adaptation, Pleistocene and Recent climates, anthropogenic environmental change.

ANTH 360 03(2-2-0). Archaeological Investigation. S. Prerequisite: ANTH 140.

Investigation of the archaeological record, how the record was formed, and how archaeological data are analyzed and interpreted.

ANTH 370 03(3-0-0). Primate Behavior and Ecology. S. Prerequisite: ANTH 120 or BZ 101.

Behavioral patterns, ecological relationships, and communication of nonhuman primates.

ANTH 372 03(2-2-0). Human Osteology. F. Prerequisite: ANTH 120 or BZ 101 or BZ 110 or LIFE 102.

Human bones and teeth in a review of functional human evolution.

ANTH 373 03(3-0-0). Human Evolution. S. Prerequisite: ANTH 120 or BZ 110.

Current topics and debates in human evolution concentrating on biocultural changes in the human lineage.

***ANTH 374 03(2-0-1). Human Biological Variation.** S. Prerequisite: ANTH 120 or BZ 101 or BZ 110 or LIFE 102.

Biological diversity of human populations; history of development of race concept.

***ANTH 375 03(3-0-0). Evolution of Primate Behavior.** F. Prerequisite: ANTH 120 or BZ 110 or LIFE 102.

Primate behavior from an evolutionary perspective, drawing on a variety of studies of humans, primates, and mammals.

ANTH 376 03(2-0-1). Evolution of Human Adaptation. F. Prerequisite: ANTH 120 or BZ 110 or LIFE 102.

Unique characteristics of humans: bipedalism, encephalization, dentition, birth process, an attenuated period of development.

ANTH 400 03(3-0-0). History of Anthropological Theory. F. Prerequisite: ANTH 100 or ANTH 200; ANTH 120; ANTH 121; ANTH 140; senior status.

Anthropological theory from its beginnings in 19th century through recent developments in the latter half of the 20th century.

ANTH 411 03(0-0-3). Indians of South America. F, S, SS. Prerequisite: ANTH 100 or ANTH 200 or ANTH 413 or ANTH 414/ETST 414.

Ethnographic and cultural characteristics of South American indigenous groups and the current critical issues they face. (NT-O)

ANTH 412 03(3-0-0). Indians of North America. F, S, SS. Prerequisite: ANTH 100 or ANTH 200 or ANTH 413 or ANTH 414/ETST 414.

Native American peoples, their cultural variation across the continent, and cultural encounters with colonial expansion. (NT-O)

ANTH 413 03(3-0-0). Indigenous Peoples Today. F. Prerequisite: ANTH 200 or ANTH 412 or ANTH 414/ETST 414.

Contemporary cultural and social issues of indigenous peoples around the globe, including North and South American Indians and Australian Aborigines.

°ANTH 414/°ETST 414 03(3-0-0). Development in Indian Country. F. Credit not allowed for both ANTH 414 and ETST 414.

Critical examination of history, public policy, and tribal strategies for economic development and natural resource management in Indian Country.

ANTH 415 03(3-0-0). Indigenous Ecologies and the Modern World. F, S, SS.

Impact of the modern world on indigenous peoples' relationship to their environments and natural resources. (NT-O)

***ANTH 422/*SOC 422 03(3-0-0). Comparative Legal Systems.** S. Prerequisite: ANTH 100 or SOC 100. Credit not allowed for both ANTH 422 and SOC 422.

Traditional approaches to law, competing concepts of law in the global system, and experiences of minorities in state legal systems.

°ANTH 423 03(3-0-0). Ethnopsychiatry and Spiritual Healing. S. Prerequisite: ANTH 100 or ANTH 200.

Psychiatric systems and mental health within their cultural contexts. Indigenous systems of healing. Religious influences on health and healing.

ANTH 438 03(0-0-3). Approaches to Community-Based Development. F, S, SS. Prerequisite: ANTH 100 or ANTH 200.

Explores the structure and practice of community development globally, engaging in critical analysis of different approaches and their impact. (NT-O)

ANTH 439 03(0-0-3). Community Mobilization. F, S, SS. Prerequisite:

ANTH 100 or ANTH 200.

Structural, social, and psychological barriers that inhibit cooperation and collective action. (NT-O)

°ANTH 440 03(3-0-0). Theory in Cultural Anthropology. F, S. Prerequisite: ANTH 100 or ANTH 200.

Theoretical paradigms used to explain culture including evolutionary, functional, ecological, political economy, postmodernism, and hegemony.

°ANTH 441 03(3-0-0). Method in Cultural Anthropology. F. Prerequisite: ANTH 100 or ANTH 200.

Methodological orientations and research techniques. Ethnographic and cross-cultural approaches including quantitative and formal models.

ANTH 442 Var[3-8]. Ethnographic Field School. SS. Prerequisite: ANTH 100 or ANTH 200 or 9 credits in ANTH coursework.

Directed fieldwork with American Indian communities; methodology, protocols, and social relations of ethnographic field research.

ANTH 443 03(0-6-0). Ethnographic Field Methods. S. Prerequisite: ANTH 100 or ANTH 200.

Directed experiential preparation for applied ethnographic field methods and research questions.

ANTH 444 03(3-0-0). Cultures of Virtual Worlds: Research Methods. S. Prerequisite: ANTH 100 or ANTH 200; junior or senior standing.

Methodologies and directed research related to virtual worlds and internet and gaming communities.

ANTH 445 03(3-0-0). Psychological Anthropology. S. Prerequisite: ANTH 100 or ANTH 200; PSY 100.

Cross-cultural exploration of the human mind by studying the ideas, desires, and practices of peoples in various settings.

ANTH 446 03(3-0-0). New Orleans and the Caribbean. F. Prerequisite: ANTH 100 or ANTH 200.

New Orleans and the Caribbean connections through colonization, slavery, modernity, legacies of race, gender, and class, the expressive arts.

ANTH 447 03(0-0-3). Gender Equity in Development. F, S, SS. Prerequisite: ANTH 100 or ANTH 200.

Various forms of women's power, and potentials for disempowerment within the context of international development. (NT-O)

ANTH 448 03(0-0-3). Development and Empowerment. F, S, SS. Prerequisite: ANTH 100 or ANTH 200.

Development as an economic process of wealth accumulation, as well as a socio-political process of empowerment. (NT-O)

ANTH 449 03(3-0-0). Participatory Monitoring and Evaluation. F, S, SS. Prerequisite: ANTH 100 or ANTH 200.

Participatory methods in the monitoring and evaluation of development projects, where multiple stakeholders are involved in the process. (NT-O)

ANTH 450 03(0-0-3). Hunter-Gatherer Ecology. S. Prerequisite: ANTH 100; ANTH 120; ANTH 121; ANTH 140.

Development of anthropological method and theory; study of contemporary and prehistoric foraging peoples.

°ANTH 451 03(3-0-0). Andean Archaeology and Ethnohistory. S. Prerequisite: ANTH 100 or ANTH 140.

Prehistory and colonial experiences of native Andean peoples.

ANTH 452 03(3-0-0). Archaeology of Mesoamerica. F. Prerequisite: ANTH 140.

Ancient cultures and civilizations in Middle America.

ANTH 453 03(3-0-0). Impacts on Ancient Environments. S. Prerequisite: ANTH 140.

Major issues and case studies in the archaeology of ancient human societies and their environmental impacts.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

***ANTH 455 03(3-0-0). Great Plains Archaeology.** F. Prerequisite: ANTH 140.

Prehistoric people on Great Plains from earliest hunter-gatherers to historic contact; cultural responses to changing conditions.

***+ANTH 456 03(3-0-0). Archaeology and the Public.** S. Prerequisite: ANTH 140; 3 additional credits of archaeology.

Applied archaeology in public settings, including publication, museum display, education, the illicit artifact trade, and other ethical issues. Required field trips.

°ANTH 457 03(2-2-0). Lithic Technology. F. Prerequisite: ANTH 140.

Method and theory behind production, use, and discard of stone tools by prehistoric peoples. Hands-on application in laboratory setting.

+ANTH 460 Var [3-8]. Field Class in Archaeology. SS. Prerequisite: Written consent of instructor.

Directed fieldwork in local archaeology, site survey, and excavation; recovery, preservation, cataloging, analysis of artifactual and skeletal materials. (\$)

ANTH 461 03(0-0-3). Anthropological Report Preparation. F. Prerequisite ANTH 460; written consent of instructor.

Producing written and oral presentations for anthropological research, employment, or graduate work. Grant writing and manuscript preparation.

°ANTH 465 03(2-2-0). Zooarchaeology. S. Prerequisite: ANTH 120; ANTH 140.

Analysis of animal bones from archaeological sites to develop interpretations of past human behavior.

ANTH 469 03(0-0-3). Archeology Seminar in Mesopotamian Prehistory. F, S, SS. Prerequisite: 6 credits of anthropology.

Origins of human society from the stone age to urban civilizations using architecture, art, tools, and other material remains. (NT-O)

ANTH 470 04(2-4-0). Paleontology Field School. SS. Prerequisite: ANTH 120 or BZ 110 or LIFE 104.

Field methods in fossil excavation, preservation, and curation; the evolution of the primate order. (\$)

ANTH 472 03(3-0-0). Human Biology. S. Prerequisite: ANTH 120 or BZ 110 or LIFE 102.

Human biological responses to environmental conditions and constraints including diet, nutrition, disease, climate, culture change, and urbanization.

***ANTH 473 03(2-0-1). The Neandertals.** S. Prerequisite: ANTH 120 or BZ 110; ANTH 372 or ANTH 373 or ANTH 374 or ANTH 375 or ANTH 376.

Socio-historical foundations of questions regarding Neandertal paleobiology and culture and the Neandertal role in the evolution of Homo sapiens.

ANTH 475 03(3-0-0). Methods of Analysis in Paleoanthropology. F. Prerequisite: ANTH 373.

Practical discussion of techniques used to reconstruct dietary and locomotor behavior and evolutionary relationships in human fossil remains.

°ANTH 478/°HIST 478 03(3-0-0). Heritage Resource Management. S. Prerequisite: Junior standing. Credit not allowed for both ANTH 478 and HIST 478.

Cultural resource laws and policy; practices commonly employed in management and preservation of these diverse resources.

ANTH 479/IE 479 03(3-0-0). International Development Theory and Practice. F. Prerequisite: Junior or senior standing. Credit not allowed for both ANTH 479 and IE 479.

Contemporary issues in international community and economic development, with practical and theoretical analysis from interdisciplinary

perspectives.

ANTH 484 Var [1-5]. Supervised College Teaching. F, S. Prerequisite: Written consent of instructor. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

ANTH 486 Var [1-6]. Practicum.

Application of anthropological methods under actual project conditions.

ANTH 487 Var[1-9]. Internship. F, S, SS. Prerequisite: 9 credits of anthropology.

Academic-based work experience with selected organizations or agencies. Supervised application of anthropological principles.

ANTH 492A-B 03(0-0-3). Seminar. Prerequisite: Six credits of anthropology.

A) Archaeology. B) Biological anthropology.

ANTH 493 01(0-0-1). Capstone Seminar. F, S. Prerequisite: Concurrent registration in a 4A course (see department list).

Linkages between anthropological subfields and how professional anthropologists approach issues.

ANTH 495 Var [1-3]. Independent Study.

ANTH 496 Var [1-3]. Group Study.

ANTH 500 03(3-0-0). Development of Anthropological Theory. F. Prerequisite: Undergraduates must have written consent of instructor.

Contemporary development of anthropological thought.

ANTH 513/ETST 513 03(3-0-0). Capitalism and Global Ethnic Conflicts. S. Prerequisite: ANTH 200 or ETST 100. Credit not allowed for both ANTH 513 and ETST 513.

Causes of global ethnic conflicts with emphasis on resource competition, capitalist development schemes, and role of the state.

ANTH 515 03(3-0-0). Culture and Environment. F. Prerequisite: Graduate standing.

Theoretical accounts of societies' variable relationships to their environments; indigenous peoples' interactions with nature in context of modernity.

°ANTH 520 03(3-0-0). Women, Health, and Culture. S. Prerequisite: Graduate standing.

Women's experiences and interpretations of their health; cultural, political, and economic forces affecting women's health.

***ANTH 521 03(3-0-0). Gender, Sexuality, and Culture.** S. Prerequisite: Graduate standing.

Gender and sexuality cross-culturally; theory, cultural constructions, colonialism, class, race, ethnicity, health, violence.

ANTH 528 03(0-0-3). Economic Anthropology. S. Prerequisite: Nine credits in anthropology.

Theoretical approaches to the cultural context of economic activity.

ANTH 529 03(0-0-3). Anthropology and Sustainable Development. F. Prerequisite: Nine credits in anthropology.

Global development goals, poverty and hunger, environmental sustainability, education, and equity.

°ANTH 530 03(3-0-0). Human-Environment Interactions. F. Prerequisite: Nine credits in anthropology.

Paradigms and concepts in ecological anthropology with an emphasis on adaptation and resilience.

ANTH 532 03(0-0-3). The Culture of Disaster. S. Prerequisite: Graduate student standing.

Study of how the human impacts of disaster and the process of recovery are shaped by cultural as well as structural realities.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

***ANTH 535 03(0-0-3). Globalization and Culture Change.** F. Prerequisite: Nine credits in anthropology.

Evolving paradigms and patterns of globalization and international development; cultural responses--resistance, dependency, fragmented identities.

°**ANTH 539 03(3-0-0). Anthropology of Modernity.** F.

Critical examination of the institutions, values, and processes which constitute the modern world. Impact of modern forces on "traditional" peoples.

***ANTH 540 03(0-0-3). Medical Anthropology.** S. Prerequisite: Graduate standing.

Cultural and biocultural approaches to health, illness, and the body; theory and application in medical anthropology.

***ANTH 541 03(1-0-2). Seminar in Archaeological Method.** S. Prerequisite: Nine credits in anthropology.

Methods of archaeological recovery and interpretation, and process of archaeological analysis and reporting.

°**ANTH 542 03(1-0-2). Seminar in Archaeological Theory.** S. Prerequisite: Nine credits in anthropology.

Theories of recovery, reconstruction, and interpretation of the archaeological record.

ANTH 544 03(1-0-2). Anthropological Method and Theory. F, S. Prerequisite: Nine credits of anthropology.

Current trends of research in archaeology; cultural and physical anthropology.

°**ANTH 545 03(3-0-0). Culture and Mental Health: Theory and Method.** S. Prerequisite: Nine credits in anthropology.

Anthropological contributions to the cross-cultural study of mental health; indigenous peoples' health and healing; integration of theory and method.

***ANTH 546 03(3-0-0). Culture, Mind, and Cognitive Science.** S. Prerequisite: Graduate standing.

Anthropological contributions to cognitive science. Culture, mind, and social context. Theory building and practical applications.

***ANTH 547 04(3-2-0). Mind, Medicine, and Culture.** S. Prerequisite: Graduate standing.

Cultural-psychological influences on health and healing; mind-body medicine; complementary and alternative medicine; indigenous and spiritual healing.

ANTH 550A-C 03(0-0-3). Regional Prehistory.

A) Great Plains prehistory. F. Prerequisite: ANTH 350. B) Great Basin prehistory. °S. Prerequisite: ANTH 350. C) Southwestern. *S. Prerequisite: Nine credits in anthropology.

°**ANTH 551 03(3-0-0). Historical Archaeology.** S. Prerequisite: Graduate standing.

Theory, methods, and issues in historical archaeology.

***ANTH 553 03(0-0-3). Archaeology of Complex Societies.** S. Prerequisite: Graduate standing.

Issues in development and organization of complex societies with emphasis on the Americas.

°**ANTH 554/NR 554 03(2-2-0). Ecological and Social Agent-based Modeling.** S. Prerequisite: Junior or senior standing. Credit not allowed for both ANTH 554 and NR 554.

Exploring the use and making of agent-based models featuring interacting individuals in ecological and social simulation, with examples and projects.

***ANTH 555 03(0-0-3). Paleoindian Archaeology.** F. Prerequisite: ANTH 140.

Archaeology of the Americas during late Pleistocene/early Holocene; background and development of contemporary models.

ANTH 570 03(0-0-3). Contemporary Issues-Biological Anthropology. F. Prerequisite: Six credits in biological anthropology.

Theory and applications in biological anthropology focusing on syntheses and interpretations of human biology, variation, adaptability, and evolution.

***ANTH 571 03(3-0-0). Anthropology and Global Health.** F. Prerequisite: Graduate standing.

Global health concerns and problems including poverty, urbanization, malnutrition, diet, war and refugees, climate, and environment.

°**ANTH 572 03(0-0-3). Human Origins.** S. Prerequisite: Graduate standing.

Major trends in human evolution through use of detailed case studies and regionally focused primary research.

***ANTH 573 03(3-0-0). Paleoclimate and Human Evolution.** S. Prerequisite: Graduate Standing.

Methods used to reconstruct past environments and understand the effects of past climate on the major trends of human evolution.

ANTH 643 03(0-6-0). Advanced Ethnographic Field Methods. S.

Development of applied field methods and research questions for graduate-level ethnographic field research.

+**ANTH 660 Var [2-10]. Field Archaeology.** F, SS. Prerequisite: ANTH 460 or two seasons field experience.

Field application of nondestructive survey methods, advanced cartographic and excavation methods, project supervision skills. (\$)

°**ANTH 679/IE 679 03(3-0-0). Applications of International Development.** F, S. Prerequisite: Graduate standing. Credit not allowed for both ANTH 679 and IE 679.

In-depth interdisciplinary analysis of theoretical and practical issues in implementing economic and community-based international development programs.

ANTH 684 Var. Supervised College Teaching.

ANTH 686 Var. Practicum-Field Archaeology.

Direction of anthropological fieldwork under professional supervision.

ANTH 692 03(0-0-3). Seminar.

Current trends of research in archaeology; cultural and physical anthropology.

ANTH 695 Var. Independent Study.

ANTH 696 Var [1-3]. Group Study-Anthropological Theory.

Intensive analysis of selected topics and theories in anthropology, both historical and contemporary.

ANTH 699 Var. Thesis.

AGRICULTURAL AND RESOURCE ECONOMICS COURSES

Department of Agricultural and Resource Economics *College of Agricultural Sciences*

AREC 202 03(3-0-0). Agricultural and Resource Economics. (GT-SS1, AUCC 3C). F, S. Prerequisite: MATH 117 or concurrent registration or MATH 118 or MATH 124 or MATH 125 or MATH 126 or MATH 141 or MATH 155 or MATH 160. Credit not allowed for both AREC 202 and ECON 202.

Introduction to decision-making by consumers, firms, and government, and resulting allocation of resources through markets.

AREC 205 03(2-2-0). Farm and Ranch Management. F. Prerequisite: AREC 202 or ECON 202.

Application of economic concepts and management functions to production, financial, and marketing decisions involved in farm or ranch business.

AREC 240/ECON 240 03(3-0-0). Issues in Environmental Economics. (GT-SS1, AUCC 3C). F, S. Credit not allowed for both AREC 240 and ECON 240.

Discussion and economic analysis of current environmental issues with special emphasis on the impact of economic growth. (NT-C)

AREC 305 03(2-2-0). Agricultural and Resource Enterprise Analysis. F, S. Prerequisite: AGRI 140 or BUS 150 or CIS 120; AREC 202 or ECON 202.

Use of records in agricultural and resource enterprise management; analytical methods, budgets, and planning techniques for improved decision making. (NT-O)

AREC 310 03(3-0-0). Agricultural Marketing. F, S, SS. Prerequisite: AREC 202 or ECON 202.

Market structure, behavior, and performance including futures market and market games theory. (NT-O)

AREC 311 03(3-0-0). Agricultural and Resource Product Marketing. F. Prerequisite: AREC 202 or ECON 202.

Theory and practice of marketing differentiated agricultural products and natural resource amenities with focus on strategies and market trends.

AREC 328 03(3-0-0). Small Agribusiness Management. F. Prerequisite: AREC 202 or ECON 202.

Apply business principles to small agribusinesses and cooperatives.

AREC 335/ECON 335 03(3-0-0). Introduction to Econometrics. F, S. Prerequisite: ECON 204; MATH 141 or MATH 155 or MATH 160; STAT 201 or STAT 204 or STAT 301 or STAT 307. Credit not allowed for both AREC 335 and ECON 335.

Estimating statistical regression models of economic relationships; treatment of special problems that may arise in analysis of economic data.

AREC 340/ECON 340 03(3-0-0). Introduction: Economics of Natural Resources. S. Prerequisite: AREC 202 or ECON 202. Credit not allowed for both AREC 340 and ECON 340.

Concepts, theories, institutions; analytical methods for economic evaluation of alternative resource use patterns and land use plans.

AREC 342 03(3-0-0). Water Law, Policy, and Institutions. F.

Legal water issues within the context of historical, social and economic development with emphasis on the southwestern United States. (NT-O)

AREC 346/ECON 346 03(3-0-0). Economics of Outdoor Recreation. F. Prerequisite: AREC 202 or ECON 202. Credit not allowed for both AREC 346 and ECON 346.

Benefit-cost framework in public planning for outdoor recreation, pricing problems, projecting demand, and regional economic development.

AREC 375 03(3-0-0). Agricultural Law. F, S. Prerequisite: Junior standing.

Laws, regulations, case decisions affecting ranching and farming in the Rocky Mountain area.

AREC 405 03(2-2-0). Agricultural Production Management. S. Prerequisite: AREC 305.

Economic principles of agricultural production decisions with linear programming analysis of production choices and farm planning.

+AREC 408 03(3-0-0). Agricultural Finance. S. Prerequisite: AREC 305.

Monetary affairs of agribusiness and agricultural production emphasizing credit institutions and procurement, investment, and management. (NT-O)

AREC 412 03(3-0-0). Agricultural Commodities Marketing. F. Prerequisite: AREC 310.

Agricultural marketing and agribusiness principles applied to current marketing problems relating to livestock and field and horticultural crops. (\$, NT-O)

AREC 415 03(3-0-0). International Agricultural Trade. F. Prerequisite: AREC 310; ECON 204.

Agricultural trade patterns and institutions; trade theory with applications to agriculture. Current issues in agricultural trade.

AREC 428 03(3-0-0). Agricultural Business Management. F, S. Prerequisite: AREC 305; AREC 310; senior standing.

Economic analysis, organization, and management practices of agriculture and food industries studied through simulation, case study, computer labs. (NT-O)

AREC 442 03(3-0-0). Water Resource Economics. S. Prerequisite: AREC 342; ECON 306 or concurrent registration. Credit not allowed for both AREC 442 and AREC 542.

An in-depth exploration of the role of economics in water resource planning.

AREC 460 03(3-0-0). Economics of World Agriculture. S. Prerequisite: AREC 202 or ECON 202.

Relationships between nations affecting agricultural growth and productivity, food security, and human welfare.

AREC 478 03(3-0-0). Agricultural Policy. F, S. Prerequisite: AREC 202 or ECON 202 or AREC 240/ECON 240.

Formulation and administration of public policies affecting agricultural industries and rural areas in the United States. (NT-O)

AREC 484 Var [1-5]. Supervised College Teaching. F, S. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

AREC 487 Var. Internship.

AREC 495 Var. Independent Study.

AREC 496 Var. Group Study.

AREC 505 03(3-0-0). Agricultural Production Economics. F. Prerequisite: AREC 405 or ECON 306; MATH 141.

Empirical applications of production economic theory for use of inputs and allocation of resources in agricultural, natural resource sectors.

AREC 508 03(3-0-0). Financial Management in Agriculture. S. Prerequisite: AREC 408.

Systematic approach to understanding and applying financial

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management in farm businesses.

AREC 510 03(3-0-0). Agricultural Product Marketing. F. Prerequisite: AREC 310; AREC 335/ECON 335.

Marketing techniques, industrial organization/competition for agricultural products in U.S. domestic, international trade, and developing country markets.

AREC 530 03(3-0-0). Agricultural Price Analysis. S.

Agricultural commodity prices related to neoclassical economics; current literature emphasizing management problems.

AREC 535/ECON 535 03(3-0-0). Applied Econometrics. F. Prerequisite: AREC 335/ECON 335; ECON 304 or ECON 306. Credit not allowed for both AREC 535 and ECON 535.

Econometric techniques applied to testing and quantification of theoretical economic relationships drawn from both microeconomics, macroeconomics.

AREC 540/ECON 540 03(3-0-0). Economics of Natural Resources. F. Prerequisite: AREC 340/ECON 340; MATH 141. Credit not allowed for both AREC 540 and ECON 540.

Public natural resources policy, effect on resource use in private sector, optimal pricing of minerals, timber and fisheries, public project analysis.

AREC 541/ECON 541 03(3-0-0). Environmental Economics. S. Prerequisite: ECON 306. Credit not allowed for both AREC 541 and ECON 541.

Economics of environmental policy; partial equilibrium and general equilibrium model; pollution; natural environments; population and economic growth.

AREC 542 04(3-2-0). Applied Advanced Water Resource Economics. S. Prerequisites: AREC 342; ECON 306; MATH 141 or MATH 155 or MATH 160; STAT 301. Credit not allowed for both AREC 442 and AREC 542.

Theory and application of economics in water resource planning.

AREC 547 03(3-0-0). Public Lands Planning and Management. S. Prerequisite: AREC 202 or ECON 202.

Principles and techniques used by federal land management agencies including Forest Service, Park Service, Fish and Wildlife Service, and BLM.

AREC 563/ECON 563 03(3-0-0). Regional Economics-Theory, Methods, and Issues. F. Prerequisite: ECON 306; ECON 501 or concurrent registration. Credit not allowed for both AREC 563 and ECON 563.

Tools and methods of regional economics, including supply, demand, and externality analyses. Applications to current urban and regional policy issues.

AREC 566/SOC 566 03(3-0-0). Contemporary Issues of Developing Countries. S. Prerequisite: Two or more courses in AREC or ECON or SOC. Credit not allowed for both AREC 566 and SOC 566.

Social, economic, and technological factors in developing countries.

AREC 570/ECON 530 03(3-0-0). Methodology of Economic Research. F. Prerequisite: ECON 304; ECON 306. Credit not allowed for both AREC 570 and ECON 530.

Philosophical foundations of science and research. Concepts and skills for planning, performing, reporting, and evaluating economic research.

AREC 572 03(3-0-0). Social Benefit Cost Analysis. F. Prerequisite: ECON 306.

Theory, application of concepts relating to social benefit cost analysis of public projects, policies intended to promote social welfare, economic growth.

AREC 635/ECON 635 03(3-0-0). Econometric Theory I. F. Prerequisite: AREC 535/ECON 535; ECON 501 or concurrent registration. Credit not allowed for both AREC 635 and ECON 635.

Theory of mathematical statistics and classical linear regression model in context of economic application.

AREC 660 03(3-0-0). Economics of Agricultural Development. S. Prerequisite: AREC 460.

Developments in agriculture related to food supply and economic growth in developing countries.

AREC 678 03(3-0-0). Agricultural and Resource Policy. F. Prerequisite: ECON 306; MATH 141.

Evaluate and analyze economic theory, applications and public incentives related to government policies for agriculture and natural resources.

AREC 695 Var. Independent Study.

AREC 699 Var. Thesis.

AREC 735/ECON 735 03(3-0-0). Econometric Theory II. S. Prerequisite: AREC 635/ECON 635. Credit not allowed for both AREC 735 and ECON 735.

Model building, estimation and testing, using both microanalytic models and aggregate models of the economy.

AREC 740 03(3-0-0). Advanced Resource and Environmental Economics. F. Prerequisite: AREC 540 or ECON 540; AREC 541 or ECON 541; AREC 635 or ECON 635; ECON 706.

Advanced theory, methods, and literature of natural resource and environmental economics, including dynamic programming and non-market valuation.

AREC 784 Var [1-3]. Supervised College Teaching. F, S, SS.

AREC 792A-C Var. Seminar.

A) Agricultural. B) International. C) Resources.

AREC 795 Var. Independent Study.

AREC 799 Var. Dissertation.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ART COURSES

Department of Art College of Liberal Arts

ART 100 03(3-0-0). Introduction to the Visual Arts. (GT-AH1, AUCC 3B). F, S, SS.

Exploration of the development of visual arts.

ART 101 03(0-6-0). Visual Form. F, S, SS.

Two- and three-dimensional design to develop visual awareness and insight into structure and organization of visual arts.

ART 105 01(1-0-0). Issues and Practices in Art. F, S.

Current issues, practices, and resources in the visual arts; integration of unified vocabulary in various art disciplines.

ART 106D 03(0-6-0). Art Studio-Fibers. F, S, SS.

ART 110 03(3-0-0). Art History I. F.

The arts of ancient cultures and civilizations.

ART 111 03(3-0-0). Art History II. S. Prerequisite: ART 110.

Medieval through early modern art history.

***ART 112 03(3-0-0). History of Asian Art.** F.

Arts of China, Japan, and India.

°ART 113 03(3-0-0). Native Art Survey. F.

Visual arts of native peoples of North America, Africa, and Oceania.

ART 135 03(0-6-0). Introduction to Drawing. F, S, SS.

Elements of artistic freehand drawing emphasizing experimentation with wide variety of media.

ART 136 03(0-6-0). Introduction to Figure Drawing. F, S, SS.

Prerequisite: ART 135.

Human form as basis for self-expression through various drawing media.

(\$)

ART 160 03(0-6-0). Two-Dimensional Visual Fundamentals. F, S.

Concepts of organization and color theory structured for understanding and manipulation of two-dimensional space. (\$)

ART 170 03(0-6-0). Three-Dimensional Visual Fundamentals. F, S.

Understanding and manipulating three-dimensional form and space; use of materials and tools.

+ART 208/ETST 208 03(3-0-0). Native American Art and Material Culture. S. Credit not allowed for both ART 208 and ETST 208.

Traditional arts and material culture of the indigenous peoples of North America.

ART 212 03(3-0-0). Art History III. F, S. Prerequisite: ART 111.

Modern to contemporary art history.

ART 230 03(0-6-0). Photo Image Making I. F, S. Prerequisite: ART 111; ART 136; ART 160; ART 170.

Photographic imagery as an art medium; exploration of silver-based (film) materials. (\$)

ART 235 03(0-6-0). Intermediate Drawing I. F, S, SS. Prerequisite: ART 136.

Drawing using models and various still life material. (\$)

ART 240 03(0-6-0). Pottery I. F, S. Prerequisite: ART 111; ART 136; ART 160; ART 170.

Basic techniques of studio ceramics and wheel throwing; exploration of

expressive potential in pottery. (\$)

ART 245 03(0-6-0). Metalsmithing and Jewelry I. F, S. Prerequisite: ART 111; ART 136; ART 160; ART 170.

Basic metal techniques; forming and construction; surface treatment and finishing processes; behavior and mechanical properties of metals. (\$)

ART 250 03(0-6-0). Fibers I. F, S. Prerequisite: ART 110; ART 135; ART 160 or ART 170.

Fibers and fabric as expressive media; weaving and basic fiber structures; fabric painting and surface techniques. (\$)

ART 255 03(0-6-0). Introduction to Graphic Design. F, S. Prerequisite: ART 111; ART 136; ART 160; ART 170; 2.55. G.P.A. or better.

Problems emphasizing typography, layout, symbols, illustration, and package design. (\$)

ART 260 03(0-6-0). Painting I. F, S. Prerequisite: ART 111; ART 136; ART 160; ART 170.

Basic oil painting procedures, techniques, and concepts. (\$)

ART 265 03(0-6-0). Printmaking I-Intaglio and Relief. F, S. Prerequisite: ART 110; ART 135; ART 160 or ART 170.

Problems in composition utilizing basic techniques and principles of printmaking processes. (\$)

ART 270 03(0-6-0). Sculpture I. F, S. Prerequisite: ART 111; ART 136; ART 160; ART 170.

Introduction to sculptural techniques and concepts. (\$)

ART 295A-K Var [1-4]. Independent Study.

A) Painting. B) Printmaking. C) Sculpture. (S) D) Fibers. E) Metalsmithing and jewelry. (S) F) Drawing. G) Graphic design. H) Art ART 212.

American art from 17th century to 1945.

ART 311 03(3-0-0). Art of Africa. F. Prerequisite: ART 212.

History of the art of Africa.

***ART 312 03(3-0-0). History of Pre-Columbian Art.** F. Prerequisite: ART 212.

History of the art of Central and South America.

°ART 314 03(3-0-0). Women in Art History. S. Prerequisite: ART 212.

Women as artists in history of art and women's media in art.

ART 315 03(3-0-0). United States Art 1945-1980. S. Prerequisite: ART 212.

Visual art in the United States since 1945.

ART 316 03(3-0-0). Art of the Pacific. S. Prerequisite: ART 212.

Arts of Australia, Indonesia, Melanesia, Micronesia, and Polynesia.

°ART 319 03(3-0-0). History of Graphic Design. F. Prerequisite: ART 212.

History of graphic design emphasizing 19th- and 20th-century work.

ART 321A-C Var [3-5]. Travel Abroad-Studio Workshop in Italy. SS.

Exploration of studio techniques in Italy. A) Drawing. Prerequisite: ART 135. B) Photo image making. Prerequisite: ART 230 or portfolio review; written consent of instructor. C) Fibers. Prerequisite: ART 250 or portfolio review; written consent of instructor. D) Sculpture. Var[3-5] Prerequisite: ART 270.

ART 325 03(3-0-0). Concepts in Art Education. S. Prerequisite: EDUC 275; admission to teacher licensure.

Artistic learning in children, adolescents, adults, and special populations.

ART 326 04(0-8-0). Art Education Studio. F, S. Prerequisite: EDUC 275; admission to teacher licensure.

Art areas required for teacher licensure as indicated by individual

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

student needs. (\$)

ART 330 04(0-8-0). Photo Image Making II. F, S. Prerequisite: ART 230 or portfolio review.

Studio course designed to develop the growth of photographic expression. (\$)

ART 331 04(0-8-0). Photo Image Making III. F, S. Prerequisite: ART 330.

Studio course designed to further growth of concept, materials in photographic expression as an art medium. (\$)

ART 335 04(0-8-0). Intermediate Drawing II. F, S, SS. Prerequisite: ART 235. May be taken 3 times for credit.

Assigned and independent drawing projects; use of traditional and non-traditional materials. (\$)

ART 336 04(0-8-0). Intermediate Drawing III. F, S. Prerequisite: ART 335.

Assigned and independent drawing projects; art theory and criticism; readings and written assignments. (\$)

ART 340 04(0-8-0). Pottery II. F, S, SS. Prerequisite: ART 240.

Studio ceramic and wheel throwing techniques; surface treatment, kiln firing, clay and glaze formulation. (\$)

ART 341 04(0-8-0). Pottery III. S. Prerequisite: ART 340.

Form and surface exploration; supportive ceramic technologies; expression in historical pottery. (\$)

ART 345 04(0-8-0). Metalsmithing and Jewelry II. F, S. Prerequisite: ART 245.

Raising and casting techniques in combination with construction; metal spinning. (\$)

ART 346 04(0-8-0). Metalsmithing and Jewelry III. F, S. Prerequisite: ART 245.

Forging and enameling techniques on nonferrous and ferrous metals; stone setting. (\$)

ART 350 04(0-8-0). Fibers II. F, S. Prerequisite: ART 250.

Intermediate fiber structures and fabric and surface design; dyes and pigments; continued investigation of fibers and fabric as expressive media.. (\$)

ART 351 04(0-8-0). Fibers III. F, S. Prerequisite: ART 250.

Investigation of fibers and fabric as expressive media; research in historic textiles. (\$)

ART 355 04(0-8-0). Typography and Design Systems. F. Prerequisite: ART 255.

Emphasis on typographic solutions for advertising, corporate identity, packaging, and publication design. (\$)

ART 356 04(0-8-0). Illustration. S. Prerequisite: ART 255; 6 credits in drawing.

Problems emphasizing media, experimental techniques, and compositions. (\$)

ART 357 04(0-8-0). Interactive Media. F. Prerequisite: ART 255 or ART 256.

Technical, conceptual, and historic aspects of creating interactive electronic media.

ART 358 04(0-8-0). Experimental Video. F. Prerequisite: ART 255 or ART 256.

History, theory, application of experimental video and digital special effects, animation and video techniques as they apply to experimental video.

ART 360 04(0-8-0). Painting II. F. Prerequisite: ART 260.

Techniques and concepts inherent in acrylic and other water-based media. (\$)

ART 361 04(0-8-0). Painting III. S. Prerequisite: ART 235; ART 260.

Compositions and techniques in oil and/or acrylic emphasizing the human figure. (\$)

ART 365 04(0-8-0). Printmaking II-Lithography. F, S. Prerequisite: ART 136.

Preparation, processing, and printing techniques in stone and metal plate lithography. (\$)

ART 366 04(0-8-0). Printmaking III-Studio Workshop. F, S. Prerequisite: ART 365.

Advanced intaglio, relief, planographic, and stencil processes in the workshop; continued emphasis on individual creative growth. (\$)

ART 370 04(0-8-0). Sculpture II. F. Prerequisite: ART 270.

Additive, subtractive, and related techniques. (\$)

ART 371 04(0-8-0). Sculpture III. S. Prerequisite: ART 270.

Casting in metal. (\$)

ART 375 03(0-6-0). Figure Modeling and Drawing. F. Prerequisite: ART 270. Maximum of 9 credits allowed in course.

Studio course based on observation of the human figure in sculpture and drawing. (\$)

ART 384 Var [1-4]. Supervised College Teaching. F, S. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Supervised assistance in instruction.

ART 410 03(3-0-0). Greek Art. F. Prerequisite: ART 212.

Aegean and Greek architecture, painting, and sculpture.

ART 411 03(3-0-0). History of Medieval Art. S. Prerequisite: ART 212.

Early Christian, Byzantine, Islamic, Romanesque, and Gothic visual art forms.

ART 412 03(3-0-0). History of Renaissance Art. S. Prerequisite: ART 212.

Architecture, sculpture, painting, and minor arts, 1300 to 1600.

ART 414 03(3-0-0). History of Baroque and Rococo Art. S. Prerequisite: ART 212.

17th- and 18th-century visual arts.

***ART 415 03(3-0-0). History of 19th-Century European Art.** F. Prerequisite: ART 212.

Architecture, sculpture, painting, and other arts in Europe, 1780 to 1900.

ART 416 03(3-0-0). History of European Art, 1900 to 1945. S. Prerequisite: ART 212.

Visual arts in Europe, 1900 to 1945.

***ART 417 03(3-0-0). Roman Art.** S. Prerequisite: ART 212.

Roman sculpture, painting, and architecture.

ART 418 03(2-0-1). Contemporary Artists and Art Critics. F, S.

Prerequisite: ART 315.

Critical study of contemporary artists and art criticism.

ART 419 03(3-0-0). Historiography and Methodology of Art History. F. Prerequisite: Written consent of instructor.

Historiography/methodology/research methods in art history.

ART 420 Var [3-5]. Travel Abroad-Art History in Italy. SS. Prerequisite: ART 212.

Art historical study of painting, sculpture, and architecture in Italy.

ART 430 04(0-8-0). Advanced Photo Image Making I. F, S. Prerequisite:

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ART 331.

Advanced problems in use of photo image making as an art medium. (\$)

ART 431 04(0-8-0). Advanced Photo Image Making II. F, S. Prerequisite: ART 430.

Studio course to refine individual directions and professional goals in photography as an art medium. (\$)

ART 435 04(0-8-0). Advanced Drawing I. F, S, SS. Prerequisite: ART 336.

Independent projects and identification of personal artistic direction; research in art-related topics. (\$)

ART 436 04(0-8-0). Advanced Drawing II. F, S, SS. Prerequisite: ART 435.

Capstone course; production of professional exhibition-quality work. (\$)

ART 440 04(0-8-0). Pottery IV. F. Prerequisite: ART 341.

Advanced individual research in pottery form and expression; supportive technology; expression in contemporary American pottery. (\$)

ART 441 04(0-8-0). Pottery V. S. Prerequisite: ART 440.

Advanced individual research in pottery form and expression of personal subject matter; supportive technology. (\$)

ART 445 04(0-8-0). Metalsmithing and Jewelry IV. F, S. Prerequisite: ART 345; ART 346.

Chasing and repousse techniques in two- and three-dimension; inlay, engraving, and etching techniques. (\$)

ART 446 04(0-8-0). Metalsmithing and Jewelry V. S. Prerequisite: ART 345; ART 346.

Advanced techniques: granulation, electroforming, photoetching, makume, niello; ferrous metals techniques. (\$)

ART 450 04(0-8-0). Fibers IV. F, S. Prerequisite: ART 350; ART 351. Maximum of 8 credits allowed in course.

Advanced studio problems in expressive use of fibers and fabric. (\$)

ART 451 04(0-8-0). Fibers V. F, S. Prerequisite: ART 351 or ART 450. Maximum of 8 credits allowed in course.

Advanced studio problems in the expressive use of fibers and fabric. (\$)

ART 455 04(0-8-0). Advanced Typography and Design Systems. F. Prerequisite: ART 355. Maximum of 8 credits allowed in course.

Two- and three-dimensional solutions for advertising, corporate identity, packaging, and publication design. (\$)

ART 456 04(0-8-0). Advanced Illustration. S. Prerequisite: ART 356. Maximum of 8 credits allowed in course.

Projects in editorial and reportorial illustration emphasizing techniques applied to solving problems in advanced composition. (\$)

ART 457 04(0-8-0). Advanced Interactive Media. F, S, SS. Prerequisite: ART 255 or ART 256; ART 357.

Technical, conceptual, and historic aspects of creating interactive electronic media.

ART 458 01(0-8-0). Advanced Experimental Video. F. Prerequisite: ART 255 or ART 256; ART 358.

Advanced experimental video and visual effects.

ART 460 04(0-8-0). Advanced Painting I. F. Prerequisite: ART 360; ART 361. Maximum of 8 credits allowed in course.

Advanced composition and exploration of individual creative expression. (\$)

ART 461 04(0-8-0). Advanced Painting II. S. Prerequisite: ART 460. Maximum of 8 credits allowed in course.

Continuation in direction of individual creative expression. (\$)

ART 465 04(0-8-0). Printmaking IV-Studio Workshop. F, S. Prerequisite: ART 366.

Advanced printmaking workshop; intaglio, relief, planographic, and stencil; continued emphasis on individual creative growth. (\$)

ART 466 04(0-8-0). Printmaking V-Studio Workshop. F, S. Prerequisite: ART 465. Maximum of 8 credits allowed in course.

Advanced printmaking concepts in studio and research problems. (\$)

ART 470 04(0-8-0). Sculpture IV. F, S. Prerequisite: ART 370; ART 371. Maximum of 12 credits allowed in course.

Development of individual expression using sculptural techniques. (\$)

ART 471 04(0-8-0). Sculpture V. F, S. Prerequisite: ART 470. Maximum of 8 credits allowed in course.

Advanced expression using sculptural techniques. (\$)

ART 487 Var [1-4] Internship.

Supervised work experience in an approved location.

ART 492A-B 03(0-0-3). Seminar.

A) Art history. Prerequisite: ART 212. **B)** Art education. Prerequisite: Concurrent registration in ART 326.

ART 495A-L Var [1-4]. Independent Study. Maximum of 8 credits allowed per subtopic.

A) Painting **B)** Printmaking. (\$) **C)** Sculpture. (\$) **D)** Fibers. (\$) **E)** Metalsmithing and jewelry. (\$) **F)** Drawing. **G)** Graphic design. **H)** Art history. **I)** Art education. **J)** Pottery. (\$) **K)** Photo image making. Prerequisite: ART 330. (\$)

ART 496A-L Var [1-4]. Group Study. Maximum of 8 credits allowed per subtopic.

A) Painting. **B)** Printmaking. (\$) **C)** Sculpture. (\$) **D)** Fibers. (\$) **E)** Metalsmithing and jewelry. (\$) **F)** Drawing. **G)** Graphic design. **H)** Art history. Prerequisite: ART 212. **I)** Art education. **J)** Pottery. (\$) **K)** Photo image making. (\$)

ART 510A-Q 03(3-0-0). Advanced Study in Art History. F, S. Prerequisite: Written consent of instructor.

A) American art. **B)** African art. **C)** Pre-Columbian art. **E)** United States art since 1945. **F)** Greek art. **G)** Medieval art. **H)** Renaissance art. **I)** Baroque and rococo art. **J)** 19th-century European art. **K)** 20th-century European art. **M)** Roman art. **N)** Graphic design. **O)** Women in art. **P)** Pacific art. **Q)** Contemporary Artists and Art Critics.

***ART 514 03(0-0-3). Contemporary American Art Critics and Artists.** S. Prerequisite: ART 510E.

Issues in contemporary American art are explored through the work of critics and artists who visit through the Critic and Artist Residency Series.

ART 515 03(0-0-3). Seminar-Contemporary Art Theory. F. Prerequisite: ART 510E.

Relationship between critical theory and the visual arts; how artists and critics apply theory in their work.

ART 575A-G Var [1-15]. Studio Problems. F, S, SS. Prerequisite: Acceptance into MFA program in art.

A) Painting. **B)** Printmaking. (\$) **C)** Sculpture. (\$) **D)** Fibers. (\$) **E)** Metalsmithing and jewelry. (\$) **F)** Drawing. **G)** Graphic design.

ART 592 03(0-0-3). Art History Seminar. Prerequisite: Twenty-one credits of art history.

ART 675A-G Var [1-15]. Studio Problems. F, S, SS. Prerequisite: Ten credits of ART 575 in one concentration.

A) Painting. **B)** Printmaking. (\$) **C)** Sculpture. (\$) **D)** Fibers. (\$) **E)** Metalsmithing and jewelry. (\$) **F)** Drawing. **G)** Graphic design.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ART 684 Var. Supervised College Teaching.

ART 695A-H Var. Independent Study.

A) Painting. B) Printmaking. (\$) C) Sculpture. (\$) D) Fibers. (\$) E) Metalsmithing and jewelry. (\$) F) Drawing. G) Graphic design. H) Art history.

ART 696A-H Var. Group Study.

A) Painting. B) Printmaking. C) Sculpture. D) Fibers. E) Metalsmithing and jewelry. F) Drawing. G) Graphic design. H) Art history. I) Multiple Media.

ART 699A-G Var. Thesis. Prerequisite: Twelve credits in studio area of concentration.

A) Painting. B) Printmaking. (\$) C) Sculpture. (\$) D) Fibers. (\$) E) Metalsmithing and jewelry. (\$) F) Drawing. G) Graphic design.

AEROSPACE STUDIES COURSES

Department of Aerospace Studies

Office of Provost and Executive Vice President

AS 101 01(1-0-0). Foundations of the Air Force I. F.

Air Force opportunities, benefits; emphasis on officership, customs, and communicative skills, group problem solving.

AS 102 01(1-0-0). Foundations of the Air Force II. S.

Organizational structure and missions of Air Force organizations; emphasis on leadership, military history, and communicative skills.

AS 196 01(0-2-0). Aerospace Studies Group Study I. F, S.

Leadership Group Study is mandatory for students who are members of ROTC or are eligible to pursue a commission as determined by the Professor of Aerospace Studies.

AS 201 01(1-0-0). Evolution of Air and Space Power I. F.

History of the development of air power and air doctrine from Wright brothers to present emphasizing role of air power; communications skills emphasized.

AS 202 01(1-0-0). Evolution of Air and Space Power II. S.

History of air power from World War II to present examining role of air power in Berlin Airlift, Korean War, Mideast, and Vietnam War.

AS 296 01(0-2-0). Aerospace Studies Group Study II. F, S.

Leadership Group Study is mandatory for students who are members of ROTC or are eligible to pursue a commission as determined by the Professor of Aerospace Studies.

AS 301 03(3-0-0). Air Force Leadership Studies I. F.

Leadership and quality management fundamentals, officer professional knowledge, ethics, and values; communication skills heavily emphasized.

AS 302 03(3-0-0). Air Force Leadership Studies II. S.

Officer professional development, emphasizing leadership, management fundamentals, knowledge, evaluation systems, ethics, and communication skills.

AS 333 02(2-0-0). Operational Air Force Writing. S. Prerequisite: CO 150.

Common writing practices and procedures encountered by junior officers in the Air Force. Emphasizes proper writing content as well as form.

AS 396 01(0-2-0). Aerospace Studies Group Study III. F, S. Prerequisite: AS 296.

Concept of leadership; relationship between leadership and management; importance of leadership in the operation and success of any organization.

AS 401 03(3-0-0). National Security Affairs/Active Duty I. F.

Evolution and formulation of U.S. defense policy and strategy, regional conflict studies, Air Force roles and missions.

AS 402 03(3-0-0). National Security Affairs/Active Duty II. S.

Professionalism, military justice system, military ethics, commissioning essentials, and emphasis on communication skills.

AS 495 Var[1-3]. Independent Study. F, S. Prerequisite: AS 202.

AS 496 01(0-2-0). Aerospace Studies Group Study IV. F, S. Prerequisite: AS 396.

Concept of leadership; relationship between leadership and management; importance of leadership in the operation and success of any organization.

ATMOSPHERIC SCIENCE COURSES

Department of Atmospheric Science

College of Engineering

ATS 150 03(3-0-0). Science of Global Climate Change. S.

Physical basis of climate change. Energy budget of the earth, the greenhouse effect, carbon cycle, paleoclimate, projections of 21st-century climate.

ATS 300 02(2-0-0). Climate of Colorado. S.

Fundamentals of climate and climate changes; seasonal and regional Colorado climate regimes; types and availability of climate information.

ATS 350 02(2-0-0). Introduction to Weather and Climate. F, S.

Behavior of atmosphere and its influence upon human's activities.

ATS 351 01(0-3-0). Introduction to Weather and Climate Laboratory. F, S. Prerequisite: ATS 350 or concurrent registration.

Actual weather data, visualization of meteorological phenomena, in-depth discussion of current environmental issues.

ATS 495 Var. Independent Study.

ATS 540 02(0-6-0). Daily Weather Laboratory I. F. Prerequisite: Concurrent registration in ATS 601.

Synoptic analysis; cyclones, anticyclones, fronts, associated weather; long waves in the westerlies; upper troughs, ridges, basic currents; weather phenomena.

ATS 541 02(1-3-0). Daily Weather Laboratory II. S. Prerequisite: ATS 540.

Synoptic computation of cyclone and anticyclone movement, circulation, and intensity changes; mesoscale weather phenomena; precipitation processes.

°ATS 555 03(3-0-0). Air Pollution. S. Prerequisite: CHEM 113, MATH 261 or MATH 340; PH 122 or PH 142.

Nature, ambient concentrations, sources, sinks, and physiological activities of pollutants; meteorology; legislation; social and economic factors.

ATS 560 02(1-3-0). Air Pollution Measurement. F. Prerequisite: CHEM 114.

Examination and application of techniques for air pollution measurement. Includes sampling and analysis of gases, aerosols, and precipitation.

ATS 601 03(3-0-0). Atmospheric Dynamics I. F. Prerequisite: MATH 261; MATH 530.

Momentum, continuity equations; circulation, vorticity, thermodynamics; boundary layer; synoptic scale motions in midlatitudes.

ATS 602 02(2-0-0). Atmospheric Dynamics II. S. Prerequisite: ATS 601.

Sound waves, gravity waves, Rossby waves; numerical weather prediction; baroclinic instability; general circulation; tropical dynamics.

°ATS 604 03(3-0-0). Atmospheric Modeling. F. Prerequisite: ATS 601.

Design of numerical models of the atmosphere; applications to current problems. Emphasis on practical understanding of relevant numerical methods.

ATS 605 03(3-0-0). General Circulation of the Atmosphere. S. Prerequisite: ATS 602 or concurrent registration.

Observations and theory of the general circulation of the atmosphere, with emphasis on understanding physical mechanisms.

ATS 606 03(3-0-0). Introduction to Climate. F. Prerequisite: MATH 261; MATH 530.

Exchange of energy, water, and momentum through the atmosphere,

surface, vegetation, oceans. Paleoclimate, climate change, variability, and feedbacks.

ATS 610 03(3-0-0). Physical Oceanography. F.

Foundations of ocean circulation theory and the general circulation of the oceans using observational data and rotating tank experiments.

ATS 620 03(3-0-0). Thermodynamics and Cloud Physics. F. Prerequisite: MATH 340; PH 142.

Equilibrium thermodynamics, cloud microphysics, cloud dynamics, precipitation formation, and cloud electrification.

ATS 621 02(2-0-0). Atmospheric Chemistry. F. Prerequisite: CHEM 114; MATH 340; PH 142.

Overview of chemical kinetics and equilibria; sources and sinks of pollutants; photochemistry and smog formation; aqueous-phase chemistry; acid rain.

ATS 622 03(3-0-0). Atmospheric Radiation. S. Prerequisite: ATS 620.

Terrestrial, solar radiation propagation in the atmosphere; radiative components in energy budgets, weather systems, climate studies; remote sensing.

***ATS 623 02(2-0-0). Atmospheric Boundary Layer.** F. Prerequisite: ATS 601 or concurrent registration.

Equations for shallow atmospheric motions; thermal instability of a fluid layer; atmospheric turbulence; flow stability; 1-D mixed layer models.

ATS 631 02(1-3-0). Introduction to Atmospheric Aerosols. S.

Physical, chemical and microphysical characteristics of atmospheric particulate matter; measurement principles and techniques.

ATS 650 02(2-0-0). Measurement Systems and Theory. F. Prerequisite: PH 142; STAT 301.

Surface and upper air measurement systems; theory and system response, sensor design; automated data collection, analysis and display systems.

°ATS 652 02(2-0-0). Atmospheric Remote Sensing. F. Prerequisite: ATS 622.

Concepts of electromagnetic and acoustic wave propagation; active and passive remote sensing techniques including radar, lidar, thermal emission systems.

ATS 655 03(3-0-0). Objective Analysis in Atmospheric Sciences. S. Prerequisite: MATH 530.

Objective analysis of geophysical data: general statistics; matrix methods; time series analysis. Emphasis on applications to real-world data.

ATS 695 Var. Independent Study.

ATS 699A-T Var. Thesis.

A) Atmospheric dynamics. **B)** Land-atmosphere interactions. **C)** Chemistry-Climate Interactions. **D)** Weather Systems. **E)** Remote sensing. **F)** Ocean-Atmosphere Interactions. **G)** General circulation. **H)** Meteorological instruments. **I)** Atmospheric chemistry. **J)** Atmospheric radiation. **K)** Dynamic meteorology. **L)** Satellite applications. **M)** Mesoscale meteorology. **N)** Dynamics and physics of clouds. **O)** Mesoscale modeling. **P)** Radiation theory. **Q)** Radar meteorology. **R)** Aerosol and cloud chemistry. **S)** Climate dynamics. **T)** Oceanography.

***ATS 703 02(2-0-0). Numerical Weather Prediction.** F. Prerequisite: ATS 602.

Quasi-geostrophic approximation; barotropic, baroclinic, primitive equation, and general circulation models; numerical methods.

°ATS 704 02(2-0-0). Large-Scale Atmospheric Dynamics. F. Prerequisite: ATS 602.

Quasi-static, quasi-geostrophic equations; planetary waves; geostrophic adjustment; barotropic, baroclinic instability; frontogenesis; tropical cyclones.

°ATS 707 03(2-0-1). Atmospheric Waves and Vortices. F. Prerequisite:

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ATS 605.

Atmospheric wave motions and embedded vortices spanning mountain waves to large-scale Rossby waves and critical layers.

ATS 708 03(3-0-0). Middle Atmospheric Dynamics. S. Prerequisite: ATS 605.

Dynamics of the stratosphere and mesosphere with emphasis on the lower and middle stratosphere.

***ATS 710 03(3-0-0). Geophysical Vortices.** F. Prerequisite: ATS 602.

Observational, experimental, and theoretical aspects of geophysical vortices, such as hurricanes, polar lows, tornadoes, and dust devils.

***ATS 711 02(2-0-0). Microclimate.** F. Prerequisite: ATS 623; MATH 340.

Momentum, heat, water, and trace gas fluxes near the earth's surface, including fluxes between the atmosphere and the land/ocean/ice surfaces.

°ATS 712 03(3-0-0). Dynamics of Clouds. S. Prerequisite: ATS 623.

General theory of cloud dynamics; parameterization of microphysics and radiation; models of fog, stratocumuli, cumulonimbi, and orographic clouds.

°ATS 715 02(2-0-0). Atmospheric Oxidation Processes. F. Prerequisite: ATS 621.

Atmospheric hydrocarbon and nitrogen oxide reactions; aqueous phase scavenging and reactions; chemical pathways in the atmosphere.

ATS 716 02(1-2-0). Air Quality Characterization. S. Prerequisite: ATS 555 or ATS 621; ATS 560.

Planning, executing, and reporting on a measurement campaign to characterize local air quality.

°ATS 721 03(3-0-0). Theoretical Topics in Radiative Transfer. F. Prerequisite: ATS 622.

Physics of atmospheric radiation; theoretical techniques used to show radiation transfer equation.

°ATS 722 03(2-0-1). Atmospheric Radiation and Energetics. S. Prerequisite: ATS 622.

Radiative transfer in the atmosphere; implications on remote sensing and energetics.

°ATS 724 02(2-0-0). Cloud Microphysics. S. Prerequisite: ATS 621.

Theories and observations of nucleation; cloud droplet spectra broadening; precipitation growth and breakup; ice multiplication; cloud electrification.

***ATS 730 03(3-0-0). Mesoscale Modeling.** F. Prerequisite: ATS 602; ATS 623.

Development of basic equations used in mesoscale models and methodology of solution.

°ATS 735 03(3-0-0). Mesoscale Dynamics. F. Prerequisite: ATS 602.

Analysis of physical and dynamical processes that initiate, maintain, and modulate atmospheric mesoscale phenomena.

***ATS 737 03(3-0-0). Satellite Observation of Atmosphere and Earth.** S. Prerequisite: ATS 622; ATS 652.

Satellite measurements; basic orbits and observing systems; applications of remote sensing and imaging to investigations of atmospheric processes.

°ATS 741 03(3-0-0). Radar Meteorology. S. Prerequisite: ATS 652.

Radar systems; radar equation and applications; multiple Doppler observation and processing; radar studies of mesoscale systems.

***ATS 742 02(2-0-0). Tropical Meteorology.** S. Prerequisite: ATS 601; ATS 602; ATS 606.

Tropical atmosphere, monsoons, intraseasonal variability, hurricanes, theory of tropical convection and the large-scale circulation.

°ATS 743 03(3-0-0). Interactions of the Ocean and Atmosphere. S. Prerequisite: ATS 602.

Ocean-atmosphere interactions in observations, theory, and models. Time mean atmosphere-ocean circulations through climate variability and change.

***ATS 745 03(3-0-0). Atmospheric General Circulation Modeling.** S. Prerequisite: ATS 602; ATS 605.

Current problems in modeling of the general circulation of the atmosphere

***ATS 750 03(3-0-0). Climate Dynamics: Atmospheric Variability.** F. Prerequisite: ATS 605; ATS 655.

Analysis and interpretation of large-scale patterns of climate variability and observed climate change.

***ATS 753 03(3-0-0). Global Hydrologic Cycle.** S. Prerequisite: ATS 601; ATS 622 or ATS 652.

Hydrologic cycle; moisture transport and air-ground exchange; water budgets of meteorological phenomena; climatology of atmospheric water.

***ATS 755 03(3-0-0). Topics in Climate Research.** F. Prerequisite: ATS 606.

Current topics in climate research.

°ATS 760 02(2-0-0). Global Carbon Cycle. S. Prerequisite: ATS 606.

Exchanges of CO₂ between the atmosphere, the land surface, and oceans. Biogeochemical processes. Micrometeorological and inverse flux estimation.

°ATS 762 02(2-0-0). Biosphere-Chemistry-Climate Interactions. S. Prerequisite: ATS 621.

Explore the sensitivity of the climate system to atmospheric chemical composition with emphasis on connections to biospheric processes and feedbacks.

***ATS 765 03(3-0-0). Climate Dynamics: Ocean Variability.** F. Prerequisite: ATS 606.

Climate variability on time scales of years to millennia with focus on the role of the ocean circulation. Approach through dynamical systems theory.

***ATS 770 03(3-0-0). Ocean Modeling.** F. Prerequisite: ATS 601.

Conceptual and numerical ocean models and their application to current problems in climate science and biogeochemical cycles.

°ATS 772 02(2-0-0). Aerosol Chemistry. F. Prerequisite: CHEM 114; MATH 161; PH 122 or PH 142.

Physics and chemistry of atmospheric aerosols including composition, surface properties, size, interaction with radiation sources, sinks.

ATS 784 Var. Supervised College Teaching. F, S, SS.

ATS 786 Var. Practicum.

ATS 795 Var. Independent Study.

ATS 796 Var. Group Study.

ATS 799A-T Var. Dissertation.

A) Atmospheric dynamics. **B)** Land-atmosphere interactions. **C)** Chemistry-Climate Interactions. **D)** Weather Systems. **E)** Remote sensing. **F)** Ocean-Atmosphere Interactions. **G)** General circulation. **I)** Atmospheric chemistry. **K)** Dynamic meteorology. **L)** Satellite applications. **M)** Mesoscale meteorology. **N)** Dynamics and physics of clouds. **O)** Mesoscale modeling. **P)** Radiation theory. **Q)** Radar meteorology. **R)** Aerosol and cloud chemistry. **S)** Climate dynamics. **T)** Oceanography.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

BIOCHEMISTRY AND MOLECULAR BIOLOGY COURSES

Department of Biochemistry and Molecular Biology College of Natural Sciences

BC 192 02(1-0-1). Biochemistry Freshman Seminar. F.

Introduction to curriculum and career options for biochemistry majors.

BC 295 Var [1-3]. Introductory Independent Study. F, S, SS. Prerequisite: CHEM 112 or concurrent registration; LIFE 102.

Apply principles and knowledge being learned in first and second year life sciences and chemistry courses.

BC 351 04(4-0-0). Principles of Biochemistry. F, S, SS. Prerequisite: BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 341 or CHEM 345. For majors in biological sciences, engineering, and preprofessional students in the health sciences.

Structure and function of biological molecules; biocatalysis; metabolism and energy transduction; gene expression. (NT-O)

BC 401 03(3-0-0). Comprehensive Biochemistry I. F. Prerequisite: CHEM 245 or CHEM 343 or concurrent registration or CHEM 346 or concurrent registration; MATH 155 or MATH 160.

Macromolecular structure and dynamics; membranes; enzymes; bioenergetics.

BC 403 03(3-0-0). Comprehensive Biochemistry II. S. Prerequisite: CHEM 245 or CHEM 341 or CHEM 345.

Metabolic pathways and their regulation; cellular biochemistry.

BC 404 02(0-6-0). Comprehensive Biochemistry Laboratory. F, S. Prerequisite: BC 401 or concurrent registration; CHEM 246 or CHEM 344 or CHEM 346; LIFE 203; LIFE 212.

Experimental approaches to studying macromolecules, metabolism, and gene expression. (S)

BC 405 01(0-0-1). Comprehensive Biochemistry II—Honors Recitation. S. Prerequisite: Concurrent registration in BC 403—Honors section. For students participating in the Honors program.

Read and discuss current literature related to material presented in BC 403.

BC 411 04(3-0-1). Physical Biochemistry. F. Prerequisite: BC 401; CHEM 113; MATH 161 or MATH 255.

Thermodynamics; reaction rates quantum chemistry; spectroscopy; macromolecular folding and interactions; ligand binding; enzyme kinetics; membranes.

BC 441 01(0-1.5-.5). 3D Molecular Models for Biochemistry. F. Prerequisite: BC 401 or concurrent registration.

Computer instruction to construct 3D models of proteins and nucleic acids using leading software.

BC 463 03(3-0-0). Molecular Genetics. F. Prerequisite: BC 351 with a C or better, or BC 401 with a C or better or concurrent registration; BZ 350 with a C or better or LIFE 201B with a C or better. Credit not allowed for both BC 463 and BC 563.

Molecular basis of gene structure, replication, repair, recombination, and expression.

BC 464 01(0-0-1). Molecular Genetics Recitation. F. Prerequisite: BC 351 or concurrent registration or BC 401 or concurrent registration; concurrent registration in BC 463; LIFE 201B.

Methods used to study the molecular basis of gene structure, replication, repair, recombination, and expression.

BC 465 03(3-0-0). Molecular Regulation of Cell Function. S. Prerequisite: BC 403 or concurrent registration or BC 351; LIFE 210.

Credit not allowed for both BC 465 and BC 565.

Molecular regulation of cell organization, membrane formation, organelle biogenesis, cell communication, shape and motility, growth, aging, and death.

BC 467 03(3-0-0). Biochemistry of Disease. S. Prerequisite: BC 401.

Biochemical basis of specific human diseases.

BC 475 03(0-6-1). Mentored Research. F, S, SS. Prerequisite: BC 404. Maximum of 9 credits allowed in course.

Plan and conduct mentored research with weekly discussion of progress, presentation at all-university symposium, and submission of written report.

BC 484 Var. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Assist in teaching selected courses in biochemistry and molecular biology.

BC 487A-B Var. Internship.

A) Prerequisite: BC 401; BC 403; BC 404; cumulative GPA of 2.000. Work experience with an approved preceptor outside of a university laboratory environment. **B)** International. Prerequisite: BC 401; BC 463; BC 495 (one credit in lab of CSU mentor); selection by department committee. Research in foreign host laboratory in contact with CSU mentor.

BC 493 01(0-0-1). Senior Seminar. F, S. Prerequisite: BC 401 or concurrent registration.

Critical analysis of selected literature in biochemistry and molecular biology.

BC 495 Var. Independent Study. Prerequisite: Minimum cumulative GPA of 3.000.

BC 496 Var. Group Study.

Faculty-directed exploration of areas of special interest in biochemistry and molecular biology.

BC 498 Var [1-6]. Research.

Supervised laboratory research in biochemistry and molecular biology.

BC 499A-E 03(0-0-3). Thesis.

A) Laboratory research-based thesis. **B)** Literature-based thesis. Prerequisite: BC 493 or concurrent registration. **C)** Literature-based Health and Med. Sci. Prerequisite: BC 493 or concurrent registration. **D)** Literature-based in Pre-Pharmacy. Prerequisite: BC 493 or concurrent registration. **E)** Literature-based in Neurobiochemistry. Prerequisite: BC 493 or concurrent registration.

BC 511 04(3-0-1). Structural Biology I. F. Prerequisite: BC 401 or concurrent registration.

Structural principles of biological macromolecules and techniques of structural analysis.

BC 512 01(1-0-0). Principles of Macromolecular Structure. F. Prerequisite: BC 411 or concurrent registration.

Physical interactions controlling folding and solution behavior of biological macromolecules, including proteins, nucleic acids, and membranes.

BC 513 01(1-0-0). Enzymology. S. Prerequisite: BC 403.

Kinetic methods, mechanism, and regulation of enzyme catalysis.

BC 517 02(2-0-0). Metabolism. F. Prerequisite: BC 351 or BC 403.

Design and regulation of metabolic pathways.

BC 563 04(3-0-1). Molecular Genetics. F. Prerequisite: BC 401; LIFE 201B. Credit not allowed for both BC 563 and BC 463.

Mechanisms of replication, transcription, processing, translation, and

packaging of genetic material, emphasizing original literature and methods.
BC 565 04(3-0-1). Molecular Regulation of Cell Function. S.
Prerequisite: BC 403 or concurrent registration or BC 351; LIFE 210.
Credit not allowed for both BC 565 and BC 465.

Molecular regulation of cell organization, membrane formation, organelle biogenesis, cell communication, shape and motility, growth, aging, and death.

BC 571 01(1-0-0). Quantitative Biochemistry. S. Prerequisite: BC 511 or concurrent registration.

Introduction to statistics, error analysis, and curve fitting of biochemical data with a focus on practical examples.

BC 589 02(1-2-0). Current Trends in Molecular Biosciences. SS.
Prerequisite: B.S. or B.A. in biology or chemistry; secondary school teaching certification. Offered only through Division of Continuing Education.

Biochemical and molecular biological foundations of molecular genetics/genetic engineering; molecular analysis of genes. (NT)

***BC 601 01(1-0-0). Responsible Conduct in Biochemistry.** S.

Design of experiments; error and fraud, publishing/grant application submission, scientific misconduct, classic examples of fraud, case studies.

BC 611 02(2-0-0). Structural Biology II. S. Prerequisite: BC 511.

Structure and interactions of biological macromolecules related to function.

BC 663 02(2-0-0). Gene Expression. S. Prerequisite: BC 563.

Eukaryotic transcription mechanisms with emphasis on methods of study and regulatory mechanisms.

BC 665A-B 02(2-0-0). Advanced Topics in Cellular Regulation. S.
Prerequisite: BC 565.

A) Microscopic Methods. Analysis of cell behavior, function and regulation using microscopic methods. B) Modern Methods. Modern methods in cell biology.

BC 695 Var. Independent Study.

BC 698 Var. Research.

BC 699 Var. Thesis.

BC 701 01(1-0-0). Grant Proposal Writing and Reviewing. F.
Prerequisite: BC 403; BC 511 or concurrent registration; BC 563 or concurrent registration.

Didactic and hands-on experience with locating funding sources, writing effective grant proposals and the review process in the bio-molecular sciences.

BC 711A-F 01(1-0-0). Advanced Topics in Structural Biology. F, S.
Prerequisite: BC 511; BC 611.

A) Protein structure and function. B) Membrane proteins. C) Protein-DNA interactions. D) Biomolecular spectroscopy. E) Biomolecular NMR. F) Macromolecular X-ray crystallography.

BC 763A-C 01(1-0-0). Advanced Molecular Genetics Topics. F, S.
Prerequisite: BC 663 or concurrent registration.

A) Chromatin and transcription. B) Transcriptional control; co-activators and corepressors. C) Concepts and techniques of genetic analyses.

BC 784 Var [1-3]. Supervised College Teaching.

BC 793 01(0-0-1). Seminar.

BC 795 Var. Independent Study.

BC 796 Var [1-5]. Group Study.

BC 798 Var. Research.

BC 799 Var. Dissertation.

BIOLOGICAL SCIENCE COURSES

Life Sciences Committee

Provost and Executive Vice President's Office

[Beginning in Fall Semester 2008, the BIO courses have been moved to BZ (BIO 310 and BIO 311), LIFE (BIO 320), or dropped.

BIO 220 changed to LAND 220/LIFE 220, effective FA07.

BIO 384 was dropped effective FA08.

BIO 310 and BIO 311 changed to BZ 310 and BZ 311, effective FA08.

BIO 221 dropped effective FA08.

BIO 320 changed to LIFE 320, effective FA08.]

BIOMEDICAL ENGINEERING COURSES

Nondepartmental

College of Engineering

BIOM 101 03(3-0-0). Introduction to Biomedical Engineering. F.

Basic principles, fundamentals in biomedical engineering including molecular, cellular and physiological principles and major areas such as biomechanics.

BIOM 300 04(1-4-1). Problem-Based Learning Biomedical Engr Lab.

S. Prerequisite: BIOM 101; MATH 340.

Group problem-based learning approach to problems spanning all core areas of biomedical engineering.

BIOM 306/BTEC 306 04(3-2-0). Bioprocess Engineering. S.

Prerequisite: CHEM 107 or CHEM 111; PH 121 or PH 141. Credit not allowed for both BIOM 306 and BTEC 306.

Material, energy balances; fluid flow, heat exchange, mass transfer; application to operations in food, fermentation, other bioprocess industries.

BIOM 330 03(3-0-0). Transport Phenomena in Biomedical Engineering. S. Prerequisite: BIOM 300; BMS 300; CBE 332 or MECH 344.

Engineering models of active and passive mechanisms of momentum, heat, and mass transport, in mammalian cells, tissues, and organ systems.

BIOM 400 03(3-0-0). Kinetics of Biomolecular and Cellular Systems. F.

Prerequisite: BIOM 330 or CBE 320.

In-depth analysis of the systems approach to biology and biological engineering at the molecular and the cellular scales.

BIOM 441 03(3-0-0). Biomechanics and Biomaterials. F. Prerequisite:

BMS 300; MECH 324 or concurrent registration; MECH 331 or concurrent registration.

Principles of biomechanics, biofluids, and biomaterials.

BIOM 470/MECH 470 03(3-0-0). Biomedical Engineering. F.

Prerequisite: MATH 155 or MATH 160; PH 141. Credit not allowed for both BIOM 470 and MECH 470.

Engineering application in human/animal physiology, diagnosis of disease, treatment, rehabilitation, human genome manipulation.

BIOM 476A-B. Biomedical Clinical Practicum. F, S, SS. Prerequisite:

BMS 300; BIOM 470/MECH 470.

Biomedical lab work or exposure to the hospital/clinical environment.

A) 02(1-3-0). B) 04(1-6-0).

BIOM 486A-B 04(0-0-10). Biomedical Design Practicum. F, S, SS.

A) Capstone Design I. Prerequisite: BIOM 300; BIOM 330 or BIOM 441 or ECE 441. B) Capstone Design II. Prerequisite: BIOM 300; BIOM 330 or BIOM 441 or ECE 441; BIOM 486A.

BIOM 495 Var[1-6]. Independent Study. F, S, SS.

BIOM 504/CBE 504 03(3-0-0). Fundamentals of Biochemical Engineering. F. Prerequisite:

BIOM 306/BTEC 306 or CBE 320 or concurrent registration; MATH 255 or MATH 340; MIP 300. Credit not allowed for both BIOM 504 and CBE 504.

Application of chemical engineering principles to enzyme kinetics, fermentation and cell culture, product purification, and bioprocess design.

BIOM 522/CBE 522 03(2-2-0). Bioseparation Processes. F.

Prerequisite: CBE 331. Credit not allowed for both BIOM 522 and CBE 522.

Analysis of processes to recover and purify fermentation products.

***BIOM 525/*MECH 525 03(3-0-0). Cell and Tissue Engineering.** S.

Prerequisite: BC 351 or BMS 300 or BMS 500 or BZ 310 or NB 501.

Credit allowed for only one of the following: BIOM 525, CBE 525, and

MECH 525.

Cell and tissue engineering concepts and techniques with emphasis on cellular response, cell adhesion kinetics, and tissue engineering design. (\$) (NT-O)

BIOM 526/ECE 526 03(3-0-0). Biological Physics. S. Prerequisite:

MATH 340 or MATH 345; PH122 or PH142.

Credit not allowed for both BIOM 526 and ECE 526.

Mathematical and physical modeling of biological systems. Mass transport in cellular environments. Electrical/mechanical properties of biomolecules.

BIOM 531/MECH 531 03(3-0-0). Materials Engineering. S.

Prerequisite: MECH 331 or MECH 431.

Selection of structural engineering materials by properties, processing, and economics; materials for biomedical and biotechnology applications. (NT-O)

BIOM 532/MECH 532 03(3-0-0). Material Issues in Mechanical Design. F. Prerequisite: MECH 331. Credit not allowed for both BIOM

532 and MECH 532.

Failure mechanisms from materials viewpoint with emphasis on use in design. Fracture, creep, fatigue and corrosion. (NT-O)

BIOM 533/ECE 533. 03(2-3-0). Biomolecular Tools for Engineers. F.

Prerequisite: BMS 300 or MIP 300. Credit not allowed for both BIOM 533 and ECE 533.

Theoretical and practical aspects of biomolecular laboratory tools—PCR, cloning, sequencing, single-molecule optical techniques and live-cell imaging. (\$) (S)

***BIOM 537/ECE 537 03(3-0-0). Biomedical Signal Processing.** S.

Prerequisite: MATH 340 or ECE 311 or STAT 303. Credit not allowed for both BIOM 537 and ECE 537.

Measuring, manipulating, and interpreting biomedical signals.

BIOM 543/CBE 543 03(3-0-0). Membranes for Biotechnology and Biomedicine. F. Prerequisite:

CHEM 341; CHEM 343; or CBE 310. Credit not allowed for both BIOM 543 and CBE 543.

Polymeric membrane formation, modification, module design and applications to bioseparation and biomedical separations and tissue engineering. (NT-O)

BIOM 570/MECH 570 03(3-0-0). Bioengineering. S. Prerequisite:

MECH 307; MECH 324. Credit not allowed for both BIOM 570 and MECH 570.

Physiological and medical systems analysis using engineering methods including mechanics, fluid dynamics, control, electronics, and signal processing. (NT-O)

BIOM 573/MECH 573 03(3-0-0). Structure and Function of Biomaterials. S. Prerequisite:

MECH 331. Credit not allowed for both BIOM 573 and MECH 573.

Structure-function relationships of natural biomaterials; application to analysis of biomimetic materials and biomaterials used in medical devices. (NT-O)

BIOM 586A-B. Biomedical Clinical Practicum. F, S, SS. Prerequisite:

BIOM 570/MECH 570; BMS 300 or BMS 500. A) 02(1-3-0). B) 04(1-6-0).

Graduate-level activity, such as biomedical research or design of a new medical device, for exposure to the hospital/clinical environment.

BIOM 592 Var[1-3]. Seminar. F, S. Prerequisite: None.

Student and research faculty presentations, guest and invited extramural speakers. (NT-O)

°BIOM 671/MECH 671 03(3-0-0). Orthopedic Tissue Biomechanics. F.

Prerequisite: CIVE 560. Credit not allowed for both BIOM 671 and MECH 671 or for BIOM 671/MECH 671 and BIOM 571/MECH 571.

Linear elastic, finite deformation, and viscoelastic theories applied to the

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

mechanical behavior of orthopedic tissues (bone, tendon, cartilage).

BIOM 684 Var. Supervised College Teaching. Maximum of 6 credits allowed in course; may not be used to satisfy degree requirements requiring bioengineering courses.

BIOM 695 Var. Independent Study.

BIOM 699 Var. Thesis.

BIOM 784 Var [1-6]. Supervised College Teaching.

BIOM 786 Var. Practicum-Laboratory Rotations.

BIOM 795 Var [1-6]. Independent Study.

BIOM 798 Var [1-6]. Research-Laboratory Rotation

BIOM 799 Var. Dissertation.

BIOMEDICAL SCIENCES

Department of Biomedical Sciences College of Veterinary Medicine and Biomedical Sciences

BMS 120 02(2-0-0). Human Health and Disease. F, S, SS.

Function of the human body in health and disease; exercises for decision making related to health.

BMS 122 02(2-0-0). Drugs and the Human Body. F, S.

Drugs effect on body functions. Implications of drug use in society.

BMS 124 03(3-0-0). Sexuality and Health. F, S.

Basic concepts of human reproduction, contraception, pregnancy, abortion, and venereal disease; their relationship to health.

BMS 192 01(0-0-1). First Year Seminar in Biomedical Sciences. F.

The university and its resources, college survival skills, careers in the biomedical sciences; current issues in health and biotechnology.

BMS 200 01(0-0-1). Concepts in Human Anatomy and Physiology. F, S.
Prerequisite: Concurrent registration in BMS 300.

Basic concepts in the anatomy and physiology of the human body.

BMS 230 03(3-0-0). Animal Anatomy and Physiology. S. Prerequisite: CHEM 107; LIFE 102. Credit not allowed for BMS 230 and BS 231, BMS 305, or VS 333.

Comparative systemic anatomy and physiology of farm animals.

BMS 260 03(2-0-1). Biomedical Sciences. S. Prerequisite: LIFE 102.

Opportunities and challenges in biomedical sciences; business of science, ethics, model systems, cellular and systemic physiology.

BMS 300 04(4-0-0). Principles of Human Physiology. F, S, SS.
Prerequisite: BZ 101 or BZ 110 or LIFE 102; CHEM 103 or CHEM 107 or CHEM 111.

Physiology of humans. (NT-O)

BMS 301 05(3-2-1). Human Gross Anatomy. F, S, SS. Prerequisite: BZ 110 or LIFE 102.

Structure and function of the human body. Study of prosected human cadavers; clinical applications; living anatomy. (\$)

BMS 302 02(1-3-0). Laboratory in Principles of Physiology. F, S.
Prerequisite: BMS 300 or concurrent registration or BMS 360 or concurrent registration.

Basic physiology lab exercises. (\$)

BMS 305 04(3-3-0). Domestic Animal Gross Anatomy. S. Prerequisite: BZ 110 or LIFE 102. Credit not allowed for both BMS 305 and VS 333.

Comparative gross anatomy of domestic carnivores, ruminants, and horses. (\$)

BMS 325 03(3-0-0). Cellular Neurobiology. F. Prerequisite: BMS 300 or BMS 360.

Cellular and molecular bases of nervous system function and behavior.

BMS 326 03(3-0-0). Neural Integration and Behavior. S. Prerequisite: BMS 300; BMS 325.

Functional organization of the nervous system; cellular mechanisms of integration of information to organize simple and complex behaviors.

BMS 330 04(3-3-0). Microscopic Anatomy. S. Prerequisite: BMS 300 or BMS 360. Credit not allowed for both BMS 330 and VS 331.

Microscopic anatomy of mammalian tissue.

BMS 345 04(3-2-0). Functional Neuroanatomy. S. Prerequisite: BMS

300 or BMS 360.

Functional systems and circuits of the human brain and spinal cord. (\$)

BMS 360 04(4-0-0). Fundamentals of Physiology. S. Prerequisite: BZ 110 or LIFE 102; CHEM 245 or concurrent registration or CHEM 345 or concurrent registration.

Cell, tissue, and organ function related to integrated whole body function.

BMS 384 Var [1-5]. Supervised College Teaching. Prerequisite: BMS 300 or BMS 360. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Supervision by and work with graduate teaching assistants in small group learning sessions involving students enrolled in BMS 300.

BMS 405 03(3-0-0). Nerve and Muscle-Toxins, Trauma and Disease. S. Prerequisite: BMS 325 or BMS 345.

Structure, composition, function of nerves and muscles, etiology of genetic and autoimmune neuromuscular diseases, alteration by toxins and nerve gas.

BMS 410 03(3-0-0). Physiological Responses to the Environment. S. Prerequisite: BMS 300 or BMS 360.

Acute and chronic physiological responses to various environmental factors.

BMS 420 03(3-0-0). Cardiopulmonary Physiology. F. Prerequisite: BMS 300 or BMS 360.

Normal and pathophysiology of cardiovascular and pulmonary systems.

BMS 430 03(3-0-0). Endocrinology. F. Prerequisite: BMS 300 or BMS 360.

Physiology of the glands of internal secretion.

BMS 450 03(3-0-0). Pharmacology. S. Prerequisite: BMS 300 or BMS 360.

Pharmacologic principles, absorption, distribution, metabolism, excretion, side effects, and actions of drugs.

BMS 460 04(4-0-0). Essentials of Pathophysiology. F. Prerequisite: BMS 300 or BMS 360; concurrent registration in BMS 492; biomedical sciences majors only.

Integration of different facets of mechanisms underlying health and disease.

BMS 487 Var [1-6]. Internship. Prerequisite: Written consent of department.

Work/research experience with an approved preceptor outside of a university laboratory.

BMS 492 01(0-0-1). Seminar-Pathophysiology of Disease. F. Prerequisite: Concurrent enrollment in BMS 460.

Capstone seminar in biomedical sciences.

BMS 495 Var. Independent Study.

BMS 496 Var [1-3]. Group Study. F, S. Prerequisite: BMS 301 or concurrent registration OR BMS 305 or concurrent registration OR BMS 360 or concurrent registration.

Faculty-supervised investigation of areas of special interest in anatomy and physiology.

BMS 498 Var [1-3]. Research. Prerequisite: BMS 300 or BMS 360.

Faculty-directed research in biomedical sciences.

BMS 500 04(4-0-0). Mammalian Physiology I. F. Prerequisite: BMS 300 or BMS 360. Credit not allowed for both BMS 500 and NB 501.

Cell physiology of nerve, skeletal, cardiac and smooth muscle with an emphasis on how cellular functions integrate into systems behavior.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

(NT-O)

BMS 501 04(4-0-0). Mammalian Physiology II. S. Prerequisite: BMS 300 or BMS 360.

Respiratory, renal, digestive, endocrine, metabolic, and reproductive function.

BMS 503/NB 503 03(3-0-0). Developmental Neurobiology. S. Prerequisite: One college-level course in each: biology, biochemistry, physics, calculus. Credit not allowed for both BMS 503 and NB 503.

Molecular mechanisms involved in development of nervous system including differentiation, growth, pathfinding, and synaptogenesis.

BMS 505/NB 505 03(3-0-0). Neuronal Circuits, Systems, and Behavior. S. Prerequisite: BMS 325 or BMS 500 or NB 501. Credit not allowed for both BMS 505 and NB 505.

Anatomical and physiological organization of the nervous system.

BMS 531 03(0--9-0). Domestic Animal Dissection. S. Prerequisite: BMS 305.

Dissection of domestic animals. (\$)

BMS 545 05(3-4-0). Neuroanatomy. S. Prerequisite: Written consent of instructor.

Nervous system structure and function presented from a systems perspective; applied and comparative aspects are emphasized. (\$)

BMS 550 03(2-0-1). Electron Microscopy-TEM, SEM, and X-ray. S. For biologists and materials scientists.

Theory and demonstration of transmission and scanning electron microscopy and X-ray microanalysis.

***BMS 560 03(2-0-1). Theory and Practice of Animal Biotechnology.** S.

Principles of molecular technology and applications to animal and human populations, including transgenic technology and gene therapy.

BMS 575 04(0-8-0). Human Anatomy Dissection. F.

Regional approach to human gross anatomy through laboratory dissection of human cadaver. (\$)

BMS 610A-B 01(1-0-0). Managing a Career in Science. F.

A) Survival skills for coursework (M.S.). Prerequisite: Written consent of instructor. B) Survival skills for research (M.S. and Ph.D.).

BMS 619 02(0-0-2). Advanced Human Gross Anatomy. F. Prerequisite: Written consent of instructor.

Clinical application of human anatomy through case-based study.

°BMS 620 03(3-0-0). Cardiovascular Physiology. S. Prerequisite: BMS 420 or BMS 500.

Physiology and biophysics of the circulatory system.

***BMS 625 03(3-0-0). Pulmonary Physiology.** S. Prerequisite: BMS 420 or BMS 501.

Structure, function, and pathophysiology of respiratory system.

°BMS 631 02(2-0-0). Mechanisms of Hormone Action. F. Prerequisite: BMS 430 or BMS 501.

Synthesis, secretion, and mechanisms of action of hormones.

°BMS 632 02(2-0-0). Metabolic Endocrinology. F. Prerequisite: BMS 631.

Endocrine regulation of metabolic homeostasis; effects of exercise or pregnancy.

BMS 633 02(0-0-2). Domestic Animal Anatomy-Case Discussions. S. Prerequisite: Concurrent registration in BMS 531.

Clinical case discussions utilized in advanced understanding of domestic animal anatomy and physiology.

***BMS 640 04(4-0-0). Reproductive Physiology and Endocrinology.** F. Prerequisite: BMS 501.

Reproductive physiology and endocrinology of vertebrate animals.

***BMS 642 01(0-3-0). Research Techniques for Gametes and Embryos.** S. Prerequisite: BMS 640.

Collection, storage, evaluation, in vitro manipulation, and replacement of sperm, oocytes, embryos, and other reproductive tissues.

BMS 650 01(0-3-0). Transmission EM Laboratory. S. Prerequisite: BMS 550.

Operation of transmission electron microscope; preparation of samples; interpretation of images.

BMS 652 01(0-3-0). Scanning EM Laboratory. S, SS. Prerequisite: BMS 550.

Operation of scanning electron microscope; preparation of samples; interpretation of images.

BMS 660/NB 660 01(1-0-0). Seizures, Neurodegeneration, and Epilepsy. F. Prerequisite: BMS 325 or NB 505. Credit not allowed for both BMS 660 and NB 660.

Analyzes molecular, cellular and network mechanisms underlying seizures and responsible for epilepsy.

BMS 672A-B. Advanced Topics in Electron Microanalysis.

A) Freeze fracture 02(1-3-0). SS. Prerequisite: BMS 650. B) X-ray microanalysis 01(0-3-0). SS. Prerequisite: BMS 652.

BMS 684 Var. Supervised College Teaching.

BMS 692 01(0-0-1). Seminar-Classics in Neurosciences. Prerequisite: Admission to graduate program.

Review of classic papers in the neurosciences.

BMS 695A-F Var. Independent Study.

A) Developmental anatomy. B) Microscopic anatomy. C) Neuroanatomy. D) Radiographic anatomy. E) Surgical anatomy. F) Gross anatomy.

BMS 696 Var[1-3]. Group Study-Neurosciences. F.

Current topics in neuroscience; how to evaluate scientific presentations.

BMS 699 Var. Thesis.

***BMS 740 03(3-0-0). Metabolism.** F. Prerequisite: BMS 501.

Applied pathophysiology of disorders of carbohydrate, lipid, protein, fluid, and electrolyte metabolism.

BMS 784 Var. Supervised College Teaching.

BMS 792A-C Var [1-5]. Seminar.

A) Biomedical sciences. B) Neurophysiology. C) Reproductive physiology.

BMS 795A-E Var. Independent Study.

A) Endocrinology. B) Neurophysiology. C) Cell physiology. D) Cardiopulmonary physiology. E) Reproductive physiology.

BMS 796A-C Var. Group Study.

A) Neurophysiology. B) Cardiopulmonary physiology. C) Reproductive physiology.

BMS 799 Var. Dissertation.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

BIOAGRICULTURAL SCIENCES AND PEST MANAGEMENT COURSES

Department of Bioagricultural Sciences and Pest Management *College of Agricultural Sciences*

BSPM 102 03(3-0-0). Insects, Science, and Society. (GT-SC2, AUCC 3A). F, S.

How insects develop, behave, and affect human activity. What every student should know about the most diverse life form on Earth.

BSPM 201 03(3-0-0). Weed Management and Control. F, S. Offered only through the Division of Continuing Education.

Basic overview of weeds and weed control. (NT-O)

BSPM 300/ANEQ 300B 01(1-0-0). Topics in Livestock Entomology. S. Prerequisite: 3 credits of BZ or LIFE at the 100-level.. Credit not allowed for both BSPM 300 and ANEQ 300B.

Identification, biology, and management of insect, tick, and mite pests.

BSPM 302 02(2-0-0). Applied and General Entomology. F.

Biology and management of insects.

BSPM 303A-C. Entomology Laboratory. F. Prerequisite: BSPM 302 or concurrent registration.

Biology and recognition of insects. **A)** General 02(0-4-0). (\$) **B)** Horticultural 01(0-2-0). ***C)** Agricultural 01(0-2-0).

+BSPM 308 03(2-3-0). Ecology and Management of Weeds. F. Prerequisite: BZ 120 or LIFE 103; CHEM 107 or CHEM 111.

Classification, characteristics; weed biology and ecology; control by cultural, mechanical, chemical, and biological means; successional management. Field trips required.

***BSPM 310 03(3-0-0). Understanding Pesticides.** S. Prerequisite: Three credits 100-level BZ or CHEM.

Identification, properties, use, labeling, environmental interactions, and application of major classes of pesticides.

BSPM 350 02(1-2-0). Science Illustration. S. Prerequisite: None.

Fundamentals of science illustration emphasizing observational and drawing skills.

BSPM 361 03(2-2-0). Elements of Plant Pathology. S. Prerequisite: BZ 104 or BZ 120 or HORT 100 or LIFE 102.

Diseases of economic plants. (\$)

+BSPM 365 04(3-3-0). Integrated Tree Health Management. F. Prerequisite: BZ 120 or LIFE 102.

Insects and diseases in forest and urban ecosystems. Effects, diagnosis, prevention, and interactions. (\$)

BSPM 384 Var [1-3]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

°BSPM 423 03(1-4-0). Evolution and Classification of Insects. F. Credit not allowed for both BSPM 423 and BSPM 523.

Major groups of insects, living and fossil; major evolutionary trends in structure and behavior.

***BSPM 424/*BZ 424 03(3-0-0). Principles of Systematic Zoology.** S. Prerequisite: BZ 110 and BZ 111 or LIFE 103. Credit not allowed for both BSPM 424 and BZ 424.

Principles and methods of classification, zoological nomenclature, taxonomic decisions regarding species and higher categories.

BSPM 445 04(2-4-0). Aquatic Insects. F. Prerequisite: BZ 111 or LIFE 103.

Biology and recognition of major orders and families of aquatic insects; a collection is required. (\$)

***BSPM 450 03(3-0-0). Molecular Plant-Microbe Interactions.** S. Prerequisite: Three credits BZ; BZ 346 or SOCR 330. Credit not allowed for both BSPM 450 and BSPM 550.

Principles of plant-microbe/insect interactions, physiological and molecular aspects of plant defense, genomics approaches to study plant defense.

°BSPM 451 03(3-0-0). Integrated Pest Management. S. Prerequisite: BSPM 302 or BSPM 308 or BSPM 361.

Concepts of integrated pest management and the strategies and tactics employed in the application of these concepts.

BSPM 462/MIP 462/BZ 462 05(3-4-0). Parasitology and Vector Biology. F. Prerequisite: BZ 110 or LIFE 103; BZ 212 or LIFE 206 or MIP 302. Credit allowed for only one of the following: BSPM 462, MIP 462, BZ 462.

Protozoa, helminthes, and insects and related arthropods of medical importance; systematic, epidemiology, host damage and control. (\$)

BSPM 487 Var. Internship.

BSPM 492 Var [1-3]. Seminar.

BSPM 495 Var [1-3]. Independent Study.

BSPM 496 Var [1-3]. Group Study.

BSPM 502A-G 01. Topics in Plant Pathology.

°A) Plant viruses 01(1-0-0). F. Prerequisite: Three credits 300- or 400-level BIO or BSPM or BZ or LIFE. **°B)** Plant bacteriology 01(1-0-0). F. Prerequisite: Three credits 300- or 400-level BIO or BSPM or BZ or LIFE. ***F)** Plant disease epidemiology. 01(1-0-0). F. Prerequisite BSPM 361.

°BSPM 507 03(3-0-0). Insect Behavior. S.

Behavior of insects and related arthropods with special attention to social behavior.

°BSPM 508 03(3-0-0). Environmental Fate of Pesticides. S. Prerequisite: BZ 440 or CHEM 245 or SOCR 240.

Processes that affect fate of pesticides and their metabolites in the environment with emphasis on soil and water.

***BSPM 509 03(3-0-0). Herbicide Selectivity and Action.** F. Prerequisite: BSPM 308; BZ 440.

Selectivity of major photosynthetic and growth inhibitor herbicides based on herbicide transport, metabolism, and mode of action.

°BSPM 510 03(3-0-0). Insect-Plant Disease Relationships. F. Prerequisite: BSPM 302 or BSPM 361.

Relationships between insects and various plant pathogens as they affect survival and transmissions of pathogens.

***BSPM 520/*BZ 520 03 (3-0-0). Advanced Systematics.** S. Prerequisite: BSPM 424/BZ 424 or BZ 325. Credit not allowed for both BSPM 520 and BZ 520.

Theory and practice of modern systematics.

***BSPM 521 03(3-0-0). Forest Health Issues.** F.

Current topics related to forest and shade tree health from ecosystems to tree defense physiology.

°BSPM 523 04(1-4-1). Advanced Evolution/Classification of Insects. F. Credit not allowed for both BSPM 523 and BSPM 423.

Major groups of insects, living and fossil; major evolutionary trends in

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structure and behavior.

***BSPM 525 03(3-0-0). Insect Physiology.** S. Prerequisite: BSPM 302.
Principles of insect function.

°BSPM 526/°BZ 526 03(3-0-0). Evolutionary Ecology. F. Prerequisite BZ 320 or LAND 220/LIFE 220. Credit not allowed for both BSPM 526 and BZ 526.

Adaptation to abiotic and biotic environments; how current ecological processes interact with evolutionary history.

°BSPM 528 03(3-0-0). Invasive Plants/Weeds: Ecosystems to Molecules. S. Prerequisite: BZ 120; LAND 220/LIFE 220 or LIFE 320; LIFE 102 or LIFE 103.

Contributions of disciplines of weed science and invasion ecology to understanding the biology, ecology and management of “problem plants.”

BSPM 530/SOCR 530 01(1-0-0). Scientific Writing. S. Credit not allowed for both BSPM 530 and SOCR 530.

Skills necessary to prepare complete scientific journal articles including writing, editing, and literature searching and assessment.

BSPM 540 03(3-0-0). Understanding Genomes. F.

Harnessing genome information and related –omics level technologies for use in answering biological questions.

***BSPM 550 03(3-0-0). Molecular Plant-Microbe Interactions.** S. Prerequisite: Three credits BZ; BZ 346 or SOCR 330. Credit not allowed for both BSPM 550 and BSPM 450.

Principles of plant-microbe interactions, physiological and molecular aspects of plant defense, genomic approaches to study plant defense.

°BSPM 551 04(3-0-1). Advanced Integrated Pest Management. S. Prerequisite: BSPM 302 or BSPM 308 or BSPM 361.

Concepts of integrated pest management and the strategies and tactics employed in the practical application of these concepts.

°BSPM 555 03(1-4-0). Immature Insects. S. Prerequisite: BSPM 303A or BSPM 303B or BSPM 303C.

Characteristics of immature forms of orders and families of insects emphasizing those important to humans.

***BSPM 556 03(3-0-0). Biological Control of Plant and Insects.** F. Prerequisite: BZ 120 or LIFE 103; LIFE 320 or LAND 220/LIFE 220.

Management of insect pests of plants and weeds using biological control agents such as insects, bacteria, viruses, and fungi.

***BSPM 570 03(3-0-0). Chemical Ecology.** S.

Chemical interactions among animals, plants, fungi, and microorganisms.

***BSPM 571 01(0-2-0). Techniques in Chemical Ecology.** S.

Practical experience with chemical techniques for separation, analysis, and synthesis of natural products together with biological assays for activity.

***BSPM 575/*BZ 575 03(3-0-0). Molecular and Genomic Evolution.** S. Prerequisite: BZ 220; BZ 350. Credit not allowed for both BSPM 575 and BZ 575.

Molecular biological mechanisms of evolutionary change: mutation; selection; gene expression/regulation; changes in whole-genome architecture.

BSPM 576/MIP 576 03(3-0-0). Bioinformatics. F, S. Prerequisite: BC 463 or BZ 310 or BZ 350 or CM 501 or CS 155 or ERHS 332 or MIP 275 or MIP 300 or MIP 450 or STAT 307. Credit not allowed for both BSPM 576 and MIP 576.

Technical computing across platforms using bioinformatics tools in molecular analyses.

BSPM 584 Var [1-3]. Supervised College Teaching.

BSPM 587 Var. Internship.

BSPM 592 Var [1-3]. Seminar. F, S.

Major questions and theory pertinent to understanding current and relevant science topics.

BSPM 594 Var [1-3]. Independent Study.

BSPM 596 Var [1-3]. Group Study.

BSPM 698 Var. Research.

BSPM 699 Var. Thesis.

BSPM 710/CM 710 03(0-4-1). Techniques in Molecular Biology and Genetics. S. Prerequisite: BC 463 or BZ 346 or BZ 350 or MIP 450 or SOCR 330. Credit not allowed for both BSPM 710 and CM 710.

Genetic manipulation of bacteria, bacteriophage, and yeast including experiments in molecular cloning and gene expression.

°BSPM 740/°SOCR 740 03(3-0-0). Plant Molecular Genetics. F. Prerequisite: BC 351; SOCR 330. Credit not allowed for both BSPM 740 and SOCR 740.

Advances in study of organization and function of nuclear and organellar genomes, gene expression in higher plants, and plant-microbe interactions.

BSPM 784 Var [1-3]. Supervised College Teaching.

BSPM 787 Var. Internship.

BSPM 792 Var [1-2]. Seminar.

BSPM 794 Var [1-3]. Independent Study.

BSPM 798 Var. Research.

BSPM 799 Var. Dissertation.

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BIOTECHNOLOGY COURSES

Nondepartmental

College of Veterinary Medicine and Biomedical Sciences

BTEC 306/BIOM 306 04(3-2-0). Bioprocess Engineering. S.
Prerequisite: CHEM 107 or CHEM 111; PH 121 or PH 141. Credit not allowed for both BTEC 306 and BIOM 306.

Material, energy balances; fluid flow, heat exchange, mass transfer; application to operations in food, fermentation, other bioprocess industries.

BTEC 499 Var [1-3]. Biotechnology Thesis. Prerequisite: Twelve credits from biotechnology core; approval of program coordinator.

BUSINESS COURSES – GENERAL

Nondepartmental College of Business

BUS 100 01(1-0-0). Introduction to Business. F, S.

Overview of functional areas of business: accounting, finance, information systems, management, marketing, and international business.

BUS 150 03(3-0-0). Business Computing Concepts and Applications. F, S, SS.

System hardware, operating environments, and software applications. (NT-O)

BUS 205 03(3-0-0). Legal and Ethical Issues in Business. F, S, SS. Credit not allowed for both BUS 205 and BUS 260.

Ethical, legal and regulatory issues in the U.S. business environment. (NT-O)

BUS 260 03(3-0-0). Social-Ethical-Regulatory Issues in Business. F, S, SS. Prerequisite: BUS 100 or HONR 192 or KEY 192. Credit not allowed for both BUS 260 and BUS 205.

Legal issues, business ethics, corporate responsibility, and the business interface within the U.S. regulatory and business environment.

BUS 300 03(3-0-0). Business Writing and Communication. (GT-CO3, AUCC 2B) F, S, SS. Prerequisite: BUS 100 or HONR 192 or Key 192; CO 150 or HONR 193.

Advanced writing for business using recursive process and appropriate means given audience and message purpose. Preparation, presentation of reports.

BUS 350 03(3-0-0). Travel Abroad-International Comparative Management. SS. Prerequisite: Six credits of business courses.

Travel tour of European business to compare and contrast their business strategies to those of U.S. firms.

BUS 405A-C 03(3-0-0). Contemporary Business Topics. F, S. Prerequisite: Any 2 of FIN 305, MGT 305, MKT 305. For non-business majors only.

A) Entrepreneurship. (NT-O) B) International business. C) Business information management.

BUS 425 03(3-0-0). Starting and Managing Your Own Business. F. Prerequisite: Written consent of instructor.

Business aspects of starting and managing your own small enterprise.

BUS 479 03(3-0-0). Strategic Management. F, S, SS. Prerequisite: FIN 300 or FIN 305; MGT 301; MGT 305 or MGT 320; MKT 300 or MKT 305.

An integration of various business subject areas in terms of top-level policy and decision making.

BUS 495 Var. Independent Study.

BUS 496 Var. Group Study.

BUS 505 03(3-0-0). Legal and Ethical Environment of Business. S. Prerequisite: Admission to a master's program in business.

Legal and regulatory issues impacting business operation. Ethical and social responsibility concepts applied to business setting.

BUS 601 02(2-0-0). Quantitative Business Analysis. S. Prerequisite: Course in basic descriptive and inferential statistics.

Uses and management of information; decision tools and concepts; quality control. (NT-V)

BUS 604/STAT 604 02(2-0-0). Managerial Statistics. F. Prerequisite: Admission to the MBA Program. Credit not allowed for both BUS 604 and STAT 604.

Introduction to statistical thinking and methods used to support

managerial-decision making. (NT-V)

BUS 615 04(4-0-0). Accounting Systems. F.

Financial, managerial accounting information systems. Use of accounting information for purposes of management decision making, planning, and control. (NT-V)

BUS 616 02(2-0-0). Financial Reporting and Analysis. S, SS. Prerequisite: BUS 615.

Tools and techniques for analysis of financial reports of public companies. (NT-V)

BUS 620 02(2-0-0). Leadership and Teams. F.

Ethical leadership and team dynamics; basic models of motivation utilized by leaders. (NT-V)

BUS 621 02(2-0-0). Strategic Decision Making. F.

Key decision concepts, processes and tools that help managers formulate and implement competitive strategy. (NT-V)

BUS 625 02(2-0-0). Organizational Communication. S.

Improving understanding and application of managerial communication skills and negotiation tools and their implications for effective management. (NT-V)

BUS 626 02(2-0-0). Managing Human Capital. S. Prerequisite:

Admission to a graduate program in Business.

Management of human capital for competitive advantage and superior results. (NT-V)

BUS 630 02(2-0-0). Information Management. S. Prerequisite: BUS 615.

Role and value of information in business functions; risks and rewards of enterprise information; fundamentals of information storage and retrieval. (NT-V)

BUS 631 02(2-0-0). Strategic Uses of Information Technology. F, S.

Prerequisite: BUS 630 or concurrent registration.

Strategic and tactical uses of information technology in the global business environment. (NT-V)

BUS 635 02(2-0-0). Business Economics for the World Market. F, S.

Prerequisite: BUS 601 or BUS 604/STAT 604; BUS 615.

Application of economic principles to current business problems within context of global marketplace. (NT-V)

BUS 640 02(2-0-0). Financial Principles and Practice. F, S. Prerequisite: BUS 601 or BUS 604/STAT 604.

Financial environment; tools and techniques of corporate financial decision making. (NT-V)

BUS 641 02(2-0-0). Financial Markets and Investments. F, S.

Prerequisite: BUS 640 or concurrent registration.

Operating of financial markets, techniques for security valuation, and portfolio management. (NT-V)

BUS 645 02(2-0-0). Enterprise Electronic Business Strategies. S.

Prerequisite: BUS 630.

Technology for electronic commerce; regulation and strategies for competitive usage. (NT-V)

BUS 650 02(2-0-0). Supply Chain Management. S. Prerequisite: BUS 601 or BUS 604/STAT 604; BUS 630.

Value-driven supply chain principles, design and management of supply chains, and supply chain management software and applications. (NT-V)

BUS 655 02(2-0-0). Marketing Management. F. Prerequisite: BUS 635.

Examines processes of customer value creation (e.g., product development, communications, distribution) and value capture (e.g. pricing). (NT-V)

BUS 656 02(2-0-0). Marketing Strategy and Planning. F. Prerequisite: BUS 616; BUS 640; BUS 655.

Basic marketing strategy analysis, formulation, evaluation and

implementation concepts and tools. (NT-V)

BUS 660 02(2-0-0). Ethical, Legal, and Regulatory Issues. S.
Prerequisite: BUS 615.

Legal, regulatory, societal and ethical issues encountered by business professionals; analytical skills for making judgments. (NT-V)

BUS 662 02(2-0-0). International Business. F, S, SS. Prerequisite: BUS 635; BUS 641; BUS 650.

Role of government regulations and how international firms affected; cultural aspects of business, global marketing, finance, management. (NT-V)

BUS 665 04(4-0-0). MBA Capstone. S. Prerequisite: BUS 641; BUS 650; BUS 656.

To integrate business disciplines through strategic thinking and experiential learning. (NT-V)

BUS 669 03(3-0-0). Sustainable Enterprise Funding and Evaluation. F.
Prerequisite: BUS 601; FIN 601; MGT 668.

Funding sustainable enterprises. Grant writing, venture philanthropy, angel investors, and venture capital. Project development, evaluation, execution.

BUS 678 03(3-0-0). Business Research. F. Prerequisite: QNT 270.

Techniques for designing, conducting, and evaluating business research.

BUS 686 Var. Practicum. Prerequisite: Written consent of instructor.

BUS 687 Var. Internship. Prerequisite: Written consent of instructor.

BUS 690A-H Var[1-6]. Contemporary Issues in Business. F, S, SS.
Prerequisite: Admission to a College of Business graduate program.

Current issues in business, featuring business and community leaders.

A) Contemporary Issues in Business. **B)** Grad Tutorials. **C)** Info Systems. **D)** Accounting. **E)** Global Enterprise. **F)** Finance. **G)** Government. **H)** Mgmt Practices. (NT-O/T/V)

BUS 695 Var. Independent Study.

BUS 696 Var. Group Study. Prerequisite: Written consent of instructor.

BUS 699 Var. Thesis.

BOTANY/ZOOLOGY COURSES

Department of Biology

College of Natural Sciences

BZ 100 03. Introduction to Biology. F, S, SS. Offered as telecourse only.

Basic concepts in biology, including genetics, the human body, and interactions with their environment. (NT-T)

BZ 101 03(3-0-0). Humans and Other Animals. (GT-SC2, AUCC 3A). F, S. Credit not allowed for students who have already taken BZ 110 or LIFE 102 or LIFE 103.

Characteristics of animals, their evolution and diversity; humans considered as an animal. (NT-O)

BZ 104 03(3-0-0). Basic Concepts of Plant Life. (GT-SC2, AUCC 3A). F, S. For non-science and physical science majors. Credit not allowed for students who have already taken BZ 120 or LIFE 102 or LIFE 103.

Broad concepts of biology with major emphasis on plant life.

BZ 105 01(0-2-0). Basic Concepts of Plant Life Laboratory. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: BZ 104 or concurrent registration.

Modern biology exercises including viruses, Monera, Protista, fungi, plants, genetics, physiology, and ecology. (\$)

BZ 110 03(3-0-0). Principles of Animal Biology. (GT-SC1, AUCC 3A). F, S, SS.

General features (body form, physiology, life history, ecology) and evolutionary relationships of major phyla of animals.

BZ 111 01(0-3-0). Animal Biology Laboratory. (GT-SC2, AUCC 3A). F, S, SS. Prerequisite: BZ 110 or concurrent registration.

Laboratory exercises demonstrating major features of animal biology and major phyla of animals. (\$)

BZ 120 04(3-3-0). Principles of Plant Biology. (GT-SC2, AUCC 3A). F, S.

Diversity of relationships of plants and their structural and functional characteristics. (\$)

BZ 212 04(3-3-0). Animal Biology-Invertebrates. F. Prerequisite: BZ 110; BZ 111 or LIFE 103.

General biology of invertebrates; their characteristics, classification, and adaptations. (\$)

+BZ 214 04(3-3-0). Animal Biology—Vertebrates. S. Prerequisite: BZ 110; BZ 111 or LIFE 103.

General biology of vertebrates; their characteristics, classification, and adaptations. Field trips required. (\$)

BZ 220 03(3-0-0). Introduction to Evolution. F, S, SS. Prerequisite: BZ 110; BZ 111 or BZ 120 or LIFE 103.

Fundamental concepts in evolutionary biology.

BZ 223 03(2-2-0). Plant Identification. F, SS. Prerequisite: BZ 120 or LIFE 103.

Relationships and identification of flowering plants.

BZ 300 03(3-0-0). Animal Behavior. S, SS. Prerequisite: BZ 110 and (BZ 111 or LIFE 103).

Principles of ethology, behaviors of nonhuman animals emphasizing their adaptive significance and phylogenetic relationships.

***BZ 301 02(0-4-0). Animal Behavior Laboratory.** S. Prerequisite: BZ 300 or concurrent registration.

Laboratory experiments in animal behavior; demonstrations and independent investigations.

°BZ 302 03(2-2-0). Poisonous Plants. F. Prerequisite: BZ 120 or LIFE 103.

Identification and toxic properties of certain plants; animal reactions to more important ones.

BZ 310 04(3-3-0). Cell Biology. F, S, SS. Prerequisite: BZ 110 or BZ 120 or LIFE 103; CHEM 245 with a C or better or CHEM 345 with a C or better.

Structure and function of cells emphasizing molecular mechanisms. Communication, metabolism, motility, genetics, growth, reproduction. (\$)

BZ 311 04(3-2-0). Developmental Biology. S, SS. Prerequisite: BZ 310.

Developmental aspects of growth and differentiation stressed in higher plants and animals. (\$)

°BZ 315 03(2-0-1). Marine Ecology. F. Prerequisite: BZ 110; BZ 111; BZ 120 or LIFE 103; CHEM 245 or CHEM 345.

Marine organisms, habitats, and communities.

***BZ 321 03(1-4-0). Aquatic Vascular Plants.** F. Prerequisite: BZ 223 or BZ 325.

Taxonomic relationships and identification of aquatic vascular plants.

***BZ 325 04(3-2-0) Plant Systematics.** S. Prerequisite: BZ 220.

Principles and contemporary methods of classification of plants, and the application of modern phylogenetic theory in comparative biology.

BZ 329 03(2-2-0). Herpetology. S. Prerequisite: BZ 214.

Biology of amphibians and reptiles.

BZ 330 03(2-2-0). Mammalogy. F. Prerequisite: BZ 110; BZ 111 or LIFE 103.

Evolution, classification, and biology of mammals; practice in identifying and preparing specimens. (\$)

***BZ 331 04(2-4-0). Developmental Plant Anatomy.** F. Prerequisite: BZ 120 or LIFE 103; BZ 350 or concurrent registration; CHEM 245 or CHEM 346.

Structure of plant cells, tissues, and organs as they develop.

***BZ 332 04(3-2-0). Introductory Phycology.** F. Prerequisite: BZ 120 or LIFE 102.

Morphology, ultrastructure, physiology, ecology, and phylogeny of freshwater and marine algae.

BZ 333 04(2-4-0). Introductory Mycology. F. Prerequisite: BZ 120 or LIFE 103.

Groups of fungi including classification, structure, morphogenesis, phylogeny, and genetics and reproduction.

+BZ 335 03(2-3-0). Ornithology. S. Prerequisite: BZ 110; BZ 111 or LIFE 103.

Biology of birds, especially behavior, ecology, and identification in the laboratory and field. (\$)

°BZ 338 04(2-4-0). Comparative Morphology of Vascular Plants. S. Prerequisite: BZ 120 or LIFE 103.

Origin, evolution, structure, and reproduction of the vascular plants, including comparative study of organs occurring in each group.

BZ 346 03(3-0-0). Population and Evolutionary Genetics. F. Prerequisite: BZ 220; MATH 155; STAT 301 or STAT 307.

Evolutionary theories and history; heredity mechanisms that are basis for variation, evolution, and biological communication between generations.

BZ 348/MATH 348 04(3-3-0). Theory of Population and Evolutionary Ecology. F. Prerequisite: MATH 155 or MATH 160. Credit allowed for only one of the following: BZ 348, BZ 548, MATH 348.

Principles and methods for building, analyzing, and interpreting mathematical models of ecological and evolutionary problems in biology.

BZ 349 03(3-0-0). Tropical Ecology and Evolution. F. Prerequisite: BZ 220.

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Broad introduction to terrestrial and aquatic tropical biodiversity and the ecological and evolutionary processes that generate and maintain it.

BZ 350 04(3-0-1). Molecular and General Genetics. F, S, SS. Prerequisite: BZ 110 or BZ 120 or LIFE 102; STAT 201 or concurrent registration or STAT 301 or concurrent registration or STAT 307 or concurrent registration. Primarily for students in biological sciences.

Mendelian, molecular, and population genetics emphasizing the molecular basis of genetics.

BZ 353/NR 353 03(3-0-0). Global Change Ecology, Impacts and Mitigation. S. Prerequisite: LAND 220/LIFE 220 or LIFE 320. Credit not allowed for both BZ 353 and NR 353.

Ecological impacts of human-induced global change, and the strategies that can/are being used to adapt to and mitigate these impacts.

BZ 384 Var [1-5]. Supervised College Teaching. F, S. Prerequisite: 3.000 overall GPA; written consent of instructor; grade of A in course with which student assists. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

BZ 401 03(3-0-0). Comparative Animal Physiology. S. Prerequisite: BZ 214.

Physiological mechanisms of digestion, metabolism, osmoregulation, excretion, circulation, and respiration in vertebrate and invertebrate animals.

BZ 402 04(3-3-0). Molecular Cytogenetics. S. Prerequisite: BZ 310 or concurrent registration or LIFE 210 or concurrent registration; BZ 350 or concurrent registration or LIFE 201A or concurrent registration or LIFE 201B or concurrent registration or SOCR 330 or concurrent registration.

Structure, function, and behavior of chromosomes during interphase, mitosis, and meiosis.

°BZ 403 03(3-0-0). Comparative Endocrinology. F. Prerequisite: BZ 310.

Comparison of endocrine molecules, responses, and control mechanisms in vertebrates and invertebrates emphasizing molecular aspects.

***BZ 420 03(3-0-0). Evolutionary Medicine.** F. Prerequisite: BZ 220.

Integration of evolutionary biology with behavior, genetics, and ecology to understand health and disease.

***BZ 424/*BSPM 424 03(3-0-0). Principles of Systematic Zoology.** S. Prerequisite: BZ 110; BZ 111 or LIFE 103. Credit not allowed for both BZ 424 and BSPM 424.

Principles and methods of classification, zoological nomenclature, taxonomic decisions regarding species and higher categories.

***BZ 425 03(3-0-0). Molecular Ecology.** F. Prerequisite: BZ 220; BZ 350; STAT 301 or STAT 307. Credit not allowed for both BZ 425 and BZ 525. Introduction to molecular genetic markers for questions in ecology, evolution, behavior and conservation.

***BZ 433 03(3-0-0). Behavioral Genetics.** S. Prerequisite: BZ 350 or LIFE 201A or LIFE 201B or SOCR 330.

Genetics of behavioral characteristics in animals.

BZ 440 03(3-0-0). Plant Physiology. S. Prerequisite: BZ 120 or LIFE 103.

Functions and activities of plants.

BZ 441 02(0-2-1). Plant Physiology Laboratory. S. Prerequisite: BZ 440 or concurrent registration.

Laboratory applications of plant physiology principles.

BZ 450 04(3-2-0). Plant Ecology. S. Prerequisite: LIFE 103 or BZ 120.

Relation of plants to their environment.

BZ 455 03(3-0-0). Human Heredity and Birth Defects. S. Prerequisite: BZ 110 and BZ 111 or LIFE 103.

Human heredity and its individual and social implications; causes of congenital defects.

BZ 462/MIP 462/BSPM 462 05(3-4-0). Parasitology and Vector Biology. F. Prerequisite: BZ 110 or LIFE 103; BZ 212 or LIFE 206 or MIP 302. Credit allowed for only one of the following: BZ 462, BSPM 462, MIP 462.

Protozoa, helminths, and insects and related arthropods of medical importance; systematics, epidemiology, host damage and control. (\$)

°BZ 471 03(3-0-0). Stream Biology and Ecology. F. Prerequisite: LAND 220/LIFE 220 or LIFE 320.

Biology and ecology of running waters.

+°BZ 472 01(0-3-0). Stream Biology and Ecology Laboratory. F. Prerequisite: BZ 471 or concurrent registration.

Field sampling and laboratory analysis of habitats, biota, and ecological relationships in running waters. (\$)

+*BZ 474 03(2-2-0). Limnology. F. Prerequisite: LAND 220/LIFE 220 or LIFE 320.

Biology, chemistry, and physics of lakes including limnological methods. (\$)

***BZ 476 03(3-0-0). Topics in Advanced Genetics.** F. Prerequisite: BZ 350 or LIFE 201A or LIFE 201B or SOCR 330.

Advanced topics in model genetic systems including molecular and developmental genetics.

BZ 479/VS 479 03(3-0-0). Biology and Behavior of Dogs. F, S. Prerequisite: BZ 110 or LIFE 103. Credit not allowed for both BZ 479 and VS 479.

Interactions of physiology, neurobiology, and genetics on behavior of domestic dogs, and how evolution and domestication influence behavioral traits. (NT-O)

BZ 487 Var [1-12]. Internship.

Supervised work-related research experience in laboratory or field setting with consultation and approval of a regular faculty member.

BZ 492A-G Var [1-3]. Seminar.

A) Behavior. B) Ecology. C) Genetics. D) Ornithology. E) Herpetology. F) Evolution. G) Departmental.

BZ 495 Var [1-3]. Independent Study. Maximum of 7 credits allowed in course.

BZ 498 Var [1-6]. Laboratory or Field Research. Prerequisite: Written consent of research mentor.

Supervised lab or field research in biology, botany, or zoology.

°BZ 505 03(3-0-0). Cognitive Ecology. F. Prerequisite: BZ 300.

The evolutionary ecology of information processing and decision-making.

°BZ 510 03(3-0-0). Zoophysiological Ecology. S. Prerequisite: BMS 300 or BMS 360 or BZ 401; LAND 220/LIFE 220 or LIFE 320.

Concepts, principles, and examples of adaptive physiological strategies used by animals.

***BZ 515 03(3-0-0). Physiological Ecology of Marine Vertebrates.** S. Prerequisite: BZ 214; BZ 330; BC 351 or BC 401 or BMS 300 or BZ 401.

Physiological adaptations of vertebrates to different marine environments.

***BZ 520/*BSPM 520 03 (3-0-0). Advanced Systematics.** S. Prerequisite: BSPM 424/BZ 424 or BZ 325. Credit not allowed for both BZ 520 and BSPM 520.

Theory and practice of modern systematics.

***BZ 525 04(3-0-1). Molecular Ecology.** F. Prerequisite: BZ 220; BZ 350; STAT 301 or STAT 307. Credit not allowed for both BZ 525 and BZ 425.

Molecular genetic markers for questions in ecology, evolution, behavior

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and conservation.

°BZ 526/°BSPM 526 03(3-0-0). Evolutionary Ecology. F. Prerequisite: LAND 220/LIFE 220 or LIFE 320. Credit not allowed for both BZ 526 and BSPM 526.

Adaptation to abiotic and biotic environments; how current ecological processes interact with evolutionary history.

***BZ 530 02(2-0-0). Ecological Plant Morphology.** S. Prerequisite: BZ 220; BZ 450 or LIFE 320.

Adaptive significance and evolution of plant form and structure.

°BZ 535 03(3-0-0). Behavioral Ecology. S. Prerequisite: BZ 220; graduate standing or written consent of instructor.

Evolutionary and theoretical perspectives in animal behavior using examples from model empirical systems; emphasis on decision rules and social behavior.

***BZ 537 03(2-2-0). Topics in Mycology.** S. Prerequisite: BZ 333.

Features common to all fungi; trends in structure, function, and behavior.

***BZ 540 02(2-0-0). Translocation in Plants.** S. Prerequisite: BZ 331; BZ 440.

Transport of sugars, organic and inorganic ions, water, and hormones across membranes and through vascular systems of plants.

BZ 544 02(2-0-0). Presenting Research in Biology. F. Prerequisite: Written consent of instructor.

Procedures for preparing and presenting results of biological research in scientific journals and at professional meetings.

BZ 548 04(3-3-0). Theory of Population and Evolutionary Ecology. F. Prerequisite: MATH 155 or MATH 160. Credit allowed for only one of the following: BZ 548, BZ 348, MATH 348.

Principles and methods for building, analyzing, and interpreting mathematical models of ecological and evolutionary problems in biology; research module.

°BZ 555 03(3-0-0). Reproductive Biology of Higher Plants. S. Prerequisite: BZ 310 or LIFE 210; BZ 350 or LIFE 201A or LIFE 201B or SOCR 330.

Reproductive processes influencing evolution in higher plant groups.

BZ 561 03(3-0-0). Landscape Ecology. F. Prerequisite: LIFE 320; STAT 301 or STAT 307; written consent of instructor.

Concepts, methods, and models for examining spatial patterns and processes of natural and managed landscapes and their effects on ecological dynamics.

***BZ 570 03(3-0-0). Molecular Aspects of Plant Development.** S. Prerequisite: BC 463 or BZ 350 or MIP 450 or SOCR 330.

Various aspects of plant development at the molecular level.

°BZ 572 03(3-0-0). Phytoremediation. F. Prerequisite: BZ 120 or LIFE 103.

Environmental cleanup using plants.

***BZ 575/BSPM 575 03(3-0-0). Molecular and Genomic Evolution.** S. Prerequisite: BZ 220; BZ 350. Credit not allowed for both BZ 575 and BSPM 575.

Molecular biological mechanisms of evolutionary change: mutation selection; gene expression/regulation; changes in whole-genome architecture.

BZ 577/MIP 577 02(0-4-0). Computer Analysis in Population Genetics. F. Prerequisite: BZ 578/MIP 578 or concurrent registration. Credit not allowed for both BZ 577 and MIP 577.

Computational and statistical techniques and practical exercises in discrete and quantitative genetics.

BZ 578/MIP 578 04(3-0-1). Genetics of Natural Populations. F. Prerequisite: BZ 350 or LIFE 201A or LIFE 201B or SOCR 330; STAT

201 or STAT 301 or STAT 307. Credit not allowed for both BZ 578 and MIP 578.

Theoretical and empirical aspects of the genetics of natural populations; current molecular techniques and statistical analysis.

BZ 584 Var [1-3]. Supervised College Teaching. Maximum of 6 credits allowed in course.

BZ 587A-B Var [1-6]. Internship. Prerequisite: Written consent of instructor.

A) General. B) Herbarium.

BZ 594 Var [1-3]. Independent Study.

***BZ 642 03(3-0-0). Plant Metabolism.** F. Prerequisite: BC 351; BZ 440. Biosyntheses and transformations of important plant metabolites.

BZ 692A-H Var [1-3]. Seminar.

A) Behavior. C) Ecology. D) Genetics. E) Ornithology. G) Evolution. H) Departmental.

BZ 695 Var [1-3]. Independent Study.

BZ 698 Var. Research.

BZ 699 Var. Thesis.

BZ 784 Var [1-3]. Supervised College Teaching. Maximum of 6 credits allowed in course.

BZ 792 01(0-0-1). Seminar.

BZ 795 Var [1-3]. Independent Study.

BZ 798 Var. Research.

BZ 799 Var. Dissertation.

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CHEMICAL AND BIOLOGICAL ENGINEERING COURSES

Department of Chemical and Biological Engineering College of Engineering

CBE 101 03(2-2-0). Chemical and Biological Engineering I. F.

Engineering design and problem solving; technical presentation skills; basic computer programming.

CBE 102 03(2-2-0). Chemical and Biological Engineering II. S. Prerequisite: CBE 101.

Applications of engineering design and problem solving; computer programming to solve engineering problems; team project.

CBE 201 03(3-0-0). Material and Energy Balances. F. Prerequisite: CBE 102 or MATH 151 or concurrent registration in MATH 151; CHEM 111; LIFE 102 or concurrent registration; PH 141.

Principles of chemistry, physics, and mathematics applied to development of material and energy balances; illustration of concepts.

CBE 210 03(3-0-0). Thermodynamic Process Analysis. S. Prerequisite: CBE 201; MATH 261 or concurrent registration.

Thermodynamic fundamentals and applications to ideal and non-ideal mixtures, power cycles, and chemical equilibria.

CBE 310 03(3-0-0). Molecular Concepts and Applications. F. Prerequisite: CBE 210; MATH 340.

Application of modern molecular theory to chemical and biological engineering programs in thermodynamics, chemical kinetics, and transport phenomena.

CBE 320 03(3-0-0). Chemical and Biological Reactor Design. S. Prerequisite: CBE 310; CBE 330.

Mechanisms and rates of chemical reactions; design of homogeneous and heterogeneous reactors; biological reactions and reactors.

CBE 330 03(3-0-0). Process Simulation. F. Prerequisite: CBE 210; MATH 340.

Analysis of chemical and biological engineering problems by numerical simulation.

CBE 331 03(3-0-0). Momentum Transfer and Mechanical Separations. F. Prerequisite: CBE 210 or MECH 237; MATH 340.

Fluid properties; conservation equations; compressible and incompressible flow; pumping and metering; mixing; separation of fluid-solid mixtures.

CBE 332 03(3-0-0). Heat and Mass Transfer Fundamentals. F. Prerequisite: CBE 310; CBE 330; CBE 331.

Thermal processes; steady and unsteady conduction; convective heat transfer; radiation; heat exchanger design; mass transfer by diffusion and convection.

CBE 333 02(0-5-0). Chemical and Biological Engineering Lab I. S. Prerequisite: CBE 332 or concurrent registration.

Laboratory experiments involving material balances, thermodynamics, and momentum and heat transfer. Data analysis; written and oral reports. (\$)

CBE 406 03(3-0-0). Introduction to Transport Phenomena. F. Prerequisite: CBE 332.

Fundamental treatment of momentum and mass transport processes; dimensional analysis for parameter identification and order of magnitude estimation.

CBE 430 03(3-0-0). Process Control and Instrumentation. S.

Prerequisite: CBE 320; CBE 442.

Measurement and control of process variables; transient chemical and biological processes; feedback, feedforward, and computer control concepts.

CBE 439/CIVE 439 03(2-3-0). Environmental Engineering Chemical Concepts. F. Prerequisite: CHEM 113; MATH 340. Credit not allowed for both CBE 439 and CIVE 439.

Application of chemical principles to environmental engineering problems.

CBE 442 04(4-0-0). Separation Processes. F. Prerequisite: CBE 332.

Analysis of chemical and biological separations based on thermodynamics, diffusion, and convective mass transfer; design of separations equipment.

CBE 443 02(0-5-0). Chemical and Biological Engineering Lab II. F. Prerequisite: CBE 442 or concurrent registration.

Laboratory experiments involving advanced chemical and biological engineering concepts. Data analysis; written and oral reports. (\$)

CBE 451 03(3-0-0). Chemical and Biological Engineering Design I. F. Prerequisite: CBE 320; CBE 442 or concurrent registration.

Chemical and biological process synthesis and simulation; engineering economics principles.

CBE 452 03(2-2-0). Chemical and Biological Engineering Design II. S. Prerequisite: CBE 451.

Projects requiring students to design a chemical and/or biological process with cost estimation and constraint analysis; written and oral reports.

CBE 493 01(0-0-1). Professional Development Seminar. F.

Topics in engineering professional development, including ethics, role of engineers in society, and life-long learning.

CBE 495 Var. Independent Study.

CBE 496 Var. Group Study.

CBE 501 03(3-0-0). Chemical Engineering Thermodynamics. F. Prerequisite: CBE 210; MATH 340.

Definition, correlation, and estimation of thermodynamic properties; nonideal chemical and physical equilibria.

CBE 502 03(3-0-0). Advanced Reactor Design. F. Prerequisite: CBE 320; CBE 332.

Nonideal flow and tracers, reactions and diffusion, evaluation of complex kinetics, stability of reactors. Biochemical reactor examples. (NT-V)

CBE 503 03(3-0-0). Transport Phenomena Fundamentals. S. Prerequisite: CBE 406.

General topics in transport phenomena; analytical and numerical solutions of laminar flows; perturbation techniques; coupled transport.

CBE 504/BIOM 504 03(3-0-0). Fundamentals of Biochemical Engineering. F. Prerequisite: BIOM 306/BTEC 306 or concurrent registration or CBE 320 or concurrent registration; MATH 255 or MATH 340; MIP 300. Credit not allowed for both CBE 504 and BIOM 504.

Application of chemical engineering principles to enzyme kinetics, fermentation and cell culture, product purification, and bioprocess design.

°CBE 505 01(0-3-0). Biochemical Engineering Laboratory. F. Prerequisite: CBE 504/BIOM 504 or concurrent registration.

Fermentation technology, bioprocess control, and protein purification.

CBE 514 03(3-0-0). Polymer Science and Engineering. S. Prerequisite: CHEM 343 or CHEM 346; or CHEM 474 or CBE 310.

Fundamentals of polymer science: synthesis, characterization, processing of polymers. Physical properties of polymers; rheology of melts and

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solutions.

CBE 521 03(3-0-0). Mathematical Modeling for Chemical Engineers. F. Prerequisite: MATH 340.

Application of mathematical models to analysis and design of chemical reactors and separation processes.

CBE 522/BIOM 522 03(2-2-0). Bioseparation Processes. F. Prerequisite: CBE 331. Credit not allowed for both CBE 522 and BIOM 522.

Analysis of processes used to recover and purify fermentation products.

°CBE 524 0 1(1-0-0). Bioremediation. F. Prerequisite: CBE 540/CIVE 540.

Use of biotechnology for site remediation. Biodegradation, bioreactor design, and in situ bioremediation. (NT-V)

CBE 540/CIVE 540 03(3-0-0). Advanced Biological Wastewater Processing. S. Prerequisite: CIVE 438/ENVE 438 or CBE 320. Credit not allowed for both CBE 540 and CIVE 540.

Fundamentals of environmental biotechnology: environmental microbiology, microbial kinetics, basic reactor design, wastewater treatment.

CBE 543/BIOM 543 03(3-0-0). Membranes for Biotechnology and Biomedicine. F. Prerequisite: CHEM 343; CBE 310. Credit not allowed for both CBE 543 and BIOM 543.

Polymeric membrane formation, modification, module design and applications to bioseparation and biomedical separations and tissue engineering. (NT-O)

°CBE 613 03(3-0-0). Advanced Transport Phenomena. F. Prerequisite: ATS 601 or CBE 503 or CIVE 502; MATH 530.

Fundamental studies of multi-component mass, energy, and momentum transport, with applications in advanced materials, biomedical and biochemical systems.

CBE 621 03(3-0-0). Advanced Process Control. F. Prerequisite: CBE 430.

Application of modern control theory to chemical processes. Computer control aspects emphasized.

***CBE 660 03(3-0-0). System and Parameter Identification.** S. Prerequisite: Graduate standing.

Principles and methods for selecting the most appropriate equations, and properties within those equations, to mathematically simulate physical phenomena.

CBE 693 Var. Seminar I.

CBE 695 Var. Independent Study.

CBE 699 Var. Thesis.

CBE 707 01(1-0-0). Advanced Topics in Biochemical Engineering. F. Advanced biochemical engineering topics.

CBE 793 Var. Seminar II.

CBE 795 Var. Independent Study.

CBE 799 Var. Dissertation.

CHEMISTRY COURSES

Department of Chemistry College of Natural Sciences

CHEM 103 03(3-0-0). Chemistry in Context. (GT-SC2, AUCC 3A). F, S, SS. For students who do not plan to take additional courses in chemistry.

Chemistry, chemical principles from more conceptual, less mathematical perspective; how chemical substances, chemical reactions affect our daily lives. (NT-O)

CHEM 104 01(0-2-0). Chemistry in Context Laboratory. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: CHEM 103 or concurrent registration.

Laboratory applications of principles covered in CHEM 103. (\$)

CHEM 107 04(4-0-0). Fundamentals of Chemistry. (GT-SC2, AUCC 3A). F, S, SS. Prerequisite: (MATH 117 or placement out of MATH 117) or MATH 141 or MATH 155 or MATH 160 or MATH 161 or MATH 229 or MATH 261 or concurrent registration in MATH 141 or MATH 155 or MATH 160 or MATH 161 or MATH 229 or MATH 261. For students in science-related programs requiring one semester of general chemistry. Quantitative reasoning but with less focus on mathematical calculations than CHEM 111/CHEM 113. Credit allowed for only one of the following: CHEM 107, CHEM 111, and CHEM 117.

Atomic/molecular theory, gases, liquids, solids, solutions, acid/base and oxidation/reduction reactions, kinetics, selected topics.

CHEM 108 01(0-2-0). Fundamentals of Chemistry Laboratory. (GT-SC2, AUCC 3A). F, S, SS. Prerequisite: CHEM 107 or concurrent registration. Credit not allowed for both CHEM 108 and CHEM 112.

Laboratory applications of principles presented in CHEM 107. (\$)

CHEM 111 04(3-0-1). General Chemistry I. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: (MATH 118 or placement out of MATH 118) or MATH 141 or MATH 155 or MATH 160 or MATH 161 or MATH 229 or MATH 261. Intended for science majors. Students should complete the sequence: CHEM 111, CHEM 112, CHEM 113 and CHEM 114. Credit allowed for only one of the following: CHEM 107, CHEM 111, or CHEM 117.

Fundamental aspects of chemistry and chemical principles; emphasis on structure, bonding, and stoichiometry.

CHEM 112 01(0-3-0). General Chemistry Laboratory I. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: CHEM 111 or concurrent registration or CHEM 117 or concurrent registration. Credit not allowed for both CHEM 112 and CHEM 108.

Laboratory applications of principles covered in CHEM 111. (\$)

CHEM 113 03(3-0-0). General Chemistry II. F, S, SS.

Prerequisite: CHEM 107 or CHEM 111 or CHEM 117; (MATH 124 or placement out of MATH 124) or MATH 141 or MATH 155 or MATH 160 or MATH 161 or MATH 229 or MATH 261 or concurrent registration in MATH 141 or MATH 155 or MATH 160 or MATH 161 or MATH 229 or MATH 261.

Acid/base equilibria, kinetics, thermodynamics, solubility, oxidation-reduction reactions, electrochemistry, selected topics.

CHEM 114 01(0-3-0). General Chemistry Laboratory II. F, S, SS. Prerequisite: CHEM 112; CHEM 113 or concurrent registration.

Laboratory applications of principles covered in CHEM 113. (\$)

CHEM 117 03(3-0-0). General Chemistry I for Chemistry Majors. F. Prerequisite: Concurrent registration in CHEM 192; (MATH 118 or placement out of MATH 118) or MATH 141 or MATH 155 or MATH 160 or MATH 161 or MATH 229 or MATH 261. Credit allowed for only one of the following: CHEM 107, CHEM 111, or CHEM 117.

Fundamental aspects of chemistry and chemical principles with an emphasis placed on atomic and molecular structure, bonding, and stoichiometry.

CHEM 192 01(0-0-1). Introductory Seminar in Chemistry. F. Prerequisite: Concurrent registration in CHEM 117.

Small group discussions of aspects of chemistry.

CHEM 245 04(4-0-0). Fundamentals of Organic Chemistry. F, S, SS. Prerequisite: CHEM 107 or CHEM 113. Credit allowed for only one of the following: CHEM 245, CHEM 341, and CHEM 345. Intended for students in science-related programs requiring one semester of organic chemistry.

Nomenclature, structure, bonding, reactions, mechanisms, synthesis, stereochemistry of organic compounds.

CHEM 246 01(0-3-0). Fundamentals of Organic Chemistry Laboratory. F, S. Prerequisite: CHEM 108 or CHEM 112 or CHEM 114; CHEM 245 or concurrent registration. Credit not allowed for students who have already taken CHEM 344.

Laboratory applications of principles presented in CHEM 245. (\$)

CHEM 261 03(3-0-0). Fundamentals of Inorganic Chemistry. S. Prerequisite: CHEM 113 or concurrent registration.

Preparation, structures, properties, and reactions of chemical elements and inorganic compounds; periodic trends, organizing principles; applications.

CHEM 301 03(1-4-0). Advanced Scientific Writing--Chemistry. (AUCC 2B). S. Prerequisite: CO 150; CHEM 334 or CHEM 345 or a 300-level science laboratory course with written approval of instructor.

Advanced scientific writing using the read-analyze-write approach and scientific poster preparation and presentation.

***CHEM 311 03(3-0-0). Introduction to Nanoscale Science.** S. Prerequisite: CHEM 113; CHEM 343 or CHEM 346.

Synthesis, characterization, and applications of nanoscale materials.

CHEM 334 01(0-3-0). Quantitative Analysis Laboratory. F, S. Prerequisite: CHEM 114; CHEM 335 or concurrent registration. Credit not allowed for both CHEM 334 and CHEM 332.

Laboratory applications of principles presented in CHEM 335.

(\$)

CHEM 335 03(3-0-0). Introduction to Analytical Chemistry. F, S. Prerequisite: CHEM 113 with a C or better; CHEM 334 or concurrent registration. Credit not allowed for both CHEM 335 and CHEM 331.

Modern and classical applications and methods in analytical chemistry including statistical, kinetic, spectroscopic, and chromatographic analysis.

CHEM 341 03(3-0-0). Modern Organic Chemistry I. F, S, SS. Prerequisite: CHEM 113. Credit allowed for only one of the following: CHEM 245, CHEM 341, and CHEM 345.

Structures, nomenclature, dynamics, spectroscopy, and reactions of organic molecules.

CHEM 343 03(3-0-0). Modern Organic Chemistry II. F, S, SS. Prerequisite: CHEM 245 or CHEM 341 or CHEM 345. Credit not allowed for both CHEM 343 and CHEM 346.

Continued studies of reactions and mechanisms of organic molecules and biological chemistry.

CHEM 344 02(0-6-0). Modern Organic Chemistry Laboratory. F, S, SS. Prerequisite: CHEM 113; CHEM 114. Intended for science majors. Credit not allowed for both CHEM 344 and CHEM 246.

Laboratory applications of modern organic chemistry. (\$)

CHEM 345 04(3-3-0). Organic Chemistry I. F, S. Prerequisite: CHEM 113; CHEM 114. Intended for science majors. Students should plan to complete the sequence CHEM 345, CHEM 346. Credit allowed for only one of the following: CHEM 245, CHEM 341, and CHEM 345.

Structure, nomenclature, dynamics, spectroscopy, reactions of organic molecules. Laboratory applications of principles presented in lecture. (\$)

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CHEM 346 04(3-3-0). Organic Chemistry II. F, S. Prerequisite: CHEM 345. Credit not allowed for both CHEM 343 and CHEM 346. Intended for science majors. Students should plan to complete the sequence CHEM 345, CHEM 346.

Continue studies of reactions and mechanisms of organic molecules. Laboratory applications of principles presented in lecture. (\$)

CHEM 384 Var [1-3]. Supervised College Teaching. Prerequisite: Twenty credits in chemistry; written consent of department head. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements. Maximum of 12 credits for any combination of CHEM 384, CHEM 487, CHEM 495, CHEM 498.

CHEM 431 04(3-3-0). Instrumental Analysis. F. Prerequisite: CHEM 334; CBE 310 or concurrent registration or CHEM 474 or concurrent registration.

Instrumental methods of chemical analysis. (\$)

CHEM 433 03(2-3-0). Clinical Chemistry. S. Prerequisite: CHEM 334; BC 351 or BC 401.

Principles and methodology of clinical chemistry. Laboratory experience in methodology and method development. (\$)

CHEM 440 02(0-6-0). Advanced Organic Chemistry Laboratory. F. Prerequisite: CHEM 344 or CHEM 346.

Advanced techniques in organic synthesis, mechanisms of reactions, structure determination. (\$)

CHEM 461 03(3-0-0). Inorganic Chemistry. S. Prerequisite: CHEM 261; CHEM 472 or CHEM 474.

Concepts, models to explain structural, spectroscopic, magnetic, thermodynamic, and kinetic properties of inorganic compounds; symmetry, group theory.

CHEM 462 02(0-6-0). Inorganic Chemistry Laboratory. S. Prerequisite: CHEM 461 or concurrent registration.

Synthetic techniques and instrumental methods in inorganic chemistry. (\$)

CHEM 474 03(3-0-0). Physical Chemistry I. F. Prerequisite: CHEM 113; MATH 261; PH 142; concurrent registration in CHEM 475. Credit allowed for only one of the following: CHEM 471, CHEM 472, or CHEM 474.

Quantum chemistry; applications to bonding, molecular structure, and spectroscopy.

CHEM 475 01(0-3-0). Physical Chemistry Laboratory I. F. Prerequisite: CBE 333 or CHEM 334; CBE 310 or concurrent registration or CHEM 474 or concurrent registration.

Physicochemical experiments; emphasis on quantum mechanics/spectroscopy; interpretation/presentation of data; formal lab reports. (\$)

CHEM 476 03(3-0-0). Physical Chemistry II. S. Prerequisite: CHEM 474.

Statistical thermodynamics; applications to phase and chemical equilibria; kinetics.

CHEM 477 01(0-3-0). Physical Chemistry Laboratory II. S. Prerequisite: CHEM 475.

Physicochemical experiments; emphasis on thermodynamics/statistical mechanics/kinetics; interpretation/presentation of data; formal lab reports. (\$)

CHEM 487 Var. Internship. Prerequisite: CHEM 476. Maximum of 12 credits allowed for any combination of CHEM 384, CHEM 487, CHEM 495, CHEM 498.

Supervised work experience in approved off-campus chemical laboratory setting. Consultation with faculty adviser/instructor.

CHEM 493 02(0-0-2). Seminar. S. Prerequisite: CHEM 474.

Critical analyses of selected literature; develop presentation of technical topic; required oral presentation.

CHEM 495 Var [1-3]. Independent Study. Prerequisite: Nine credits in chemistry, written consent of laboratory mentor and department chair. Maximum of 12 credits for any combination of CHEM 384, CHEM 487, CHEM 495, CHEM 498.

Satisfactory completion of course requires a written report, an oral presentation at a research group meeting, or a poster presentation.

CHEM 498 Var [1-3]. Research. Prerequisite: Twenty credits in chemistry, written consent of research mentor and department chair. Maximum of 12 credits for any combination of CHEM 384, CHEM 487, CHEM 495, CHEM 498.

Supervised laboratory research in chemistry; written report consistent with ACS guidelines required.

CHEM 511 03(3-0-0). Solid State Chemistry. F. Prerequisite: CHEM 461; CHEM 476.

Physical and descriptive chemistry of solids including characterization and synthetic methods.

CHEM 515 03(3-0-0). Polymer Chemistry. F. Prerequisite: CHEM 346; CHEM 476.

Fundamentals of polymer chemistry: synthesis, characterization, physical properties.

CHEM 517 03(3-0-0). Chemistry of Electronic Materials. F. Prerequisite: CHEM 571 or concurrent registration.

Chemical aspects of preparation and processing of materials in electronic devices, "molecular electronics," and nanostructured materials.

CHEM 530A-F 01(1-0-0). Advanced Topics in Chemical Analysis. F. Prerequisite: CHEM 431 or concurrent registration.

A) Environmental chemical analysis. **B)** Absorption and emission spectroscopy. **C)** Bioanalytical chemistry. **D)** Statistical analysis in analytical chemistry. **E)** Mass spectrometry. **F)** Analysis of materials.

CHEM 532 03(3-0-0). Advanced Chemical Analysis II. S. Prerequisite: CHEM 431.

Advanced optics; instrumentation and methodology for analytical spectroscopy; computer applications.

CHEM 533 03(3-0-0). Chemical Separations. S. Prerequisite: CHEM 335; CHEM 431.

Fundamentals and applications of chemical separations.

CHEM 537 03(3-0-0). Electrochemical Methods. S. Prerequisite: CHEM 431

Theory and methods of electrochemistry; applications of modern electrochemical techniques.

CHEM 539A-C 01(1-0-0). Principles of NMR and MRI. S. Prerequisite: CHEM 474.

Modern experimental methods in inorganic chemistry. **A)** Basic NMR principles. **B)** NMR diffusion measurements-2D NMR and MRI. **C)** Advanced NMR and MRI techniques.

CHEM 541 03(3-0-0). Organic Spectroscopy. SS. Prerequisite: CHEM 440.

Organic structure determination by spectroscopic methods.

CHEM 543 03(3-0-0). Structure/Mechanisms in Organic Chemistry. F. Prerequisite: CHEM 346.

Structure including stereochemistry and conformational isomerism; reactivity and mechanisms in organic chemistry.

CHEM 545 03(3-0-0). Synthetic Organic Chemistry I. S. Prerequisite: CHEM 543.

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Reactions and synthesis in organic chemistry.

CHEM 547 03(3-0-0). Physical Organic Chemistry. S. Prerequisite: CHEM 543.

Mechanisms, theory, kinetics, and thermodynamics.

CHEM 549 03(3-0-0). Synthetic Organic Chemistry II. F. Prerequisite: CHEM 545.

Modern synthetic methods. Strategies for total synthesis of natural products.

CHEM 550A 01(1-0-0). Materials Chemistry—Hard Materials. F. Prerequisite: CHEM 343 or CHEM 346; CHEM 461; CHEM 476.

Structure and bonding; crystallography; properties; synthesis; characterization of metals, semiconductors, and network solids.

CHEM 550B 01(1-0-0). Materials Chemistry—Soft Materials. F. Prerequisite: CHEM 343 or CHEM 346; CHEM 461; CHEM 476.

Structure and bonding, mechanisms, properties, applications, synthesis, characterization of polymers, complex fluids, and biomaterials.

CHEM 550C 01(1-0-0). Materials Chemistry—Nanomaterials. F. Prerequisite: CHEM 343 or CHEM 346; CHEM 461; CHEM 476.

Structure and bonding, synthesis, properties, characterization of carbon nanotubes, metal and semiconductor nanocrystals, and nanocomposites.

CHEM 551 03(3-0-0). Organometallic Chemistry. F, S. Prerequisite: CHEM 346.

Descriptive and mechanistic organometallic chemistry applied to homogeneous catalysis and organic synthesis.

CHEM 561 03(3-0-0). Inorganic Synthesis. F, S. Prerequisite: Written consent of instructor.

Chemistry of compounds of representative elements and transition metals.

CHEM 563A-F 01(1-0-0) Physical Methods in Inorganic Chemistry. F, S. Prerequisite: CHEM 461.

A) Group theory. B) Vibrational spectroscopy. C) Electronic structure and magnetism. D) Magnetic spectroscopies. E) Advanced nuclear magnetic resonance spectroscopy. F) Other structural methods.

***CHEM 565 03(3-0-0). Inorganic Mechanisms.** F. Prerequisite: CHEM 476.

Fundamental tools, key principles, selected classic case histories of inorganic and organometallic mechanistic chemistry, emphasizing kinetic methods.

***CHEM 566 03(3-0-0). Bioinorganic Chemistry.** S. Prerequisite: CHEM 461.

Biological-inorganic chemistry, including key principles, prototype systems, classic papers, and problems.

CHEM 567 01(1-0-0). Crystallographic Computation. F, S, SS. Prerequisite: CHEM 474.

Theory and practice of structural computations using single crystal X-ray diffraction data.

***CHEM 569 03(3-0-0). Chemical Crystallography.** S. Prerequisite: CHEM 474.

Theory and practice of determination of crystal and molecular structure by single crystal X-ray and neutron diffraction.

***CHEM 570 03(3-0-0). Chemical Bonding.** F. Prerequisite: CHEM 474 or CBE 310.

Electronic structure methods; chemical bonding models; intermolecular interactions.

°CHEM 571 03(3-0-0). Quantum Chemistry. F. Prerequisite: CHEM 474 or CBE 310.

Simple systems; symmetry; approximate methods; time dependent methods; molecular structures.

***CHEM 575 03(3-0-0). Chemical Thermodynamics.** F. Prerequisite: CHEM 476 or CBE 310.

Thermodynamic concepts and their applications to chemical problems.

°CHEM 576 03(3-0-0). Statistical Mechanics. S. Prerequisite: CHEM 476 or CBE 310.

Principles of statistical mechanics with application in the chemical sciences.

°CHEM 577 03(3-0-0). Surface Chemistry. S. Prerequisite: CHEM 476 or CBE 310.

Capillarity; interfacial thermodynamics, electrical aspects of surface chemistry, adsorbed layers.

°CHEM 579 03(3-0-0). Chemical Kinetics. F. Prerequisite: CHEM 476 or CBE 310.

Elementary reactions, unimolecular reactions, reactions in solution, gas phase ion chemistry, photochemistry, and kinetic modeling.

***CHEM 601 01(1-0-0). Responsible Conduct in Chemistry Research.** S.

Appropriate conduct in research, publishing, intellectual property decisions, job hunting, and negotiating; social responsibilities of scientists.

CHEM 641 02(2-0-0). Organic Reaction Mechanisms. S. Prerequisite: CHEM 545.

Organic reaction mechanisms, including using arrows to show electron movement; heterolytic, radical, and pericyclic reactions.

CHEM 651A-D Var [1-4]. Special Topics in Chemistry. F, S. Prerequisite: Written consent of instructor.

A) Analytical chemistry. B) Inorganic chemistry. C) Organic chemistry. D) Physical chemistry.

CHEM 695 Var [1-3]. Independent Study.

CHEM 698 Var[1-9]. Research. F, S, SS. Prerequisite: Graduate standing in chemistry.

Graduate research in chemistry for students who do not plan to write an M.S. thesis.

CHEM 699 Var [1-15]. Thesis.

CHEM 702 01(0-0-1). Independent Research Proposal. F, S. Prerequisite: Admission to Ph.D. candidacy.

Preparation, submission, and defense of an independent research proposal; creative and original thinking about research problems in modern chemistry.

CHEM 751 01(1-0-0). Methods of Chemistry Laboratory Instruction. F.

Basic materials, methods, and skill development related to teaching undergraduate chemistry laboratory courses.

CHEM 752 01(0-0-1). Advanced Methods of Chemistry Instruction. S. Prerequisite: CHEM 751.

Advanced materials, methods, and presentation skills development related to teaching undergraduate chemistry courses.

***CHEM 773 03(3-0-0). Atomic and Molecular Spectroscopy.** S. Prerequisite: CHEM 571.

Time-dependent methods; multiphoton and nonlinear spectroscopy; fundamentals of rotational, vibrational, electronic and magnetic resonance spectroscopy.

CHEM 784 Var [1-2]. Supervised College Teaching.

CHEM 793 01(0-0-1). Seminar.

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CHEM 795A-D Var [1-5]. Independent Study.

A) Inorganic chemistry. B) Analytical chemistry. C) Biological chemistry. D) Physical chemistry.

CHEM 799 Var [1-15]. Dissertation.

COMPUTER INFORMATION SYSTEMS COURSES

Department of Computer Information Systems College of Business

CIS 120 03(3-0-0). Business Programming Fundamentals. F, S. Credit not allowed for both CIS 120 and CIS 210.

File and operating systems for business application development. Business program development using a high-level programming language.

CIS 200 03(3-0-0). Business Information Systems. F, S, SS. Prerequisite: BUS 150 or CS 110 or AGRI 140.

Use of information technology (IT) to enable knowledge workers, support business processes, and grow the business.

CIS 210 03(3-0-0). Information Technology in Business. F, S, SS. Prerequisite: CIS 200 or concurrent registration. Credit not allowed for both CIS 210 and CIS 120.

Introduction to information systems: the IS profession; hardware, software, and programming; web and database applications; data analysis tools.

CIS 220 03(3-0-0). Object-Oriented Information Design. F, S, SS. Prerequisite: CIS 120. Credit not allowed for both CIS 220 and CIS 340.

Object-oriented information design and programming; design and manipulation of data structures.

CIS 240 03(3-0-0). Application Design and Development. F, S, SS. Prerequisite: CIS 210.

Software engineering methods including design, implementation, and testing using structured and event-driven techniques, logic, and data structures. (NT-O)

CIS 301 03(3-0-0). End User Computing. F, S, SS.

End user applications in a Graphical User Interface environment including spreadsheet, word processing, and presentation graphics; Internet concepts. (NT-O)

CIS 320 03(3-0-0). Project Management for Information Systems. F, S. Prerequisite: CIS 120 or CIS 210.

Project management concepts including work breakdown structure, estimating, scheduling, tools, and reports.

CIS 340 03(3-0-0). Advanced Application Design and Development. F, S. Prerequisite: CIS 240. Credit not allowed for both CIS 340 and CIS 220.

Design and construction of business applications using object-orientation and advanced data structures.

CIS 350 03(3-0-0). Operating Systems and Networks. F, S. Prerequisite: CIS 210.

Multiuser and network operating systems; basic networking concepts including security, transmission, performance, and topologies.

CIS 355 03(3-0-0). Business Database Systems. F, S. Prerequisite: CIS 120 or CIS 210.

Physical and logical design, implementation, and administration of databases. (NT-O)

CIS 360 03(3-0-0). Systems Analysis and Design. F, S. Prerequisite: CIS 240.

Traditional and cutting-edge systems analysis and design techniques, with emphasis on object-oriented approaches.

CIS 370 03(3-0-0). Business Intelligence. SS. Prerequisite: CIS 200; MKT 300.

Techniques and technologies for deriving business value from the integration, analysis, mining, and transformation of data.

CIS 400 03(3-0-0). Information Management in the Enterprise. F, S. Prerequisite: Any two of FIN 300, MGT 301, MGT 320, MKT 300.

Role of information in business functional areas; value of information in business; risks and rewards of enterprise information.

CIS 410 03(3-0-0). Web Application Development. F. Prerequisite: CIS 240; CIS 355.

Web development techniques and strategies including Active Server Pages using VBScript, JavaScript, ColdFusion; security, web design.

CIS 411 03(3-0-0). Enterprise Resource Planning Systems. S. Prerequisite: ACT 220; FIN 300 or FIN 305; MGT 305 or MGT 320; MKT 300 or MKT 305.

Introduction to enterprise resource planning (ERP) systems concepts, business processes impacted by ERP, systems and software integration.

CIS 412 03(3-0-0). Issues and Cases in Electronic Commerce. S. Prerequisite: CIS 355.

Business models for B2B or B2C e-commerce, technology infrastructure, electronic payment mechanisms, information privacy.

CIS 413 03(3-0-0). Advanced Networking and Security. F. Prerequisite: CIS 240; CIS 350.

Modern communication standards, protocol systems; network security, security policies, attack and protection mechanisms, legal and ethical issues.

CIS 455 03(3-0-0). Advanced Database Management. S. Prerequisite: CIS 355.

Advanced data management topics including performance tuning, concurrency control, security, object-oriented databases, and data warehousing.

CIS 460 03(3-0-0). Object-Oriented Systems. F. Prerequisite: CIS 355; CIS 360.

Object-oriented concepts, development methodologies, techniques, and languages.

CIS 462 03(3-0-0). Systems Development Project. F, S. Prerequisite: CIS 320; CIS 360.

Application of concepts, techniques, and tools used in analysis, design, and implementation of computer-based information systems in applied setting.

CIS 487 03(0-9-0). Internship.

Supervised and planned work experience paralleling concentration in industry.

CIS 492 03(3-0-0). Seminar. Prerequisite: CIS 460.

Current topics in computer-based information systems.

CIS 495 Var. Independent Study.

CIS 496B-E Var. Group Study.

B) Small business information systems. **C)** Communications and distributed systems. **D)** Information systems performance measurement. **E)** Current issues in business computing systems.

CIS 498 Var [1-3]. Research.

CIS 600 03(3-0-0). Information Technology and Project Management. F, SS. Prerequisite: Admission to one of the following programs: M.S. in Business, M.B.A., or systems engineering specialization in Master of Engineering.

Strategic role and management of information technology and software development projects. (NT-O/T/V)

CIS 601/MGT 601 03(3-0-0). Enterprise Computing and Systems Integration. F. Prerequisite: Admission to one of the following programs: M.S. in Business, M.B.A., or Systems Engineering specialization in Master

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of Engineering. Credit not allowed for both CIS 601 and MGT 601.

Integrated extended enterprise planning and execution systems concepts including ERP, CRM, SCM, MRPII, business processes, front/back office systems. (NT-O)

CIS 605 03(3-0-0). Business Visual Application Development. F. Prerequisite: Admission to one of the following programs: M.S. in Business, M.B.A., or Systems Engineering specialization in Master of Engineering.

Design, construction, and testing of business application systems including leading-edge visual, E-commerce languages and tools. (NT-O)

CIS 606 03(3-0-0). Application Software Infrastructure. F. Prerequisite: Admission to one of the following programs: M.S. in Business, M.B.A., or Systems Engineering specialization in Master of Engineering.

Design, construction, and testing of business application software infrastructure including hardware, operating software, and communications network. (NT-O)

CIS 610 03(3-0-0). Software Development Methodology. F. Prerequisite: Admission to one of the following programs: M.S. in Business, M.B.A., or systems engineering specialization in Master of Engineering.

Methods for all phases of software development focusing upon the establishment of economical software that is reliable and cross platform.(NT-O/T/V)

CIS 611 03(3-0-0). Object-Oriented Systems. S. Prerequisite: CIS 610; Admission to one of the following programs: MS in Business, MBA or Systems Engineering specialization in Master of Engineering.

Object-oriented and web-based software; object model describing classes; relationships to other objects, attributes, and operations. (NT-O)

CIS 620 03(3-0-0). IT Communications Infrastructure. S. Prerequisite: Admission to one of the following programs: MS in Business, MBA or Systems Engineering specialization in Master of Engineering .

Technical aspects of information communications, business considerations; wireless technology, architecture, and applications. (NT-O)

CIS 655 03(3-0-0). Business Database Systems. S. Prerequisite: Admission to one of the following programs: MS in Business, MBA or Systems Engineering specialization in Master of Engineering.

Database analysis, design, administration; data modeling; data sublanguages, query facilities; distributed database systems. (NT-O)

CIS 665 03(3-0-0). E-Business Application Technologies. S. Prerequisite: Admission to one of the following programs: MS in Business, MBA or Systems Engineering specialization in Master of Engineering.

Developing E-business (B2B and B2C) through construction and deployment. (NT-O)

CIS 695 Var. Independent Study.

CIS 696 Var. Group Study.

CIS 699 Var. Thesis.

CIVIL ENGINEERING COURSES

Department of Civil and Environmental Engineering

College of Engineering

CIVE 102 03(2-3-0). Introduction: Civil/Environmental Engineering. F.

Civil engineering profession, computer applications and programming related to civil engineering; introduction to surveying.

CIVE 103 03(2-2-0). Engineering Graphics and Computing. S.
Prerequisite: CIVE 102.

Introduction to the profession and academia; principles of civil engineering design; graphical, oral, and written communication; team projects.

CIVE 202 03(2-2-0). Numerical Modeling and Risk Analysis. F.
Prerequisite: CIVE 103; MATH 160 or concurrent registration.

Civil engineering systems, simulation and optimization techniques, statistical tools and their use in civil engineering, risk analysis.

CIVE 203 03(2-2-0). Engineering Systems and Decision Analysis. S.
Prerequisite: CIVE 202.

Civil engineering infrastructure systems, numerical and decision analysis techniques, applications of risk analysis.

CIVE 260 03(3-0-0). Engineering Mechanics-Statics. F, S. Prerequisite: MATH 160; PH 141 or concurrent registration.

Forces using vector notation; static equilibrium of rigid bodies; friction, virtual work, centroids, and moments of inertia.

CIVE 261 03(3-0-0). Engineering Mechanics-Dynamics. F, S.
Prerequisite: CIVE 260.

Kinematics and kinetics of particles and rigid bodies; concepts of work-energy and impulse-momentum; computer applications; vector notation.

CIVE 262 04(3-2-0). Engineering Mechanics. F. Prerequisite: MATH 161; PH 141.

Forces, static equilibrium, mass center, moments of inertia, kinematics and kinetics of particles and rigid bodies.

CIVE 300 04(3-3-0). Fluid Mechanics. F, S. Prerequisite: CIVE 261; MATH 340 or concurrent registration; MECH 237 or concurrent registration or MECH 337 or concurrent registration.

Fluid properties; statics, kinematics, and dynamics of fluid motion including viscous and gravitational effects.

CIVE 302 03(2-3-0). Evaluation of Civil Engineering Materials. F.
Prerequisite: CHEM 111; CIVE 203; CIVE 360.

Behavior and properties of construction materials, instrumentation, use of statistical tools, material standards, material selection, quality control.

CIVE 303 03(3-0-0). Infrastructure and Transportation Systems. S.
Prerequisite: CIVE 203.

Principles of infrastructure systems, transportation systems, applications of spatial data and GIS, project management and engineering economy.

CIVE 322/ENVE 322 03(3-0-0). Basic Hydrology. F, S. Prerequisite: CBE 331 or CIVE 300 or WR 416; CIVE 202 or STAT 301 or STAT 315.
Credit not allowed for both CIVE 322 and ENVE 322.

Hydrologic cycle, soil moisture, groundwater, runoff processes, water contamination, applications in water resources and environmental engineering.

CIVE 330 03(3-0-0). Ecological Engineering. S. Prerequisite: (BZ 110; BZ 111) or BZ 120 or LIFE 102; CHEM 113.

Principles of ecological engineering and design of sustainable ecosystems.

CIVE 350 03(2-3-0). Soil Engineering for Nonengineers. F, S.
Prerequisite: CON 359.

Concepts of soil mechanics and soil behavior, elementary application to compaction, seepage, earth pressure, foundations, and slopes.

CIVE 355 04(3-3-0). Introduction to Geotechnical Engineering. F, S.
Prerequisite: CIVE 360.

Soil behavior, stress-strain and strength properties, application to earth pressure, slope and foundation problems

CIVE 360 03(3-0-0). Mechanics of Solids. F, S. Prerequisite: CIVE 260 or CIVE 262.

Stresses and deformations in structural members and machine elements, combined stresses, stress transformation.

CIVE 363 01(0-3-0). Material Properties. F, S. Prerequisite: CIVE 360.

Mechanical properties of metals, woods, and plastics; testing techniques and standards.

CIVE 367 03(3-0-0). Structural Analysis. F, S. Prerequisite: CIVE 360.

Determination of actions in and deformations of determinate and indeterminate structures.

CIVE 390 Var [1-3]. Civil Engineering Student Projects Workshop. F, S.

CIVE 401 03(3-0-0). Hydraulic Engineering. S. Prerequisite: CIVE 300.

Basic principles of fluid mechanics applied to practical problems in hydraulic engineering.

CIVE 402 03(2-2-0). Senior Design Principles. F. Prerequisite: CIVE 300; CIVE 303 or CHEM 245..

Design of civil engineering systems, nontechnical and economic design considerations, project organization, design project development and presentation.

CIVE 403 03(2-2-0). Senior Project Design. S. Prerequisite: CIVE 402.

Design of civil engineering systems, nontechnical and economic design considerations; project organization, design project development and presentation. (\$)

CIVE 413 03(3-0-0). Environmental River Mechanics. S. Prerequisite: CIVE 300 or WR 416.

Fluvial geomorphology, river hydraulics, sediment transport, and river response with special emphasis on environmental aspects. (NT-O/V)

CIVE 423 03(3-0-0). Groundwater Engineering. S. Prerequisite: CBE 331 or CIVE 300 or WR 416.

Development of groundwater resources; origin, movement, distribution of water below ground surface.

CIVE 425 03(2-3-0). Soil and Water Engineering. S. Prerequisite: CBE 331 or CIVE 300 or SOCR 240.

Control of the soil-water-plant medium for optimum plant growth and environmental protection.

CIVE 437/ENVE 437 03(3-0-0). Wastewater Treatment Facility Design. S. Prerequisite: CIVE 300; CIVE 438/ENVE 438 or concurrent registration.

Credit not allowed for both CIVE 437 and ENVE 437.

Design concepts and principles for wastewater treatment systems and unit processes, principles of treatment plant operation.

CIVE 438/ENVE 438 03(3-0-0). Environmental Engineering Concepts. F, S. Prerequisite: CBE 331 or CIVE 300 or MECH 342; CHEM 113.
Credit not allowed for both CIVE 438 and ENVE 438.

Environmental engineering approaches to designing water supply, wastewater removal, and pollution control systems.

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CIVE 439/CBE 439 03(2-3-0). Environmental Engineering Chemical Concepts. F. Prerequisite: CHEM 113; MATH 340. Credit not allowed for both CIVE 439 and CBE 439.

Application of chemical principles to environmental engineering problems.

CIVE 440 03(3-0-0). Nonpoint Source Pollution. F. Prerequisite: CIVE 300 or CIVE 322/ENVE 322 or SOCR 240 or WR 416.

Principles, processes, impacts, and control of nonpoint source pollution of surface and groundwater. (NT-O)

CIVE 455 03(3-0-0). Applications in Geotechnical Engineering. F. Prerequisite CIVE 355.

Geotechnical engineering applications of earth retaining structures, foundations, dams and embankments, geosynthetics, waste containment systems.

CIVE 466 03(3-0-0). Design and Behavior of Steel Structures. S. Prerequisite: CIVE 367.

Loads acting on a structure; behavior and design of steel members, connections, and systems.

CIVE 467 03(3-0-0). Design of Reinforced Concrete Structures. F. Prerequisite: CIVE 367.

Design and behavior of reinforced concrete structural members.

CIVE 495 Var [1-3]. Independent Study.

CIVE 496 Var. Group Study.

CIVE 502 03(3-0-0). Fluid Mechanics. F. Prerequisite: CIVE 300.

Fundamental physical concepts of fluid mechanics; ideal and viscous fluid flows; boundary-layer concepts. (NT-V)

CIVE 504 03(3-0-0). Wind Engineering. F. Prerequisite: CIVE 300.

Influence of wind on humanity. Applications to structures, air pollution, wind energy, agricultural aerodynamics, snow movement, human comfort. (NT-V)

CIVE 506 03(3-0-0). Wind Effects on Structures. S. Prerequisite: CIVE 504.

Analysis of wind effects on buildings and structures; deterministic and probabilistic methods; aerodynamic loading and response; codes and standards.

CIVE 510 03(3-0-0). Applied Hydraulic System Design. F. Prerequisite: CIVE 401.

Operational management systems, data collection, real-time control, management modeling, rehabilitation and retrofit, maintenance.

CIVE 512 03(3-0-0). Irrigation Systems Design. F. Prerequisite: CIVE 322/ENVE 322 or CIVE 425.

Irrigation systems principles and design procedures for operation of sprinkler, trickle, and surface irrigation systems. (NT-O)

CIVE 514 03(3-0-0). Hydraulic Structures/Systems. F. Prerequisite: CIVE 401.

Analysis and design of hydraulic structures which make up components of water resource systems.

CIVE 516 03(3-0-0). Water Control and Measurement. S.

Flow regulation and measurement in gravity flow irrigation systems for efficient and equitable water distribution among users. (NT-O)

CIVE 517 03(3-0-0). Surface Irrigation Systems. F. Prerequisite: CIVE 425.

Design and evaluation of surface irrigation systems. Water measurements, conveyance and control structures, land forming.

CIVE 518 03(3-0-0). Sprinkler and Trickle Irrigation Systems. S.

Prerequisite: CIVE 300; CIVE 425.

Basic principles, design, and evaluation of pressurized irrigation systems.

CIVE 519 03(3-0-0). Irrigation Water Management. F. Prerequisite: CIVE 425.

Apply soil, plant, water, and atmospheric engineering principles to determine crop water need to sustain agricultural production and the environment. (NT-O)

CIVE 520 03(3-0-0). Physical Hydrology. F. Prerequisite: CIVE 322/ENVE 322.

Hydrologic, atmospheric processes in the water cycle; linear systems, hydrologic response; geomorphologic description of hydrologic processes, response. (NT-O)

***CIVE 521 03(2-3-0). Hydrometry.** F. Prerequisite: CIVE 322/ENVE 322.

Principles, methods, instruments, and equipment for measuring water quantity and water quality variables in nature.

CIVE 522 03(3-0-0). Engineering Hydrology. S. Prerequisite: CIVE 520.

Hydrologic design under uncertainty; conventional and remote sensing; design flows and storms; river routing; reservoir design; watershed models. (NT-O/V)

°CIVE 524/WR 524 03(2-2-0). Modeling Watershed Hydrology. S. Prerequisite: CIVE 322/ENVE 322 or WR 416; CIVE 202 or STAT 301 or STAT 315. Credit not allowed for both CIVE 524 and WR 524.

Development and application of watershed models: structure, calibration, evaluation, sensitivity analysis, simulation.

***CIVE 525 03(3-0-0). Water Engineering: International Development.** F. Prerequisite: CIVE 401 or CIVE 425 or CIVE 438/ENVE 438.

Planning and design of small-scale and low-cost drinking water, wastewater, and irrigation systems for rural communities in developing countries.

CIVE 531 03(3-0-0). Groundwater Hydrology. F. Prerequisite: CBE 331 or CIVE 300 or MECH 342.

Groundwater occurrence, distribution, movement, exploration and recharge, well hydraulics and design, interaction of ground and surface water.

CIVE 532 03(3-0-0). Wells and Pumps. S. Prerequisite: CIVE 423; CIVE 531 or GEOL 452; CHEM 111.

Well field hydraulics, well drilling methods, well design, aquifer test methods, pumping systems, well maintenance, storage/distribution systems.

CIVE 534 03(2-2-0). Applied and Environmental Molecular Biology. S. Prerequisite: CIVE 540.

Environmental microbiology and molecular biology tools used to investigate both natural systems and engineered processes. (\$)

CIVE 537 03(3-0-0). Residuals Management. S. Prerequisite: CIVE 300.

Planning and design for processing and disposal of residuals including solid wastes, sludges, hazardous wastes.

CIVE 538 03(3-0-0). Aqueous Chemistry. S. Prerequisite: CHEM 113; MATH 340.

Principles of solution chemistry applied to aquatic systems.

°CIVE 539 03(2-3-0). Water and Wastewater Analysis. F. Prerequisite: CHEM 113; MATH 340.

Chemical and biological methods of assessing water quality; significance of chemicals in aquatic systems.

CIVE 540/CBE 540 03(3-0-0). Advanced Biological Wastewater Processing. S. Prerequisite: CIVE 438/ENVE 438 or CBE 320. Credit not allowed for both CIVE 540 and CBE 540.

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Fundamentals of environmental biotechnology: environmental microbiology, microbial kinetics, basic reactor design, wastewater treatment.

CIVE 541 04(3-3-0). Environmental Unit Operations-Treatment-Design. S. Prerequisite: CIVE 439/CBE 439.

Reactor theory, filtration, adsorption, ion exchange, gas transfer, oxidation, membranes, biological reactors, disinfection.

°**CIVE 542 03(3-0-0). Water Quality Modeling.** S. Prerequisite: Two semesters of chemistry; one course in hydrology or water quality.

Chemical, physical, and biological processes defining surface water quality, construction and application of computer models for lakes and streams.

CIVE 544 03(3-0-0). Water Resources Planning and Management. F. Prerequisite: CIVE 322/ENVE 322.

Management and planning of natural and constructed water systems. Integrated management and case studies of water use and environmental resources. (NT-O)

CIVE 545 03(3-0-0). Management and Monitoring of Water Quality. F. Prerequisite: CIVE 322/ENVE 322 or WR 418.

Management activities, information needs, data analysis protocols, network design, case studies. (NT-O)

CIVE 546 03(2-2-0). Water Resource Systems Analysis. S. Prerequisite: CIVE 322/ENVE 322 or concurrent registration; ENGR 510 or concurrent registration or MATH 510 or concurrent registration.

Applications of systems analysis and optimization techniques in water resources planning and management. (NT-O)

CIVE 547/STAT 547 03(3-0-0). Statistics for Environmental Monitoring. S. Prerequisite: STAT 301. Credit not allowed for both CIVE 547 and STAT 547.

Applications of statistics in environmental pollution studies involving air, water, or soil monitoring; sampling designs; trend analysis; censored data. (NT-O)

CIVE 548 03(3-0-0). Irrigation Management for Water Quality. F. Prerequisite: CIVE 425.

Environmental impacts of irrigation; reduced environmental impact by improved design and management of irrigation; sustainability.

CIVE 549 03(3-0-0). Drainage and Wetlands Engineering. S. Prerequisite: CIVE 425.

Drainage and wetlands design for agricultural and natural resource applications. Water table modification for nonpoint sources pollution control.

CIVE 550 03(3-0-0). Foundation Engineering. F. Prerequisite: CIVE 355.

Mechanics and methodology of foundation engineering; selection and design of foundation systems on soft, firm, and expansive soils; special problems.

°**CIVE 553 03(3-0-0). Slope Stability and Retaining Structures.** S. Prerequisite: CIVE 355.

Slope stability theory and application, retaining walls, sheet-pile walls, braced excavations, geosynthetic uses.

***CIVE 556 03(3-0-0). Seepage and Earth Dams.** S. Prerequisite: CIVE 355.

Hydraulic conductivity measurements; seepage analysis and control; earth dam and embankment design; computer applications.

CIVE 558 03(3-0-0). Containment Systems for Waste Disposal. F. Prerequisite: CIVE 355.

Basic principles governing the design of containment systems used in waste disposal applications.

CIVE 560 03(3-0-0). Advanced Mechanics of Materials. F. Prerequisite: CIVE 360.

Analysis of stress and strain failure theory; selected topics in solid mechanics, plate analysis; introduction to elastic stability.

CIVE 562 03(3-0-0). Fundamentals of Vibrations. S. Prerequisite: CIVE 261; CIVE 360.

Free and forced vibrations of single, two, and multiple degree of freedom systems. Closed-form and numerical solutions.

CIVE 563 03(3-0-0). Structural Reliability: Theory, Application. S.

Theory of structural reliability as it relates to analysis, design, construction, and maintenance of structural and mechanical systems.

CIVE 565 03(3-0-0). Finite Element Method. S. Prerequisite: MATH 340.

Theory and application in elasticity, porous flow, heat conduction, and other engineering problems. (NT-V)

CIVE 566 03(3-0-0). Intermediate Structural Analysis. F. Prerequisite: CIVE 367.

Work and energy concepts, curved members and arches, matrix analysis of linear systems, numerical techniques.

CIVE 567 03(3-0-0). Advanced Concrete Design. S. Prerequisite: CIVE 467.

Behavior of reinforced and prestressed concrete members; development of design methods; behavior and design of slabs, shearwalls, and buildings.

CIVE 568 03(3-0-0). Design of Masonry and Wood Structures. S. Prerequisite: CIVE 466 or CIVE 467.

Behavior and design of structures and structural components constructed of masonry or engineered wood.

CIVE 569 03(3-0-0). Intermediate Design of Wood Structures. F. Prerequisite: CIVE 367; CON 432.

Characteristics of structural products and their consideration in design; behavior of glulam members, wood trusses, and other wood structural systems.

CIVE 571 03(3-0-0). Pipe System Engineering and Hydraulics. S. Prerequisite: CIVE 300.

Planning, design and management of water, wastewater, and industrial pipelines. Emphasis on flow and operation of water supply pipelines. (NT-O)

***CIVE 572 03(2-2-0). Analysis of Urban Water Systems.** F. Prerequisite: CIVE 300; CIVE 401.

Behavior and interaction of urban water distribution and collection systems; how system state and driving variables affect system performance.

°**CIVE 573 03(2-2-0). Urban Stormwater Management.** F. Prerequisite: CIVE 322/ENVE 322; CIVE 401.

Effects of urbanization on watershed hydrology and receiving waters; control practices to mitigate effects using mathematical models.

CIVE 574 03(3-0-0). Civil Engineering Project Management. F. Prerequisite: None.

Principles of civil engineering project management including proposals, contracts, scheduling, quality assurance, budgeting, and risk management.

CIVE 576 03(2-2-0). Engineering Applications of GIS and GPS. F.

Integration of GPS and GIS in the planning and decision making process, application to case study.

CIVE 577 03(2-2-0). GIS in Civil and Environmental Engineering. S. Prerequisite: CIVE 300; CIVE 322/ENVE 322.

GIS technology for spatial design/analysis; applications in facilities management, urban infrastructure, water resources, environmental

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engineering. (NT-O)

CIVE 578 03(3-0-0). Infrastructure and Utility Management. S. Prerequisite: Ten credits of engineering, economics, public administration, or planning courses.

Infrastructure and utility planning, management, and security. Systems approach to life cycle management. Problems, analysis, decision support systems. (NT-O/V)

CIVE 579 03(3-0-0). Risk and Security of the Built Environment. F.

Infrastructure security and safety to prepare the built environment against natural and human-caused threats. (NT-O)

CIVE 584 Var. Supervised College Teaching.

CIVE 592A-L 01(0-0-1). Seminar.

A) Fluid mechanics and wind engineering. E) Geotechnical engineering. G) Environmental engineering. L) Space engineering.

CIVE 604 03(3-0-0). Fluid Turbulence and Modeling. S. Prerequisite: CIVE 502 or CIVE 504.

Engineering concepts for transport of pollutants, toxic and flammable species, sand, and snow. Fluid modeling, numerical and analytical approaches.

CIVE 607 03(3-0-0). Computational Fluid Dynamics. S. Prerequisite: CIVE 300.

Numerical methods used in computational solutions of hydraulics, environmental and wind engineering problems.

CIVE 610 03(3-0-0). Special Topics in Hydraulics. S. Prerequisite: CIVE 502.

Advanced topics in hydraulics, hydromechanics, environmental hydraulics, and computational hydraulics

CIVE 612 04(4-0-0). Open Channel Flow. S. Prerequisite: CIVE 502.

Steady, uniform, and non-uniform flow; backwater curves; flow through bridge piers, transitions, and culverts; spatially varied and unsteady flow.

CIVE 613 03(3-0-0). Stream Rehabilitation Design. S. Prerequisite: CIVE 401.

Analysis and design of streams and channels in harmony with the environment.

CIVE 622 03(3-0-0). Risk Analysis of Water/Environmental Systems. F. Prerequisite: CIVE 322/ENVE 322; STAT 315.

Risk and uncertainty analysis applied to hydrology, hydraulics, groundwater, water resources, and environmental engineering systems.

CIVE 623 03(3-0-0). Water Quality Hydrology. S. Prerequisite: CIVE 322/ENVE 322.

Effects and dispersion of natural, municipal, industrial, toxic, and other water pollutants on natural and impounded waters.

***CIVE 624 03(3-0-0). Control of Floods and Droughts.** S. Prerequisite: CIVE 522.

Flood and drought characteristics, impacts; structural, nonstructural flood control measures; drought prediction, drought control, drought response.

CIVE 631 03(3-0-0). Computational Methods in Subsurface Systems. F. Prerequisite: CIVE 531; MATH 340.

Numerical flow models; finite difference and finite element methods; parameter identification, stochastic modeling and advanced analytical solutions.

CIVE 638 03(3-0-0). Groundwater Quality and Contaminant Transport. S. Prerequisite: CIVE 531.

Analysis of hydrochemical data. Advection with and without mixing.

Retardation of reactive solutes. Design of groundwater quality investigations.

***CIVE 639/*SOC 639 03(3-0-0). Technology Assessment and Social Forecasting.** F. Prerequisite: SOC 500. Credit not allowed for both CIVE 639 and SOC 639.

Interrelationship between technology and society emphasizing procedures for evaluating impacts and forecasting alternatives.

***CIVE 645 03(2-2-0). Computer-Aided Water Management and Control.** F. Prerequisite: CIVE 546 or CIVE 577.

Real-time management and control of water resource systems; applications of computer control concepts to improve system performance.

***CIVE 654 03(2-3-0). Experimental Soil Mechanics.** F. Prerequisite: CIVE 355.

Experimental design; data acquisition; soil fabric; isotropic/ K_0 condensation; swelling; stiffness; shear wave velocity; triaxial; hollow cylinder; partial saturation.

CIVE 655 03(3-0-0). Advanced Soil Mechanics. F. Prerequisite: CIVE 355.

Advanced topics in shear strength and consolidation of soils; stress paths; anisotropy; submergence; partial and radial drainage; numerical methods.

CIVE 658 03(3-0-0). Remediation Systems-Subsurface Contamination. S.

Applications in geoenvironmental engineering practice involving design of in situ containment and remediation systems.

CIVE 662 03(3-0-0). Foundations of Solid Mechanics. F. Prerequisite: CIVE 560;

Analysis of stress and strain in solids emphasizing linear elasticity and plasticity; introductions to creep, viscoelasticity, and finite deformations.

CIVE 664 03(3-0-0). Mechanics of Fatigue and Fracture. S. Prerequisite: CIVE 560.

Fracture mechanics including linear elastic, elastic-plastic, and dynamic fracture; on ductile and cleavage fracture in metals.

CIVE 667 03(3-0-0). Advanced Structural Analysis. S. Prerequisite: CIVE 566.

Analysis program development, application of finite element analysis, computer-assisted analysis, introduction to nonlinear analysis.

***CIVE 669 03(3-0-0). Advanced Design of Metal Structures.** S. Prerequisite: CIVE 466.

Behavior of steel, aluminum, and cold formed members. Development of elastic and inelastic code provisions. LRFD design methods, building systems.

CIVE 684 Var. Supervised College Teaching.

CIVE 695A-J Var. Independent Study.

A) Fluid mechanics and wind engineering. B) Hydraulics. C) Hydrology and water resources. D) Mechanics. E) Geotechnical engineering. F) Structures. G) Environmental engineering. H) Water resource planning and management. I) Groundwater. J) Bioresource and agricultural engineering.

CIVE 696A-J Var. Group Study.

A) Fluid mechanics and wind engineering. B) Hydraulics. C) Hydrology and water resources. D) Mechanics. E) Geotechnical engineering. F) Structures. G) Environmental engineering. H) Water resource planning and management. I) Groundwater. J) Bioresource and agricultural engineering.

CIVE 699A-J Var. Thesis.

A) Fluid mechanics and wind engineering. B) Hydraulics. C) Hydrology and water resources. D) Mechanics. E) Geotechnical engineering. F) Structures. G) Environmental engineering. H) Water resource planning and management. I) Groundwater. J) Bioresource and agricultural engineering.

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°CIVE 703 03(3-0-0). **Special Topics in Fluid Mechanics.** F. Prerequisite: CIVE 502.

Advanced topics in fluid mechanics; associated experimental and numerical techniques.

CIVE 716 03(3-0-0). **Erosion and Sedimentation.** F. Prerequisite: CIVE 502.

Sediment properties; resistance to flow; incipient motion and bedforms; sediment transport, reservoir sedimentation.

CIVE 717 03(3-0-0). **River Mechanics.** S. Prerequisite: CIVE 716.

Characteristics of rivers, mechanics of sediment and water discharge emphasizing alluvial systems, channel stabilization, control, response.

°CIVE 721 03(3-0-0). **Stochastic Water and Environmental Systems.** S. Prerequisite: CIVE 622.

Stochastic analysis of water and environmental systems. Simulation, forecasting, spatial analysis, modeling changes, stochastic differential equations.

°CIVE 722 03(3-0-0). **Large Scale Hydrology.** F. Prerequisite: CIVE 520.

Global and regional scale hydrologic processes; land/atmosphere interaction; scaling in hydrology, geomorphoclimatic structure of hydrologic response.

*CIVE 724 03(3-0-0). **River Basin Morphology.** S. Prerequisite: Written consent of instructor.

Analysis of river basin properties including their connections to statistical theories and erosion processes and their hydrologic implications.

*CIVE 742 03(2-3-0). **Advanced Topics in Environmental Engineering.** S. Prerequisite: CIVE 540/CBE 540.

Selected topics from current environmental engineering research including molecular methods, water/wastewater treatment, hazardous waster remediation.

*CIVE 751 03(3-0-0). **Soil Dynamics.** S. Prerequisite: CIVE 355.

Soil behavior under dynamic loading; stress wave propagation; foundation response to vibratory and transient loading; elements of earthquake effects.

°CIVE 754 03(3-0-0). **Special Topics in Geotechnical Engineering.** S. Prerequisite: CIVE 655; written consent of instructor.

Advanced topics in geotechnical engineering including cold regions problems, expansive/collapsing soils, computer applications.

*CIVE 766 03(3-0-0). **Theory of Plates and Shells.** F. Prerequisite: CIVE 560.

Classical plate, shell and membrane theory for isotropic and layered anisotropic media. Analytic and computational solution techniques.

°CIVE 767 03(3-0-0). **Structural Dynamics and Earthquake Engineering.** F. Prerequisite: CIVE 562; CIVE 667.

Analysis, behavior, and design of structural systems subjected to dynamic loads, including earthquakes, wind, and ocean waves.

CIVE 799A-J Var. Dissertation.

A) Fluid mechanics and wind engineering. B) Hydraulics. C) Hydrology and water resources. D) Mechanics. E) Geotechnical engineering. F) Structures. G) Environmental engineering. H) Water resource planning and management. I) Groundwater. J) Bioresource and agricultural engineering.

CELL AND MOLECULAR BIOLOGY COURSES

Nondepartmental, Interdisciplinary Office of Provost and Executive Vice President

CM 795 Var. Independent Study.
CM 799 Var. Dissertation.

CM 501 04(4-0-0). Advanced Cell Biology. F. Prerequisite: BZ 310.
Cell structure and organelle function.

CM 502/NB 502 02(1-3-0). Techniques in Molecular & Cellular Biology. F. Prerequisite: One college-level course with laboratory in each: biology, biochemistry, physics; written consent of instructor. Credit not allowed for both CM 502 and NB 502.

Current methods in molecular and cellular neurobiology.

CM 510 01(1-0-0). Introduction to Cell and Molecular Biology. F.
Overview of CMB program and research opportunities; enhances writing and oral communication skills.

***CM 520 03(2-0-1). Proteolytic Regulation of Cellular Processes.** S.
Prerequisite: CM 501.

Functions of proteolytic pathways in the regulation of eukaryotic cellular processes, such as mitosis, apoptosis, signal transduction and gene regulation.

CM 595 Var. Independent Study.

CM 601 01(0-0-1). Responsible Conduct of Research in CMB. S.
Prerequisite: Enrollment in the CMB graduate program.

Key aspects of responsible conduct of research and ethical considerations in cell and molecular biology.

CM 640 03(3-0-0). Creative Science Writing. S.

Consideration of creative writing techniques and their relevance to traditional science/nature writing.

°CM 666/°PHIL 666 03(3-0-0). Science and Ethics. S. Credit not allowed for both CM 666 and PHIL 666.

Ethical issues of research on humans and animals; biosafety; fraud and deception in science; genetic engineering.

CM 699 Var. Thesis.

CM 701D-I. Topics in Cell and Molecular Biology. F, S. Prerequisite: BC 403; CM 501; MATH 255.

D) Radiation cytogenetics 01(1-0-0). **I)** Planning research and grant proposals 02(2-0-0).

CM 702B-E Methods in Cell and Molecular Biology. F, S.

B) Mammalian cell culture techniques 01(0-3-0). Prerequisite: BC 403; CM 501. **C)** Immunochemical techniques 01(0-3-0). Prerequisite: BC 403; CM 501; MATH 255. **D)** Radiation cytogenetics 01(0-3-0). Prerequisite: BC 403; CM 501; **E)** Flow cytometry and cell sorting 02(0-4-0). Prerequisite: BC 403; CM 501.

CM 710/BSPM 710 03(0-4-1). Techniques in Molecular Biology and Genetics. S. Prerequisite: BC 463 or BZ 346 or BZ 350 or MIP 450 or SOCR 330. Credit not allowed for both CM 710 and BSPM 710.

Genetic manipulation of bacteria, bacteriophage, and yeast including experiments in molecular cloning and gene expression.

CM 784 Var. Supervised College Teaching.

CM 792 01(1-0-0). Cell and Molecular Biology Seminar. F, S.
Prerequisite: CM 501 or concurrent registration.

Preparation and presentation of cell and molecular biology seminars.

CM 793 01(0-0-1). Seminar.

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COMPOSITION COURSES

Department of English

College of Liberal Arts

CO 130 03(3-0-0). Academic Writing. (GT-CO1). F, S. Prerequisite: composition challenge/placement exam.

Academic writing, critical thinking, and critical reading through study of a key academic issue.

CO 150 03(3-0-0). College Composition. (GT-CO2, AUCC 1A). F, S, SS. Prerequisite: SAT critical reading score of 600 or above or ACT English score of 26 or above or composition placement/challenge exam (score of 3, 4, or 5) or CO 130. (For students registered at CSU prior to Fall 2008, SAT verbal score of 500 or above or ACT English score of 20 or above.)

Understanding and writing for rhetorical situations; critical reading and response; writing source-based argument for academic and public audiences. (NT-O)

CO 300 03(3-0-0). Writing Arguments. (AUCC 2). F, S, SS. Prerequisite: CO 150 or HONR 193.

Reading, analyzing, researching, and writing arguments.

CO 301A-D 03(3-0-0). Writing in the Disciplines. (AUCC 2). F, S, SS. Prerequisite: CO 150 or HONR 193.

Learning writing strategies for addressing general audiences. **A)** Arts and humanities. **B)** Sciences. **C)** Social sciences. (NT-O) **D)** Education.

CO 302 03(3-0-0). Writing Online. (AUCC 2). F, S. Prerequisite: CO 150 or HONR 193.

Writing and analysis of electronic texts.

CO 401 03(3-0-0). Writing and Style. F, S. Prerequisite: CO 300 or CO 301A or CO 301B or CO 301C or CO 301D or CO 302.

Advanced expository and persuasive writing emphasizing modes, strategies, and styles for a variety of audiences and purposes.

CO 402 03(3-0-0) Advanced Writing Online. F, S. Prerequisite: CO 302 or JTC 372 or SPCM 346.

Advanced study of rhetorical contexts shaping online texts. Builds on fluency in coding and familiarity with online document design.

CONSTRUCTION MANAGEMENT COURSES

Department of Construction Management College of Applied Human Sciences

CON 101 03(3-0-0). Introduction to Construction Management. F, S.

Identify and understand relationships among participants in the construction process and its history.

CON 131 02(0-4-0). Graphic Communications/CAD. F, S, SS.

Reading technical drawings, manual drafting techniques, reprographic technologies. CAD applications are introduced.

CON 136 03(1-4-0). Computer-Aided Design. F, S, SS. Prerequisite: BUS 150.

Introduction to and application of computer-aided design and drafting software. Applications using the latest release of AutoCAD. (NT-O/C)

CON 151 03(3-0-0). Construction Materials and Methods. F, S.

Materials and methods utilized in the design and construction of buildings.

CON 251 02(1-2-0). Materials Testing and Processing. F, S. Prerequisite: CON 151.

Testing of construction materials for standards and quality. Conduct common quality tests and document the results. (\$)

CON 261 03(2-3-0). Construction Surveying. F, S, SS. Prerequisite: CON 131 or INTD 166; MATH 125 or MATH 160.

Surveying fundamentals to field of construction, building layout, measurement procedures, vertical controls, line and grade, surveying, instrument operation. (\$)

CON 265 03(2-2-0). Construction Estimating I. F, S. Prerequisite: CON 151.

Integration of construction materials and methods into construction systems that will be incorporated in projects. (\$)

CON 267 01(0-0-1). Construction Management Pre-Internship. F, S, SS. Construction management majors only.

Skills and concepts related to successful internships within the construction management industry.

CON 270 03(3-0-0). Introduction to Road Construction. F.

Steps necessary to construct a paved roadway from conception, land acquisition and finance through paving operations and trafficking.

CON 317 02(2-0-0). Safety Management. F, S.

Safety management in construction, corporate, and institutional environments.

CON 351 02(1-2-0). Construction Field Management. F, S. Prerequisite: CON 251 or concurrent registration; CON 317 or concurrent registration.

Materials and methods used in construction, administrative and organizational planning used to complete a project.

CON 352 02(1-2-0). Metal Fabrication for Construction. F, S. Prerequisite: CON 251.

Shaping, cutting, and joining of structural and non-structural metal. Emphasis on jobsite safety, economics, and efficiency. (\$)

CON 359 04(4-0-0). Structures I. F, S. Prerequisite: MATH 125; junior or senior standing.

Behavior of structural components and systems, overview of structural engineering analysis/design process.

CON 360 03(2-2-0). Electrical and Control Systems. F, S. Prerequisite: CON 265.

Electrical and control systems and their application in the construction industry.

CON 365 03(2-2-0). Construction Estimating II. F, S. Prerequisite: CON 265.

Industry-recognized methods for work item analysis, quantity surveying, resource estimating, and bid development using work breakdown structures.

CON 366 03(2-2-0). Construction Equipment and Methods. F, S. Prerequisite: CON 261.

Equipment/methods in heavy and highway construction; equipment selection, productivity, and costs. Infrastructure, tunneling, and trenchless technology.

CON 367 03(3-0-0). Construction Contracts/Project Administration. F, S. Prerequisite: CON 265; CON 351 or concurrent registration. Construction management majors and minors only.

Utilization of field engineering systems and procedures to effectively meet project objectives.

CON 370 03(2-2-0). Asphalt Pavement Materials and Construction. F, S.

Constituents of asphalt pavements; manufacture of asphalt cement, emulsions, and cutbacks; material properties and behavior.

CON 371 03(3-0-0). Mechanical and Plumbing Systems. F, S. Prerequisite: CON 360 or concurrent registration or INTD 276 or concurrent registration.

Heating, ventilation, air conditioning, plumbing, and fire suppression with emphasis on design, operation, and interaction.

CON 384 Var [1-5]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

CON 450/INTD 450 03(3-0-0). Travel Abroad-Sustainable Building. SS. Credit not allowed for both CON 450 and INTD 450.

Major components of sustainable design and construction, energy, healthy buildings, natural resources, and other environmental issues.

CON 459 04(4-0-0). Structures II. F, S. Prerequisite: CON 359.

Design of formwork, falsework, and shoring.

CON 461 03(2-2-0). Construction Project Scheduling and Cost Control. F, S. Prerequisite: CON 365 or concurrent registration. Construction management majors and minors only.

Strategies and techniques for efficient scheduling of project activities and control of project costs; emphasis on Critical Path Method.

CON 462 03(3-0-0). Financial Management for Construction. F, S. Prerequisite: ACT 205 or ACT 210; MGT 305 or MGT 320.

Financial statements, financial ratios, applications of engineering economy, cash flow analysis, construction financing, and cost information systems.

CON 465 03(1-0-2). Construction Management Professional Practice. F, S. Prerequisite: CON 461 or concurrent registration; CON 487A or CON 487B. Construction management majors only.

Professional practice using an understanding of the contractual and working relationships among all participants in the design/construction process.

CON 469 03(2-0-1). Soils Engineering for Construction Managers. F, S. Prerequisite: CON 359.

Soil mechanics, foundation engineering, and foundation construction.

CON 471 03(3-0-0). Project Management for Mechanical Systems. F. Prerequisite: CON 371; CON 365 or concurrent registration.

Fundamental principles of mechanical systems. Presentation and practice of management principles relevant to mechanical projects.

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CON 476 03(3-0-0). Sustainable Practices-Design and Construction. F.
Major components of sustainable design/construction: energy, healthy buildings, cultural, natural resources, use, other environmental/economic issues.

CON 487A-B Var[3-6]. Internship. F, S, SS.
A) Construction Management I. (06(0-0-18). Prerequisite: CON 267; CON 367. B) Construction Management II. Prerequisite: CON 267; CON 367; 500 hours of documented work experience.

CON 495 Var. Independent Study-Construction.

CON 496 Var. Group Study-Construction.

CON 500 03(3-0-0). Models of Disciplined Inquiry. F. Prerequisite: Admission to master's program.
Models and methods of disciplined inquiry used in diverse organizations; applying disciplined inquiry methods to solve problems.

CON 560 03(3-0-0). Applied Project Management. F. Prerequisite: Admission to master's program.
Project development, planning, and control relevant to construction, manufacturing and technology education professionals.

CON 561 03(3-0-0). Applied Productivity Improvement. S. Prerequisite: Admission to master's program.
Existing and emerging tools for productivity enhancement in project and production environment.

CON 562 03(3-0-0). Issues and Trends in Construction Management. F. Prerequisite: Admission to master's program.
Current issues and trends related to management of technology in fields associated with manufacturing and construction industries.

CON 565 03(3-0-0). Legal Aspects of Construction Process. S. Prerequisite: Admission to master's program.
Common points of dispute; methods of avoiding disputes among owner, architect, engineer, and contractor.

CON 566 03(3-0-0). Advanced Construction Estimating. F. Prerequisite: Admission to master's program.
Advanced estimating procedures dealing with special application and techniques in construction.

CON 567 03(3-0-0). Preservation and Rehabilitation of Buildings. F. Prerequisite: Admission to master's program.
Theory and applications of preservation technology used in the management and rehabilitation of historic and archaic buildings.

CON 568 03(3-0-0). Construction Industry Institute Practices. F. Prerequisite: CON 367.
Senior executives from the Construction Industry Institute (CII) present best practices developed by CII over the last 25 years.

CON 569 03(3-0-0). Regulatory Impact on Construction. S. Prerequisite: Admission to master's program.
Role government plays in the design and construction of the built environment.

CON 571 03(3-0-0). Facility Planning and Management. S. Prerequisite: Admission to master's program.
Planning, organizing, and managing large educational and/or commercial facilities.

CON 575 03(3-0-0). Managerial Decision Making for Constructors. F. Prerequisite: Admission to master's program.
Construction and real estate development applications of multi-disciplinary managerial analysis and decision-making techniques.

CON 576 03(2-0-1). Sustainable Technology in Built Environments. S.

Prerequisite: CON 450/INTD 450 or CON 476.

Major components of creating environmentally sustainable built environments.

CON 590 Var. Workshop.

CON 592 Var. Seminar.

CON 684 Var. Supervised College Teaching.

CON 687 Var [1-6]. Internship. Maximum of 6 credits allowed in course.

CON 695 Var. Independent Study.

CON 696 Var. Group Study. Prerequisite: Admission to master's program.

CON 698 Var. Research.

CON 699 Var [1-6]. Thesis.

COMPUTER SCIENCE COURSES

Department of Computer Science

College of Natural Sciences

CS 110 04(3-3-0). Personal Computing. F, S, SS.

Hardware/software concepts, Internet services, OS commands, electronic presentations, spreadsheets, databases, programming concepts. (NT-O)

CS 115 03(2-0-1). Computer Science Concepts and Practices. F, S, SS.

Prerequisite: Placement into MATH 117 or MATH 130.

Development of computer science, central concepts: algorithm, recursion, autonomous computation, computability limits. Examples using programming. (NT-O)

CS 122/MATH 122 01(0-0-1). Theory for Introductory Programming.

F, S, SS. Prerequisite: MATH 118; concurrent registration in CS 161. Credit not allowed for both CS 122 and MATH 122. Credit not allowed for students who have completed CS 160.

Set theory, definitions operations, Venn diagrams, power sets, propositional logic and proofs. Functions; loop invariants. (NT-O)

CS 150 04(3-0-1). Interactive Programming with Java. F, S.

Prerequisite: Placement into MATH 117 or MATH 130.

Introduction to object-oriented programming with Java; problem solving, creating applets for Web pages, and graphical user interfaces. (NT-O)

CS 155 01(1-0-0). Introduction to Unix. F, S.

Unix shell commands, utilities (editors, sorting, file management), shell scripting.

CS 156 01(1-0-0). Introduction to C Programming I. F, S. Prerequisite:

CS 155 or concurrent registration; MATH 118.

Basic elements of language structure, data types, expressions, program control flow and modularity.

CS 157 01(1-0-0). Introduction to C Programming II. F, S. Prerequisite:

CS 156 or concurrent registration; MATH 118.

More basic design types, function usage and strings. Arrays, user-defined types and structures, enumerated types, recursion, dynamic storage allocation.

CS 158/MATH 158 01(0-2-0). Mathematical Algorithms in C. S.

Prerequisite: CS 156; MATH 151; MATH 160. Credit not allowed for both CS 158 and MATH 158.

Compilers, expressions, variable types, control statements, pointers, logical statements, plotting, secant method, trapezoidal rule, recursion.

CS 160 04(3-2-0). Foundations in Programming. F, S. Prerequisite:

MATH 118 with a C or better.

Introduction to computer theory, programming and systems. Sets, functions, logic. Procedural programming in Java. Computer and data models.

CS 161 04(3-2-0). Object-Oriented Problem Solving. F, S, SS.

Prerequisite: CS 160 with a C or better; MATH 141 or concurrent registration or MATH 155 or concurrent registration or MATH 160 or concurrent registration.

Fundamental object oriented concepts, inheritance, polymorphism, basic algorithms, linked lists, assertions, recursion, induction, counting.

CS 192 02(1-0-1). First Year Seminar in Computer Science. F, S.

Computer science majors only.

Introduction to the computer science major; basic computer skills; campus resources, and various subject-specific topics.

CS 200 04(3-2-0). Algorithms and Data Structures. F, S, SS.

Prerequisite: CS 161 with a C or better; MATH 141 with a C or better or MATH 155 with a C or better or MATH 160 with a C or better.

Data structures; abstract data types; algorithm correctness; complexity

analysis; sorting, searching, hashing. (NT-V)

CS 253 04(3-0-1). Problem Solving with C++. F, S. Prerequisite: CS 200 with a C or better; CS 270 with a C or better or ECE 251 with a C or better.

C++ programming techniques for experienced programmers. UNIX tools for editing, compiling, debugging, and testing C++ programs. (NT-V)

CS 270 04(3-0-1). Computer Organization. F, S. Prerequisite: CS 161

with a C or better; CS 200 or concurrent registration; MATH 141 with a C or better or MATH 155 with a C or better or MATH 160 with a C or better..

Representation of data, arithmetic, assembly language, digital logic, digital systems, memory organization, and architecture. (NT-V)

CS 295 Var [1-4]. Independent Study.

Investigation of special topics under direction of computer science faculty.

CS 314 03(3-0-0). Software Development Methods. F, S. Prerequisite: CS

253 with a C or better.

Methods used to develop large-scale software projects in industry emphasizing design, implementation, and testing. (NT-V)

CS 320 03(3-0-0). Algorithms—Theory and Practice. F, S. Prerequisite:

CS 200 with a C or better; MATH 161 with a C or better; MATH 229 with a C or better or MATH 369 with a C or better.

Analysis, design, implementation and applications of algorithms.

CS 356 03(3-0-0). Systems Security. F, S. Prerequisite: CS 253 with a C

or better; CS 270 with a C or better or ECE 251 with a C or better; STAT 201 or STAT 204 or STAT 301 or STAT 307 or STAT 311 or STAT 315.

Computer and system security, authentication, access control, malicious software, and software security.

CS 370 03(3-0-0). System Architecture and Software. F, S. Prerequisite:

CS 200 with a C or better; CS 270 with a C or better or ECE 251 with a C or better.

Introduction to operating systems including memory organization, I/O control, multitasking, process control, coordination, and resource management. (NT-V)

CS 410 04(3-2-0). Introduction to Computer Graphics. F. Prerequisite:

CS 253 with a C or better; MATH 229 with a C or better or MATH 369 with a C or better.

Graphics hardware and software; drawing simple objects; coordinate transformations in 2D and 3D; modeling and viewing complex 2D and 3D objects. (NT-O)

CS 414 04(3-3-0). Object-Oriented Design. F. Prerequisite: CS 314 with a

C or better.

Object-oriented methods for large-scale software systems. Software design for reuse using patterns. Development of WWW applications in languages, e.g., Java. (NT-O)

CS 420 04(3-0-1). Introduction to Analysis of Algorithms. F.

Prerequisite: CS 320 with a C or better.

Efficiency analysis, correctness proofs, design strategies, illustrations from domains such as graph theory, scheduling and optimization, geometry. (NT-O)

CS 430 04(3-2-0). Database Systems. S. Prerequisite: CS 314 with a C or

better.

Database analysis, design, administration, implementation, hierarchical, network relational models; data sublanguages; query facilities. (NT-O)

CS 440 04(3-2-0). Introduction to Artificial Intelligence. F. Prerequisite:

CS 253 with a C or better; CS 320 with a C or better.

Concepts, representations, and algorithms for applications of problem solving search, logical reasoning and machine learning. (NT-O)

CS 451 04(3-3-0). Operating Systems. S. Prerequisite: CS 370 with a C or

better.

Operating system design and implementation, file systems, distributed

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

operating systems, case studies.

CS 453 04(3-0-1). Introduction to Compiler Construction. S. Prerequisite: CS 314 with a C or better.

Functional components of a compiler: modules, interfaces, lexical and syntax analysis, error recovery, resource allocation, code generation.

CS 454 04(3-3-0). Principles of Programming Languages. S. Prerequisite: CS 253 with a C or better; CS 320 with a C or better.

Language design concepts; functional programming; interpreter support for environments, procedures, recursion, types, objects; language paradigms.

CS 455 04(3-2-0). Introduction to Distributed Systems. S. Prerequisite: CS 370 with a C or better.

Fundamentals of distributed systems: concurrency, thread pools, scalable servers, graphs, data formats, transactions, secure systems, and overlays.

CS 457 04(3-3-0). Computer Networks and the Internet. F, S. Prerequisite: CS 253 with a C or better; CS 370 with a C or better; STAT 301 with a C or better or STAT 303/ECE 303 with a C or better or STAT 307 with a C or better or STAT 311 with a C or better or STAT 315 with a C or better.

Principles of communications, local area networks, communication protocols, TCP/IP, and the Internet. (NT-O/V)

CS 460/ECE 460 04(3-3-0). Embedded Systems. F. Prerequisite: CS 370. Credit not allowed for both CS 460 and ECE 460.

Industry standard tools for embedded system hardware software co-design. VHDL, ModelSim, Xilinx ISE and EDK.

CS 470 04(3-2-0). Computer Architecture. S. Prerequisite: CS 370.

Instruction set; hardwired, microprogramming; memory; arithmetic; I/O and buses; performance evaluation; pipelining; RISC. (NT-O)

CS 475 04(3-3-0). Parallel Programming. F. Prerequisite: CS 370 with a C or better.

Parallel programming techniques for shared-memory and message-passing systems; process synchronization, communication; example languages. (NT-O)

CS 486 Var [1-4]. Practicum. Maximum of 12 credits allowed for any combination of CS 486, CS 495.

Supervised work experience in approved computer science setting with periodic consultation of faculty.

CS 495 Var. Independent Study. Maximum of 12 credits allowed for any combination of CS 486, CS 495.

CS 498 Var [1-4]. Research. F, S, SS. Prerequisite: Written consent of instructor; computer science majors only.

Supervised research in computer science.

CS 510 04(3-3-0). Image Computation. S. Prerequisite: CS 410.

Image generation theory and implementation, image manipulation/interpretation. Ray tracing, geometric and photometric manipulation, image matching.

CS 514 04(3-3-0). Software Product and Process Evaluation. F. Prerequisite: CS 414.

Software development process modeling and evaluation; software metrics, testing verification, validation; experimental methods in software engineering. (NT-O)

CS 517 04(3-3-0). Software Specification and Design. S. Prerequisite: CS 414.

Rigorous techniques for modeling, specifying, and analyzing software requirements and designs; reusable software development. (NT-O)

CS 518 04(3-2-0). Distributed Software System Development. S. Prerequisite: CS 414; CS 451.

Principles of developing distributed systems; middleware technologies

and techniques for building complex distributed component-based systems.

CS 520 04(3-3-0). Analysis of Algorithms. S. Prerequisite: CS 420.

Asymptotic complexity, algorithm complexity, and problem complexity; the Master Method; parallel algorithms; algorithm design.

CS 530 04(3-3-0). Fault-Tolerant Computing. S. Prerequisite: CS 370.

Achieving high reliability and fault tolerance. Fault modeling, testing, reliability evaluation, redundancy, fault tolerance. (NT-O)

CS 533 04(3-2-0). Database Management Systems. F. Prerequisite: CS 430.

Theory and implementation of concurrency control, recovery, and query processing as it applies to centralized and distributed systems. (NT-O)

CS 540 04(3-3-0). Artificial Intelligence. S. Prerequisite: CS 440.

Knowledge-based systems, representation, automated logic, planning, neural networks, genetic algorithms, natural language, vision, machine learning. (NT-V)

CS 545 04(3-3-0). Machine Learning. F. Prerequisite: CS 440.

Computational methods that allow computers to learn; neural networks, decision trees, genetic algorithms, bagging and boosting. (NT-O)

CS 548/STAT 548 04(3-2-0). Bioinformatics Algorithms. F. Prerequisite: STAT 301 or STAT 307 or STAT 315; knowledge of a contemporary programming language.

Computational methods for analysis of DNA/protein sequences and other biological data.

CS 551 04(3-3-0). Distributed Operating Systems. F, SS. Prerequisite: CS 370 with a C or better or CS 451 with a C or better.

Distributed operating systems, memory management, computer security, client-server computing, distributed resource management failure recovery. (NT-O)

CS 553 04(3-3-0). Algorithmic Language Compilers. F. Prerequisite: CS 453.

Compiler construction; lexical scanner generators, parser generators, dataflow analysis, optimization.

CS 555 04(3-3-0). Distributed Systems. F. Prerequisite: CS 451 with a B or better.

Principles, paradigms, protocols and algorithms underlying modern distributed systems.

CS 556 04(3-2-0). Computer Security. F. Prerequisite: CS 451.

Topics in computer security: Concepts, threats, risks, access control models, trusted systems, cryptography, authentication. (NT-O)

CS 557 04(3-3-0). Advanced Networking. S. Prerequisite: CS 457.

Core internet protocols including transport, routing, and security protocols. Protocol design principles. Network measurements and assessment. (NT-O)

CS 560/ECE 560 04(3-2-0). Foundations of Fine-Grain Parallelism. S. Prerequisite: CS 475 or CS 460/ECE 460. Credit not allowed for both CS 560 and ECE 560.

Programming novel architectures; performance tuning; automatic parallelization; program transformation; polyhedral model; equational programming. (NT-O, CS 560 only)

CS 561/ECE 561 04(3-3-0). Hardware/Software Design of Embedded Systems. S. Prerequisite: CS 270 or CS 470 or ECE 251 or ECE 452. Credit not allowed for both CS 561 and ECE 561.

Embedded systems design including system level modeling, design space exploration, hardware-software partitioning, high-level synthesis.

CS 570 04(3-3-0). Advanced Computer Architecture. F. Prerequisite: CS 470.

Pipelined CPU design. Superscalar architectures and instruction-level

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

parallelism. Cache and memory hierarchy design. Storage systems.

CS 575 04(3-3-0). Parallel Processing. F. Prerequisite: CS 475.

Parallel and distributed computing models, algorithms, mapping and performance evaluations, parallel computing tools and applications. (NT-O)

CS 612 04(3-2-0). Topics in Computer Graphics. F. Prerequisite: CS 510.
Computer graphics research topics.

CS 614A-E 04(3-3-0). Advanced Topics in Software Engineering. F, S.
Prerequisite: CS 514 or CS 517 or CS 518.

Advanced topics in software engineering. **A)** Specification and design. **B)** Testing and verification. **C)** Software environments and tools. **D)** Software measurement, analysis and evaluation. **E)** Application domains.

CS 620 04(3-2-0). Advanced Topics in Algorithms. F. Prerequisite: CS 520.

Designing and analyzing algorithms and data structures; illustrations from variety of problem domains.

CS 635 04(3-3-0). Advanced Fault-Tolerant Computing. F. Prerequisite: CS 530.

Advanced topics and recent developments in high reliability and fault-tolerant systems.

CS 640 02(2-0-0). Advanced Artificial Intelligence I. F. Prerequisite: CS 540.

Research topics in artificial intelligence: genetic algorithms, neural networks, connectionist models; machine learning; planning, automated reasoning.

CS 641 02(2-0-0). Advanced Artificial Intelligence II. S. Prerequisite: CS 640.

Advanced research topics in artificial intelligence.

CS 646 04(3-2-0). Machine Learning in Bioinformatics. S. Prerequisite: CS 545 or STAT 560.

Recent research on the applications of machine learning in bioinformatics.

CS 653 04(3-3-0). Topics in Programming-Language Implementation. S. Prerequisite: CS 553.

Data dependence analysis; code generation.

CS 655 04(3-2-0). Advanced Topics in Distributed Systems. F.
Prerequisite: CS 555.

Issues related to robustness, replication, consistency, scalability, isolation and privacy in large-scale distributed systems.

CS 656A-C 04(3-2-0). Advanced Topics in Computer Security. F, S.
Prerequisite: CS 556.

Advanced research topics in computer security. **A)** Formal models of computer security. **B)** Models for privacy and application security. **C)** Network security.

CS 657 04(3-2-0). Advanced Topics in Computer Networking. F.
Prerequisite: CS 557.

Advanced research topics in computer networks.

CS 658/ECE 658 04(3-3-0). Internet Engineering. F. Prerequisite: CS 457 or ECE 456. Credit not allowed for both CS 658 and ECE 658.

Link technologies, multiple access, hardware and software for internetworks routing, switching flow control, multicast, performance, and applications. (NT-O)

CS 670 B-D/ECE 670B-D Var [1-4]. Topics in Architecture/Systems. F, S. Prerequisite: CS 570 or ECE 554. Credit not allowed for both CS 670B-D and ECE 670B-D.

B) Performance evaluation and modeling. **C)** Distributed systems. **D)** Architecture of advanced systems.

***CS 674/*ECE 674 03(3-0-0). Heterogeneous Computing.** S.
Prerequisite: CS 551 or CS 570 or CS 575 or ECE 550 or ECE 554. Credit not allowed for both CS 674 and ECE 674.

Allocation of resources to tasks in parallel and distributed heterogeneous computing systems. A variety of computational environments are considered.

CS 675 04(3-3-0). Advanced Parallel Computing. S. Prerequisite: Written consent of instructor.

Parallel computing, computational models, parallel languages and algorithms, distributed simulation, Internet and mobile computing, parallel search.

CS 692 Var. Seminar.

CS 695 Var. Independent Study.

CS 696 Var. Group Study.

CS 699 Var. Thesis.

CS 787 01(0-3-0). Internship. SS.

CS 799 Var. Dissertation.

COMPUTING TECHNOLOGY COURSES

Department of Computer Science
College of Natural Sciences

CT 310 04(3-3-0). Web Development. F, S, SS. Prerequisite: CS 200.

Web development languages used to create fully functional dynamic web sites; server and client scripting, database access and security issues.

CT 320 04(3-3-0), Network and System Administration. F, S. Prerequisite: (CS 155 and CS 156) or CS 253.

Installation of network and operating systems services, management and support; upgrades, security, backups.

DANCE COURSES

Department of Music, Theatre, and Dance *College of Liberal Arts*

D 110 03(3-0-0). Understanding Dance. (GT-AH1, AUCC 3B). F, S, SS.
For non-dance majors. Previous dance experience not necessary.
Broad examination of dance.

D 120A-C 02(0-4-0). Dance Techniques I. F, S.
A) Modern. (\$) B) Ballet. (\$) C) Jazz.

D 121A-C. Dance Techniques II. F, S.
A) Modern 02(0-4-0). Prerequisite: D 120A. (\$) B) Ballet 03(0-6-0).
Prerequisite: D 120B; written consent of instructor. (\$) C) Jazz 02(0-4-0).
Prerequisite: D 120C.

D 126 02(1-2-0). Dance Improvisation. F, S. Prerequisite: None.
Organic movement and inventive dance movement through
improvisational skills, body, physicality, space/direction/level imagery and
partnering.

***D 160 02(0-4-0). Musical Tap Forms.** S.
Basic tap dance forms with emphasis on terminology, study of rhythm,
and tap styles; historical development of tap in American culture.

D 220A-C. Dance Techniques III. F.
A) Modern 02(0-4-0). Prerequisite: D 121A. (\$) B) Ballet 03(0-6-0).
Prerequisite: D 121B; written consent of instructor. (\$) C) Jazz 02(0-4-0).
Prerequisite: D 121C.

D 221A-C. Dance Techniques IV. S.
A) Modern 02(0-4-0). Prerequisite: D 220A. (\$) B) Ballet 03(0-6-0).
Prerequisite: D 220B; written consent of instructor. (\$) C) Jazz 02(0-4-0).
Prerequisite: D 220C.

D 226 02(1-2-0). Dance Choreography I. F. Prerequisite: D 121A or D
121B or D 121C.
Elements of dance composition including space, levels, rhythm,
dynamics, qualities of movement, form, style.

D 286 Var [1-3]. Practicum. F, S. Prerequisite: D 121A; D 121B.
Dance performance and production experience.

D 320A-C Dance Techniques V. F.
A) Modern 03(0-6-0). Prerequisite: D 221A; written consent of
instructor. (\$) B) Ballet 03(0-6-0). Prerequisite: D 221B; written consent of
instructor. (\$) C) Jazz 02(0-4-0). Prerequisite: D 221C.

D 321A-C. Dance Techniques VI. S.
A) Modern 03(0-6-0). Prerequisite: D 320A; written consent of
instructor. (\$) B) Ballet 03(0-6-0). Prerequisite: D 320B; written consent of
instructor. (\$) C) Jazz 02(0-4-0). Prerequisite: D 320C.

D 324 02(1-2-0). Teaching Creative Movement for Children. S.
Theoretical and practical experience in teaching creative movement.

D 325 03(2-2-0). Dance Production. S. Prerequisite: TH 161.
Advanced stage management, lighting, and sound design.

D 326 02(1-2-0). Dance Choreography II. S. Prerequisite: D 226.
Advanced choreographic elements: group work, music influence, and
nontraditional performance venues.

D 330 Var [1-3]. Dance Repertory. F, S, SS. Prerequisite: Written consent
of dance faculty.
Experience in choreographic styles and choreography of national,
international choreographers; opportunity to develop individual repertoire
of dance.

D 420A-C 02(0-4-0). Dance Techniques VII. F.
A) Modern. Prerequisite: D 321A. B) Ballet. Prerequisite: D 321B. (\$) C) Jazz. Prerequisite: D 321C.

D 421A-C 02(0-4-0). Dance Techniques VIII. S.
A) Modern. Prerequisite: D 420A. B) Ballet. Prerequisite: D 420B. (\$) C) Jazz. Prerequisite: D 420C.

D 424 03(3-0-0). Dance Pedagogy. F. Prerequisite: D 324.
Theories of dance education.

D 426 02(1-2-0). Dance Choreography III. F, S. Prerequisite: D 321A or
D 321B or D 321C.
Studies in 20th-century dance composition forms.

***D 427 03(3-0-0). Dance History I.** S.
History of classical ballet to modern times from its origins in folk dance
of Middle Ages and social dance of Renaissance.

°D 428 03(3-0-0). Dance History II. S.
History of contemporary dance forms including modern, jazz, and tap
dance.

D 432 03(2-2-0). Dance Therapy. SS.
Use of dance forms in therapy for mentally and physically handicapped.

D 471 03(0-6-0). Dance Concert. F, S. Prerequisite: D 321A-C; D 325; D
326; D 330; written consent of faculty. Dance majors only.
Demonstration of individual performance and choreographic proficiency
in a public performance. Supporting paper and video documentation
required.

D 484 Var [1-3]. Supervised College Teaching. F, S. Prerequisite: D
324; D 424; D 486. A maximum of 10 combined credits for all 384 and 484
courses are counted towards graduation requirements.

D 486 Var [1-3]. Practicum. S. Prerequisite: D 221A or D 221B or
D221C; D 324; D 424.
Theory and practice of teaching methods in dance.

D 491 Var [1-3]. Workshop.

D 495 Var. Independent Study.

D 496 Var. Group Study.

D 527 02(0-4-0). Contemporary Dance. S.
Techniques of dance movement and choreography.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

DESIGN AND MERCHANDISING COURSES

Department of Design and Merchandising College of Applied Human Sciences

DM 120 03(2-2-0). Textiles. F, S, SS.

Fibers, fabrics, and finishes basic to selection, use, and care. (NT-O)

DM 272 03(3-0-0). Consumers in the Marketplace. F, S.

Analysis and evaluation of consumers in the marketplace as applied to merchandising. (NT-O)

DM 300 03(3-0-0). Retail Sales and Customer Strategies. F, S, SS.

Examine selling practices and their impact on business and consumers in the global marketplace. (NT-O)

DM 360/MKT 360 03(3-0-0). Retailing. F, S, SS. Prerequisite: MKT 300 or MKT 305. Credit not allowed for both DM 360 and MKT 360.

Retail markets, institutions, operations, and problems. (NT-O)

DM 400 03(1-2-1). U.S. Travel-New York City. S. Prerequisite: Six credits in AM, DM and/or INTD courses.

Interview/analyze designers, manufacturers, buying offices, retail stores, magazine firms, interior design and architecture firms, etc. (\$)

DM 470A-B 02(1-0-1). International Design and Merchandising. F, S, SS.

Historical, cultural, and business aspects of international design and merchandising in selected countries. A) Apparel Merchandising. Prerequisite: AM101; AM130; DM 120; concurrent registration in DM482A. B) Interior Design. Prerequisite: ART 100; INTD 129; INTD 166; concurrent registration in DM 482B.

DM 482 01(0-0-1). Travel Abroad. F, S, SS. Prerequisite: AM 101; AM130; DM 120; concurrent registration in DM 470A.

Historical, cultural, aesthetic, and business aspects of design and merchandising in the selected country(ies).

DM 487A-F Internship.

A) Merchandising. Var [12-16]. Prerequisite: GPA 2.500; AM 371; DM 360/MKT 360; DM 492. B) Apparel design and production. Var [12-16]. Prerequisite: GPA 2.500; AM 244; DM 492. F) General. Var [3-16]. Prerequisite: Written consent of instructor.

DM 490 A-C Var [1-6]. Workshop.

A) Merchandising. B) Apparel design and production. C) Interior design.

DM 492 02(1-0-1). Preinternship Seminar. F, S. Prerequisite: Minimum GPA of 2.50; minimum of 60 credits completed..

Professional standards/corporate structure of apparel and merchandising companies in apparel design, product development, and/or merchandising.

DM 495 Var. Independent Study. Maximum of ten credits allowed in course.

DM 496 Var. Group Study. Maximum of ten credits allowed in course.

DM 501 03(0-0-3). Research and Theory—Design and Merchandising. F, SS.

Theory and various approaches and philosophies of research in design and merchandising. Critical evaluation and synthesis of scholarly literature. (NT-O)

DM 510 03(3-0-0). Consumer Behavior. F.

Evaluation of psychological, sociological, and cultural theories of consumer behavior through examination of factors that influence decision

making. (NT-O)

DM 518 03(3-0-0). Consumer Issues-Global Perspectives. F.

Understanding and analysis of consumer well-being and issues from global perspective.

DM 520 03(3-0-0). Professional Advancement in Merchandising. SS. Offered as an online course only.

Analysis of leadership and how it affects organizational culture and change through a prism of past and current experiences. (NT-O)

DM 530 03(3-0-0). Product Design Development and Evaluation. SS. Offered as an online course only.

Issues and strategies necessary to design and produce a competitive product, including the role of globalization and technology. (NT-O)

DM 540 03(3-0-0). Promotional Strategies in Merchandising. F.

Integrated marketing communications while fostering cultural and global awareness, social responsibility and ethical decision-making. (NT-O)

***DM 542 03(1-4-0). Advanced Computer-Aided Textile Design.** S. Prerequisite: None.

Use of computer-aided design system to produce fabric designs for apparel or interior professional end use. (\$)

DM 550 03(3-0-0). Retail Theory and Practice. S. Offered as an online course only.

Theoretical and applied analysis of merchandising strategies; assessment of internal and external environmental forces; trend analysis of forecasting. (NT-O)

DM 551 03(3-0-0). Research Methods. S.

Design and methods of research applicable to design and merchandising. (NT-O)

DM 563 03(1-2-1). Care and Exhibit of Museum Collections. S. Prerequisite: Three credits of ART or HIST or AM or DM.

Hands-on experience in management, care, exhibition, and interpretation of museum collections.

DM 578 03(2-0-1). Trends-Consumer Issues. F, S, SS.

Developments and projections of consumer issues.

DM 590A-C Var [1-6]. Workshop.

A) Merchandising. B) Apparel design and production. C) Interior design.

DM 592 Var [1-3]. Seminar.

DM 596 Var. Group Study.

DM 610 03(3-0-0). Historical and Contemporary Issues in Trade. F. Offered as an online course only.

Examination of fiber, textile, and apparel industries in a global context; how economic, political, and social systems affect production and trade. (NT-O)

DM 620 03(3-0-0). International Merchandise Management. F. Offered as an online course only.

Comprehensive understanding of theory, practices, and trends in international merchandise management. Analysis of global retail system. (NT-O)

DM 630 03(3-0-0). Merchandising Research Methods. S. Prerequisite: Graduate level course in statistics; completion of DM 500-level courses. Offered as an online course only.

Research process used in social science, including survey and analysis of research methodologies; review of merchandising literature. (NT-O)

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

DM 640 03(3-0-0). Merchandising Finance. F. Offered as an online course only.

Advanced study of financial trends in merchandising; implications for sole proprietors, partnerships, franchises, S corporations, and C corporations. (NT-O)

DM 650 03(3-0-0). Strategic Decisions in Merchandising. S. Offered as an online course only.

Examination of executive planning processes utilized to develop successful corporate strategies; emphasis on the importance of a market orientation. (NT-O)

DM 684 Var [1-6]. Supervised College Teaching. F, S.

DM 687 Var. Internship.

DM 695 Var. Independent Study. (NT-B)

DM 698 03(0-0-3). Research. F, S, SS. Prerequisite: Written consent of instructor. (NT-O)

DM 699 Var. Thesis. (NT-O)

ENGLISH COURSES

Department of English *College of Liberal Arts*

E 140 03(3-0-0). The Study of Literature. (GT-AH2, AUCC 3B). F, S, SS.

Basic principles of reading literary texts.

E 179 03(3-0-0). Western American Literature. F, S, SS.

Trans-Mississippi West in fiction and other literary forms.

E 210 03(3-0-0). Beginning Creative Writing. F, S. Prerequisite: Any lower-level E prefix course.

Basic techniques of writing fiction and poetry; may include some elements of drama.

E 232 03(3-0-0). Introduction to Humanities. (GT-AH2, AUCC 3B). F, S.

Great literature of Western cultural tradition from ancient times to present.

E 234/ETST 234 03(3-0-0). Introduction to Native American Literature. S. Credit not allowed for both E 234 and ETST 234.

Native American writings and their significance in American culture.

E 237 03(3-0-0). Introduction to Science Fiction. F, S.

Historical development and major themes of science fiction, featuring writers such as Wells, Huxley, Bradbury, and LeGuin.

E 238 03(3-0-0). 20th-Century Fiction. (GT-AH2, AUCC 3E). F, S.

20th-century fiction chosen for its relevance to global and cultural awareness. (NT-O)

E 239/ETST 239 03(3-0-0). Introduction to Chicano Literature. F, S. Credit not allowed for both E 239 and ETST 239.

Chicano fiction and poetry with consideration of historical roots and influences.

E 240 03(3-0-0). Introduction to Poetry. F, S, SS.

Development of critical skills necessary to understand and enjoy poetry.

E 242 03(3-0-0). Reading Shakespeare. (GT-AH2, AUCC 3B). F, S.

Reading of Shakespeare texts, using various approaches of interpretation for understanding and relation to our contemporary cultural situation.

E 245 03(3-0-0). World Drama. (GT-AH2, AUCC 3E). F, S.

World drama in cultural contexts.

E 270 03(3-0-0). Introduction to American Literature. (GT-AH2, AUCC 3B). F, S, SS.

History and development of American writings from 16th-century travel narratives through early 20th-century modernism.

E 276 03(3-0-0). Survey of British Literature I. (GT-AH2, AUCC 3B). F.

British literature from Beowulf through the 18th century in relation to its historical contexts.

E 277 03(3-0-0). Survey of British Literature II. (GT-AH2, AUCC 3B). S.

British literature from the Romantics to the present in relation to its historical contexts.

E 300/AMST 300 03(3-0-0). American Lives-Methods in American Studies. F, S. Prerequisite: AMST 100; AMST 101. Credit not allowed for both E 300 and AMST 300.

Methods and changing approaches of American studies since 1950s using autobiography as organizing theme.

E 302 03(3-0-0). Reading and the Web. F, S. Prerequisite: CO 150 or

HONR 193.

Critical examination of reading processes, as well as the rhetorical and cultural contexts of readers on the web.

E 305 03(3-0-0). Principles of Writing and Rhetoric. F, S. Prerequisite: CO 300 or CO 301A or CO 301B or CO 301C or CO 301D.

Humanities-based exploration of central principles of rhetoric in written communication.

E 311A-C 03(3-0-0). Intermediate Creative Writing. F.

Group discussion of student writing, literary models, and theory; emphasis on developing individual style. **A)** Fiction. Prerequisite: E 210 with a B or better. **B)** Poetry. Prerequisite: E 210 with a B or better. **C)** Nonfiction. Prerequisite: CO 150; E 210 with a B or better or JTC 210.

E 320 03(3-0-0). Introduction to the Study of Language. F, S, SS.

Varied topics covering general linguistics or the relationships between language and literature or society and science.

E 322 03(3-0-0). English Language for Teachers I. F.

Foundations of language structure, emphasizing grammar, sounds, spelling, word structure, linguistic variation, usage, acquisition, and pedagogy.

E 323 03(3-0-0). English Language for Teachers II. S. Prerequisite: E 322.

Advanced grammar; language history; meaning; applications to teaching composition, reading, and literature.

E 324 03(3-0-0). Teaching English as a Second Language. F, S. Prerequisite: E 320 or E 322.

Introduction to teaching English to speakers of other languages for teacher certification candidates and for those wanting to teach abroad.

E 326 03(3-0-0). Development of the English Language. S.

Chronological study of four historical stages of English (Old, Middle, Early Modern, Modern) with emphasis on grammar, vocabulary, and phonology.

E 327 03(3-0-0). Syntax and Semantics. S.

Linguistic study of sentence structure and grammatical relations, semantic roles and representation.

E 328 03(3-0-0). Phonology, Morphology, and Lexis. S.

Linguistic study of pronunciation, word-formation, and vocabulary.

E 329 03(3-0-0). Pragmatics and Discourse Analysis. S.

Linguistic study of general principles of interpretation and textual patterns.

E 330 03(3-0-0). Gender in World Literature. F, S.

Selected world literature ranging from ancient world to present, considered in light of various complexities of gender relations.

E 331 03(3-0-0). Early Women Writers. F, S. Prerequisite: E 276 or E 277.

Selected women writers from any period before the 20th century.

E 332 03(3-0-0). Modern Women Writers. S.

Selected 20th-century women writers in variety of genres emphasizing relationships between gender, writing, and reading.

E 333 03(3-0-0). Critical Studies of Popular Texts. F, S. Prerequisite: CO 150.

Texts representing one or more popular modes focusing on issues of gender, sexuality, racial or ethnic identity, technology, and colonialism.

E 334 03(3-0-0). Gay and Lesbian Literature. S.

Literature by gay and lesbian authors on gay and lesbian themes.

E 337 03(3-0-0). Western Mythology. S. Prerequisite: One course in literature.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Major themes in western myth: classical, Biblical, and Germanic.
E 338 03(3-0-0). Ethnic Literature in the United States. F, S, SS. Prerequisite: One literature course or one ETST course.

Comparative study of literatures from a range of U.S. ethnic experiences and perspectives.

E 339 03(3-0-0). Literature of the Earth. F, S. Prerequisite: CO 150.

Non-fiction, fiction, and poetry on landscape, climate, animality, ecology, place.

E 341 03(3-0-0). Principles of Literary Criticism. F, S. Prerequisite: One course in literature.

Theory and practice of modern literary analysis and evaluation; writing about literature.

E 342 03(3-0-0). Shakespeare I. F, S, SS. Prerequisite: E 240 or E 276.

Shakespeare's development as a poet and dramatist from the early plays through *Hamlet*.

E 343 03(3-0-0). Shakespeare II. F, S, SS. Prerequisite: E 240 or E 276.

Shakespeare's development as a poet and dramatist after *Hamlet*.

E 345 03(3-0-0). American Drama. F. Prerequisite: One course in literature.

Representative examples from mainstream and alternative drama.

E 350 03(3-0-0). The Gothic in Literature and Film. S. Prerequisite: One course in literature.

Interdisciplinary, cross-cultural approach to gothic works from the 18th to the 20th centuries.

E 356 03(3-0-0). Asian Literature. F.

Masterpieces of classical and contemporary literature of China, India, and Japan.

E 370 03(3-0-0). American Literature in Cultural Contexts. F, S, SS. Prerequisite: E 270.

American literature in social, political, economic, aesthetic, intellectual, and multimedia contexts.

E 384A-B Var [1-3]. Supervised College Teaching. F, S. Prerequisite: Written consent of department chair. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Supervised assistance in instruction. A) Classroom. May be taken for maximum of 6 credits. B) Writing Center.

E 401 03(3-0-0). Teaching Reading. F, S. Prerequisite: CO 301D.

Theory and pedagogy for understanding, interpreting, and evaluating print and visual texts.

E 402 03(3-0-0). Teaching Composition. F, S. Prerequisite: CO 301A or CO 301B or CO 301C or CO 301D.

Theory and practice of the analysis and the teaching of writing.

E 403 03(3-0-0). Writing the Environment. S. Prerequisite: One course in literature or CO 301A-D or E 311A-C.

Creative writing in conjunction with study of recent American literature on nature and landscape.

E 405 03(3-0-0). Adolescents' Literature. F, S.

Survey of literature for adolescents emphasizing development of critical ability, appreciation, and taste.

E 406 03(3-0-0). Topics in Literacy. F, S. Maximum of 6 credits allowed in course.

Exploring literacy through written theory: specific issues of cultural difference, gender, technology, acquisition, and workplace.

E 412A-C 03(3-0-0). Creative Writing Workshop. S. Maximum of 6 credits allowed per subtopic.

Individual projects with group discussion and analysis. A) Fiction.

Prerequisite: E 311A with a B or better. B) Poetry. Prerequisite: E 311B with a B or better. C) Nonfiction. Prerequisite: E 311C with a B or better.

E 420 03(3-0-0). Beat Generation Writing. S. Prerequisite: One course in literature.

Shared experiences and historical pressures that made Beat Generation writers, including Kerouac, Ginsberg, Burroughs, and Waldman, a countercultural movement.

E 421 03(3-0-0). Asian American Literature. F, S. Prerequisite: CO 150; E 270.

Asian American writing on immigration, exile, exclusion, detainment, neocolonialism, resistance, hybridity, and transnationalism.

E 422 03(3-0-0). African-American Literature. F. Prerequisite: One course in literature.

African-American literature as a distinct tradition of writing and protest.

E 423 03(3-0-0). Latino/a Literature. F, S. Prerequisite: CO 150; E 270.

Latino/a writing on themes of settlement, expropriation, resistance, conquest, immigration, exile, hybridity and transnationalism.

E 424 03(3-0-0). English Renaissance. F. Prerequisite: E 276 or E 342 or E 343.

English Renaissance literature (1500-1670), covering a range of poetry, drama, and prose.

***E 425 03(3-0-0). Restoration and 18th Century Literature S.** Prerequisite: One course in literature.

Poetry, drama, and prose, 1600-1789.

E 426 03(3-0-0). British Romanticism. F. Prerequisite: E 276 or E 277 or E 341.

British Romantic era literature (1780-1830) with emphasis on the social and cultural context.

E 427 03(3-0-0). Victorian Age. F. Prerequisite: E 276 or E 277 or E 341.

Victorian era literature (1830-1900) in social and cultural context, with attention to multiple genres (poetry, fiction, drama, and essay).

E 428 03(3-0-0). Postcolonial Literature. F, S. Prerequisite: One course in literature.

Selected readings in postcolonial literatures and theory.

E 430 03(3-0-0). 18th-Century English Fiction. F. Prerequisite: One course in literature.

English fiction from Defoe to Austen stressing Richardson, Fielding, Smollett, and Sterne.

E 431 03(3-0-0). 19th-Century English Fiction. S. Prerequisite: E 276 or E 277 or E 341.

English fiction in Victorian and Edwardian eras emphasizing Dickens, the Brontes, Thackeray, George Eliot, and Hardy.

E 432 03(3-0-0). 20th-Century British Fiction. F. Prerequisite: One course in literature.

British fiction from Conrad to the present emphasizing Joyce, Lawrence, Forster, Woolf, and Beckett.

E 433 03(3-0-0). Literatures of the American West. F, S, SS. Prerequisite: One course in literature or HIST 351 or HIST 352 or HIST 353.

Relationships between places, environments, cultures, and literature in the American West.

E 436 03(3-0-0). American Fiction, 1945-Present. S. Prerequisite: One course in literature. Offered only as an online course through the Division of Continuing Education.

Form, content, and context of American fiction from 1945 to present: Kesey, Updike, Heller, Pynchon, Barthelme, Vonnegut, and others. (Ω-O)

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

E 438/ETST 438 03(3-0-0). Native American Literature. F. Credit not allowed for both E 438 and ETST 438.

Literature of Native Americans emphasized as distinctive tradition in American literature and cultural expression of indigenous peoples.

E 440 03(3-0-0). American Prose Before 1900. F, S, SS. Prerequisite: One course in literature.

Novels, stories, and/or literary non-fiction prose written in the U.S. before 1900.

E 441 03(3-0-0). American Prose Since 1900. F, S, SS. Prerequisite: One course in literature.

Novels, stories, and/or literary non-fiction prose written in the U.S. from 1900 to the present.

E 443 03(3-0-0). English Renaissance Drama. F. Prerequisite: E 276 or E 342 or E 343.

Interplay between dramatic form and cultural context in the plays of Marlowe, Jonson, Cary, Middleton, Heywood, Dekker, Webster.

E 444 03(3-0-0). Restoration and 18th-Century Drama. S. Prerequisite: One course in literature.

Major plays and dramatic issues from 1660 to 1780 including Dryden, Etherege, Congreve, Sheridan, and others.

E 445 03(3-0-0). Modern British and European Drama. S. Prerequisite: One course in literature.

Realism and anti-realism in modern British and European drama.

E 452 03(3-0-0). Masterpieces of European Literature. S. Prerequisite: One course in literature.

Selected works of European literature through the 19th century.

E 455 03(3-0-0). European Literature after 1900. S. Prerequisite: Two courses in literature.

Continental European texts in translation since 1900.

E 460 03(3-0-0). Chaucer. S. Prerequisite: E 341; one other upper-division E prefix course.

Chaucer's works in medieval context.

E 463 03(3-0-0). Milton. F. Prerequisite: E 276 and E 341.

Milton's poetry and prose emphasizing *Paradise Lost*.

E 465 03(3-0-0). Topics in Literature and Language. F, S. Prerequisite: E 341; one other upper-division E prefix course. Maximum of 6 credits allowed in course.

Selected issues in literature and language.

E 470 03(3-0-0). Individual Author. F, S, SS. Prerequisite: E 341; one other upper-division E prefix course. Maximum of 6 credits allowed in course.

Intensive study of works of a single major author.

E 475 03(3-0-0). American Poetry Before 1900. F. Prerequisite: E 240.

Major American poets through the 19th century including Whitman, Dickinson, and Frost.

E 478 03(3-0-0). Modern Poetry. F. Prerequisite: E 240.

Major British and American poets from late 19th century to World War II.

E 479 03(3-0-0). Recent Poetry of the United States. F, S, SS. Prerequisite: E 240.

U.S. poetry since World War II, emphasis on the 1980s through the present.

E 487A-B. Internship. Prerequisite: **A-B)** 2.500 GPA; CO 150; written consent of department head or director. **C)** 2.500 GPA; CO 150; written consent of CLC director. **D)** 2.500 GPA; CO 300 or CO 301A-D; written

consent of Writing Center director. Maximum of 4 credits allowed in E 487A and E 487B.

A) Supervised work experience. Var [1-3]. Maximum of 3 credits allowed in course. **B)** Literary editing. 01(0-0-1). **C)** Community literacy center. Var [1-3]. **D)** CSU writing center. Var [1-3].

E 495 Var [1-3]. Independent Study. Maximum of 6 credits allowed in course.

Individually guided studies in literature, writing, English language, and linguistics.

E 501 03(3-0-0). Theories of Writing. F. Prerequisite: E 402.

Theoretical approaches to the nature of the composing process.

E 502 03(3-0-0). Language, Literacy, and Learning. F. Prerequisite: Teaching experience or 3 credits in upper-division English or education courses.

Theoretical and practical perspectives on language and learning skills necessary for basic academic reading and writing.

E 503 03(3-0-0). Investigating Classroom Literacies. F, S, SS.

Research methods and ethical issues in classroom-based inquiry into oral and written literacy practices.

E 504 03(3-0-0). Situating Composition Studies. F, S. Prerequisite: E 501.

Contexts for composition programs, roles for program administrators, and professional opportunities for teachers and scholars.

E 505A-C 03(3-0-0). Major Authors. F, S. Prerequisite: Six credits of literature.

Intensive study of the works of one or two major authors. **A)** English. **B)** American. **C)** World.

E 506A-C 03(3-0-0). Literature Survey. F, S. Prerequisite: Six credits of literature.

Synthesis of literary attitudes, modes, genres of an age. **A)** English. **B)** American. **C)** Comparative.

E 507 03(3-0-0). Special Topics in Linguistics. F, S. Prerequisite: Written consent of instructor.

E 513A-C 03(3-0-0). Form and Technique in Modern Literature. F.

Selected readings in and discussions of modern literature and criticism from the writer's point of view with emphasis on form and technique. **A)** Fiction. **B)** Poetry. **C)** Essay.

E 514 03(3-0-0). Phonology/Morphology-ESL/EFL. F.

English sound system and word formation in relation to second language acquisition and teaching.

E 515 03(3-0-0). Syntax for ESL/EFL. F.

Major grammatical structures of English in relation to second language acquisition and teaching.

E 520 03(3-0-0). English Phonetics and Phonology. S.

Articulatory phonetics, phonological theory and analysis with principal applications to American English and to pedagogy.

E 522 03(3-0-0). Semantics, Pragmatics, and Discourse. F.

Linguistic study of literal and nonliteral meaning, including role of textual and situational context.

E 526 03(3-0-0). Teaching English as Foreign/Second Language. F.

Principles of teaching English as a foreign/second language. Development of a coherent method, including activities, materials, and course design.

E 527 03(3-0-0). Theories of Foreign/Second Language Learning. S. Prerequisite: E 526.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Theories of second language learning/acquisition; emphasis on psycholinguistic processes of language learning.

E 590 Var [1-3]. Workshop in TESOL. F, S. Prerequisite: E 526.

Methodology/linguistic theory designed to solve practical problems in teaching, testing, and materials development.

E 600A-B 03(3-0-0). Research Methods and Theory.

Research methods in English studies.

A) Literary scholarship. B) Research design with quantitative and qualitative methods.

E 601 Var [2-3]. Research in Teaching English as Second Language. F.

Prerequisite: E 526.

Evaluation and design of research in language acquisition.

E 603 03(3-0-0). Computers and Composition. S.

Relationship of computer-assisted instruction to rhetoric and composition.

E 605 03(3-0-0). Reading/Writing Connection. S.

Theoretical understanding of reading and writing processes; practical implications for professional writers and teachers of writing.

E 607A-B 03(3-0-0). Teaching Writing. F, S.

A) Composition and rhetoric. B) Creative writing.

E 608 01(0-0-1). Integrating Writing in the Academic Core. F.

Theories and best practices associated with writing integration in the academic core.

E 615 03(3-0-0). Reading Literature-Recent Theories. F, S, SS.

Recent developments in critical and cultural theories of discourse.

E 630A-D 03(3-0-0). Special Topics in Literature. F, S.

A) Area studies. B) Genre studies. C) Theory and technique studies. D) Gender studies.

E 631 03(3-0-0). Crossing Boundaries. F, S.

Cross-topical studies of literature.

E 632 Var [1-3]. Professional Concerns in English. F, S.

Professional concerns of secondary school teachers of English.

E 633 03(3-0-0). Special Topics in Discourse Studies. F, S, SS.

Varied topics covering cultural or historical areas, or literacy and discourse theory and practice, or professional pedagogical issues.

E 634 03(3-0-0). Special Topics in TEFL/TESL. F, S.

Theory, practice, and professional conduct of teaching English as a foreign or second language.

E 635 03(3-0-0). Critical Studies in Literature and Culture. F, S.

Prerequisite: E 615.

Advanced interpretation in contemporary literary and critical studies.

E 636 03(3-0-0). Environmental Literature and Criticism. F, S.

Literary, critical, and theoretical representations of nature, animals, human-environment relations.

E 637 03(3-0-0). History of Writing. F, S.

Writing systems and practices across time, cultures, and varied constructions of author, text, audience, social context, technology.

E 640A-C Var [1-5]. Graduate Writing Workshop. F, S. Maximum of 11 credits allowed per subtopic.

Individual projects with group discussion and analysis. A) Fiction. B) Poetry. C) Essay.

E 641 Var [1-5]. Nonfiction Workshop. F, S. Prerequisite: E 640C.

Writing workshop exploring various areas within literary nonfiction.

E 642 Var [1-5]. Writing Hypertexts. F, S.

Writing workshop exploring development of texts in electronic formats.

E 679 01(1-0-0). Community Service Learning. F, S.

Opportunities to learn, practice, and develop skills by serving the community.

E 684A-E Var [1-5]. Supervised College Teaching. F, S.

A) Composition. B) ESL. C) Creative writing. D) Literature. E) Computer-assisted instruction.

E 687A-M Var [1-5]. Internship. Prerequisite: B) E 501; E 684A.

A) Teaching college English. B) Composition supervision/administration. C) Literary editing. E) Teaching ESL, K-12. H) ESL-adult learning. I) ESL-supervision/administration. J) Arts administration in literature. K) Public education. L) Computers and writing. M) Writing/editing for specific purposes.

E 692 01(0-0-1). Rhetoric and Composition Seminar. S.

Forum for faculty and student work in progress.

E 694 Var[1-3]. Independent Study: Portfolio. F, S, SS.

E 695 Var. Independent Study.

E 698 Var[1-2]. Research: Project. F, S, SS.

E 699 Var. Thesis.

E 700 03(0-0-3). Introduction to Doctoral Studies in English. F.

Prerequisite: Admission to the doctoral program.

Disciplinary approaches to the study of written discourse.

E 710 03(3-0-0). Writing for Publication. F, S.

Shaping research questions, determining publication venues, writing and revising for publication.

E 792A-C 03(0-0-3). Seminar. F, S.

A) New Literacies. B) Writing about Science and the Environment. C) Writing and Cultural Contexts.

E 795 Var. Independent Study. F, S, SS.

Individually guided study in doctoral topic.

E 799 Var[1-12]. Dissertation. F, S, SS.

ENGLISH FOR ACADEMIC PURPOSES COURSES

Department of English

College of Liberal Arts

CSU-INTO

EAP 150 06(6-0-0). English for International Students I. F, S, SS.

Prerequisite: Admission to Pathways program.

Academic English for international students, emphasizing analysis and integration of text and lecture-based information and its application.

EAP 151 03(3-0-0). English for International Students II. F, S, SS.

Prerequisite: EAP 150.

Academic English for international students, emphasizing research and writing papers in various academic genres using appropriate academic language.

ELECTRICAL AND COMPUTER ENGINEERING COURSES

*Department of Electrical and Computer
Engineering
College of Engineering*

ECE 102 04(3-2-0). Digital Circuit Logic. F.

Boolean algebra; Karnaugh maps; multiplexers, decoders, ROMs, PLAs, flip-flops, counters; sequential networks; state tables. (\$)

ECE 103 03(2-2-0). DC Circuit Analysis. S. Prerequisite: MATH 160.

Basic DC circuit analysis. Use of scientific-oriented software to solve problems and analyze small projects. (\$)

ECE 202 04(3-3-0). Circuit Theory Applications. S, SS. Prerequisite: ECE 103.

Basic circuit analysis techniques and applications to engineering design problems. (\$)

ECE 204 03(3-0-0). Introduction to Electrical Engineering. S. Prerequisite: MATH 161; PH 142.

Basic analog and digital circuits and systems; introduction to electromechanical devices.

ECE 251 04(3-3-0). Introduction to Microprocessors. F. Prerequisite: ECE 102 with a C- or better.

Microprocessor organization, assembly language, I/O techniques, real-time interfaces, applications, hardware/software. (\$)

ECE 303/STAT 303 03(3-0-0). Introduction to Communications Principles. F. Prerequisite: ECE 311 or concurrent registration.; MATH 261. Credit not allowed for both ECE 303 and STAT 303.

Basic concepts in design and analysis of communication systems.

ECE 311 03(3-0-0). Linear System Analysis I. F. Prerequisite: ECE 202 with a C- or better; MATH 340 or MATH 345.

Continuous and discrete time signals and systems representations in time and frequency domain; time convolution.

ECE 312 03(3-0-0). Linear System Analysis II. S. Prerequisite: ECE 311 with a C- or better.

Laplace and Z transforms, applications to modulation, filtering and sampling, state space representation.

ECE 325 03(3-0-0). Telecommunication Networks. S. Prerequisite: MATH 141 or MATH 155 or MATH 160.

Principle technologies that support data and voice communications. (NT-O)

ECE 331 04(3-3-0). Electronics Principles I. F. Prerequisite: ECE 202 with a C- or better; MATH 340 or MATH 345.

Discrete component semiconductor devices, characteristics and applications. Rectifier circuits, single-stage and multi-stage amplifiers. (\$)

ECE 332 04(3-3-0). Electronics Principles II. S. Prerequisite: ECE 331 with a C- or better.

Discrete and integrated-circuit amplifiers-frequency response, negative feedback; digital logic circuits. (\$)

ECE 341 03(3-0-0). Electromagnetic Fields and Devices I. F. Prerequisite: MATH 340 with a C- or better or MATH 345 with a C- or better; PH 142 with a C- or better.

Basic concepts of electrostatic and magnetostatic fields.

ECE 342 03(3-0-0). Electromagnetic Fields and Devices II. S. Prerequisite: ECE 341 with a C- or better.

Basic concepts of time varying electromagnetic fields and transmission lines.

ECE 395 Var. Independent Study.

ECE 401 03(1-4-0). Senior Design Project I. F, S, SS. Prerequisite: CS 301 with a C- or better or ECE 332 with a C- or better; ECE 312 with a C- or better; ECE 342 with a C- or better or ECE 452 with a C- or better

Advanced project, seminar series, formal written report, and oral presentation. (\$)

ECE 402 03(1-4-0). Senior Design Project II. F, S, SS. Prerequisite: ECE 401.

Advanced project, formal report, and oral presentation. (\$)

ECE 404 02(1-3-0). Experiments in Optical Electronics. F. Prerequisite: Concurrent registration in ECE 441.

Experiments in optical electronics and lasers.

ECE 411 04(3-3-0). Control Systems. F. Prerequisite: ECE 312 with a C- or better.

Control system analysis and design for linear systems: stability and performance; time and frequency domain techniques.

ECE 412 03(3-0-0). Digital Control and Digital Filters. S. Prerequisite: ECE 411.

FIR and IIR digital filter design, analog and digital invariance and direct digital control algorithms, hybrid systems analysis. (NT-O)

ECE 421 03(3-0-0). Telecommunications I. F. Prerequisite: ECE 303/STAT 303 with a C- or better; ECE 312 with a C- or better.

Digital communication (source coding; modulation and detection; channel coding), analog communication (modulation). (NT-O/V)

ECE 422 03(3-0-0). Telecommunications II. S. Prerequisite: ECE 421.

Issues of source coding, detection and estimation, and equalization; introduction of information theory.

ECE 423 03(1-4-0) DSP for Communications. S. Prerequisite: ECE 312.

Design and programming of communication and signal processing algorithms into DSP hardware using C and assembly language. (NT-V)

ECE 430/MATH 430 03(3-0-0). Fourier and Wavelet Analysis with Apps. S. Prerequisite: MATH 345. Credit not allowed for both ECE 430 and MATH 430.

Fourier analysis and transforms, FFTs; sampling theorems, computational algorithms; wavelets; applications to communication, imaging, and compression.

ECE 441 03(3-0-0). Optical Electronics. F. Prerequisite: ECE 342 with a C- or better.

Concepts of modern physics, optical properties of atoms, light sources, lasers, optical detectors, optical cavities, and optical fiber transmission.

ECE 444 03(3-0-0). Antennas and Radiation. F. Prerequisite: ECE 342 with a C- or better.

Retarded potential theory, antenna arrays, long wire antennas, dipoles, aperture antennas, receiving antennas.

ECE 450 01(0-3-0). Digital System Design Laboratory. F. Prerequisite: Concurrent registration in ECE 451.

Small digital circuits are designed and simulated using very high speed hardware description language and synthesis tools.

ECE 451 03(3-0-0). Digital System Design. F. Prerequisite: ECE 251 with a C- or better; concurrent registration in ECE 450.

State machines with PLAs as controllers and small computers; timing and race elimination considerations; state and microprogramming implementation.

ECE 452 03(3-0-0). Computer Organization and Architecture. S. Prerequisite: ECE 251 with a C- or better.

CPU design; microarchitecture; data path and control path; pipelining;

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memory system; I/O system; program optimization by system software/hardware. (NT-O)

ECE 454 03(3-0-0). Database Computers. F. Prerequisite: ECE 251 with a C- or better or CS 370.

Computer architectures for database processing. Data filters, associative processors, parallel and distributed computers, text search processors.

ECE 456 04(3-3-0). Computer Networks. S. Prerequisite: ECE 251; ECE 303/STAT 303; CS 160 or (CS 155; CS 156; CS 157). Credit not allowed for both ECE 456 and CS 457.

Circuit/packet switching, protocols, LAN/MAN, TCP/IP, error correction, ATM, wireless LANS, mobile networks. (NT-O)

ECE 457 03(3-0-0). Fourier Optics. S. Prerequisite: ECE 311 with a C- or better; ECE 342 with a C- or better.

Introduction to optical systems for signal and information processing with emphasis on Fourier optics.

ECE 460/CS 460 04(3-3-0). Embedded Systems. F. Prerequisite: CS 370. Credit not allowed for both ECE 460 and CS 460.

Industry standard tools for embedded system hardware software co-design. VHDL, ModelSim, Xilinx ISE and EDK.

ECE 461 03(3-0-0). Power Systems. F. Prerequisite: ECE 341 with a C- or better; ECE 462 or concurrent registration.

Multi-phase power systems; power generation, transformer design, power distribution, power costs.

ECE 462 01(0-3-0). Power Systems Laboratory. F. Prerequisite: ECE 332 with a C- or better; ECE 461 or concurrent registration.

Set of labs designed to enhance students' understanding of power systems.

ECE 465 02(2-0-0). Electrical Energy Generation Technologies. S. Prerequisite: ECE 202.

Various electrical energy generation alternatives. Comparisons based on cost, reliability, availability and environmental impact.

ECE 466 02(2-0-0). Integrated Lighting Systems. F. Prerequisite: ECE 331 or INTD 330.

Technical underpinnings of light sources, their associated heat sink fixtures and power electronics drivers.

ECE 471 03(3-0-0). Semiconductor Devices. F. Prerequisite: ECE 332 with a C- or better; ECE 342 with a C- or better.

Semiconductor physics, device fabrication technology, analysis of PN junctions, and bipolar and field-effect transistors. (NT-O)

ECE 472 03(3-0-0). MOS Integrated Circuits. S. Prerequisite: ECE 332 with a C- or better.

MOS transistor theory, design rules, layout design, gate, cell and circuit design, memories, clocking strategies, MOS technologies.

ECE 495 Var. Independent Study.

ECE 501/ENGR 501 03(0-0-3). Foundations of Systems Engineering. F, S. Credit not allowed for both ECE 501 and ENGR 501.

Functional components of systems engineering, application of systems engineering to practical problems, system life-cycle process (NT-O)

***ECE 503 03(3-0-0). Ultrafast Optics.** S. Prerequisite: ECE 341; ECE 342.

Principles and theory behind ultrashort pulse generation, amplification, and manipulation.

ECE 504 03(3-0-0). Physical Optics. F. Prerequisite: ECE 341; ECE 342.

Classical optics from first principles; basic electromagnetic theory to wave and geometric guides.

°ECE 505 03(3-0-0). Nanostructures: Fundamentals and Applications. F. Prerequisite: ECE 342; PH 353.

Fundamentals of quantum confinement; nanostructures optical properties; fabrication and characterization. (NT-O)

ECE 506 03(3-0-0). Optical Interferometry and Laser Metrology. F. Prerequisite: ECE 341; ECE 342; ECE 441.

High resolution metrology techniques utilizing and interferometric sensors using lasers and other light sources. (NT-O)

ECE 507 03(3-0-0). Plasma Physics and Applications. S. Prerequisite: ECE 342.

Fundamental principles and industrial applications of plasmas.

ECE 508/ENGR 508 03(3-0-0). Introduction to Power System Markets. F. Prerequisite: ECE 461. Credit not allowed for both ECE 508 and ENGR 508.

Deregulated electrical power systems, system security, investments in generation and transmission, ancillary services, and nodal pricing. (NT-O)

ECE 509/ENGR 509 03(3-0-0). Signal Processing for Power Systems. F. Prerequisite: ECE 312; ECE 461. Credit not allowed for both ECE 509 and ENGR 509.

Signal processing tools for analyzing power systems, voltage frequency, magnitude variations, unbalance, waveform distortion. (NT-O)

ECE 512 03(3-0-0). Digital Signal Processing. F. Prerequisite: ECE 312 with a C- or better.

Discrete time signals and systems, digital filter design and implementation, fast algorithms, quantization effects. (NT-O)

ECE 513 03(3-0-0). Digital Image Processing. S, SS. Prerequisite: ECE 303/STAT 303 with a C- or better; ECE 312.

Image acquisition and display systems, image enhancement, restoration and encoding, image analysis; real-life applications. (NT-O)

ECE 514 03(3-0-0). Applications of Random Processes. F. Prerequisite: ECE 303/STAT 303 with a C- or better; ECE 312 with a C- or better.

Bit-error rates, signal-to-noise power ration, signal detection, signal estimation, Wiener filter, application.

***ECE 516 03(3-0-0). Information Theory.** Prerequisite: ECE 303/STAT 303; ECE 421.

Information measures and their properties; lossless data compression; channel capacity; channel coding theorem; rate distortion theorem.

°ECE 520 03(3-0-0). Optimization Methods-Control and Communication. S. Prerequisite: MATH 229; MATH 317.

Linear and nonlinear optimization theory and methods; applications in systems, control, and communication.

ECE 521 03(3-0-0). Satellite Communication. S. Prerequisite: ECE 421.

Principles of satellite communication systems engineering.

ECE 524 03(3-0-0). Wireless Telecommunications. S. Prerequisite: ECE 421.

Physical layer design, including channel modeling, receiver design and performance, and multiple access techniques.

ECE 525 3(3-0-0). Fiber Optic Communications. S, SS. Prerequisite: ECE 471.

Optoelectronic and optical components for fiber optics; communications system physical layer issues and examples. (NT-O)

ECE 526/BIOM 526 03(3-0-0). Biological Physics. S. Prerequisite: MATH 340 or MATH 345; PH122 or PH142. Credit not allowed for both ECE 526 and BIOM 526.

Mathematical and physical modeling of biological systems. Mass transport in cellular environments. Electrical/mechanical properties of biomolecules.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ECE 530/ENGR 530 03(3-0-0). Overview of Systems Engineering Processes. F, S. Prerequisites: ECE 303/STAT 303 or STAT 315. Credit not allowed for both ECE 530 and ENGR 530.

Systems engineering life-cycle process and analysis techniques. Reliability and robustness. (NT-O)

ECE 531/ENGR 531 03(3-0-0). Engineering Risk Analysis. F, S. Prerequisite: ECE 303/STAT 303 or STAT 315; ENGR/ECE 501 or concurrent enrollment. Credit not allowed for both ECE 531 and ENGR 531.

Estimation and risk identification, development of mitigation techniques. (NT-O)

ECE 532/ENGR 532 03(3-0-0). Dynamics of Complex Engineering Systems. F, S. Prerequisites: ENGR 501/ECE 501 or concurrent registration. Credit not allowed for both ECE 532 and ENGR 532.

Higher-level behavior and issues that emerge from interaction between components in complex socio-technical systems. (NT-O)

ECE 533/BIOM 533. 03(2-3-0). Biomolecular Tools for Engineers. F. Prerequisite: BMS 300 or MIP 300. Credit not allowed for both BIOM 533 and ECE 533.

Theoretical and practical aspects of biomolecular laboratory tools—PCR, cloning, sequencing, single-molecule optical techniques and live-cell imaging. (S)

ECE 534 03(3-0-0). Analog Integrated Circuit Design. F. Prerequisite: ECE 332 with a C- or better; concurrent registration in ECE 535.

Design methods for state-of-the-art analog integrated circuits, including CMOS op-amps, comparators, and phase-locked loops.

ECE 535 01(0-2-0). Analog Integrated Circuit Laboratory. F. Prerequisite: Concurrent registration in ECE 534.

Analog integrated circuits are designed and simulated using modern software tools.

ECE 536 03(3-0-0). RF Integrated Circuit Design. F. Prerequisite: ECE 332.

Design of state-of-the-art ICs for RF applications including CMOS low-noise amplifiers, voltage-controlled oscillators, mixers and power amplifiers. (NT-O)

***ECE 537/BIOM 537 03(3-0-0). Biomedical Signal Processing.** S. Prerequisite: MATH 340 or ECE 311 or STAT 303. Credit not allowed for both ECE 537 and BIOM 537.

Measuring, manipulating, and interpreting biomedical signals.

°ECE 540 03(3-0-0). Computational Electromagnetics. S. Prerequisite: ECE 342.

Computational techniques for practical applications in electromagnetic fields, devices, scattering, propagation, and radiation.

ECE 546 03(3-0-0). Laser Fundamentals and Devices. S. Prerequisite: ECE 441.

Amplification of light, laser excitation mechanisms, laser devices, characteristics and design.

ECE 548 03(3-0-0). Microwave Theory and Component Design. F. Prerequisite: ECE 342 with a C- or better.

Fundamentals of microwave engineering, components, devices, and measurements. (NT-O)

ECE 549 03(3-0-0). Radar Systems and Design. F. Prerequisite: ECE 444. Fundamental ideas of radar operation and basic design of various radar types including current topics. (NT-O)

ECE 550A-B. Microprocessors Based Systems. F. Prerequisite: ECE 451. High-performance microprocessors, e.g., 68000 family; intelligent I/O processors. Asynchronous bus, virtual memory, microprocessor in control and multi-user systems. **A)** 04(3-2-0). **B)** 03(3-0-0). CSUN students only.

ECE 554 03(3-0-0). Computer Architecture. F. Prerequisite: CS 470 or ECE 452.

Fundamentals of computer design, multiprocessors and thread-level parallelism, storage systems, and interconnection networks and clusters. (NT-O/V)

ECE 555 03(3-0-0). Robot Motion Planning. F. Prerequisite: CS 253; MATH 369.

Concepts in geometry and spatial reasoning for the design of autonomous robots.

ECE 557 03(3-0-0). Digital Optical Computing. S. Prerequisite: ECE 441 or ECE 451 or ECE 554.

Optical devices; optical disks, holographic memories; interconnection networks. Optical systems for numerical and nonnumerical data processing. (NT-V)

ECE 560/CS 560 04(3-2-0). Foundations of Fine-Grain Parallelism. S. Prerequisite: CS 475 or CS 460/ECE 460. Credit not allowed for both ECE 560 and CS 560.

Programming novel architectures; performance tuning; automatic parallelization; program transformation; polyhedral model; equational programming.

ECE 561/CS 561 04(3-3-0). Hardware/Software Design of Embedded Systems. F, S. Prerequisite: CS 270 or CS 470 or ECE 251 or ECE 452. Credit not allowed for both CS 561 and ECE 561.

Embedded systems design including system level modeling, design space exploration, hardware-software partitioning, high level synthesis. (ECE 561 only: NT-O)

ECE 562 03(3-0-0). Power Electronics I. F. Prerequisite: ECE 332 with a C- or better.

Switch mode and resonant converters, control using switch averaged dynamic models, modeling of all circuit components including sources, loads, and switches. (NT-O)

ECE 563 03(3-0-0). Power Electronics II. S. Prerequisite: ECE 562.

Electrical energy, processing circuits, lightweight power management, and power conversion circuits, emphasizing small signal transfer functions. (NT-O/V)

***ECE 564 03(3-0-0). Resonant Converters.** S. Prerequisite: ECE 562.

Analysis and design of resonant converters.

ECE 565/ENGR 565 03(3-0-0). Electrical Power Engineering. F, S. Prerequisite: ECE 332; ECE 342. Credit not allowed for both ECE 565 and ENGR 565.

Analysis of power systems in terms of current, voltage, and active/reactive power; introduction of computer-aided tools for power systems. (NT-O)

ECE 566/ENGR 566 03(3-0-0). Energy Conversion for Electrical Power Systems. F, S. Prerequisite: ECE 332. Credit not allowed for both ECE 566 and ENGR 566.

Energy conversion; fuel cell, battery storage, solar-photovoltaic, wind energy and traditional rotating-magnetic-field based machines. (NT-O)

ECE 567/ENGR 567 03(3-0-0). Systems Engineering Architecture. F, S. Prerequisite: ECE 501 or ENGR 501. Credit not allowed for both ECE 567 and ENGR 567.

Observation/classification of systems architecture. Systems architecture principles and critical evaluation through design studies. (NT-O)

ECE 568/ENGR 568 03(3-0-0). Electrical Energy Generation Systems. F, S. Prerequisite: Written consent of instructor.

Energy systems: renewable and traditional. Physics and operation of energy devices; solar-photovoltaic, wind energy, gas, coal, and nuclear plants. (NT-O)

***ECE 569/*MECH 569 03(3-0-0). Micro-Electro-Mechanical Devices.**

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

S. Prerequisite: ECE 331 with a C- or better or MECH 344. Credit not allowed for both ECE 569 and MECH 569.

Micro-electro-mechanical processes and applications in sensors, optics, and structures. (NT-O)

ECE 570 03(3-0-0). Compound Materials and Devices. S. Prerequisite: ECE 471.

III-V and II-VI alloy semiconductors; bandgap engineering; quantum well heterostructures; HEMT, HBT, and high-performance devices; GaAsICs.

ECE 571 03(3-0-0). VLSI System Design. S. Prerequisite: ECE 451; concurrent registration in ECE 575.

Design of integrated circuits at the system level including cell design, digital systems, parallel architecture, systolic arrays. (NT-V)

ECE 573 03(1-4-0). Semiconductor Optoelectronics Laboratory. S. Prerequisite: ECE 471.

Experimental characterization techniques for semiconductor optoelectronic devices and design and testing of related electronic circuits.

ECE 574 03(3-0-0). Optical Materials and Devices. S. Prerequisite: ECE 441 or ECE 471.

Semiconductor light emitters and detectors, dielectrics, and light reflection from, and propagation through, anisotropic dielectrics.

ECE 575 01(0-3-0). Experiments in VLSI System Design I. S. Prerequisite: ECE 451; concurrent registration in ECE 571.

Set of labs designed to enhance students' understanding of the materials in ECE 571.

ECE 576 03(3-0-0). VLSI Processing-Science and Technology I. S. Prerequisite: ECE 472.

Physics, chemistry of VLSI processing including plasma, thermal techniques of oxidation, deposition; photolithography; etching; cleaning, process modeling.

ECE 604 03(3-0-0). Nonlinear Optics. F. Prerequisite: ECE 504; PH 451.

Principles of nonlinear optics, symmetry properties, multiple order nonlinear phenomenon, and nonlinear spectroscopy.

ECE 611 03(3-0-0). Nonlinear Control Systems. F. Prerequisite: ECE 412.

Controller analysis and design for nonlinear systems. (NT-O)

ECE 612 03(3-0-0). Robust Control Systems. S. Prerequisite: ECE 411.

Introduction to modern robust control theory techniques for analysis and design of large-scale uncertain multivariable systems. (NT-V)

ECE 614 03(3-0-0). Principles of Digital Communications. S. Prerequisite: ECE 514.

Information theory, optimal receiver design, waveform coding, error correcting coding.

ECE 621/ENGR 621 03(3-0-0). Energy Storage for Electrical Power Systems. F, S. Prerequisite: Written consent of instructor. Credit not allowed for both ECE 621 and ENGR 621.

Physics and operation of electrical, mechanical, thermal and novel energy storage systems/devices. (NT-O)

ECE 622/ENGR 622 03(3-0-0). Energy Networks and Power Distribution Grids. F, S. Prerequisite: ECE 411 or MECH 417; ECE 565/ENGR 565. Credit not allowed for both ECE 622 and ENGR 622.

Energy networks: generation, storage, consumers. Systems approach to analysis of distribution networks and transition to intelligent grid systems. (NT-O)

ECE 623/ENGR 623 03(3-0-0). Electric Power Quality. S. Prerequisite: ECE 461 or ECE 562. Credit not allowed for both ECE 623 and ENGR 623.

Interconnecting power electronic devices and renewable energy sources

to power systems. (NT-O)

ECE 641 03(3-0-0). Electromagnetics. F. Prerequisite: ECE 342 with a C- or better.

Electrostatics, magnetostatics, boundary value problems, EM induction, quasi-statics, Maxwell's equations.

ECE 642 03(3-0-0). Time Harmonic Electromagnetics. S. Prerequisite: ECE 641.

Maxwell's equations, radiation, boundary value problem, dyadic Green's functions, scattering theory.

ECE 650 03(3-0-0). Extreme Ultraviolet and Soft X-Ray Radiation. S. Prerequisite: ECE 342.

Fundamental principles of short wavelength electromagnetic radiation.

ECE 651 03(3-0-0). Detection Theory. F. Prerequisite: ECE 512; ECE 514.

Neyman-Pearson and Bayes detectors and properties, matched filter and matched subspace detectors, distributed detection, and applications.

ECE 652 03(3-0-0). Estimation and Filtering Theory. S. Prerequisite: ECE 411 or ECE 412; ECE 514 or STAT 525.

Linear and Nonlinear parameter and state estimation methods; Optimal Kalman state estimation and applications.

ECE 655 03(3-0-0). Multidimensional Digital Signal Processing. S. Prerequisite: ECE 512.

Multidimensional signals and systems, 2-D transforms, stability methods, design and implementations, spectral factorization, and image modeling.

ECE 656 03(3-0-0). Neural Networks and Adaptive Systems. F. Prerequisite: ECE 512.

Various adaptation rules, neural network paradigms, learning, stability and convergence, applications in signal/image processing and control.

ECE 658/CS 658 04(3-3-0). Internet Engineering. F. Prerequisite: CS 457 or ECE 456. Credit not allowed for both ECE 658 and CS 658.

Link technologies, multiple access, hardware and software for interworks routing, switching flow control, multicast, performance, and application. (NT-O)

ECE 660 03(3-0-0). Advanced Topics in VLSI Design. S. Prerequisite: ECE 571.

VLSI synthesis, optimization, and other issues.

ECE 661 04(3-3-0). Advanced Topics in Embedded Systems. S. Prerequisite: ECE 561/CS 561; ECE 452.

Embedded systems design: networks on chip, novel memory architectures, synthesis algorithms, optimization for low power, fault tolerance, security.

ECE 666 03(3-0-0). Topics in Robotics. S. Prerequisite: ECE 555 or MECH 514 or MECH 564.

Recent advances in robotics, automation, and intelligent systems.

ECE 670 B-D/CS 670B-D Var [1-4]. Topics in Architecture/ Systems. F, S. Prerequisite: CS 570 or ECE 554. Credit not allowed for both ECE 670B-D and CS 670B-D.

B) Performance evaluation and modeling. **C)** Distributed systems. **D)** Architecture of advanced systems.

ECE 672/PH 672 03(3-0-0). Principles of Semiconductors. S. Prerequisite: ECE 471 or PH 531. Credit not allowed for both ECE 672 and PH 672.

Electronic properties of semiconductors: band structure, statistics, transport properties, photoelectronic properties, potential barriers, interfaces.

ECE 673 03(3-0-0). Thin Film Growth. F. Prerequisite: One course in

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thermodynamics.

Microstructures of physically vapor-deposited films; thin-film morphological development; atomistic processes of condensation, nucleation, and growth.

***ECE 674/*CS 674 03(3-0-0). Heterogeneous Computing. S.** Prerequisite: CS 551 or CS 570 or CS 575 or ECE 550 or ECE 554. Credit not allowed for both ECE 674 and CS 674.

Allocation of resources to tasks in parallel and distributed heterogeneous computing systems. A variety of computational environments are considered.

ECE 695 Var. Independent Study.

ECE 697/ENGR 697 Var[1-6]. Group Study. F, S, SS.

ECE 699 Var. Thesis.

***ECE 721 03(3-0-0). Topics in Communication Theory. F.** Prerequisite: ECE 521.

Detection and estimation theory; radar-sonar problems; nonlinear modulation; information theory; communication systems.

°ECE 742 03(3-0-0). Topics in Electromagnetics. S. Prerequisite: ECE 641.

Applications of wave propagation and scattering to microwave radar, Doppler radar, meteorological radar applications.

***ECE 744 03(3-0-0). Topics in Plasma Dynamics. S.**

Kinetic equations, nonlinear theory of waves and instabilities; plasma fluctuation and radiations; plasma diagnostics and plasma heating.

***ECE 752 03(3-0-0). Topics in Signal Processing. F.** Prerequisite: ECE 512; ECE 514 or STAT 525.

Adaptive filtering, spectral estimation, sonar/radar signal processing, and detection/classification schemes.

ECE 773 03(3-0-0). Topics in Solid State Electronics. F. Prerequisite: ECE 471 or ECE 672/PH 672.

Advanced principles of microwave devices, solar cells, theory of solids, or transport in materials.

***ECE 777 03(3-0-0). X-ray Lasers. S.** Prerequisite: ECE 546.

Fundamentals, design, and implementation of soft X-ray lasers and X-ray optics.

ECE 795 Var. Independent Study.

ECE 799 Var. Dissertation.

ECOLOGY COURSES

Nondepartmental, Interdisciplinary Warner College of Natural Resources and College of Natural Sciences

ECOL 505 02(2-0-0). Foundations of Ecology. F. Prerequisite: One course in ecology.

Overview of the science of ecology; what questions are asked, how they are answered.

ECOL 571 Var [1-3]. Advanced Topics in Ecology. S. Prerequisite: One course in ecological principles.

Current research topics presented and analyzed by visiting scientists.

ECOL 592 Var [1-3]. Interdisciplinary Seminar in Ecology. F, S. Prerequisite: One 300- or 400-level course in ecology.

Concepts and principles of basic and applied ecology in an interdisciplinary context.

ECOL 600 03(2-0-1). Community Ecology. S. Prerequisite: One course in general ecology, calculus, and statistics.

Current theories and tests of the dynamics and regulation of plant and animal communities.

***ECOL 610 03(3-0-0). Ecosystem Ecology.** F. Prerequisite: LIFE 320 or any ECOL course.

Concepts, methods, issues in ecosystem science: energy and matter cycling, systems perspectives, simulation modeling, sustainability, global change.

***ECOL 620 04(2-2-1). Applications in Landscape Ecology.** F. Prerequisite: Previous coursework in geographic information systems, ecology, statistics, and mathematics.

Spatial patterning of landscape elements and dynamics of ecological systems; spatial heterogeneity. Influence on biotic and abiotic processes.

ECOL 693 01(0-0-1). Research Seminar. Prerequisite: Written consent of instructor.

Critique of research programs, plans, and ecological theory.

ECOL 695 Var. Independent Study.

ECOL 698 Var. Research.

Non-thesis research in ecology.

ECOL 699 Var. Thesis.

ECOL 799 Var. Dissertation.

ECONOMICS COURSES

Department of Economics

College of Liberal Arts

ECON 101 03(3-0-0). Economics of Social Issues. (GT-SS1, AUCC 3C). F, S, SS.

Economic analysis of poverty, crime, education, and other social issues. Basics of macro, micro, and political economy.

ECON 202 03(2-0-1). Principles of Microeconomics. (GT-SS1, AUCC 3C). F, S, SS. Prerequisite: MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160. Credit not allowed for both ECON 202 and AREC 202.

Introduction to decision-making by households, firms, and government, and resulting allocation of resources through markets. (NT-O)

ECON 204 03(2-0-1). Principles of Macroeconomics. (GT-SS1, AUCC 3C). F, S, SS. Prerequisite: AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160.

Determinants of national output, employment, and price level; inflation and unemployment; fiscal and monetary policy. (NT-O)

ECON 211 03(3-0-0). Gender in the Economy. (GT-SS1, AUCC 3E). F, S, SS.

Role gender plays in economies; the way gender affects economic outcomes for individuals and societies. (NT-O)

ECON 212 03(3-0-0). Racial Inequality and Discrimination. (GT-SS1, AUCC 3C). F.

Economic inequality between Afro-Americans and Euro-Americans. Debates about causes, consequences, and remedies.

ECON 240/AREC 240 03(3-0-0). Issues in Environmental Economics. (GT-SS1, AUCC 3C). F, S, SS. Credit not allowed for both ECON 240 and AREC 240.

Discussion and economic analysis of current environmental issues with special emphasis on the impact of economic growth. (NT-C/O)

ECON 304 03(3-0-0). Intermediate Macroeconomics. F, S, SS. Prerequisite: ECON 204; MATH 141 or MATH 155 or MATH 160.

Theory of national income, its measurement and determinants; analysis of inflation, growth, debt, and public policy. (NT-C/O)

ECON 306 03(3-0-0). Intermediate Microeconomics. F, S, SS. Prerequisite: AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160.

Analysis of competitive and noncompetitive markets in terms of efficiency of resource utilization. (NT-O)

ECON 310 03(3-0-0). Poverty and the Welfare State. S, SS. Prerequisite: AREC 202 or ECON 101 or ECON 202.

Description and analysis of U.S. poverty; the "underclass"; feminization of poverty; working poor; the welfare state.

ECON 315 03(3-0-0). Money and Banking. F, S, SS. Prerequisite: ECON 204.

Monetary theory and policy; description of financial institutions and markets. (NT-O)

ECON 320 03(3-0-0). Economics of Public Finance. F, S, SS. Prerequisite: ECON 204.

Impact of taxes, government expenditures on allocation of resources, distribution of income; evaluation of government expenditure program; tax policies. (NT-O)

ECON 325 03(3-0-0). Health Economics. S. Prerequisite: ECON 202.

Economic analysis of health care markets, health insurance markets, and public policy regarding health care.

ECON 332/POLS 332 03(3-0-0). International Political Economy. F, S. Prerequisite: AREC 202 or ECON 202; POLS 232. Credit not allowed for both ECON 332 and POLS 332.

Theories on relations between international politics and economics. Policy implications of different theories and case studies.

ECON 335/AREC 335 03(3-0-0). Introduction to Econometrics. F, S. Prerequisite: ECON 204; MATH 141 or MATH 155 or MATH 160; STAT 201 or STAT 204 or STAT 301 or STAT 307. Credit not allowed for both ECON 335 and AREC 335.

Estimating statistical regression models of economic relationships; treatment of special problems that may arise in analysis of economic data. (NT-O)

ECON 340/AREC 340 03(3-0-0). Introduction: Economics of Natural Resources. S. Prerequisite: AREC 202 or ECON 202. Credit not allowed for both ECON 340 and AREC 340.

Concepts, theories, institutions; analytical methods for economic evaluation of alternative resource use patterns and land use plans.

ECON 344 03(3-0-0). Economics of Energy Resources. S. Prerequisite: AREC 202 or ECON 202.

Supply, consumption trends and projected demand for alternative energy resources in domestic and world perspective; economics of public energy policies.

ECON 346/AREC 346 03(3-0-0). Economics of Outdoor Recreation. F. Prerequisite: AREC 202 or ECON 202. Credit not allowed for both ECON 346 and AREC 346.

Benefit cost framework in public planning for outdoor recreation, pricing problems, projecting demand, and regional economic development.

ECON 370 03(3-0-0). Comparative Economic Systems. F. Prerequisite: AREC 202 or ECON 101 or ECON 202.

Place of the economy in different societies; nature and evolution of capitalism; crisis of command economies and capitalist restoration.

ECON 372 03(3-0-0). History of Economic Institutions and Thought. F, S. Prerequisite: AREC 202 or ECON 101 or ECON 202.

Origins and development of capitalist institutions including contemporary issues of alienation, loss of community, and changing values. (NT-O)

ECON 376 03(3-0-0). Marxist Economic Thought. S. Prerequisite: AREC 202 or ECON 101 or ECON 202.

Marxist critique of capitalism and orthodox economics in both its original 19th-century and contemporary settings.

ECON 379/HIST 379 03(3-0-0). Economic History of the United States. F. Prerequisite: AREC 202 or ECON 101 or ECON 202 or any two courses in American history; completion of 45 credits. Credit not allowed for both ECON 379 and HIST 379.

Economic analysis of growth and welfare from beginning of industrialization to present.

ECON 404 03(3-0-0). Macroeconomic Policy. S. Prerequisite: ECON 304.

Alternative macroeconomic policies, policy coordination; application to current macroeconomic problems, policies, proposals.

ECON 410 03(3-0-0). Labor Economics. S. Prerequisite: ECON 306.

Capital/labor relationship; supply, demand of labor; wage determination; role of unions; unemployment and instability; structure of modern working class.

ECON 435 03(3-0-0). Economic Forecasting. S. Prerequisite: AREC 335/ECON 335 or STAT 340; ECON 204.

Theory and techniques used in economic forecasting as practiced by economists in industry, government, and academic life.

ECON 440 03(3-0-0). International Economics I. F. Prerequisite: ECON

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

306.

Theory of international trade; payments, commercial policies, and economic integration. (NT-O)

ECON 442 03(3-0-0). International Economics II. F, S, SS. Prerequisite: ECON 304.

Balance of payments, adjustment mechanisms, and international monetary systems. (NT-O)

ECON 460 03(3-0-0). Economic Development. F. Prerequisite: ECON 304.

Economic problems of underdeveloped nations. (NT-O)

ECON 463 03(3-0-0). Regional Economics-Tools/Analysis/Policy. S. Prerequisite: ECON 306.

Introduction to economic importance of location for firms, consumers, and policy makers. Basic tools, applications, and student research.

ECON 474 03(3-0-0). Recent Economic Thought. S. Prerequisite: ECON 304; ECON 306.

Nontraditional schools of economic thought, such as institutionalism and neo-Marxism, that critique neoclassical economic theory.

ECON 484 Var [1-3]. Supervised College Teaching. F, S, SS. Prerequisite: Written consent of instructor. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Assistance in teaching introductory economics courses.

ECON 487 Var [1-3]. Internship.

ECON 492 03(0-0-3). Seminar. F, S, SS. Prerequisite: Senior status.

Summarizes, debates, and applies issues and policies chosen by the instructor. Emphasis on student participation, debate, and research.

ECON 495 Var. Independent Study.

ECON 501 03(3-0-0). Quantitative Methods for Economists. F. Prerequisite: MATH 141 or MATH 155 or MATH 160.

Quantitative methods essential for graduate study in economics; functional forms, optimization, matrix methods, topological modeling.

ECON 504 03(3-0-0). Macroeconomic Analysis I. S. Prerequisite: ECON 304; ECON 306.

Analysis of national income, employment, price levels, growth, and policies to achieve national economic goals.

ECON 505 03(3-0-0). History of Economic Thought. F. Prerequisite: Graduate status.

History of economic thought as a foundation for studying economic theory.

ECON 506 03(3-0-0). Microeconomic Analysis I. S. Prerequisite: ECON 306; ECON 501.

Price theory: analyses of demand, production, and costs; analysis of various market structures; factor markets; general equilibrium, welfare economics.

***ECON 510 03(3-0-0). Labor Market Analysis.** F. Prerequisite: ECON 304; ECON 306.

Determination of wages and employment. Focus on theoretical and applied controversies.

°ECON 515 03(3-0-0). Financial Institutions-Structure/Regulation. F.

Regulation of financial institutions in the U.S.; international banking and international financial institutions, and financial modernization.

ECON 520 03(3-0-0). Public Economics I. S. Prerequisite: ECON 506.

Analysis and evaluation of tax policy in terms of efficiency and equity.

***ECON 530/AREC 570 03(3-0-0). Methodology of Economic Research.** F. Prerequisite: ECON 304; ECON 306. Credit not allowed for both ECON 530 and AREC 570.

Philosophical foundations of science and research. Concepts and skills for planning, performing, reporting, and evaluating economic research.

ECON 535/AREC 535 03(3-0-0). Applied Econometrics. F. Prerequisite: AREC 335/ECON 335; ECON 304 or ECON 306;.Credit not allowed for both ECON 535 and AREC 535.

Econometric techniques applied to testing and quantification of theoretical economic relationships drawn from both microeconomics, macroeconomics.

ECON 540/AREC 540 03(3-0-0). Economics of Natural Resources. F. Prerequisite: ECON 340/AREC 340; MATH 141. Credit not allowed for both ECON 540 and AREC 540.

Public natural resources policy, effect on resource use in private sector, optimal pricing of minerals, timber and fisheries, public project analysis.

ECON 541/AREC 541 03(3-0-0). Environmental Economics. S. Prerequisite: ECON 306. Credit not allowed for both ECON 541 and AREC 541.

Economics of environmental policy; partial equilibrium and general equilibrium model; pollution; natural environments; population and economic growth.

ECON 563/AREC 563 03(3-0-0). Regional Economics-Theory, Methods, and Issues. F. Prerequisite: ECON 306; ECON 501 or concurrent registration. Credit not allowed for both ECON 563 and AREC 563.

Tools and methods of regional economics, including supply, demand, and externality analyses. Applications to current urban and regional policy issues.

***ECON 570 03(3-0-0). Evolution of Economic Thought.** F. Prerequisite: ECON 304; ECON 306.

From Plato and Aristotle to the modern period.

ECON 635/AREC 635 03(3-0-0). Econometric Theory I. F. Prerequisite: AREC 535/ECON 535; ECON 501 or concurrent registration. Credit not allowed for both ECON 635 and AREC 635.

Theory of mathematical statistics and classical linear regression model in context of economic application.

ECON 640 03(3-0-0). International Trade Theory. F. Prerequisite: ECON 306 or ECON 506.

Theory of international trade including comparative advantage, factor growth, market distortions, and commercial policy.

ECON 663 03(3-0-0). Urban and Regional Modeling. S. Prerequisite: ECON 506.

Methodological approaches in regional economics: general equilibrium, input-output, compatible general equilibrium models; social accounting matrices.

ECON 695 Var. Independent Study.

ECON 698 03(0-0-3). Research—Technical Paper. F, S, SS. Prerequisite: ECON 504; ECON 506; ECON 705; ECON 735/AREC 735.

ECON 699 Var. Thesis.

ECON 704 03(3-0-0). Macroeconomic Analysis II. F. Prerequisite: ECON 501; ECON 504.

Theoretical framework for analyzing flows of aggregate income and expenditure; relationship between these flows and other dimensions of economic activity.

ECON 705 03(3-0-0). Heterodox Approaches to Economics. S. Prerequisite: ECON 505.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Contemporary heterodox approaches to economic research.

ECON 706 03(3-0-0). Microeconomic Analysis II. F. Prerequisite: ECON 501; ECON 506.

Partial and general equilibrium analysis of demand, production, pricing, and welfare under competitive and imperfectly competitive conditions.

ECON 715 03(3-0-0). Monetary Economics. F. Prerequisite: ECON 504.

Principle issues of monetary theory: money supply and demand, interest rates, and current problems of monetary policy.

ECON 720 03(3-0-0). Public Economics II. F. Prerequisite: ECON 506.

Analysis of welfare foundations of public expenditure, including cost-benefit analysis.

ECON 735/AREC 735 03(3-0-0). Econometric Theory II. S. Prerequisite: AREC 635/ECON 635. Credit not allowed for both ECON 735 and AREC 735.

Model building, estimation and testing, using both microanalytic models and aggregate models of the economy.

ECON 742 03(3-0-0). International Production and Monetary Theory. S. Prerequisite: ECON 304 or ECON 504.

Factor movements, theory of international production (multinationalism), balance of payments, and international monetary system.

ECON 760 03(3-0-0). Theories of Economic Development. S. Prerequisite: ECON 460.

Analysis of fundamentals of economic development (processes, problems, and strategies) with special reference to developing nations.

ECON 770 03(3-0-0). Economic Thought and Systems. S. Prerequisite: ECON 570.

Aspects of modern economic thought and comparative economics selected according to backgrounds and interests of the class.

ECON 771 03(3-0-0). Political Economy of Race and Gender. F, S. Prerequisite: Graduate status.

Economic approaches to inequality based on race/ethnicity, gender, and class.

ECON 772 03(3-0-0). Marxian Political Economy. F. Prerequisite: ECON 505.

Marxian method, relevance of Marxian approach, and relation to other economic approaches.

ECON 784 Var. Supervised College Teaching.

ECON 792A-E Var. Seminar.

A) Theory. C) Social and political. D) Quantitative analysis. E) Development.

ECON 793 03(0-0-3). Seminar—Doctoral Research. S. Prerequisite: ECON 704; ECON 705; ECON 706; ECON 735/AREC 735.

ECON 795 Var. Independent Study.

ECON 799 Var. Dissertation.

ADULT EDUCATION COURSES

School of Education

College of Applied Human Sciences

EDAE 495 Var. Independent Study-Adult Education.

EDAE 520 03(0-0-3). Adult Education. F.

Philosophical foundations, a description of program service areas, adult participation trends, and current issues. (NT-O, V)

EDAE 586 Var. Practicum.

Participation in field experiences relevant to study program and objectives.

EDAE 590 Var. Workshop.

Specially designed learning situations to provide opportunities for concentrated problem-solving experiences. (NT-O)

EDAE 601 03(3-0-0). Philosophy/Organization of Workforce Education. SS.

Principles, philosophy, practices, and innovations of workforce education and human resources. (NT-O/V)

EDAE 620 03(0-0-3). Processes and Methods. F.

Processes and methods including helping theories used by adult learning facilitators. (NT-O)

EDAE 624 03(0-0-3). Adult Teaching and Learning I. S. Prerequisite: EDAE 520.

Using theory and best practices to design and deliver instruction for adults. (NT-O)

EDAE 629 03(0-0-3). Program Development. S.

Models for planning, implementing, and evaluating programs for adult learners. (NT-O)

EDAE 639 03(1-0-2). Instructional Design. F. Prerequisite: none.

Apply instructional design principles in the development of a course or workshop and explore application of various learning methods. (NT-O)

EDAE 668 03(3-0-0). Cognitive Theory and Learning Transfer. F. Prerequisite: None.

Investigation of learning processes and training strategies that lead to application of learning outside of the classroom. (NT-O)

EDAE 687 Var. Internship.

Career or job fieldwork experience with an adult education institution, agency, or program.

EDAE 692 Var. Seminar-Adult Education. (NT-O)

EDAE 695 Var. Independent Study.

EDAE 698 Var. Research. Prerequisite: EDAE 520; EDAE 624; EDRM 600.

EDAE 699 Var. Thesis. Prerequisite: EDAE 520; EDAE 624; EDRM 600.

EDAE 724 03(0-0-3). Adult Teaching and Learning II. F.

Adult teaching and learning, alternative delivery systems, performance technology, and faculty evaluation.

COMMUNITY COLLEGE EDUCATION COURSES

School of Education

College of Applied Human Sciences

EDCL 675 03(3-0-0). The Community College. SS. Prerequisite: None.

Role and scope of community college: history, philosophy, organization, administration.

EDCL 687 Var. Internship.

EDCL 701 03(0-0-3). Higher Education Law. S. Legal theory, analysis, and review of cases relevant to higher education. (NT)

EDCL 702 03(2-0-1). Community College Curriculum. F. .

Investigation and research of critical curricular issues affecting the community college now and in the future.

EDCL 703 03(2-0-1). Community College Leadership. S. Prerequisite: EDCL 675.

Investigation and research of critical leadership issues affecting the community college now and in the future.

EDCL 750 03(0-0-3). Simulated Presidential Cabinet I. SS. Prerequisite: EDCL 701; EDUC 710.

Issues and challenges relating to students, faculty, instructional programs, noninstructional programs, and instructional delivery.

EDCL 751 03(0-0-3). Simulated Presidential Cabinet II. SS. Prerequisite: EDCL 701; EDUC 710.

Issues and challenges relating to internal/external governances, legal authority, institutional revenues, expenditures and insurances, human resources.

EDCL 792 Var [1-6]. Seminar. F.

EDCL 799 Var. Dissertation.

COUNSELING AND CAREER DEVELOPMENT COURSES

School of Education

College of Applied Human Sciences

EDCO 500 03(0-0-3). Career and Employment Concepts. F.
Prerequisite: Bachelor's degree.

Career and lifestyle studies that provide an understanding of career development, employment concepts, and career counseling resources. (NT-O)

EDCO 550 03(3-0-0). Professional School Counseling. S. Prerequisite: Admission to Counseling and Career Development Program or approval of instructor.

History, professionalism, ethics, program planning and program development of school counseling programs.

EDCO 552 03(0-0-3). School Counseling Program Delivery/Evaluation. F. Prerequisite: EDCO 550.

Effective school counseling program development, delivery, and evaluation.

EDCO 590 Var. Workshop.

EDCO 625 03(2-0-1). Foundations of Counseling. F. Prerequisite: Bachelor's degree.

Foundations and techniques of individual guidance and counseling.

EDCO 650 03(2-0-1). Individual Guidance and Counseling. F.
Prerequisite: EDCO 625.

Theories of individual counseling and development.

EDCO 651 03(2-0-1). Group Guidance and Counseling. S.
Prerequisite: EDCO 650.

Theory and techniques of group guidance and counseling.

EDCO 652 03(3-0-0). Ethics in Counseling/Career Development. S.
Prerequisite: Admission to Counseling and Career Development Program.

Awareness and critical analysis of ethical and legal issues in counseling and career development.

EDCO 656 03(1-0-2). Tests and Assessment. SS.

Use of tests in educational, vocational, and counseling assessment. (\$)

EDCO 660 03(3-0-0). Career Development Counseling. S, SS.
Prerequisite: EDCO 500.

Career development programs and processes over the life span with particular attention to career choice.

EDCO 686 Var. Practicum.

EDCO 687 Var. Internship.

EDCO 692 03(1-0-2). Seminar-Brief Counseling. S, SS. Prerequisite: EDCO 650; EDCO 652; proof of professional counseling liability insurance.

Blends theory of brief counseling with practice. Individualized for application in the student's counseling setting.

EDCO 693 Var. Seminar.

EDCO 696 Var. Group Study.

EDCO 792A-C Var. Seminar.

A) Individual counseling. B) Group counseling. C) Contemplative practices in counseling and education. S.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

CAREER AND TECHNICAL EDUCATION COURSES

School of Education

College of Applied Human Sciences

EDCT 300 02(0-0-2). Principles of Career and Technical Education. F, S, SS. Offered only through Continuing Education, School of Education

History, purpose, administration, funding, programs, services, and delivery of career and technical education within educational systems. (NT-O)

EDCT 370 03(3-0-0). Laboratory Management, Safety, and Liability. S, SS.

Organization and management of learning laboratories. Approved principles and practices of classroom and laboratory safety including impact of accidents.

EDCT 387 Var. Internship.

Coordinated and supervised experiences in business, industry, or agriculture selected to strengthen the intern's specialty through experience.

EDCT 400 02(2-0-0). Building Student Organizations/Partnerships. F, S, SS. Credit not allowed for both EDCT 400 and EDCT 402.

Techniques and methods to implement and advise student leaders; establish and nurture business/industry partners and work-based experiences. (NT-O)

EDCT 403 02(0-0-2). Coordination Techniques of Cooperative Programs. F, S, SS. Offered only through Continuing Education, School of Education.

Techniques and methods employed in organization, development, and maintenance of a cooperative program. (NT)

EDCT 420 03(3-0-0). Agricultural Experience and Adult Education. S.

Developing secondary agriculture experience programs. Organizing and teaching adult education classes in agriculture.

EDCT 425 04(4-0-0). Methods/Materials in Agricultural Education. F. Prerequisite: Concurrent registration in EDCT 492; EDUC 350 or concurrent registration or EDUC 450 or concurrent registration.

Methods and procedures in teaching and evaluating agricultural education in the classroom and laboratory; vocational foundations; microteaching.

EDCT 431 04(4-0-0). Methods/Materials in Business Education. F. Prerequisite: Concurrent registration in EDCT 492; EDUC 350 or concurrent registration or EDUC 450 or concurrent registration.

Methods for teaching business education. (NT-O)

EDCT 441 01(1-0-0). Methods/Materials-Vocational Marketing Education. F. Prerequisite: EDCT 431; EDUC 350 or concurrent registration or EDUC 450 or concurrent registration.

Instructional methods and resource materials development for vocational marketing education. (NT-O)

EDCT 451 04(3-2-0). Methods-Family/Consumer Sciences Education. F. Prerequisite: EDUC 350 or concurrent registration or EDUC 450 or concurrent registration.

Teaching methods, processes, and materials for family and consumer sciences education.

EDCT 465 03(3-0-0). Methods and Materials in Technology Education. F. Prerequisite: EDUC 350 or concurrent registration or EDUC 450 or concurrent registration.

Strategies and practices of teaching in a technical laboratory setting.

EDCT 471 02(2-0-0). Orientation and Assessment of New Teachers. F, S, SS. Offered only through Continuing Education, School of Education.

Orientation to teaching and individual assessment of teaching skills; development and implementation of professional growth plan. (NT)

EDCT 472 01(0-0-1). Classroom Management. F, S, SS. Prerequisite: Admission to TAP; EDCT 471. Offered only through Continuing Education, School of Education.

Introduction to student management techniques and program management. Teachers will create a preliminary plan for instruction. (NT)

EDCT 473 01(0-0-1). Communication Strategies. F, S, SS. Prerequisite: Admission to TAP; EDCT 471. Offered only through Continuing Education, School of Education.

Introduction to improved communication techniques, conflict resolution, performing occupational advisement, and facilitating leadership activities. (NT)

EDCT 485 Var. Student Teaching. F, S. Prerequisite: EDUC 450; appropriate special (content) methods courses.

Teacher education candidates participate in an intensive and extensive on-site capstone experience within a public school setting. (\$)

EDCT 486 Var [1-6]. Practicum. Prerequisite: Admission to teacher licensure.

EDCT 492 Var. Seminar-Professional Relations. F, S. Prerequisite: EDUC 450; appropriate special (content) methods course; concurrent registration in EDCT 485.

Collegial and professional discussions, support, and assistance.

EDCT 494 Var. Independent Study.

EDCT 496 Var. Group Study.

EDCT 520 Var. Teaching Agricultural Education. SS. Prerequisite: Admission to teacher licensure.

Methods of teaching recent developments in the field of agriculture and allied industries.

EDCT 571 03(0-0-3). Vocational Assessment for Special Needs. F, S, SS.

Information on techniques regarding vocational assessment of special needs students including traditional and curriculum-based strategies. (NT-O)

EDCT 590 Var. Workshop.

EDCT 612 03(0-0-3). Career and Technical Administrative Strategies. F, S, SS. Offered only through Continuing Education, School of Education.

Basic educational systems; the scientific method as a basis for analysis; systems as a tool for planning and decision making. (NT)

EDCT 630 02(2-0-0). Organization of Business Education. SS. Prerequisite: EDCT 300.

Procedures for organizing new programs and for managing or modifying existing programs. (NT-O)

EDCT 631 02(2-0-0). Management of Business Departments. SS. Prerequisite: EDCT 300.

Preparation of teachers and administrators for implementation of vocational business and office education programs. (NT-O)

EDCT 640 02(2-0-0). Methods in Marketing Education. SS. Prerequisite: EDCT 441.

Instruction and curricula for secondary and postsecondary vocational marketing education. (NT-O)

EDCT 641 02(2-0-0). Programs in Marketing Education. SS. Prerequisite: EDCT 441.

Techniques used in determining need for and implementations of new or additional programs of vocational marketing education. (NT-O)

EDCT 693 Var. Seminar.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HIGHER EDUCATION COURSES

School of Education

College of Applied Human Sciences

Service learning. **D)** International programs.
EDHE 694 Var. Independent Field Studies.

EDHE 695 Var. Independent Study.

EDHE 590A-M 01(0-0-1). Workshop-Student Personnel. Prerequisite: Enrollment in SAHE program.

A) Admissions. **F. B)** College union administration. **F. C)** Housing/auxiliary services. **S. D)** International programs. **F. E)** Career services. **S. F)** Service learning. **S. G)** Wellness programs. **S. H)** Advising student groups. **F. °J)** Access and Opportunity in Higher Education 01(0-0-1). **S** (odd years). ***K)** Leadership and Service in Higher Education. **F** (even years). ***L)** Working with Students' Parents and Families. **F** (even years). **°M)** Spiritual Dimensions of Student Development. **S** (odd years).

EDHE 660 02(1-0-1). Financial Management in Student Affairs. **F, S.** Prerequisite: Written consent of instructor.

Budgeting, fiscal planning, and financial administration in student affairs. (NT-O)

EDHE 661 03(3-0-0). Inclusive University. **S.** Prerequisite: Enrollment in SAHE program.

Exploration of broad range of human differences and their impact in higher education.

EDHE 662 02(2-0-0). Trends/Issues/Assessment in Higher Education. **S.** Prerequisite: Enrollment in SAHE program.

Assessment and research involving students in collegiate settings.

EDHE 670 03(0-0-3). College Student Personnel Administration. **F, SS.** Prerequisite: Written consent of instructor.

Historical, philosophical, and professional development in student affairs functions; analysis of role of student affairs in higher education. (NT-O)

EDHE 671 03(3-0-0). Higher Education Administration. **F, SS.**

History, purpose, structure, and role of leadership within the administration of higher education with relevance to present day higher education.

EDHE 672 02(2-0-0). Ethical and Practical Issues-Student Affairs. **F, S.** Prerequisite: Enrollment in SAHE program.

Ethical principles and standards used in student affairs. (NT-O)

EDHE 673 03(0-0-3). Student Development Theory. **F, S.**

Strategies for application of student development theories in practice. (NT-B)

EDHE 674 03(3-0-0). Campus Ecology. **SS.**

Patterns of relationships among students and the college campus' social and physical environments. (NT-O)

EDHE 676 03(3-0-0). Organizational Behavior in Student Affairs. **S.** Prerequisite: Enrollment in SAHE program.

Understanding and application of basic organizational behavior principles within administration of student affairs in higher education.

EDHE 677 03(3-0-0). Law in Student Affairs. **F.** Prerequisite: Enrollment in SAHE program.

Legal issues focusing on sources and application of educational law and responsibilities of higher education administrators.

EDHE 678 02(2-0-0). Current Issues in Student Affairs. **S, SS.** Prerequisite: Enrollment in SAHE program.

Capstone analyzing current issues and leadership in transition to professional roles. (NT-O)

EDHE 692A-D Var. Seminar. Prerequisite: Enrollment in SAHE program.

A) Current trends and issues. **B)** Working with student groups. **C)**

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ORGANIZATION PERFORMANCE AND CHANGE COURSES

School of Education

College of Applied Human Sciences

EDOD 506 03(3-0-0). Human Resource Development. S. Prerequisite: Admission to the Organizational Performance and Change specialization. Human resource development foundational theory, research, and techniques for workplace and organizational learning and performance. (NT-O)

°**EDOD 670 03(3-0-0). Strategic Human Resource Development.** SS. Prerequisite: Admission to OPC specialization. Examine fundamentals of strategy from a HRD perspective, utilizing management tools, recent research and contemporary theory.

***EDOD 671 03(3-0-0). Performance Consulting and Causal Analysis.** S. Prerequisite: Admission to OPC specialization. Performance analysis and causal analysis; roles and responsibilities of performance consultants and process in performance consulting.

***EDOD 672 03(3-0-0). Change Facilitation.** F. Prerequisite: Admission to OPC specialization. Roles and responsibilities of change agents and the fundamentals of change: principles, practices, processes, and resistance strategies.

EDOD 673 03(3-0-0). Organizational Intervention Strategies. S. Prerequisite: Admission to the Organizational Performance and Change specialization. Identify, analyze, evaluate, and select performance improvement interventions/change initiatives for organizational performance problem or breakdown.

EDOD 674 03(3-0-0). Analyze Workplace Learning. S. Prerequisite: EDOD 506 or concurrent registration. Analyze workplace learning and performance issues drawing on foundational principles.

EDOD 687 Var. Internship

EDOD 692 Var. Seminar-Human Resource Development. Prerequisite: Admission to OPC specialization.

***EDOD 765 03(3-0-0). Strategic Planning of Education for Work.** F. Prerequisite: Admission to OPC specialization. Human capital as component of strategic planning of education; training and development at national, regional, and organizational levels.

EDOD 767 03(3-0-0). Cross-Culture and International Training. S. Prerequisite: Admission to OPC specialization. Issues, models, techniques of development and delivery of human resource development and training programs across cultural, interregional, national barriers.

***EDOD 768 03(3-0-0). Workforce Development.** S. Prerequisite: Admission to OPC specialization. Characteristics and elements of workforce development with special attention to the roles and responsibilities of employers and managers.

°**EDOD 769 03(3-0-0). Theory and Practice of Change.** F, S. Prerequisite: None. Theory, history, characteristics, nature, levels, and types of change and modern conceptual and integrated models of change. (NT-B)

EDOD 770 03(3-0-0). Organizational Culture. F. Prerequisite: Admission to the Organizational Performance and Change specialization. Examine the theories, methods, and practices of organizational culture

for evaluating, analyzing, and changing organizational culture.

EDOD 786 Var. Practicum. Prerequisite: Admission to OPC specialization.

EDOD 792 Var. Seminar-Human Resource Development. Prerequisite: Admission to OPC specialization.

EDOD 799 Var. Dissertation. F, S, SS. Prerequisite: None. Dissertation research, writing, and defense.

EDUCATION RESEARCH METHODS COURSES

School of Education

College of Applied Human Sciences

EDRM 600 03(3-0-0). Introduction to Research Methods. F, S, SS.

Methods of research, scientific methods, problem identification, research design, preparation and evaluation of research reports. (NT-O/V)

EDRM 602 03(3-0-0). Action Research. S, SS. Prerequisite: EDRM 600.

Provide educators with knowledge and skills to plan and implement school-based research to improve teaching and learning. (NT-B)

EDRM 606 03(3-0-0). Principles: Quantitative Data Analysis. F, S, SS. Prerequisite: EDRM 600; STAT 201.

Quantitative data analysis in social science research; descriptive statistics; fundamentals of inference. (NT-B)

EDRM 612 03(2-0-1). Assessing Students in Educational Settings. F, S, SS. Prerequisite: Admissions into a Master's program within the School of Education.

Various ways of assessing students including traditional, authentic, and portfolio techniques for P-20 education. (NT-O)

EDRM 666 03(3-0-0). Program Evaluation. F, S. Prerequisite: EDRM 600.

Models and practices of program evaluation in both public and private sector organizations. (NT-B)

EDRM 692 Var. Seminar-Research Methods and Proposal Design.

EDRM 698 Var. Research. (NT-O)

EDRM 699 Var. Thesis. (NT-O)

EDRM 700 03(3-0-0). Quantitative Research Methods. F, S. Prerequisite: EDRM 606 or concurrent registration.

Design, data analysis, interpretation of results, and evaluation of educational research studies. (NT-B)

EDRM 701 03(3-0-0). Applied Linear Models-Educational Research. S. Prerequisite: EDRM 606.

General linear model applications in educational research emphasizing conceptual understanding and characteristics of non-experimental designs.

EDRM 702 03(3-0-0). Foundations of Educational Research. F, S.

Philosophical, theoretical, and ethical foundations of educational research. (NT-B)

EDRM 703 03(3-0-0). Applied Longitudinal Data Analysis. F. Prerequisite: EDRM 701.

Methods and empirical applications of individual growth modeling and discrete-time event history analysis in educational research.

EDRM 704 03(3-0-0). Qualitative Research. F. Prerequisite: EDRM 600.

Examination of qualitative research theory, methods, and applications to education and the social sciences. (NT-O)

EDRM 705 03(3-0-0). Qualitative Data Analysis. S. Prerequisite: EDRM 704.

Examination of qualitative methods of data analysis, data presentation, and use of computer. (NT-O)

EDRM 706 03(3-0-0). Analysis of Variance-Education Research. S, SS. Prerequisite: EDRM 700 or concurrent registration.

Analysis of variance applications in educational research; experimental design and analysis of data from experiments.

EDRM 707 03(0-0-3). Quantitative Data Collection Methods/Analysis. F, S. Prerequisite: EDRM 700.

Selection or development of questionnaires, tests, structured interviews, and observations. Reliability and validity. Reporting educational studies. (NT-B)

EDRM 708 03(3-0-0). Narrative Inquiry. F. Prerequisite: EDRM 704.

Theory, methods and design of narrative approaches to research including data collection and analysis applications. (NT-B)

EDRM 711 03(3-0-0) Ethnographic Research. S. Prerequisite: EDRM 704.

Theoretical underpinnings, research design, ethics and practical application of ethnographic research in a naturalistic setting.

EDRM 786 Var[1-6]. Practicum. F, S, SS.

EDRM 792A-B Var. Seminar.

A) Research methodology. **B)** Proposal development. (NT-B, subtopic B only.)

EDRM 798 Var. Research. F, S, SS.

EDRM 799 Var. Dissertation.

EDUCATION COURSES

School of Education

College of Applied Human Sciences

EDUC 255 02(2-0-0). Introduction to Education. F, S, SS.

Overview of teaching profession emphasizing teaching opportunities, licensure, and University professional program.

EDUC 275 03(3-0-0). Schooling in the United States. (GT-SS1, AUCC 3C). F, S, SS. Prerequisite: Completion of 30 credits course work.

Social, political, historical, and economic forces that shape U.S. system of public schooling (P-12).

EDUC 296 Var. Group Study.

EDUC 320 03(0-0-3). Educational Psychology. F, S, SS. Offered as an online or correspondence course only.

Psychological conditions of classroom learning and teaching including understanding needs of exceptional children in the classroom. (NT-O/C)

EDUC 331 02(1-2-0). Educational Technology and Assessment. F, S, SS. Prerequisite: EDUC 275; EDUC 340; admission to teacher licensure.

Skills and strategies for the use of appropriate technology and assessment in teacher education.

EDUC 340 03(1-2-1). Literacy and the Learner. F, S, SS. Prerequisite: Completion of 30 credits of course work. Required background check through CDE, CBI, FBI.

Understanding and supporting literacy and numeracy development. Field experiences, service learning experiences.

EDUC 350 03(2-2-0). Instruction I-Individualization/Management. F, S, SS. Prerequisite: EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure.

Theory, research, and practice of teaching at the junior high/middle school level; adapting instruction for individuals including learners with special needs.

EDUC 386 Var [1-3]. Practicum-Instruction I. Prerequisite: EDUC 275; EDUC 340; concurrent registration in EDUC 350; admission to teacher licensure.

EDUC 400 03(1-4-0). Diagnostic Teaching of Reading. F, S. Prerequisite: EDUC 275; EDUC 340; HDFS 217; HDFS 310; HDFS 320.

Development of the knowledge base, skills, and strategies for teaching reading from birth to age 8. Service learning experiences.

EDUC 425 04(2-6-0). Early Childhood Education I. F, S. Prerequisite: EDUC 275; EDUC 340; admission to teacher licensure.

Integrated methods; theoretical bases; teacher's role; appropriate curriculum; measurement; environments; pedagogy; instructional design and decisions.

EDUC 426 04(2-4-0). Early Childhood Education II. F, S. Prerequisite: EDUC 425.

Integrated methods; organizing/presenting materials/activities; applying decisions; managing groups; individual instruction; assessment/evaluation.

EDUC 450 04(2-4-0) Instruction II-Standards and Assessment. F, S. Prerequisite: EDUC 331; EDUC 350; EDUC 386; concurrent registration in EDUC 486J. Course must be taken semester immediately prior to student teaching semester.

Theory, research, and practice of standards-based instruction: assessment, literacy and technology. Includes work in public schools.

EDUC 460 04(3-2-0). Methods and Materials in Teaching Science. F. Prerequisite: Admission to teacher licensure.

Current trends in science education, K-12; techniques of experimentation demonstrations; study of equipment, facilities, and resource materials.

EDUC 462 04(4-0-0). Methods and Assessment in Teaching Languages. F. Prerequisite: Admission to teacher licensure; oral and written competency in the language endorsement area.

Objectives, methods, and resource materials for teaching languages in secondary schools.

EDUC 463 04(4-0-0). Methods in Teaching Language Arts. F, S. Prerequisite: Admission to teacher licensure.

Objectives, content, and methods of teaching English, speech, and journalism in secondary schools.

EDUC 464 04(4-0-0). Methods and Materials in Teaching Mathematics. S. Prerequisite: 18 credits in mathematics; admission to teacher licensure.

Problems and techniques of teaching secondary mathematics; evaluation of student achievement and teacher effectiveness.

EDUC 465 04(4-0-0). Methods and Materials in Social Studies. F. Prerequisite: Admission to teacher licensure.

Methods of teaching social studies; sources of information and teaching materials and literature for social studies teachers.

EDUC 466 04(4-0-0). Methods and Assessment in K-12 Art Education. F. Prerequisite: EDUC 275; admission to teacher licensure.

Objectives, methods, and resource materials for teaching art in elementary and secondary schools.

EDUC 474 02(1-3-0). Elementary Music Methods I. F. Prerequisite: Admission to teacher licensure.

Developmentally appropriate strategies and materials for K-6 music instruction; emphasis on common methodologies, resources, standards-based teaching.

EDUC 475 02(1-3-0). Elementary Music Methods II. S. Prerequisite: EDUC 474.

Classroom management, motivational strategies, technology tools, assessment/evaluation of music learning and field experiences in K-6 music education. (\$)

EDUC 476 02(1-3-0). Choral Methods for Secondary Schools. F. Prerequisite: MU 217; admission to teacher licensure.

General music classes, choral techniques and literature; current practices and trends. (\$)

EDUC 477 02(1-3-0). Instrumental Methods for Secondary Schools. F. Prerequisite: MU 217; admission to teacher licensure.

Organization and administration of instrumental music, grades 5-12. (\$)

EDUC 485A-C. Var [6-14]. Student Teaching. F, S.

Teacher education candidates participate in an intensive and extensive on-site capstone experience within a public school setting. **A)** Elementary. Prerequisite: EDUC 450; appropriate special methods courses. **B)** Secondary. Prerequisite: EDUC 450; appropriate special methods courses. **(S) C)** Early childhood. Prerequisite: EDUC 426. (\$)

EDUC 486A-E Var. Practicum. Prerequisite: Admission to teacher licensure.

A) K-12 classroom. **B)** Reading. **C)** Mathematics. **D)** Literacy. **E)** Instruction II.

EDUC 493A-B Var [1-3]. Seminar. Prerequisite: EDUC 426 or EDUC 450; appropriate special methods course(s); EDUC 485A or concurrent registration, or EDUC 485B or concurrent registration, or EDUC 485C or concurrent registration, or EDCT 485 or concurrent registration.

A) Professional relations. Collegial and professional discussions, support, and assistance. **B)** Assessment of learning. Information and techniques that enable educators to use assessment results to inform planning and instructional practices.

EDUC 494 Var. Independent Field Studies.

Specialized field study in the public schools under direction and supervision of faculty.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

EDUC 495 Var. Independent Study.

EDUC 496 Var. Group Study.

EDUC 501 03(3-0-0). Reading in the Content Areas. SS. Prerequisite: EDUC 320.

Specific methods, materials, and techniques for helping students become more efficient in reading content area material.

EDUC 502 03(3-0-0). Human Relations in Education. F, S. Prerequisite: Bachelor's degree or EDCT 300.

Human relations in an individual's educational, organizational, and social activities as applied to various educational settings. (NT-O)

EDUC 525A-D Expert Teaching. Prerequisite: Bachelor's degree; admission to teacher licensure.

Theories related to effective classroom instruction. **A)** Inclusion, special needs. 02(0-0-2) **S. B)** Thinking and learning. 02(0-0-2) **F. C)** Literacy and numeracy. 03(0-0-3) **S. D)** Standards, assessment. 02(0-0-2). F.

EDUC 526 04(0-4-2). Interdisciplinary Methods. F. Prerequisite: Bachelor's degree; admission to teacher licensure.

Methods and theories related to effective classroom instruction.

EDUC 530 02(1-2-0). Computer Applications in Effective Instruction. F, SS. Prerequisite: Bachelor's degree; admission to teacher licensure.

Increasing instructional effectiveness through the use of computer technology.

EDUC 570 03(2-2-0). Perspectives of Special Education. F, SS.

Historical and legal, philosophical foundations, student characteristics, and building collaborative relationships in special education.

EDUC 572 03(3-0-0). Special Needs-Foundations and Practices. SS. Prerequisite: Teacher licensure.

Theory related to foundations and professional practices relevant for teaching students with mild/moderate special needs.

EDUC 573 03(3-0-0). Differentiating Instruction for Diverse Needs. F, SS. Prerequisite: EDUC 570.

Information techniques, and practice regarding methods for differentiating instruction.

EDUC 574 03(3-0-0). Transition and Secondary Services. F, SS. Prerequisite: EDUC 570.

Methods comprising state-of-the-art transition services for individuals with disabilities for the special education generalist.

EDUC 575 04(4-0-0). Methods for Mild/Moderate Special Needs. S. Prerequisite: EDUC 572; teacher licensure.

Methods addressing learning of students with mild/moderate special needs and instructional accommodations in regular classes.

EDUC 576A-L. Issues in Education. F, S, SS. Prerequisite: Baccalaureate degree. Offered only through Division of Continuing Education.

Issues in educating a diverse student population. Methods used in identification and assessment; strategies for intervention and/or instruction. **A)** Talented and Gifted. 02(0-0-2). **B)** Attention Deficit Disorder. 02(0-0-2). **C)** Autism/Asperger's. 02(0-0-2). **D)** Behavior is Language. 02(0-0-2). **E)** Classroom Management. 02(0-0-2). **F)** Teaching Diversity. 01(0-0-1). **G)** Harassment in Schools. 01(0-0-1). **H)** Assessing Special Needs. 02(0-0-2). **I)** Sexually Transmitted Diseases. 01(0-0-1). **J)** Drugs and Alcohol. 02(0-0-2). **K)** Child Abuse. 02(0-0-2). **L)** Traumatized Child. 02(0-0-2). (NT-C)

EDUC 591A-F Var. Workshop.

A) Instruction. **B)** Community partnerships. **C)** Annenberg/CPB science instruction. Var [1-3]. (NT-T) **D)** Annenberg/CPB mathematics instruction. Var [1-3]. (NT-T) **E)** Annenberg/CPB educational theory and issues. Var

[1-3]. (NT-T) **F)** Annenberg/CPB humanities instruction. Var[1-3]. (NT-T)

EDUC 610 03(2-0-1). Principles of Supervision and Evaluation. F,S.

Supervision and evaluation of instruction including required Colorado evaluation training. (NT-B)

EDUC 618 03(3-0-0). School Law. F, S.

Legal framework for operation and management of public and private schools emphasizing legal responsibilities for administrators and teachers.

EDUC 619 03(3-0-0). Curriculum Development. S, SS.

Principles and procedures for school personnel in planning the public school curriculum. (NT-O)

EDUC 620 02(2-0-0). Philosophy of Education. SS.

Contemporary philosophies as related to principles and practices in education.

EDUC 622 03(3-0-0). Innovative Social Studies Teaching. SS. Prerequisite: EDUC 485A or EDUC 485B.

Current trends in secondary school social studies teaching and curriculum techniques and materials for value formulation, decision-making skills, concepts, generalizations, and attitudes.

EDUC 623 03(0-2-2). Innovative Science Teaching. SS. Prerequisite: EDUC 485A or EDUC 485B.

Innovative trends in curriculum and methodology of science teaching.

EDUC 625 03(3-0-0). Contexts of Schooling. SS. Prerequisite: Admission to graduate program.

History, purpose, structure, and role of schooling with relevance to current issues, U.S. and international.

EDUC 628 03(3-0-0). Models of Teaching. F, SS. Prerequisite: Must be enrolled in one of the following levels: professional or graduate.

Exploration of pedagogical topics and skill development related to instructional approaches. (NT-T)

EDUC 629 03(3-0-0). Communication and Classrooms. F, S, SS.

Exploration of pedagogical topics and growth experiences related to classroom management and presentation skills. (NT-T)

***EDUC 635 03(3-0-0). Educators, Systems and Change.** F, S, SS. Prerequisite: EDUC 485A or EDUC 485B. Offered only through the Division of Continuing Education

Process of change in education, focusing on teacher's role as leader and facilitator. (NT)

EDUC 645 03(3-0-0). Leadership and Ethics in Public Education. SS. Prerequisite: Admission to administrator licensure.

Focus on leadership functions for public schools and ethical dimensions of leadership.

EDUC 646 03(3-0-0). School Resource Management. SS. Prerequisite: Admission to administrator licensure.

School resource management including fiscal, personnel, and organization. (NT-O)

EDUC 647 03(3-0-0). School Culture, Climate, and Communications. SS. Prerequisite: Admission to administrator licensure; concurrent registration in EDUC 645; EDUC 646.

Assist public school leaders in their facilitation role in enhancing human relations and communication within schools and communities.

EDUC 648A-C. Role of the Principal.

Role of the principal as a result of changes in society and in the schools. **A)** Professional learning community 01(1-0-0). F. Prerequisite: Admission to administrator licensure; concurrent registration in EDUC 687B. **B)** Managing and leading change 01(1-0-0). S. Prerequisite: Admission to administrator licensure; concurrent registration in EDUC 687B. **C)**

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Capstone 01(1-0-0). SS. Prerequisite: EDUC 687B.

EDUC 651 03(2-0-1). Multicultural and Special Populations. F, S, SS. Prerequisite: Bachelor's degree.

Special concerns for working with people of various cultural, ethnic, exceptional, and special interest groups. (NT-O)

EDUC 660 03(0-0-3). Advanced Methods—Science and Math Instruction. SS. Prerequisite: None. Offered as an online course only through the Division of Continuing Education.

Knowledge and skills to improve the teaching of science, technology, engineering, and mathematics for in service K-12 teachers. (NT-O).

EDUC 670 03(1-0-2). Grant Writing. F, S, SS. Prerequisite: None. Offered as an online course only through the Division of Continuing Education.

Mechanics of proposal writing, including intangibles of the grant-seeker's art. (NT-O)

EDUC 675 03(1-0-2). Analyzing Education Literature. F, S, SS. Prerequisite: EDRM 700 or EDRM 702 or EDRM 704.

Analyze, critique, and interpret scholarly literature in the discipline. (NT-B)

EDUC 684 Var. Supervised College Teaching.

EDUC 686A-B Var. Practicum.

A) Administration. Var[1-6]. F, S, SS. (NT-O). B) Urban teaching. Var.

EDUC 687A-E Var. Internship.

A) Administration. B) Principal. C) Guidance and counseling. D) Teacher licensure I. Prerequisite: Must be enrolled in one of the following levels: professional or graduate. E) Teacher licensure II. Prerequisite: Must be enrolled in one of the following levels: professional or graduate.

EDUC 693A-C Var. Seminar.

A) Administrator. B) Instruction. C) Teacher licensure capstone. Prerequisite: Must be enrolled in one of the following levels: professional or graduate.

EDUC 695 Var. Independent Study.

EDUC 696 Var. Group Study.

EDUC 709 03(3-0-0). Leadership Development. F, S, SS.

Principles, theories, attributes, and skills related to individual leadership development. (NT-B)

EDUC 710 03(0-0-3). Higher Education Finance. S.

Federal, state, and local revenue distribution, budget preparation and controls, accounting options, audit preparation. (NT)

EDUC 713 03(3-0-0). Teaching, Learning, and Professional Growth. F.

Prerequisite: Admission to Ph.D. program.

Teaching, learning, and professional development perspectives related to educational change and reform.

EDUC 714 03(3-0-0). Education Policy Analysis. S, SS. Prerequisite: Admission to Ph.D. program.

Frameworks for analyzing, designing policy proposals, and implementing plans.

EDUC 715 03(3-0-0). Critical Issues for Special Populations. S. Prerequisite: EDUC 709; EDUC 713.

Social and cultural issues related to special populations are researched and analyzed to understand policy that guides educational decisions.

EDUC 716 03(3-0-0). Capstone: Educational Equity and Reform. F, SS. Prerequisite: EDUC 709; EDUC 713.

Applies tenets of educational leadership research and theory into a

context of equity, global citizenship and environmental responsibility.

EDUC 725 03(3-0-0). Professionalism in Education and Leadership. F, SS. Prerequisite: Admitted into doctoral program. Credit not allowed for both EDUC 725 and EDHE 725.

Professional choices and ethical decision making in education and leadership, with emphasis on higher education.

EDUC 786 Var. Practicum.

EDUC 787 Var. Internship.

EDUC 792 Var. Seminar. (NT-O)

EDUC 793 Var. Seminar.

EDUC 795 Var. Independent Study.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC-*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ENGINEERING SCIENCE COURSES

Nondepartmental

College of Engineering

EGSC 492 01(0-0-1). Seminar. F, S.

EGSC 495 Var. Independent Study.

ENGINEERING COURSES

Nondepartmental College of Engineering

ENGR 101 03(3-0-0). Grand Challenges in Engineering. F. Prerequisite: None.

National Academy of Engineering's Grand Challenges in Engineering: overview, roles of engineering disciplines, engineering and societal challenges.

ENGR 102 03(3-0-0). Problem Solving for Engineers. F, S. Prerequisite: MATH 160 or concurrent registration.

Engineering problem solving: dimensional analysis; precision, accuracy, repeatability; problems from all major engineering disciplines.

ENGR 298 Var [1-3]. Undergraduate Research. Prerequisite: Written consent of research mentor and department head.

Directed undergraduate research with a faculty mentor.

ENGR 486 Var[1-3]. Practicum. F, S, SS.

ENGR 496 Var [1-3]. Group Study. F, S.

ENGR 498 Var [1-3]. Undergraduate Research. Prerequisite: Thirty credits in engineering and science; written consent of instructor.

Directed undergraduate research with a faculty mentor.

ENGR 501/ECE 501 03(0-0-3). Foundations of Systems Engineering. F, S. Credit not allowed for both ENGR 501 and ECE 501.

Functional components of systems engineering, application of systems engineering to practical problems, system life-cycle process. (NT-O)

ENGR 508/ECE 508 03(3-0-0). Introduction to Power System Markets. F. Prerequisite: ECE 461. Credit not allowed for both ENGR 508 and ECE 508.

Deregulated electrical power systems, system security, investments in generation and transmission, ancillary services, and nodal pricing. (NT-O)

ENGR 509/ECE 509 03(3-0-0). Signal Processing for Power Systems. F. Prerequisite: ECE 312; ECE 461. Credit not allowed for both ENGR 509 and ECE 509.

Signal processing tools for analyzing power systems, voltage frequency, magnitude variations, unbalance, waveform distortion. (NT-O)

ENGR 510 03(3-0-0). Engineering Optimization: Method/Application. F. Prerequisite: MATH 229; MATH 261. Credit not allowed for both ENGR 510 and MATH 510.

Optimization methods; linear programming, network flows, integer programming, interior point methods, quadratic programming, engineering applications. (NT-O)

ENGR 520 03(3-0-0). Engineering Decision Support/Expert Systems. S. Prerequisite: ENGR 510 or MATH 510. Credit not allowed for both ENGR 520 and ENGR 610.

Decision support systems for complex engineering problems; multicriteria decision making and optimization; hybrid knowledge-based/algorithmic methods. (NT-O/V)

ENGR 530/ECE 530 03(3-0-0). Overview of Systems Engineering Processes. F, S. Prerequisites: ECE 303/STAT 303 or STAT 315. Credit not allowed for both ENGR 530 and ECE 530.

Systems engineering life-cycle process and analysis techniques. Reliability and robustness. (NT-O)

ENGR 531/ECE 531 03(3-0-0). Engineering Risk Analysis. F, S. Prerequisite: ECE 303/STAT 303 or STAT 315; ENGR 501/ECE 501 or concurrent enrollment. Credit not allowed for both ENGR 531 and ECE 531.

Estimation and risk identification, development of mitigation

techniques. (NT-O)

ENGR 532/ECE 532 03(3-0-0). Dynamics of Complex Engineering Systems. F, S. Prerequisites: ENGR 501/ECE 501 or concurrent registration. Credit not allowed for both ENGR 532 and ECE 532.

Higher-level behavior and issues that emerge from interaction between components in complex socio-technical systems. (NT-O)

ENGR 565/ECE 565 03(3-0-0). Electrical Power Engineering. F, S. Prerequisite: ECE 332; ECE 342. Credit not allowed for both ENGR 565 and ECE 565.

Analysis of power systems in terms of current, voltage, and active/reactive power; introduction of computer-aided tools for power systems. (NT-O)

ENGR 566/ECE 566 03(3-0-0). Energy Conversion for Electrical Power Systems. F, S. Prerequisite: ECE 332. Credit not allowed for both ENGR 566 and ECE 566.

Energy conversion; fuel cell, battery storage, solar-photovoltaic, wind energy and traditional rotating-magnetic-field based machines. (NT-O)

ENGR 567/ECE 567 03(3-0-0). Systems Engineering Architecture. F, S. Prerequisite: ECE 501 or ENGE 501. Credit not allowed for both ENGR 567 and ECE 567.

Observation/classification of systems architecture. Systems architecture principles and critical evaluation through design studies. (NT-O)

ENGR 568/ ECE 568 03(3-0-0). Electrical Energy Generation Systems. F, S. Prerequisite: Written consent of instructor. Credit not allowed for both ENGR 568 and ECE 568.

Energy systems: renewable and traditional. Physics and operation of energy devices; solar-photovoltaic, wind energy, gas, coal, and nuclear plants. (NT-O)

ENGR 597 03(0-0-3). Group Study in Systems Engineering. F, S. Prerequisites: CIS 600; ENGR 530/ECE 530; ENGR 531/ECE 531.

Capstone study experience in systems engineering. (NT-O)

+ENGR 601/AGRI 601 03(2-2-0). Bioenergy Technology. F.

Science and engineering aspects of bioenergy production, including plant biology, fermentation, and biofuel properties. Required field trips.

ENGR 621/ ECE 621 03(3-0-0). Energy Storage for Electrical Power Systems. F, S. Prerequisite: Written consent of instructor. Credit not allowed for both ENGR 621 and ECE 621.

Physics and operation of electrical, mechanical, thermal and novel energy storage systems/devices. (NT-O)

ENGR 622/ECE 622 03(3-0-0). Energy Networks and Power Distribution Grids. F, S. Prerequisite: ECE 411 or MECH 417; ECE 565/ENGR 565. Credit not allowed for both ENGR 622 and ECE 622.

Energy networks: generation, storage, consumers. Systems approach to analysis of distribution networks and transition to intelligent grid systems. (NT-O)

ENGR 623/ECE 623 03(3-0-0). Electric Power Quality. S. Prerequisite: ECE 461 or ECE 562. Credit not allowed for both ENGR 623 and ECE 623.

Interconnecting power electronic devices and renewable energy sources to power systems. (NT-O)

ENGR 695 Var. Independent Study. F, S, SS. Prerequisite: None. (NT-O)

ENGR 697/ECE 697 Var[1-6]. Group Study. F, S, SS.

ENGR 699 Var. Thesis. F, S, SS. Prerequisite: None. (NT-O)

ENGR 795 Var. Independent Study. F, S, SS. Prerequisite: None. (NT-O)

ENGR 799 Var. Dissertation. F, S, SS. Prerequisite: None. (NT-O)

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ENVIRONMENTAL ENGINEERING COURSES

Department of Civil and Environmental Engineering College of Engineering

ENVE 322/CIVE 322 03(3-0-0). Basic Hydrology. F, S. Prerequisite: CBE 331 or CIVE 300 or WR 416; CIVE 202 or STAT 301 or STAT 315. Credit not allowed for both ENVE 322 and CIVE 322.

Hydrologic cycle, soil moisture, groundwater, runoff processes, water contamination, applications in water resources and environmental engineering.

ENVE 437/CIVE 437 03(3-0-0). Wastewater Treatment Facility Design. S. Prerequisite: CIVE 300; CIVE 438/ENVE 438 or concurrent registration.

Credit not allowed for both ENVE 437 and CIVE 437.

Design concepts and principles for wastewater treatment systems and unit processes, principles of treatment plant operation.

ENVE 438/CIVE 438 03(3-0-0). Environmental Engineering Concepts. F, S. Prerequisite: CBE 331 or CIVE 300 or MECH 342; CHEM 113. Credit not allowed for both ENVE 438 and CIVE 438.

Environmental engineering approaches to designing water supply, wastewater removal, and pollution control systems.

ENVE 441 03(2-3-0). Water Quality Analysis and Treatment. S. Prerequisite: CIVE 438/ENVE 438 or concurrent registration or CIVE 440 or concurrent registration.

Physical, chemical and biological methods for the characterization of waters and wastewaters.

ENVIRONMENTAL AND RADIOLOGICAL HEALTH COURSES

Department of Environmental and Radiological Health Sciences College of Veterinary Medicine and Biomedical Sciences

ERHS 174 01(1-0-0). Freshman Scholar. F, S. Prerequisite: Admission to CVMBS Freshman Scholar's Program. May be taken up to 2 times for credit.

Scholarship-supported exploration of biomedical research theory and practice.

ERHS 192 01(1-0-0). Environmental Health First Year Seminar. F. Prerequisite: Freshman standing.

Introduction to biosciences, college life, learning skills, problem solving, and degree planning.

ERHS 220 03(3-0-0). Environmental Health. F, S. Prerequisite: BZ 101 or concurrent registration or BZ 104 or concurrent registration or BZ 110 or concurrent registration or BZ 120 or concurrent registration or LIFE 102 or concurrent registration.

Impact of people on the physical and biological environment as well as impact of the environment on people; emphasis placed on human health.

ERHS 230 03(0-6-0). Environmental Health Field Methods. F, S. Prerequisite: CHEM 113 or concurrent registration; CHEM 114 or concurrent registration.

Field and laboratory techniques necessary for practice of environmental health. (\$)

ERHS 300 03(3-0-0). Introduction to Radiation Biology. S. Prerequisite: LIFE 102; PH 121.

Genetic and somatic effects of radiation on cells, tissues, and the whole organism; tumor therapy; carcinogenesis; risks vs. benefits of radiation.

ERHS 320 03(3-0-0). Environmental Health Water Quality. F. Prerequisite: MIP 300 or concurrent registration.

Water quality and treatment technologies for practice of environmental health.

ERHS 332 03(3-0-0). Principles of Epidemiology. S. Prerequisite: MIP 149 or concurrent registration or MIP 300 or concurrent registration; STAT 307 or concurrent registration.

Use of epidemiological methods in studying distribution of diseases in human populations.

ERHS 350 03(3-0-0). Industrial Hygiene and Air. F. Prerequisite: BMS 300; ERHS 230.

Industrial and airborne hazards, disease prevention, hazard control and evaluation.

ERHS 400 03(2-3-0). Radioisotope Techniques. F. Prerequisite: CHEM 112; ERHS 300; PH 122.

Radiation measurement, radiochemistry, waste management, radiotracer experiments. Prepares student to act as principal user in radiation laboratory.

ERHS 405 02(2-0-0). Fundamentals of Ergonomics. S. Prerequisite: One college-level animal biology or anatomy/physiology or engineering design course or concurrent registration. Offered as an online course only.

Basic skills, knowledge, and abilities in ergonomics; focus on musculoskeletal injury prevention. (NT-O)

ERHS 410 03(3-0-0). Environmental Health Waste Management. S. Prerequisite: CHEM 245 or concurrent registration or CHEM 343 or concurrent registration or CHEM 346 or concurrent registration; ERHS

230.

Recognition of impacts, occupational and environmental, in handling wastes; administrative management for waste programs.

ERHS 430 03(3-0-0). Human Disease and the Environment. S.

Overview of the human diseases which are associated with the environment.

ERHS 446 03(3-0-0). Environmental Toxicology. F. Prerequisite: CHEM 245 or CHEM 343 or CHEM 346.

Essentials of environmental toxicology based on problem-oriented discussions addressing environmental impacts of organic/inorganic chemicals.

ERHS 448 03(3-0-0). Environmental Contaminants: Exposure and Fate. S. Prerequisite: CHEM 245 or CHEM 341 or CHEM 345; LIFE 102.

Pathways of exposure and behavior of environmental contaminants. Exposure assessment in environmental health protection.

ERHS 487 07(0-21-0). Internship-Environmental Health. F, S.

Professional field practice in environmental health with a public or private sector agency.

ERHS 492 01(0-0-1). Environmental Health Seminar. S.

Networking, preparation of resume, and statement of qualifications for professional internship or employment.

ERHS 494 Var. Independent Study in Environmental Health. Prerequisite: ERHS 220.

Directed independent study or project under faculty guidance.

ERHS 498 Var [1-4]. Research. Prerequisite: Written consent of instructor.

Research in environmental and radiological health sciences.

ERHS 502 03(3-0-0). Fundamentals of Toxicology. F. Prerequisite: BMS 300 or BMS 360; CHEM 245 or CHEM 341 or CHEM 345.

Fundamental principles of toxicology; dose-response, organ targets, toxic agents.

ERHS 510 03(3-0-0). Cancer Biology. S. Prerequisite: BC 351 or BC 403 or concurrent registration or BZ 310 or CM 501.

Cancer biology, from epidemiology and classification, through the molecular basis of the phenotypes to detection and treatment.

ERHS 515 02(2-0-0). Non-Ionizing Radiation Safety. F, S, SS. Prerequisite: CHEM 107 or CHEM 113; MATH 118; PH 122 or PH 142.

Evaluation and safe use of non-ionizing radiation sources. Calculation of safe distances for exposure and maximum permissible exposures. (NT-O)

ERHS 520 03(3-0-0). Environmental and Occupational Health Issues. F. Prerequisite: BZ 110 or LIFE 102; CHEM 245 or CHEM 341 or CHEM 345.

Issues in environmental and occupational health sciences in the context of public health and regulatory concerns. (NT-O)

ERHS 526 03(3-0-0). Industrial Hygiene. F. Prerequisite: CHEM 245 or CHEM 341 or CHEM 345; ERHS 520 or concurrent registration; PH 110 or PH 121.

Theory and application of industrial hygiene principles to management of the occupational environment.

ERHS 527 01(0-3-0). Industrial Hygiene Laboratory. S. Prerequisite: ERHS 526 or concurrent registration.

Industrial hygiene field monitoring equipment and techniques.

ERHS 528 03(3-0-0). Occupational Safety. S. Prerequisite: ERHS 526.

Introduction to occupational safety hazard recognition and control.

ERHS 530 03(3-0-0). Radiological Physics and Dosimetry I. F. Prerequisite: MATH 155 or MATH 160; PH 122.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Theory and detection of ionizing radiation; measurement and calculation of exposure and dose. (NT-V)

ERHS 531 02(1-3-0). Nuclear Instruments and Measurements. S. Prerequisite: ERHS 530 or concurrent registration.

Instrument systems for measurement and identification of ionizing radiations.

ERHS 532 03(2-0-1). Epidemiologic Methods. F. Prerequisite: STAT 307.

Method of epidemiologic investigation and study design. Applications to disease control with literature examples.

***ERHS 536 03(3-0-0). Advanced Occupational Health.** S. Prerequisite: ERHS 446 or ERHS 526.

Advanced topics in occupational health emphasizing contemporary issues, topics, trends, and problems in the field of industrial hygiene.

ERHS 540 03(3-0-0). Principles of Ergonomics. F.

Theory and practice of ergonomics.

°ERHS 541 03(3-0-0). Ergonomics in Product and Process Design. S. Prerequisite: ERHS 540.

Application of ergonomics to design of products and processes with respect to health, safety, function, and quality.

ERHS 542 03(3-0-0). Biostatistical Methods for Qualitative Data. F. Prerequisite: STAT 301 or STAT 307.

Statistical analysis of categorical data as obtained in epidemiology, toxicology, occupational health, and clinical sciences.

ERHS 544/STAT 544 03(3-0-0). Biostatistical Methods for Quantitative Data. S. Prerequisite: STAT 301 or STAT 307. Credit not allowed for both ERHS 544 and STAT 544.

Regression and analysis of variance methods applied to both observational studies and designed experiments in the biological sciences.

ERHS 547 03(0-6-0). Equipment and Instrumentation. S. Prerequisite: ERHS 446.

Sample collection, quality control, theory and application of equipment and instrumentation for analysis and confirmation of organic-inorganic chemicals.(S)

ERHS 549 03(3-0-0). Environmental Health Risk Assessment. S. Prerequisite: ERHS 446 or ERHS 502 or ERHS 532.

Environmental contamination and health effects of chemicals using risk assessment, management and communication approaches.

ERHS 550 05(5-0-0). Principles of Radiation Biology. S. Prerequisite: BZ 310; ERHS 300 or ERHS 530.

Dose-response relationships; physical, chemical, and biological modification of radiation damage; radiation oncology; radiation genetics and oncogenesis.

ERHS 561 02(2-0-0). Radiation Public Health. F, S. Prerequisite: ERHS 530; ERHS 550 or concurrent registration; or ERHS 300 and ERHS 400 with written consent of instructor.

Aspects of radiation public health for students in health physics with emphasis on contemporary issues in radiation protection.

ERHS 563 02(2-0-0). Environmental Contaminant Modeling I. S. Prerequisite: MATH 155.

Mathematical modeling of radionuclide and chemical transport in aquatic and terrestrial ecosystems.

ERHS 565 02(2-0-0). Chemical and Biological Warfare Agents. S. Prerequisite: CHEM 245 or CHEM 346.

Current understanding of chemical and biological agents used in asymmetric warfare.

ERHS 566 03(3-0-0). Clinical and Forensic Toxicology. F. Prerequisite: CHEM 245 or CHEM 346.

Toxic effects on commonly encountered abused and toxic substances.

ERHS 567 03(0-6-0). Cell and Molecular Toxicology Techniques. F. Hands-on techniques exposure to molecular toxicology. (S)

ERHS 568 03(3-0-0). Pharmaceutical and Regulatory Toxicology. S. Prerequisite: ERHS 502.

Toxicology as applied in public (regulatory) and private (pharmaceutical, industrial) sectors.

ERHS 570 02(2-0-0). Radioecology. S.

Environmental transport and exposure assessment of radioactive and other contaminants; estimating risk for human health and ecological impacts. (NT-O)

ERHS 595B-K Var. Independent Study.

B) Large animal radiology. **D)** Radiation therapy. **E)** Radiation physics. **F)** Dosimetry. **G)** Radiation chemistry. **H)** Radiation biology. **I)** Radiological health. **J)** Radiation ecology. **K)** Microcomputer analysis.

ERHS 601 03(3-0-0). Metabolism and Disposition of Toxic Agents. F. Prerequisite: ERHS 502 or concurrent registration.

Metabolism of toxic agents and effects on their fate in the body. Covalent and non-covalent interactions with cellular targets.

ERHS 602 03(3-0-0). Toxicological Mechanisms. S. Prerequisite: ERHS 502.

Role of cellular information systems in toxic mechanisms: DNA expression, signal transduction and control of cellular processes.

ERHS 603 03(3-0-0). Toxicological Pathology. S. Prerequisite: BMS 300 or BMS 360.

Toxicological study of pharmacologic, chemical and environmental agents and resulting morphologic and cellular changes.

ERHS 611 02(2-0-0). Cancer Genetics. F. Prerequisite: BZ 350 or MIP 450.

Role of genetic background in determining individual susceptibility to cancer.

ERHS 630 03(3-0-0). Radiological Physics and Dosimetry II. S. Prerequisite: ERHS 530.

Calculations and measurement techniques for dosimetry shielding and protection from ionizing radiations.

ERHS 632 01(0-3-0). Techniques in Radiation Dosimetry. F. Prerequisite: ERHS 630 or concurrent registration.

Techniques for determining the absorbed dose in tissue from ionizing radiations.

ERHS 633 01(0-3-0). Radiation Detection Methods in Radiobiology. S. Prerequisite: ERHS 630 or concurrent registration.

Detection and measurement of ionizing radiation appropriate for radiobiologists.

***ERHS 636 03(3-0-0). Industrial Hygiene Control Methods.** S. Prerequisite: ERHS 526; ERHS 536 or concurrent registration.

Controlling occupational exposures to chemical agents, emphasizing local exhaust ventilation; personal protective devices.

***ERHS 637 Environment, Safety, and Health Management.** F. Prerequisite: ERHS 526.

Environment, safety, and health management systems for occupational health practitioners; major environmental and DOT regulatory standards and laws.

°ERHS 640 03(3-0-0). Advanced Epidemiology. S. Prerequisite: ERHS

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

In-depth exploration of advanced epidemiologic methods.

***ERHS 642 03(3-0-0). Applied Logistic Regression.** S. Prerequisite: ERHS 532; ERHS 542.

Basic and advanced concepts of logistic regression with focus on practical applications in epidemiology using SAS.

***ERHS 656 03(3-0-0). Occupational Noise Control.** F. Prerequisite: ERHS 527.

Measurement and control of industrial or environmental noise emphasizing practical solutions. (NT-O)

°ERHS 658 03(2-0-1). Environmental/Occupational Epidemiology. S. Prerequisite: ERHS 532.

Epidemiologic analyses of effects of exposure to environmental and occupational health hazards.

ERHS 665 03(2-3-0). Radiochemistry. S. Prerequisite: CHEM 114; ERHS 530 or concurrent registration; MATH 155.

Radionuclide separation and measurement and radiotracer applications in physical and biological systems.

ERHS 670 Var [1-3]. Directed Readings. F, S, SS. Prerequisite: ERHS 520.

Advanced study through supervised readings on specialized topics.

ERHS 671 01(0-3-0). Experimental Radioecology. S. Prerequisite: ERHS 400 or ERHS 532; concurrent registration in ERHS 570.

Experimental techniques used in radioecological and environmental radioactivity studies.

+ERHS 679 01(0-0-1). Occ Env Health Interdisciplinary Symposium. F, S. Prerequisite: Enrollment in a graduate program related to occupational, environmental, or public health. May be repeated for credit.

Evaluation of complex occupational and environmental health issues, through multidisciplinary interactions in seminars and field visits. Required field trips.

ERHS 684 Var [1-3]. Supervised College Teaching.

Participation in environmental health course teachings under guidance of faculty in classroom, laboratory, or field.

ERHS 687 Var [1-6]. Internship.

Advanced study or research in environmental health with a governmental agency, private sector entity, or research facility.

ERHS 692 01(1-0-0). Seminar. F, S.

Professional seminar series with student interaction on weekly basis; topics presented by outside experts, faculty, or doctoral candidates.

ERHS 693A-D 01(0-0-1). Research Seminar.

Presentation of student research and discussion of publications from scientific literature. **A)** Epidemiology. **B)** Industrial hygiene. **C)** Toxicology. **D)** Health physics.

ERHS 695A-P Var. Independent Study.

Specialized study in a defined area under supervision of faculty. **A)** Epidemiology. **B)** Occupational and environmental health. **C)** Toxicology. **D)** Radiation chemistry. **E)** Radiation ecology. **F)** Cancer biology. **G)** Health physics **H)** Exposure assessment. **I)** Small animal radiology. **J)** Large animal radiology. **K)** Special techniques in radiology. **L)** Radiation therapy. **M)** Computed tomography. **N)** Magnetic resonance imaging. **O)** Ultrasound. **P)** Nuclear medicine.

ERHS 696A-D Var [1-3]. Group Study

A) Epidemiology. Prerequisite: ERHS 520. **B)** Industrial hygiene. Prerequisite: ERHS 520. **C)** Toxicology. Prerequisite: ERHS 520. **D)** Health physics. Prerequisite: ERHS 530.

ERHS 698 Var [1-6]. Research. Prerequisite: Written consent of research mentor.

ERHS 699 Var. Thesis.

Master's-level research and preparation of thesis.

°ERHS 701 04(4-0-0) Advanced Diagnostic Imaging Modalities. S. Prerequisite: VM 786A or VM 786B or DVM.

Interpretation/applications of advanced imaging methods including ultrasound, nuclear medicine, magnetic resonance imaging and computed tomography.

***ERHS 711 Var. Advanced Radiographic Interpretation.** S. Prerequisite: VM 786A or VM 786B or DVM

Radiographic interpretation of disease processes of all major systems in large and small animals.

°ERHS 712 03(3-0-0). Physics of Diagnostic Imaging. F. Prerequisite: DVM or equivalent professional veterinary medicine degree.

Physics of imaging for radiology, ultrasound, computerized tomography, magnetic resonance, and nuclear medicine.

***ERHS 714 03(3-0-0). Radiation Therapy Physics.** F. Prerequisite: DVM or health physics, physics, or engineering graduate student.

Radiation therapy physics, photon and electron production for therapeutic use, teletherapy, brachytherapy, radiation protection and quality assurance.

ERHS 721 Var [1-3]. Radiation Oncology. F, S, SS.

Management of spontaneous and experimental tumors with emphasis on radiation therapy.

ERHS 726 03(3-0-0). Aerosols and Environmental Health. F. Prerequisite: PH 141.

Properties and behavior of environmental and occupational aerosols emphasizing how airborne particles affect health of humans and the environment.

°ERHS 733 03(3-0-0). Environmental Carcinogenesis. S. Prerequisite: BC 403.

Molecular and cellular mechanisms by which environmental carcinogens exert effects.

***ERHS 751 03(3-0-0). Advanced Radiation Biology I.** F. Prerequisite: ERHS 550.

Molecular and cellular mechanisms of radiation damage and repair; mammalian radiation genetics.

°ERHS 753 03(3-0-0). Advanced Radiation Biology II. S. Prerequisite: ERHS 550.

Perturbations in cell cycle and cell population growth kinetics by radiation; radiation effects on normal tissues; radiation oncogenesis.

ERHS 765 01(0-3-0). Environmental Contaminant Modeling II. SS. Prerequisite: ERHS 563; ERHS 570.

Development and analysis of advanced computer models for radionuclide and chemical transport in aquatic and terrestrial ecosystems.

ERHS 770 01(0-0-1). Radiation Biology Basic to Tumor Therapy. F, S.

Current aspects of radiation biology pertinent to improvements in radiation therapy.

ERHS 784 Var [1-3]. Supervised College Teaching.

Participation in environmental health course teachings under guidance of faculty in classroom, laboratory, or field.

ERHS 786 Var. Practicum. Prerequisite: ERHS 530.

ERHS 787 Var [1-6]. Internship.

Advanced study or research in environmental health with a

governmental agency, private sector entity, or research facility.

ERHS 792 01(0-0-1). Seminar.

Professional seminar series with student interaction on weekly basis; topics presented by outside experts, faculty, or doctoral candidates.

ERHS 793 01(0-0-1). Seminar.

ERHS 795A-P Var. Independent Study.

A) Epidemiology. B) Occupational and environmental health. C) Toxicology. D) Radiation chemistry. E) Radiation ecology. F) Cancer biology. G) Health physics. H) Exposure assessment. I) Small animal radiology. J) Large animal radiology. K) Special techniques in radiology. L) Radiation therapy. M) Computed tomography. N) Magnetic resonance imaging. O) Ultrasound. P) Nuclear medicine.

ERHS 796 Var. Group Study.

ERHS 799 Var. Dissertation.

Doctoral-level research and preparation of dissertation.

ECOSYSTEM SCIENCE AND SUSTAINABILITY COURSES

*Department of Ecosystem Science and
Sustainability*
Warner College of Natural Resources

ESS 130 01(0-2-0). System Theory and Information Management. F.
Prerequisite: AGRI 140 or BUS 150 or CS 110.

Applying computers, networks, software applications, and the internet for managing information in ecosystem science and sustainability.

ESS 211 03(3-0-0). Foundations in Ecosystem Science. F. Prerequisite: GR 210.

Linkage between society and ecosystems services as foundation for sustainability of the coupled human-environmental system.

+ESS 311 03(3-0-0). Ecosystem Ecology. F. Prerequisite: ESS 211.
Required field trips.

Principles of ecosystems ecology, emphasis on their application to coupled natural and human systems.

ESS 330 03(3-0-0). Quantitative Reasoning for Ecosystem Science. S.
Prerequisite: ESS 211; MATH 155 or MATH 160; STAT 301 or STAT 307; junior or senior standing.

Understanding diverse approaches for using data and models to understand complex ecological systems.

ESS 400 04(2-0-2). Sustainability and Ecosystem Science. S.
Prerequisite: ESS 311; ESS 330.

Integrates ecosystems services and sustainability strategies, application to coupled natural and human systems.

ESS 411 03(2-2-0). Earth Systems Ecology. F. Prerequisite: ESS 311.

Earth as a system, stressing ecological interactions among energy, water, and biogeochemistry.

ESS 440 03(3-0-0). Practicing Sustainability. S. Prerequisite: ESS 311; ESS 330; senior standing in WCNR.

Capstone integration of ecosystem science and sustainability, focused on case studies.

+ESS 486 02(0-0-2). Ecosystem Practicum. F. Prerequisite: ESS 311; NR 220; senior standing. Field trips required.

One-week field practicum to examine ecosystem science and sustainability issues in Colorado landscapes.

ESS 524 03(3-0-0). Foundations for Carbon/Greenhouse Gas Mgmt. F.
Prerequisite: Upper division coursework in biology, ecology, or chemistry.

Foundations for understanding greenhouse gas emissions management and accounting. (NT-O)

ETHNIC STUDIES COURSES

Department of Ethnic Studies *College of Liberal Arts*

ETST 100 03(3-0-0). Introduction to Ethnic Studies. (GT-SS3, AUCC 3E). F, S, SS.

Key concepts, theories, and historical experiences that form the basis of scholarly work in comparative ethnic studies, domestically and internationally.

ETST 205 03(3-0-0). Ethnicity and the Media. (GT-SS3, AUCC 3E). F.

Ethnic representation across time as represented in auto/biography, fiction, poetry, and popular media.

+ETST 208/ART 208 03(3-0-0). Native American Art and Material Culture. S. Credit not allowed for both ETST 208 and ART 208.

Traditional arts and material culture of the indigenous peoples of North America. (\$)

ETST 210 03(3-0-0). Asian American Leaders and Leadership. F.

Cultural, historical and social influences on Asian American leaders and leadership explored via personal histories, culture, and values.

ETST 234/E 234 03(3-0-0). Introduction to Native American Literature. F. Credit not allowed for both ETST 234 and E 234.

Native American writings and their significance in American culture.

ETST 239/E 239 03(3-0-0). Introduction to Chicano Literature. F, S. Credit not allowed for both ETST 239 and E 239.

Chicano fiction and poetry with consideration of historical roots and influences.

ETST 240 03(3-0-0). Native American Cultural Expressions. (GT-AH2, AUCC 3B). F.

Exploration of Native lives and expressions through examination of Native architecture, art, music, film, activism, and literature.

ETST 250/HIST 250 03(3-0-0). African American History. (GT-HI1, AUCC 3D). F. Credit not allowed for both ETST 250 and HIST 250.

Slavery, emancipation, labor, political, socioeconomic, and cultural history of African Americans since colonial times.

ETST 252/HIST 252 03(3-0-0). Asian American History. (GT-HI1, AUCC 3D). F. Credit not allowed for both ETST 252 and HIST 252.

Asian American historical experience in the United States from 1850s to the present time.

°ETST 253 03(3-0-0). Chicana/o History and Culture. GT-HI1, (AUCC 3E). F.

Historical study of Chicana/o/Mexicana/o people and culture from Spanish colonization to beginning of 20th century.

***ETST 254 03(3-0-0). La Chicana in Society.** F.

Historical contributions of Chicana women and current gender issues in Chicano communities in the U.S.

ETST 255/HIST 255 03(3-0-0). Native American History. (GT-HI1, AUCC 3D). S. Credit not allowed for both ETST 255 and HIST 255.

History of Native American peoples in the United States to the present, including origin stories.

ETST 256 03(3-0-0). Border Crossings: People/Politics/Culture. (GT-SS3, AUCC 3E). S.

Colonial and post-colonial discourse, politics of representation and epistemology of "location" it has produced: first and third world.

ETST 261 03(3-0-0). Latina/o Populations in the U.S. F.

Historical processes and sociocultural phenomena that define Latina/o populations in the U.S.

ETST 300 03(3-0-0). Queer Studies and Women of Color. F, S. Prerequisite: None.

Historical/contemporary analysis of contributions of women of color to queer studies; racialized sexual/gender identities; written and cultural works.

ETST 310 03(3-0-0). African American Studies. F.

Meaning of African-American studies in context of American higher education; historical development of such studies; perceptions and misperceptions.

ETST 312 03(3-0-0). African American Situation. F.

Examination of historical, political, social, and economic experiences of the African American people.

ETST 316/JTC 316 03(3-0-0). Multiculturalism and the Media. S.

Credit not allowed for both ETST 316 and JTC 316.

Media and multiculturalism with emphasis on race, ethnicity, and other protected groups.

***ETST 318/*ANTH 318 03(3-0-0). Peoples and Cultures of the Southwest.** F, S. Prerequisite: ANTH 100. Credit not allowed for both ETST 318 and ANTH 318.

Analyze development of cultures of the American Southwest; colonialism, migration, political incorporation, and socioeconomic processes. (NT-O)

ETST 319/ANTH 319 03(3-0-0). Latin American Peasantries. F, S. Credit not allowed for both ETST 319 and ANTH 319. Prerequisite: (ANTH 100; ANTH 200) or ETST 100.

Sociocultural, economic, and political responses of Latin American peasantries to poverty and global processes.

ETST 320 03(3-0-0). Ethnicity and Film: Asian-American Experience. F.

Asian American film image and film representation through both mainstream and independent movies.

ETST 324 03(3-0-0). Asian Pacific Americans and the Law. S.

Legal history of Asian Pacific Americans examined through case studies.

ETST 332 03(3-0-0). Contemporary Chicana/o Issues. S.

Current Chicana/o issues including conquest, immigration, urbanization, health in context of societal trends.

ETST 340 03(3-0-0). Native American Perspectives on Conquest. S.

Native life and expression in the U.S. through response of Native Americans to conquest via revitalization movements, literature, arts.

ETST 344 03(3-0-0). Native American Religious History and Issues. F.

Native ritual, ceremony, and sacred existence; clearer understanding of Native life and religious ways.

ETST 352/SOWK 352 03(3-0-0). Indigenous Women, Children, and Tribes. F. Credit not allowed for both ETST 352 and SOWK 352.

Historical and contemporary lives of women, children, and tribal communities.

ETST 354 03(3-0-0). A Century of Black Cinema. F.

History of Black cinema in 20th century.

ETST 360 03(3-0-0). Service and Leadership in Black Communities. S. Prerequisite: None.

Sociocultural context of leadership in and beyond the African American community.

ETST 364/HIST 364 03(3-0-0). Asian American Social Movements, 1945-Present. F, S. HIST 151 of HIST 252/ETST 252; completion of 45 credits. Credit not allowed for both ETST 364 and HIST 364.

Historical relationships between Asian Americans and social movements

for social, economic, and political equity in the U.S. since 1945.

ETST 365 03(3-0-0). Global Environmental Justice Movements. F, S.

How the world's poor and minorities self-empower to challenge institutional racism and government apathy in order to secure basic environmental goods.

ETST 370 03(3-0-0). Caribbean Identities. F, S.

Development of Caribbean identities from the arrival of Amerindian groups to the abolition of slavery in the nineteenth century.

ETST 371 03(3-0-0). The Modern Caribbean. F, S.

Modern political and socio-economic developments in the Caribbean with emphasis on race, ethnicity, and gender.

ETST 382/LGEN 382 03(2-0-1). Italian Ethnic Identity, Culture, and Gender. SS.

Different ethnic identities in southern and northern Italy. Historical and contemporary culture and feminism. Enhancement of linguistic skills.

ETST 404 03(3-0-0). Race Formation in the United States. F.

Concept of race as a social construct in the shaping of U.S. character, values, and institutions.

ETST 405 03(3-0-0). Ethnicity, Class, and Gender in the U.S. S.

Roles of and interconnections among ethnicity, class and gender for various groups in the United States.

***ETST 410 03(3-0-0). African American Periods and Personalities.** S.

Historical moments, movements, and men and women who have helped shape the African American heritage.

ETST 411 03(3-0-0). Black Feminism(s). F, S. Prerequisite: None.

History and trajectory of Black feminist thought from the nineteenth century to the present.

***ETST 412 03(3-0-0). Africa and African Diaspora.** F.

Interdisciplinary investigation of retention, transformation, and creation of culture in plantation economies of Americas.

ETST 413 03(3-0-0). Queer Creative Expressions. F, S. Prerequisite: None.

Analysis of queer creative expressions within socio-political discourse and cultural works, with an emphasis on critical, queer feminist theory.

°ETST 414/°ANTH 414 03(3-0-0). Development in Indian Country. F. Credit not allowed for both ETST 414 and ANTH 414.

Critical examination of history, public policy, and tribal strategies for economic development and natural resource management in Indian country.

°ETST 424 03(3-0-0). Asian Pacific American Literature and Culture. S.

Asian Pacific American culture viewed through literature, art, and popular culture.

ETST 425 03(3-0-0). Indigenous Film and Video. F, S.

Historical and contemporary analysis of film featuring indigenous peoples.

ETST 430 03(3-0-0). Latina/o Creative Expression. S. Prerequisite: Junior or senior status.

Creative expression in literature, art, theatre, music: approach to understanding experiences of various Chicana/o/Latina/o groups in the U.S.

ETST 432 03(3-0-0). Latina/o Routes to Empowerment. S. Prerequisite: Junior or senior status.

Critical examination of political and economic strategies used to incorporate Chicana/o/Latina/o groups into U.S. society.

ETST 438/E 438 03(3-0-0). Native American Literature. F. Credit not

allowed for both ETST 438 and E 438.

Literature of Native Americans emphasized as distinctive tradition in American literature and cultural expression of indigenous peoples.

ETST 444/SOC 444 03(3-0-0). Federal Indian Law and Policy. S. Credit not allowed for both ETST 444 and SOC 444.

Indian policy processes and their impact on Native lives and culture, particularly Native sovereignty.

ETST 454/SPCM 454 03(2-2-0). Chicano/a Film and Video. F. Credit not allowed for both ETST 454 and SPCM 454.

Emergence of Chicano/a cinema from a place of displacement, resistance, and affirmation found in contemporary Chicano/a film, video.

ETST 484 Var [1-3]. Supervised College Teaching. Prerequisite: Written consent of instructor. May be taken only once. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

ETST 487 Var [1-6]. Internship. Prerequisite: ETST 100.

ETST 492 03(0-0-3). Seminar. F, S.

ETST 493 03(3-0-0). Ethnic Studies Research Methods and Writing. S. Prerequisite: ETST 100; 18 additional ETST credits. Senior standing required.

Research ethics, methodology, theory, and writing in ethnic studies.

ETST 495 Var. Independent Study. F, S.

ETST 500 03(3-0-0). Race, Ethnicity, and Nationality. S.

Intersections of race, ethnicity, and nationality within a broader framework of political economy.

ETST 501 03(3-0-0). Ethnic Studies History and Theory. F. Prerequisite: Graduate or senior status.

History and theory of study of racial and ethnic formation, identity, and politics.

ETST 502 03(3-0-0). Research Methods. F. Prerequisite: Graduate or senior status.

Interdisciplinary ethnic studies research methods.

ETST 503 03(3-0-0). Contemporary Ethnic Studies Issues. F. Prerequisite: Graduate or senior status.

Contemporary ethnic studies issues in the United States and abroad.

ETST 505 03(3-0-0). Academic Writing. S. Prerequisite: Graduate status.

Academic writing skills development including article summaries, literature reviews, annotated bibliographies, proposals, and journal articles.

ETST 510 03(3-0-0). Ethnicity, Race, and Health Disparities in US. F.

Health status of ethnic/racial populations; cultural dimensions that underlie health and health disparities.

ETST 513/ANTH 513 03(3-0-0). Capitalism and Global Ethnic Conflicts. S. Prerequisite: ANTH 200 or ETST 100. Credit not allowed for both ETST 513 and ANTH 513.

Causes of global ethnic conflicts with emphasis on resource competition, capitalist development schemes, and role of the state.

ETST 520 03(3-0-0). Race and U.S. Social Movements. S. Prerequisite: Graduate or senior status.

Intersections of race, class, gender, and sexuality which structure life chances and mobilize movements for rights, recognition, and resources.

ETST 530 03(3-0-0). Race, Labor, and the Economy. S. Prerequisite: Graduate or senior status.

Social stratification, class, race, and gender formation, neoliberalism, and the impact of globalization.

ETST 531 03(3-0-0). Latina/o Politics in the U.S. F, S.

Impact of Latina/o politics on the U.S. political system by examining Latina/o political mobilization patterns and behaviors.

ETST 535 03(3-0-0). Chicana Feminism: Theory and Form. F, S.

Different forms of Chicana feminism as produced by Chicana scholars, writers, poets, artists and activists from historical and contemporary accounts.

ETST 541 03(3-0-0). Gender, Violence, and Indigenous Peoples. F, S.

Multiple forms of violence against indigenous women and children in the Americas, Australia, and New Zealand.

ETST 544/POLS 544 03(3-0-0). National Identities and Nation Building. F. Credit not allowed for both ETST 544 and POLS 544.

How statist conceptions of race and ethnicity have been mobilized in nation-building projects.

ETST 550 03(3-0-0). Law, Policy, and Indigenous Peoples. S.

Prerequisite: Graduate or senior status.

Laws and policies impacting indigenous women, children, families, and communities in North America, New Zealand, and Australia.

ETST 560 03(3-0-0). Race, Ethnicity, and Higher Education. F.

Historical and contemporary experiences of people of color as students, faculty, and staff in higher education in the United States.

ETST 684 Var. Supervised College Teaching.

ETST 687 Var. Internship.

ETST 695 Var. Independent Study.

ETST 698 Var. Research in Ethnicity.

ETST 699 Var. Thesis.

FOREST SCIENCES COURSES

Department of Forest and Rangeland

Stewardship

Warner College of Natural Resources

F 210 03(2-2-0). Forest Ecogeography. F, S. Prerequisite: BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 102.

Ecogeography of forested ecosystems on a global scale and identification of important North American trees.

+F 224 01(0-2-0). Wildland Fire Measurements. F.

Wildland fire control and use measurements: fuels, weather, topography, fire behavior, and fire ecology.

F 230 02(0-4-0). Forestry Field Measurements. SS.

Develop field skills using maps, compasses and aerial photos; photo interpretation; tree and stand measurements; stand volume and value estimates.

F 310/RS 310 03(2-2-0). Forest and Rangeland Ecogeography. F, S. Prerequisite: BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 102.

Distribution of wildland plant communities and identification of important grasses, forbs, shrubs and trees common in North America.

F 311 03(3-0-0). Forest Ecology. F, S. Prerequisite: LAND 220/LIFE 220 or LIFE 320.

Relationships of ecological concepts to the dynamics of forest ecosystems.

F 312 01(0-2-0). Dendrology Lab. F, S. Prerequisite: Concurrent registration in F 310.

Identification of characteristic trees common to North American forests.

+F 321 03(2-2-0). Forest Biometry. F. Prerequisite: NR 220; F 230; MATH 141; STAT 201 or STAT 301.

Measurement and estimation of timber in logs, trees, and stands. Sampling with varying probabilities. Field trips required. (\$)

F 322 03(3-0-0). Economics of the Forest Environment. S. Prerequisite: AREC 202 or AREC 240/ECON 240 or ECON 202.

Economic principles and techniques applied to forested environments.

F 324 03(3-0-0). Fire Effects and Adaptations. F. Prerequisite: LAND 220/LIFE 220 or LIFE 320

Introduction to fire ecology including fire history, ecosystem effects, and organism responses.

F 325 03(3-0-0). Silviculture. S. Prerequisite: F 230; F 311; NR 220. Credit not allowed for both F 325 and NR 326.

Principles of silviculture and their application to major forest types of United States.

+F 330 03(2-2-0). Timber Harvesting and the Environment. S. Prerequisite: F 230 or F 321.

Principles of timber harvesting and effects of logging on the environment.

+F 331 03(2-2-0). Wood Products in Society. F.

Role of wood products in society; spectrum of wood products, some field trips. (\$)

F 421 04(3-3-0). Forest Stand Management. F. Prerequisite: F 230; F 321; F 322; F 325.

Forest management plan preparation: forest condition and health assessment; evaluation of silvicultural treatments; implementation and monitoring.

F 422 03(2-2-0). Quantitative Methods in Forest Management. F.

Prerequisite: F 321; F 322.

Design and analysis of optimization and nonoptimization models in forest managerial operations.

F 424 03(2-2-0). Wildland Fire Behavior and Management. F. Prerequisite: LAND 220/LIFE 220 or LIFE 320

Policies and strategies for the management of fire and fuels. Fire behavior, fuels treatments, prescribed fire, suppression operations, and prevention.

F 425 03(3-0-0). Advanced Wildland Fire Behavior and Management. S. Prerequisite: F 424; NR 319.

Advanced strategies, tools, and techniques for wildland fire management: prediction, prevention, suppression, and use for resource benefit.

F 430 03(1-4-0). Forestry Field Practices. S. Prerequisite: F 330; F 421.

Forestry field course, S212 saw certification, collect stand inventory data, develop and implant stand prescriptions, and harvest and process trees. (\$)

F 487 Var [3-12]. Professional Forestry Internship. Prerequisite: Written consent of department head.

Professional-level field experience with forestry organization.

F 495 Var. Independent Study.

F 510 03(2-3-0). Ecophysiology of Trees. S. Prerequisite: BZ 440.

Environmental factors affecting physiology of woody plants; emphasis on water relations in trees and importance of water in physiological processes.

F 520 03(3-0-0). Advanced Quantitative Methods in Forestry I. F. Prerequisite: F 322; MATH 160.

Design and analysis of optimization models in forest management operations: linear, goal, and dynamic programming.

F 521 03(2-2-0). Advanced Quantitative Methods in Forestry II. S. Prerequisite: F 520.

Analysis of forest inventory information; dynamic and stochastic models oriented to decision making and research in forestry.

F 522 03(3-0-0). Advanced Forest Economics. S. Prerequisite: ECON 306.

Analysis of forestry issues: financial maturity, management intensity, federal policy, taxation, natural environments, and silviculture.

***F 524 03(2-2-0). Forest Fire Meteorology and Behavior.** F.

Effects of atmospheric processes on wild and prescribed fires; interrelationships of weather, fuels, and topography on forest and range fires.

F 525 04(3-0-1). Silvicultural Practices. S. Prerequisite: F 311.

Comprehensive coverage of silvicultural practices as applied in U.S. forestry.

F 540 03(2-3-0). Fuels, Vegetation and Fire Management. F, S, SS. Prerequisite: Admission to the Continuing Education in Fuels Management program through the Office of Conference Services.

Develop, test, and display the impact of alternative fuels and vegetation treatments on vegetation development, fuels and fire behavior.

F 541 03(3-0-0). Data Analysis/Interpretation-Fire Managers. F. Prerequisite: Employment as wildfire manager. Offered only through Division of Continuing Education

Knowledge and skills for complex analyses of fire information. (NT)

F 542 03(3-0-0). Wildland Fire Economics and Management. S. Prerequisite: Employment as wildland fire manager.

Managerial economics and management techniques applied to wildland

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fire situations. (NT)

F 544 03(3-0-0). Decision Methods for Fire Managers. F, S, SS.
Prerequisite: Written consent of instructor.

Application of decision methods, including optimization techniques, finance, and decision trees to initial attack and fuels management problems.

F 593 01(0-0-1). Seminar-Fire Science. F.

F 624 03(2-2-0). Fire Ecology. S. Prerequisite: F 424; one course in ecology.

Fire in forest and range ecosystems; principles and techniques for evaluating fire effects on vegetation, soils, watersheds, and wildlife.

***F 625 03(2-2-0). Ecology of Forest Production.** S. Prerequisite: 300-level course in ecology.

Development, structure, and production in forest communities; manipulation of forest production.

F 693 01(0-0-1). Seminar. F, S.

F 695 Var. Independent Study.

F 698 Var. Research.

F 699 Var. Thesis.

***F 721 03(3-0-0). Forest Policy.** S. Prerequisite: NR 320.

Policies and institutions affecting management of forest lands in U.S.

F 798 Var. Research.

F 799 Var. Dissertation.

FAMILY AND CONSUMER SCIENCES COURSES

School of Education

College of Applied Human Sciences

FACS 179 02(2-0-0). Introduction to Family and Consumer Sciences. S.

Career options in family and consumer sciences; professional leadership responsibilities.

FACS 320 03(3-0-0). Finance—Personal and Family. F, S, SS.

Management of income, expenditures, credit, savings, investment, insurance, taxes, and assets considering legislation and economic conditions. (NT-O)

FACS 479 02(0-0-2). Colloquium-Family and Consumer Sciences. S.

Prerequisite: FACS 179.

Current topics and issues related to professional roles, responsibilities, and opportunities.

FACS 487A-C Var. Internship.

A) Extension. B) Community service. C) Business.

FACS 494 Var. Independent Study.

FACS 590 Var [1-3]. Workshop.

FACS 698 Var. Research.

FIRE AND EMERGENCY SERVICES ADMINISTRATION COURSES

School of Education

College of Applied Human Sciences

FESA 310 03(0-0-3). Fire Service Leadership. F, S, SS.

Theory, practice and application of ethical leadership in public safety; developing personal ethics and leadership skills and abilities. (NT-O)

FESA 330 03(3-0-0). Industrial Processes and Fire Protection. S. Offered only through the Division of Continuing Education.

Industrial processes and fire protection managed by fire and safety personnel. (NT-O/V)

FESA 331 03(3-0-0). Structure Influence on Tactics and Strategy. F, S. Offered only through the Division of Continuing Education.

How construction type, alterations, design and materials influence a building's reaction to fire. Fireground influence on tactics and strategy. (NT-O/V)

FESA 333 03(3-0-0). Proposals/Reports in Fire Service Management. F, S. Offered only through the Division of Continuing Education.

Process of preparing reports and developing a proposal supported by research. Introduction to research techniques, Internet and library use; conventions of documentation. (NT-O)

FESA 334 01(1-0-0). Orientation to Experiential Learning. F, S. Offered only through the Division of Continuing Education.

Demonstration of knowledge, skill, and professional experience for the purpose of enhancing documentation and career development skills. (NT-O/V)

FESA 335 03(3-0-0). Trends in Fire Science Technologies. F. Offered only through the Division of Continuing Education.

Analytical tools designed to evaluate, align, select, and implement emerging fire science technologies. (NT-O)

FESA 336 03(3-0-0). Fire and Emergency Services Management. F, S. Offered only through the Division of Continuing Education.

Fire and emergency service administrative structures and processes. Examination of management and leadership models and applications. (NT-O)

FESA 337 03(3-0-0). Policy and Public Administration. F, S. Prerequisite: FESA 336. Offered only through the Division of Continuing Education.

Political and legal foundations of fire and emergency services. Public administration concepts, decision making and policy development. (NT-O)

FESA 338 03(3-0-0). Essentials of Emergency Management. F, S. Offered only through the Division of Continuing Education.

Emergency management theory; mitigation, planning, response, and recovery in large-scale incidents. Development/operation of emergency operation centers. (NT-O)

FESA 339 03(3-0-0). Incident Command Systems. S. Prerequisite: FESA 331 or FESA 338. Offered only through the Division of Continuing Education.

Theory and application of incident command systems (ICS) to the command and coordination of major emergency operations. (NT-O)

FESA 431 03(3-0-0). Emergency Medical Services Management. F. Prerequisite: FESA 432; FESA 433. Offered only through the Division of Continuing Education.

Emergency medical service models, design implementation evaluation. Interactions with health care systems, public policy and public health

systems. (NT-O)

FESA 432 03(3-0-0). Fire and Emergency Services Budgeting. F, S. Prerequisite: FESA 333; FESA 336. Offered only through the Division of Continuing Education.

Application of emergency service budgeting systems with emphasis on revenues, public financial controls, capital funding and performance measures. (NT-O)

FESA 433 03(3-0-0). Fire and Emergency: Human Resources. F, S. Prerequisite: FESA 333; FESA 336. Offered only through the Division of Continuing Education.

Theory, practice, and models of human resources applied to emergency organizations; workforce development, HR functions, and labor relation. (NT-O)

FESA 434 03(3-0-0). Training Program Management. F. Prerequisite: FESA 432, FESA 433. Offered only through the Division of Continuing Education.

Development of agency training and education programs. Utilization of training and education practices, resources, facilities and technologies. (NT-O)

FESA 435 03(3-0-0). Volunteer/Combination Organization Management. S. Prerequisite: FESA 432; FESA 433. Offered only through the Division of Continuing Education.

Development and management of fire and emergency service organizations with volunteer and combination resources. (NT-O)

FESA 436 03(3-0-0). Fire Protection Through Model Building Codes. S. Offered only through the Division of Continuing Education.

Overview of the most current fire codes that are used across the United States. Discussion of fire inspection methodology and enforcement practices. (NT-O/V)

FESA 437 03(0-0-3). Fire and Emergency: Legal Considerations. F, S, SS. Prerequisite: FESA 432; FESA 433.

Fire service in relation to the complex legal system of the United States, individual states, and local jurisdictions. (NT-O)

FESA 438 03(3-0-0). Prevention Program Management. F. Prerequisite: FESA 432; FESA 433. Offered only through the Division of Continuing Education.

Design, implementation, and evaluation of fire and risk prevention programs using education, engineering, and enforcement approaches. (NT-O)

FESA 467 03(3-0-0). Integrated Management Simulation. F, S. Prerequisite: FESA 331; FESA 338; FESA 432; FESA 433; completion of 15 credits of selected electives. Offered only through the Division of Continuing Education.

Integration management and administrative knowledge and skills in the development of a fire and emergency service management simulation. (NT-O)

FESA 492 Var [1-3]. Seminar. F, S. Prerequisite: Written consent of instructor. Offered only through the Division of Continuing Education.

Discussion and documentation of professional experience in fire and emergency services. (NT-O)

FESA 495 Var [1-6]. Independent Study. F, S. Prerequisite: FESA 334; completion of 30 credits of FESA coursework. Offered only through Division of Continuing Education. (NT-O)

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FINANCE COURSES

Department of Finance and Real Estate College of Business

FIN 300 03(3-0-0). Principles of Finance. F, S, SS. Prerequisite: ACT 205 or ACT 210; AREC 202 or ECON 202; ECON 204; MATH 141 or MATH 155 or MATH 160. Credit not allowed for both FIN 300 and FIN 305.

Overview of financial markets and institutions, analysis of securities and investigation of financial management techniques.

FIN 305 03(3-0-0). Fundamentals of Finance. F, S, SS. Prerequisite: ACT 205 or ACT 210; ECON 204. Credit not allowed for both FIN 305 and FIN 300.

Role of finance in management of the firm; role, structure of financial markets and institutions, valuation of basic securities. (NT-O)

FIN 310 03(3-0-0). Financial Markets and Institutions. F, S, SS. Prerequisite: ECON 204.

Analysis of the functions and operations of financial markets and the primary and secondary securities created in those markets.

FIN 311 03(3-0-0). Debt Securities Analysis. F. Prerequisite: ECON 315 or FIN 310; FIN 300; FIN 355.

Analysis of corporate, government, and mortgage-based debt securities. Emphasis on securitization of asset-backed obligations.

FIN 320 03(3-0-0). Introduction to Financial Planning. F, S. Prerequisite: ACT 210; ECON 202.

Personal financial planning including budgeting, tax planning, credit management, investing, retirement, and estate planning.

FIN 342 03(3-0-0). Risk Management and Insurance. F. Prerequisite: FIN 300 or FIN 305.

Management of insurable risks for the individual and business firm.

FIN 355 03(3-0-0). Principles of Investments. F, S, SS. Prerequisite: FIN 300; FIN 310.

Modern investment theory with applications in the debt and equity markets, with introduction to portfolio management.

FIN 370 03(3-0-0). Financial Management—Theory and Application. F, S. Prerequisite: FIN 300.

Theory and application of financial management to business firms; case problems used for illustration.

FIN 440 03(3-0-0). Estate Planning. F. Prerequisite: ACT 330; FIN 320.

Methods for conservation and transfer of wealth, considering aspects of tax, trusts, wills, probate, advanced directives, and charitable giving.

FIN 445 03(3-0-0). Financial Plan Development. S. Prerequisite: ACT 330; FIN 320; FIN 342.

Analyze client finances and economic conditions, develop and communicate comprehensive financial plan using financial planning professional standards.

FIN 455 03(3-0-0). Advanced Portfolio Management. S. Prerequisite: FIN 355.

Advanced hedging and portfolio management theory and techniques.

FIN 470 03(3-0-0). Financial Risk Management. F, S. Prerequisite: FIN 355.

Futures, options, asset-backed securities and other derivatives as they are used in financial risk management.

FIN 471 03(3-0-0). Enterprise Valuation. S. Prerequisite: FIN 355; FIN 370.

Analytical framework for measuring, managing, and applying principles and tools to value enterprises.

FIN 475 03(3-0-0). International Business Finance. F, S, SS. Prerequisite: FIN 300.

International financial management emphasizing markets, instruments, hedging techniques, and operating strategies.

FIN 487 Var. Internship.

FIN 495 Var. Independent Study.

FIN 496 Var. Group Study.

FIN 498 Var [1-3]. Research.

FIN 524/STAT 524 03(3-0-0). Financial Statistics. F. Prerequisite: MATH 345; STAT 420, or Admission to MSBA program with Financial Risk Management specialization.

Probability and statistical concepts and quantitative tools used in financial modeling and decision-making.

FIN 600 03(3-0-0). Financial Management-Theory and Case Studies. F. Prerequisite: FIN 300 or FIN 305.

Financial problems for various types of business organizations. (NT-V)

FIN 601 03(3-0-0). Financial Management and Markets. S. Prerequisite: Admission to GSSE program.

Integrated coverage of financial management, investments, and markets and institutions from the public, private, and nonprofit perspective.

FIN 605 03(3-0-0). Enterprise Valuation. F. Prerequisite: FIN 300; Admission to MSBA program with Financial Risk Management specialization.

Corporate valuation methodologies including dividend discount model, relative valuation using market multiples, free cash flows and options analysis.

FIN 610 03(3-0-0). Debt Securities Analysis. S. Prerequisite: FIN 524/STAT 524; FIN 655.

Valuation of corporate, government, and mortgage-backed debt securities and strategies for management of debt security portfolios. (NT-V)

FIN 625 03(3-0-0). Quantitative Methods in Finance. F. Prerequisite: FIN 300.

Review and application of mathematical and analytical techniques used in solving financial problems.

FIN 630 03(3-0-0). Financial Modeling. S. Prerequisite: FIN 625.

Practical applications of financial modeling and computer programming to analyze financial data.

FIN 655 03(3-0-0). Investments. S.

Investment analysis and decision making emphasizing equity securities and portfolio management. (NT-V)

FIN 665 03(3-0-0). Financial Engineering. S. Prerequisite: FIN 610 or FIN 655 or FIN 675.

Using futures, options, swaps, and securitized transactions in financial management.

FIN 670 03(3-0-0). Risk Management Theory and Application. S. Prerequisite: FIN 605; FIN 625; FIN 655.

Fundamentals of financial risk management using quantitative techniques and models to identify, measure, and manage corporate risk.

FIN 675 03(3-0-0). International Finance. S.

Analysis of the foreign exchange market and international financial markets. (NT-T/V)

FIN 678 03(3-0-0). Financial Decisions-Theory and Practice. S. Prerequisite: FIN 600.

Analysis of theory of corporate finance with emphasis on underlying

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assumptions and implications for financial decisions.

FIN 695 Var. Independent Study.

FIN 696 Var. Group Study.

FIN 698 Var[1-6]. Research. F. S.

FIN 699 Var. Thesis.

FOOD SCIENCE AND HUMAN NUTRITION COURSES

Department of Food Science and Human Nutrition

College of Applied Human Sciences

FSHN 125 02(2-0-0). Food and Nutrition in Health. F, S.
Nutritional quality and safety of food related to human health.

FSHN 150 03(3-0-0). Survey of Human Nutrition. F, S, SS.
Basic nutrition principles and concepts; their application to personal health and interactions with societal and environmental issues.

FSHN 160 03. Nutrition and the Preschool Child. F, S, SS. Offered as correspondence course only.
Basic nutrition and application of nutrition principles to needs of preschool child. (NT-C)

FSHN 300 03(3-0-0). Food Principles and Applications. F, S.
Prerequisite: CHEM 103 or CHEM 107 or CHEM 111; FSHN 150.
Application of food preparation theories to modification and evaluation of food products.

FSHN 301 02(0-6-0). Food Principles and Applications Laboratory. F, S.
Prerequisite: FSHN 300 or concurrent registration.
Techniques and manipulative skills for preparation and evaluation of standard and modified food products. (\$)

FSHN 350 03(3-0-0). Human Nutrition. F, S, SS. Prerequisite: BMS 300 or concurrent registration; CHEM 245 or CHEM 345.
Metabolism of macro and micronutrients; physiologic basis underlying dietary recommendations for human health. Nutrients, dietary requirements for physical well-being; evaluation of various diets.

FSHN 360 02(2-0-0). Nutrition Assessment. S. Prerequisite: FSHN 350.
Principles of anthropometric, dietary, and biochemical assessment of nutritional status.

FSHN 386 02(0-4-0). Practicum in Food Service Management.

FSHN 392 01(1-0-0). Dietetic Practice Seminar. F, S. Prerequisite: C or above in science courses (CHEM 107, 108 or CHEM 111, 112, 113; LIFE 102 or BZ 110, 111; BMS 300, 302; FSHN 150; FSHN 300, 301); 2.8 overall GPA.

Pre-professional skills to prepare students for the pursuit of careers in the field of dietetics.

FSHN 428 03(3-0-0). Nutrition Teaching and Counseling Techniques. S. Prerequisite: FSHN 350.
Objectives, principles, and organization of subject matter for nutrition education and counseling. (\$)

FSHN 444 01(1-0-0). Nutrition and Aging. F, S. Prerequisite: FSHN 150 or admission to Gerontology Interdisciplinary Studies Program. Credit not allowed for both FSHN 444 and FSHN 459.

Effect of aging on nutrient needs and impact of nutrition on successful aging and health in the elderly. (NT-O)

FSHN 450 05(4-2-0). Medical Nutrition Therapy. F. Prerequisite: BMS 300; FSHN 350.
Use of nutrition therapy in the treatment of acute conditions and chronic disease states. (\$)

FSHN 451 03(3-0-0). Community Nutrition. F. Prerequisite: FSHN 350 or concurrent registration.

Influences on nutritional status, assessment of nutrition problems and needs, planning and evaluation of nutrition intervention programs.

FSHN 459 03(3-0-0). Nutrition in the Life Cycle. F. Prerequisite: FSHN 350. Credit not allowed for both FSHN 459 and FSHN 444.

Nutritional aspects associated with each phase of human life cycle including pregnancy, infancy, childhood, adolescence, and early and late adulthood.

FSHN 470 03(3-0-0). Integrative Nutrition and Metabolism. S. Prerequisite: BC 351; FSHN 350.

Influence of nutrition on roles and action of hormones and gene expression on metabolism.

FSHN 484 Var [1-3]. Supervised College Teaching. F, S. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

FSHN 486A-C Var [1-3]. Practicum.

Supervised off-campus experience. **A)** Counseling. Prerequisite: FSHN 350. **B)** Nutrition. Prerequisite: FSHN 350. **C)** Food service management. Prerequisite: RRM 310.

FSHN 492 02(0-0-2). Seminar in Dietetics and Nutrition. S. Prerequisite: Senior standing.

Capstone seminar in nutrition and dietetics.

FSHN 495A-B Var. Independent Study.

A) Nutrition. **B)** Food service management.

FSHN 496A-I 01(1-0-0). Group Study in Dietetics and Nutrition.

Prerequisite: FSHN 350.

Current topics in nutrition and professional skills for the dietetics profession. **A)** Energy/weight management. **B)** Sustainable food issues. **C)** Nutrition and chronic disease. **D)** Nutrition for athletes. **E)** Food safety. **F)** Service marketing. **G)** Food and consumer issues. **H)** Public health and policy. **I)** Special topics.

FSHN 500 02(2-0-0). Food Systems, Nutrition, and Food Security. F. Prerequisite: FSHN 350.

Global and local food systems and their potential influence on nutrition and food security.

FSHN 501 03(3-0-0). Research Methods in Dietetics. S. Prerequisite: Admission to GP-IDEA program in dietetics. Offered as an online course only.

Testing and generating theory. Methods for collecting and analyzing quantitative and qualitative data, critique of research and proposal development. (NT-O)

FSHN 503 03(3-0-0). Issues in Dietetics Practice. F, S. Prerequisite: Admission to GP-IDEA program in dietetics. Offered as an online course only.

Environment in which foodservice, hospitality, and healthcare organizations operate; impact of change on hospitality and healthcare organizations. (NT-O)

FSHN 504 03(3-0-0). Micronutrients. S. Prerequisite: Admission to GP-IDEA program in dietetics. Offered as an online course only.

Coordination of structure and function related to metabolic needs as a basis for evaluating micronutrient needs in normal or altered metabolic states. (NT-O)

FSHN 505 03(3-0-0). Nutrition and Physical Activity in Aging. S. Prerequisite: Admission to GP-IDEA program in dietetics. Offered as an online course only.

Physiological changes during aging and impacts on health and disease; focus on successful aging with emphasis on physical activity and nutrition. (NT-O)

FSHN 506 03(3-0-0). Nutrition and Human Performance. S. Prerequisite: Admission to GP-IDEA program in dietetics. Offered as an online course only.

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Relationship of specific nutrients and optimal nutrition to physical efficiency and performance. (NT-O)

FSHN 507 03(3-0-0). Nutrition Education in the Community. F, S. Prerequisite: Admission to GP-IDEA program in dietetics. Offered as an online course only.

Principles and practices of teaching individuals and groups to translate nutrition knowledge into action. Emphasis on research and evaluation. (NT-O)

FSHN 508 03(3-0-0). International Nutrition and World Hunger. S. Prerequisite: Admission to GP-IDEA program in dietetics. Offered only as an online course.

Magnitude, causes, and nature of hunger and under-nutrition; programs and policies to alleviate hunger. (NT-O)

FSHN 510 03(0-0-3). Pediatric Clinical Nutrition. F. Prerequisite: Admission to the GP IDEA program in Dietetics.

Physiological, biochemical and nutritional aspects of disease processes relevant to infants and children up to 18 years of age. (NT-O)

FSHN 511 03(3-0-0). Maternal and Child Nutrition. SS. Prerequisite: Admission to the GPIdea Program in Dietetics; written permission of instructor.

Behavioral, physiological and public health issues impacting dietary and nutritional factors that support growth and development. (NT-O)

FSHN 520 03(3-0-0). Advanced Medical Nutrition Therapy. SS. Prerequisite: FSHN 550 or FSHN 551 or admission to GP-IDEA program in dietetics.

Role of nutrition in etiology and treatment of selected disorders. (NT-O)

FSHN 525 02(2-0-0). Nutrition Education Theories and Practice. F. Prerequisite: FSHN 350.

Examination of current theories, skills, and models used in nutrition education programs as preparation for research and practice.

FSHN 540 03(3-0-0). Nutrigenomics and Advanced Lipid Metabolism. S. Prerequisite: Admission to GP-IDEA program in dietetics. Offered as an online course only.

How nutrients regulate gene expression (nutrigenetics) and how genotype influences an individual's nutrient requirements (nutrigenomics). (NT-O)

FSHN 550 03(3-0-0). Advanced Nutritional Science I. S. Prerequisite: BC 351 or BC 403; FSHN 350.

Protein, vitamin, mineral metabolism; human studies, animal models.

FSHN 551 03(3-0-0). Advanced Nutritional Science II. F. Prerequisite: BC 351 or BC 403; FSHN 350.

Carbohydrate, lipid, energy metabolism; human studies, animal models.

FSHN 575 01(1-0-0). Nutrition Education for a Healthy Heart. F, S, SS. Offered only as a correspondence course only.

Nutrition-related issues of atherosclerotic cardiovascular disease risk reduction and background in the art/science of facilitating behavior change. (NT-C)

FSHN 586 Var [1-3] Practicum-Advanced Clinical Nutrition. SS. (NT-C)

FSHN 587A-C 06(0-18-0). Internship.

A) Clinical dietetics. B) Community dietetics. C) Food service management.

FSHN 590 Var. Workshop. SS.

FSHN 620 03(2-0-1). Community Nutrition Planning and Evaluation. S. Prerequisite: FSHN 350.

Community nutrition assessment; nutrition program planning and evaluation, nutrition policy analysis.

FSHN 628 02(2-0-0). Advanced Nutrition Counseling Techniques. F.

Principles, strategies, and techniques for interviewing, assessing, and providing nutrition counseling in community settings.

FSHN 630/HES 630 03(3-0-0). Integrative Exercise and Nutrition Metabolism. S. Prerequisite: FSHN 551; HES 610. Credit not allowed for both FSHN 630 and HES 630.

Advances in integrative human metabolism under conditions of changing energy flux.

FSHN 640 02(2-0-0). Selected Topics in Nutritional Epidemiology.

F. Prerequisite: FSHN 350; STAT 301 or STAT 307/ERHS 307.

Overview of topics in nutritional epidemiology; study design, interpretation of findings, linkage of data to action.

FSHN 650B-C 02(2-0-0). Recent Developments in Human Nutrition.

Appraisal of literature on human nutritional status. A) Protein, vitamins, and minerals. *F. Prerequisite: FSHN 550. B) Carbohydrates, lipids, and energy. °F. Prerequisite: FSHN 551. C) Genomic, proteomics, and metabolomics. *S. Prerequisite: FSHN 551.

FSHN 660 02(2-0-0). Women's Issues in Lifecycle Nutrition. S. Prerequisite: FSHN 459.

Current nutritional issues related to selected stages of lifecycle compared to normal adult nutritional needs.

***FSHN 661 02(2-0-0). International Nutrition.** F. Prerequisite: FSHN 350.

Roles of technological programs and international agencies in meeting nutritional needs.

°FSHN 670 02(1-2-0). Laboratory Methods. F. Prerequisite: CHEM 245; CHEM 246.

Laboratory techniques and instrumentation in nutrition and food science.

FSHN 675 03(3-0-0). Regulation of Energy Intake. S. Prerequisite: FSHN 350; PSY 454.

Central and peripheral mechanisms controlling energy intake with emphasis on humans. Current theories, experimental approaches, and new research.

FSHN 684 Var. Supervised College Teaching. F, S.

FSHN 686A-C Var. Practicum.

A) Counseling. Prerequisite: FSHN 520. B) Nutrition. C) Food service.

FSHN 692 01(0-0-1). Seminar.

FSHN 695A-C Var. Independent Study.

A) Food science. B) Nutrition. C) Food service management.

FSHN 696A-D Var. Group Study.

A) Food science. B) Nutrition. D) Exercise and nutrition.

FSHN 698A-C Var. Research.

A) Dietetics. F, S. Prerequisite: Enrollment in the Great Plains Idea program in Dietetics. Offered as an online only course through the Division of Continuing Education. (NT-O). B) Nutrition. F, S, SS. C) Food service management. F, S, SS.

FSHN 699B-C Var. Thesis.

B) Nutrition. C) Food service management.

°FSHN 700 02(2-0-0). Cellular Nutrition. F. Prerequisite: FSHN 550 and FSHN 551 or BC 403 and BMS 501.

Essential nutrient requirements of cells and organs.

FSHN 792 01(0-0-1). Seminar-Research Topics in Nutrition. F, S.

Ph.D. seminar in literature review.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

FSHN 795 Var. Independent Study.

FSHN 796 01(0-0-1). Group Study.

FSHN 799 Var. Dissertation-Nutrition.

^oAlternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

FOOD TECHNOLOGY COURSES

Department of Food Science and Human

Nutrition

College of Applied Human Sciences

FTEC 110 03(3-0-0). Food-From Farm to Table. S.

Commercial food processing related to preservation and enhancing of food quality, safety, and value.

FTEC 400 03(3-0-0). Food Safety. F. Prerequisite: CHEM 107 or CHEM 111.

Safety of human food emphasizing safe production, processing, marketing, preparation, consumption, and regulations.

***FTEC 420 03(2-2-0). Quality Assessment of Food Products. S.** Prerequisite: FTEC 110; LIFE 205.

Quality control of raw ingredients to manufactured products; assessment and sensory evaluation of foods.

°FTEC 447 02(2-0-0). Food Chemistry. S. Prerequisite: CHEM 245 or CHEM 345.

Chemistry of food constituents as related to food quality and stability.

FTEC 460 03(2-2-0). Brewing Science and Technology. F, S. Prerequisite: CHEM 245; MATH 118; 21 years of age; completed 60 credits.

Scientific and technical aspects of brewing, fermenting, finishing, and evaluating microbrewed style of lagers and ales.

FTEC 487 Var [1-15]. Internship.

FTEC 495 Var. Independent Study.

***FTEC 570 02(2-0-0). Food Product Development. F.** Prerequisite: FTEC 447.

Food product concepts, feasibility, and evaluation.

°FTEC 572 02(2-0-0). Food Biotechnology. S. Prerequisite: MIP 334.

Interrelationships among microorganisms, food processing methods, advances in biotechnology and food quality, spoilage, shelf-life and safety.

FTEC 574 02(2-0-0). Current Issues in Food Safety. S.

Current food safety issues from field to table; microbiological, consumer, processing, and agricultural issues.

°FTEC 576 02(2-0-0). Cereal Science. F. Prerequisite: FTEC 447.

Chemistry and functionality of cereal grain components and their importance in human nutrition.

***FTEC 578 03(2-0-1). Bioactives and Probiotics for Health. S.** Prerequisite: BC 351; LIFE 205 or MIP 300.

Mechanisms through which functional foods and probiotics modulate intracellular signal transduction and protein expression in chronic disease states. (NT-O)

FTEC 698 Var. Research.

FTEC 699 Var. Thesis.

FTEC 799 Var. Dissertation.

FISH, WILDLIFE, AND CONSERVATION BIOLOGY COURSES

Department of Fish, Wildlife, and

Conservation Biology

Warner College of Natural Resources

FW 104 03(3-0-0). Wildlife Ecology and Conservation. (GT-SC2, AUCC 3A). F, S.

Essentials of wildlife ecology as a foundation for understanding issues on the origins, management and conservation of biodiversity. (NT-O)

+FW 111 01(5-1-0). Basic Outdoor Skills in FWCB. F, S. Prerequisite: May be taken up to 3 times for a maximum of 3 credits.

Basic outdoor skills crucial for FWCB and outdoor novices. History of wildlife conservation and reasons for declining outdoor participation. Required field trips.

+FW 204 03(2-3-0). Introduction to Fishery Biology. F.

Exposure to sampling techniques, agencies, and topics in fishery biology careers. (\$)

FW 260 03(3-0-0). Principles of Wildlife Management. F, S. Prerequisite: MATH 124; BZ 110 or LIFE 103.

Ecology principles applied to conservation and management of fish/wildlife resources. Quantitative methods, socioeconomic factors, population dynamics.

FW 300 02(2-0-0). Ichthyology. S. Prerequisite: BZ 111 or LIFE 103.

Biology of fishes: anatomy, taxonomy, physiology, behavior, ecology, evolution, and zoogeography.

+FW 301 01(0-2-0). Ichthyology Laboratory. F, S. Prerequisite: FW 300 or concurrent registration.

Anatomy, taxonomy, evolution, and ecology of North American freshwater fishes. Field trip required. (\$)

FW 350 04(3-2-0). Teaching Shooting Responsibility. S.

Education and instructor certification course to develop knowledge, skills, behavior for teaching about firearms, shooting sports, and associated ethics.

FW 355 02(0-0-2). Hunter Education for Instructors. F, S, SS. Offered only through the Division of Continuing Education.

Principles of learning and teaching for instructors of state hunter education courses. (NT-C/O)

FW 356 03. Leopold's Ethic for Wildlife and Land. F, S, SS. Offered as a correspondence course only.

Philosophy, art, history, and science of wildlife and land management from writings of Aldo Leopold. (NT-C)

FW 357 03. Wildlife Habitat on the Great Plains. F, S, SS. Offered as a correspondence course only.

Management of cover, food, and water for wildlife and fish in the Great Plains. Emphasis on practices compatible with other uses of private land. (NT-C)

FW 370 03(2-2-0). Design of Fish and Wildlife Projects. F, S. Prerequisite: FW 260 or FW 360; LAND 220/LIFE 220 or LIFE 320; MATH 155 or MATH 160; NR 220; STAT 301 or STAT 307.

Design, analysis, and evaluation of wildlife projects; lab exercises in design and data analysis; preparation and presentation of project proposals.

+FW 375 03(1-4-0). Field Wildlife Studies. S, SS. Prerequisite: LAND 220/LIFE 220 or LIFE 320.

Field trip to see wildlife management and habitats and to discuss problems and practices with professional ecologists and resources managers. (\$)

FW 384 Var [1-5]. Supervised College Teaching. F, S, SS. Prerequisite: Written consent of instructor. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Instruction and practice in laboratory instruction in lower-division departmental courses.

FW 400 03(2-0-1). Conservation of Fish in Aquatic Ecosystems. F. Prerequisite: FW 300; LIFE 320.

Ecological processes that create habitat and biotic template for fish in aquatic ecosystems; human effects; strategies for conserving fishes. (\$)

FW 401 03(2-3-0). Fishery Science. F. Prerequisite: FW 300; MATH 141 or MATH 155 or MATH 160; STAT 301 or STAT 307.

Theory, philosophy, and applications for study and management of fishery resources. (\$)

FW 402 04(3-2-0). Fish Culture. S. Prerequisite: FW 300.

Principles and practices to produce food, bait, and sport fishes. (\$)

°FW 405 03(2-3-0). Fish Physiology. S. Prerequisite: BZ 214 or FW 300. Credit not allowed for both FW 405 and FW 605.

Physiological ecology of fishes; functional adaptations and adjustments used to cope with environmental and physiological states. (\$)

***FW 467 03(2-0-1). Wildlife Disease Ecology.** F. Prerequisite: LIFE 320.

Ecological, epidemiological, and evolutionary principles of disease in fish and wildlife populations; contemporary issues in disease ecology.

°FW 468 03(2-3-0). Wild Bird Management. S. Prerequisite: FW 360.

Ecology and management of game, pest, and rare bird populations and nongame bird communities.

°+FW 469 03(3-0-0). Conservation and Management of Large Mammals. F. Prerequisite: BZ 330; FW 260; LIFE 320; STAT 301 or STAT 307/.

Principles of behavior, ecology, population dynamics, and conservation related to large mammals. Required field trips. (\$)

+FW 471 04(2-4-0). Wildlife Data Collection and Analysis. F, S. Prerequisite: FW 370; NR 220.

Analysis methods used in wildlife management and research; adaptive resource management with emphasis on learning through field and computer labs. (\$)

***+FW 477 03(1-3-1). Wildlife Habitat Use and Management.** F. Prerequisite: FW 260; NR319 or NR322. Credit not allowed for both FW 477 and FW 677.

Wildlife habitat evaluation, classification, and improvement; analysis of habitat use patterns; planning and implementation of management plans. (\$)

FW 487 Var [1-6]. Internship. Prerequisite: Written consent of instructor. Field experience in fish and wildlife management.

FW 492 01(0-0-1). Seminar-Wildlife Biology.

FW 495A-B Var. Independent Study. Prerequisite: One course in resource management; one course in ecology; written consent of instructor. A) Fishery biology. B) Wildlife biology.

FW 496A-B Var. Group Study. Prerequisite: One course in resource management; one course in ecology. A) Fishery biology. B) Wildlife biology.

***FW 540 03(2-0-1). Fisheries Ecology.** S. Prerequisite: One course in fishery science; one course in aquatic ecology.

Population, community, and ecosystem management for fishes and other aquatic organisms in freshwater habitats.

FW 544 03(2-0-1). Ecotoxicology. S. Prerequisite: LAND 220/LIFE 220 or LIFE 320; STAT 301 or STAT 307.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Ecological effects of contaminants on populations, communities, and ecosystems.

FW 551 03(2-0-1). Design of Fish and Wildlife Studies. F. Prerequisite: STAT 301 or STAT 307.

Principles, types of studies and philosophy of science in design of experimental, observational, and sampling studies for wildlife investigations. (NT-O)

***FW 552 03(3-0-0). Applied Sampling for Wildlife/Fish Studies.** S. Prerequisite: STAT 301 or STAT 307.

Survey sampling theory and techniques, including distance sampling, with emphasis on wildlife and fish studies.

FW 555 03(3-0-0). Conservation Biology. S. Prerequisite: LAND 220/LIFE 220 or LIFE 320; STAT 307.

Ecological factors in conservation of biological diversity.

FW 561A-E Var [1-3]. Advanced Topics. F, S. Prerequisite: Written consent of instructor.

A) Fishery biology. B) Wildlife biology. C) Population analysis. E) Vertebrate management.

+FW 565 03(2-2-0). Managing Human-Wildlife Conflicts. S. Prerequisite: FW 260.

Methods for resolving conflicts caused by wildlife; integrating animal behavior, population dynamics, economics, and human dimensions into solutions. (\$)

°FW 567 03(2-0-1). Wildlife Disease Ecology. F. Prerequisite: Graduate standing; LIFE 320; STAT 301 or STAT 307.

Ecological, epidemiological, and evolutionary principles of disease in fish and wildlife populations; contemporary issues in disease ecology. (NT-O)

FW 573 03(3-0-0). Travel Abroad-Wildlife Ecology/Conservation. SS. Prerequisite: Written consent of instructor.

Study tour of various overseas ecosystems and natural resources conservation programs; discussions with local ecologists/managers.

FW 575 03(0-0-3). Wildlife Habitat Evaluation for Educators. F, S, SS. Prerequisite: Graduate standing. Offered only through the Division of Continuing Education.

Teachers or leaders implement wildlife habitat evaluation procedures in classroom or community programs and evaluate performance of students. (NT-C/O)

FW 576 03(0-0-3). Wildlife Policy, Administration, and Law. F, S, SS. Offered only through the Division of Continuing Education. Recommended preparation: One course in political science; introductory course in natural resources management.

Evolution of policy affecting wildlife and humans using historical, current, philosophical, legal, and administrative constructs. (NT-C/O)

°FW 605 04(2-3-1). Advanced Physiological Ecology of Fishes. S. Prerequisite: FW 300. Credit not allowed for both FW 605 and FW 405.

Physiological ecology of fishes; functional adaptations and adjustments used to cope with environmental and physiological states. (\$)

°FW 662 03(1-2-1). Wildlife Population Dynamics. S. Prerequisite: FW 260; MATH 155 or MATH 160; STAT 301.

Population models; experimental evidence and analysis of theories of population regulation; case studies.

***FW 663 05(3-3-1). Sampling and Analysis of Vertebrate Populations.** S. Prerequisite: FW 260; STAT 301.

Sampling and analysis of fish and wildlife populations, including survival estimation, capture-recapture sampling, and transect sampling.

+FW 677 03(1-3-1). Wildlife Habitat Management. F. Prerequisite: FW 260. Credit not allowed for both FW 477 and FW 677.

Habitat models; vegetation manipulation and monitoring for wildlife; extended field trips. (\$)

FW 684 Var [1-5]. Supervised College Teaching. Prerequisite: Written consent of instructor.

FW 692A-B Var. Seminar.

A) Fishery biology. B) Wildlife biology.

FW 695A-B Var. Independent Study.

A) Fishery biology. B) Wildlife biology.

FW 696A-B Var. Group Study.

A) Fishery biology. B) Wildlife biology.

FW 698A-B Var. Research.

A) Fishery biology. B) Wildlife biology.

FW 699A-B Var. Thesis.

A) Fishery biology. B) Wildlife biology.

FW 798A-B Var. Research.

A) Fishery biology. B) Wildlife biology.

FW 799A-B Var. Dissertation.

A) Fishery biology. B) Wildlife biology.

GEOSCIENCE COURSES

Department of Geosciences

Warner College of Natural Resources

+GEOL 120 03(3-0-0). Exploring Earth: Physical Geology. (GT-SC2, AUCC 3A). F, S, SS. Credit allowed for only one of the following: G CC 130, G CC 140, GEOL 120, GEOL 122, GEOL 124I, GEOL 150.

Develops scientific understanding through introduction to earth processes, materials, resources, and hazards.

GEOL 121 01(0-2-0). Introductory Geology Laboratory. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: GEOL 120 or GEOL 122 or GEOL 124 or concurrent registration in GEOL 120 or GEOL 122 or GEOL 124. Credit allowed for only one of the following: G CC 140, GEOL 150, GEOL 121.

Laboratory applications of introductory geology. (\$)

GEOL 122 03(3-0-0). The Blue Planet: Geology of Our Environment. (GT-SC2, AUCC 3A). F, S, SS. Credit allowed for only one of the following: G CC 130, G CC 140, GEOL 120, GEOL 122, GEOL 124, GEOL 150.

Develops scientific understanding through introduction to geological processes, natural hazards, earth resources, and their impacts on society.

GEOL 124 03(3-0-0). Geology of Natural Resources. (GT-SC2, AUCC 3A). S. Credit allowed for only one of the following: G CC 130, G CC 140, GEOL 120, GEOL 122, GEOL 124, GEOL 150.

Develops scientific understanding through introduction to the origin, use, and environmental impact of geological resources extracted from the Earth.

+GEOL 150 04(3-3-0). Physical Geology for Scientists and Engineers. F. Credit allowed for only one of the following: G CC 130, G CC 140, GEOL 120, GEOL 122, GEOL 124, GEOL 150.

Earth materials, structures, and surface processes. Geologic analysis using field data, topographic and geologic maps, and aerial photos. (\$)

+GEOL 154 04(3-3-0). Historical and Analytical Geology. S. Prerequisite: GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150.

Physical and biological history of Earth with introduction to laboratory, computer, and field techniques. (\$)

+GEOL 232 03(2-3-0). Mineralogy. F. Prerequisite: CHEM 111 or concurrent registration; GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150; MATH 124.

Crystal structures, crystal chemistry, rock-forming and economically important minerals, crystal growth and defects, physical properties of minerals. (\$)

GEOL 250 03(3-0-0). The Solid Earth. S. Prerequisite: GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150; MATH 124.

Structure, flow, and composition of the deep Earth; introduction to geophysics; tests of plate tectonic theory.

GEOL 332 02(1-2-0). Optical Mineralogy. F. Prerequisite: GEOL 232 or concurrent registration.

Fundamental light optics in crystalline substances; optical indicatrix; isotropic, uniaxial, and biaxial substances; common minerals in thin section.

GEOL 342 03(2-3-0). Paleontology. F. Prerequisite: GEOL 154.

Description of invertebrates, vertebrates, and plants and their distribution in earth history.

+GEOL 344 04(3-3-0). Stratigraphy and Sedimentology. F. Prerequisite: GEOL 154.

Description, genesis, correlation and age of sediments, sedimentary rocks and layered rock sequences. (\$)

+GEOL 364 04(3-3-0). Igneous and Metamorphic Petrology. S.

Prerequisite: GEOL 232.

Identification, classification, geochemistry, petrogenesis of igneous and metamorphic rocks; textural interpretation of hand samples and thin sections. Field trips required. (\$)

+GEOL 366 04(3-3-0). Sedimentary Petrology and Geochemistry. F. Prerequisite: CHEM 113; GEOL 154; GEOL 364.

Composition, identification, and classification of sedimentary rocks; geochemical processes affecting sedimentary rocks and surficial deposits. (\$)

+GEOL 372 04(3-3-0). Structural Geology. S. Prerequisite: GEOL 154; MATH 125; concurrent registration in PH 141.

Stress and strain in rocks, geometry of deformed rocks, and tectonic principles. (\$)

+GEOL 376 03(1-4-0). Geologic Field Methods. S. Prerequisite: GEOL 344; GEOL 372 or concurrent registration.

Scientific, surveying, and mapping methods used in geologic field studies; proposal, map, and report preparation. (\$)

GEOL 384 Var [1-5]. Supervised College Teaching. Prerequisite: Written consent of instructor. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Instruction and practice in laboratory instruction in lower-division departmental courses.

GEOL 401 01(0-3-0). Geology of the Rocky Mountain Region. F. Prerequisite: GEOL 154. May be taken up to three times for credit. Does not count as a geology elective in the departmental major.

Field course; geology of the local Rocky Mountain region. (\$)

+GEOL 436 06(0-18-0). Geology Summer Field Course. SS. Prerequisite: GEOL 364; GEOL 376.

Geologic mapping, measuring sections, interpreting geologic history in Colorado. Required comprehensive reports, geologic maps, and cross sections. (\$)

GEOL 442 04(3-2-0). Applied Geophysics. F. Prerequisite: GEOL 372; MATH 161; PH 142.

Geophysical exploration methods emphasizing hydrocarbon and mineral exploration, hydrogeology, and engineering applications.

+GEOL 446 03(3-0-0). Environmental Geology. S. Prerequisite: GEOL 454 or concurrent registration.

Geology applied to environmental problems. (\$)

°GEOL 447 03(2-3-0). Mineral Deposits. F. Prerequisite: GEOL 366; GEOL 372.

Occurrence, origin, and exploration of economic metallic mineral deposits. (\$)

+GEOL 452 04(3-3-0). Hydrogeology. F. Prerequisite: GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or GR 210; MATH 161 or MATH 255; PH 141.

Interaction of water and geologic materials; surface and groundwater; quantitative analysis and geologic effects on quality and flow of groundwater. (\$)

GEOL 454 04(3-3-0). Geomorphology. S. Prerequisite: GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or GR 210; STAT 301 or STAT 307 or STAT 315.

Origin of landforms; morphology and processes. (\$)

+GEOL 492 Var. Seminar. F, S. (\$)

GEOL 494A-I Var. Independent Study.

A) Environmental-engineering geology. **B)** Geomorphology. **C)** Mineralogy-petrology. **D)** Geoscience field studies. **E)** Paleontology-stratigraphy. **F)** Sedimentology. **G)** Structural geology. **I)** Geophysics.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

GEOL 498 Var [1-6]. Research. S. Prerequisite: Written consent of instructor.

***GEOL 530 03(2-2-0). Advanced Petrology.** S. Prerequisite: GEOL 364.

Igneous and metamorphic processes and products explored through thermodynamics, phase equilibria, and textural analysis.

+GEOL 546 04(3-3-0). Sedimentary Basin Analysis. S. Prerequisite: GEOL 344.

Sedimentologic data base, correlation, mapping, facies models, classification, and evolution of sedimentary basins. Applications to petroleum exploration. (\$)

°GEOL 547 03(3-0-0). Ore Deposit Geochemistry. S. Prerequisite: GEOL 447.

Geochemical techniques applied to the geology, exploration, and environmental analysis of ore deposits.

GEOL 551 03(3-0-0). Groundwater Modeling. S. Prerequisite: GEOL 452 or CIVE 423.

Groundwater modeling from a geologic perspective. Conceptual models and computer modeling of groundwater flow and solute transport.

GEOL 552 Var [2-3]. Advanced Topics in Hydrogeology. S. Prerequisite: GEOL 452.

Current literature, new techniques, legislative and political developments in hydrogeology, and appropriate case histories.

°GEOL 560 03(2-3-0). Clay Mineralogy. F. Prerequisite: GEOL 364.

Crystallography and chemistry of clay minerals. Applications to geology, engineering, and soil sciences, X-ray analysis of clays.

°GEOL 562 03(3-0-0). Statistical Data Analysis in Earth Resources. F. Prerequisite: STAT 340; STAT 350.

Statistical parameters, sequential data, map analysis, and multivariate data.

°GEOL 565 03(3-0-0). Petroleum Geochemistry and Geology. S. Prerequisite: GEOL 366; GEOL 372.

Geochemistry and geology of hydrocarbon generation, migration, and accumulation. Applications to hydrocarbon exploration.

***GEOL 567 03(3-0-0). Sedimentary Geochemistry.** S. Prerequisite: GEOL 366.

Geochemical processes affecting sedimentary rocks and other surficial materials.

GEOL 570 03(1-0-2). Tectonics. S. Prerequisite: GEOL 364; GEOL 372.

Evidence, environments, and consequences of tectonic theories.

***GEOL 575 04(3-2-0). Subsurface Geophysical Mapping.** S. Prerequisite: GEOL 344; GEOL 372; MATH 161; PH 142.

Advanced techniques for creating subsurface geological maps based on seismic reflection and well log data.

°GEOL 576 03(3-0-0). Exploration Seismology. S. Prerequisite: GEOL 344; GEOL 372; MATH 161; PH 142.

Seismic exploration methods, including theory, data acquisition, and data processing.

+GEOL 601 01(0-0-1). Geoscience Approaches and Thesis Proposals. F. Prerequisite: Graduate student standing in geosciences.

Core concepts of scientific approaches, local geology of Colorado, and preparation of geoscience thesis proposals. (\$)

+GEOL 652 03(3-0-0). Fluvial Geomorphology. F. Prerequisite: GEOL 120.

Geomorphology of channels, slopes, and drainage systems. (\$)

+GEOL 672 03(2-3-0). Advanced Structural Geology. F. Prerequisite: GEOL 436.

Rheology, deformation mechanisms, structural associations, and advanced methods of structural analysis. (\$)

GEOL 684 Var [1-5]. Supervised College Teaching. F, S, SS. Prerequisite: Written consent of instructor.

GEOL 692 Var. Seminar.

GEOL 695 Var. Independent Study.

+GEOL 696 Var. Group Study.

GEOL 698 Var. Research.

GEOL 699 Var. Thesis.

***GEOL 747 04(3-3-0). Advanced Sedimentary Petrology.** S. Prerequisite: GEOL 344.

Classification, origin, depositional history, and diagenesis of detrital sedimentary rocks as determined from thin sections.

GEOL 798 Var. Research.

GEOL 799 Var. Dissertation.

**GLOBAL ENVIRONMENTAL
SUSTAINABILITY COURSES**
Nondepartmental, Interdisciplinary
School of Global Environmental Sustainability
Office of Provost and Executive Vice President

GES 101 03(3-0-0). Foundations of Environmental Sustainability. F.
Concepts, foundations, and metrics of global environmental sustainability applied to global challenges. (NT-O)

GES 192 Var[1-3]. Global Environmental Sustainability Seminar. F, S.
Critical interconnections of global environmental sustainability, the environment, economics, and society.

GES 470 03(3-0-0). Applications of Environmental Sustainability. S.
Prerequisite: GES 101; 12 credits of GES interdisciplinary minor; junior or senior standing.
Integration of dimensions of global environmental sustainability—environment, society, and economy—through case studies and team project.

GEOGRAPHY COURSES

Department of Anthropology

College of Liberal Arts

GR 100 03(3-0-0). Introduction to Geography. F, S. (GT-SS2, AUCC 3C)

Major geographic themes applied to selected regions; physical environment, human-land relationships, regional analysis. (NT-O)

GR 210 03(3-0-0). Physical Geography. S.

Energy, mass budget, and human impacts on atmosphere, hydrosphere, and continental land surfaces.

GR 311 03(1-4-0). GIS for Social Scientists. F, S, SS. Prerequisite: GR100.

Applications of GIS techniques useful to the social sciences. Mapping techniques and GIS toolkits are practiced in lab. (NT-O)

°**GR 320 03(3-0-0). Cultural Geography.** F. Prerequisite: GR 100.

Geographic analysis of cultural phenomena, elements emphasizing human-land relationships and spatial patterns of agriculture, cities, language, religion. (NT-O)

GR 323/NR 323 03(2-2-0). Remote Sensing and Image Interpretation. F. Credit allowed for only one of the following: GR323, NR 323, GR 503, NR 503.

Remote sensing systems and applications; characteristics of photographic, scanner and radar images; imagery interpretation.

+**GR 342 03(3-0-0). Geography of Water Resources.** F.

Overview of spatial and temporal issues. (\$)

°**GR 345 03(3-0-0). Geography of Hazards.** S. Prerequisite: GR 210.

Causes, effects, distributional patterns, and human adjustments to environmental hazards.

GR 410 03(3-0-0). Climate Change: Science, Policy, Implications. S. Prerequisite: 3 credits of geography (GR) course work.

Implications and consequences for earth systems including the cryosphere, hydrosphere, and biosphere.

GR 420 04(3-2-0). Spatial Analysis with GIS. F. Prerequisite: 3 credits of geography (GR) course work. Credit not allowed for both GR 420 and NR 322.

Theory, application of geographic information systems for spatial analysis; conceptual basis of GIS, nature and use of geographic data, case studies.

GR 487 Var[1-9]. Internship. F, S, SS. Prerequisite: 9 credits of anthropology.

Academic-based work experience with selected organizations or agencies. Supervised application of principles of geography.

GR 495 Var. Independent Study. F, S.

GR 503/NR 503 04(3-3-0). Remote Sensing and Image Analysis. F. Credit allowed for only one of the following: GR503, NR 503, GR 323, NR 323.

Interpretation and analysis of photographic, multispectral scanner, and radar data; sensor systems; applications to resource management.

GRADUATE SCHOOL COURSES

Nondepartmental

Graduate School

GRAD 510 03(2-2-0). Fundamentals of High Performance Computing. F.

UNIX; networks; scalar, vector, and parallel architectures; performance programming.

GRAD 511 03(2-2-0). High Performance Computing and Visualization. S. Prerequisite: GRAD 510.

Interactive methods for linear systems; Monte Carlo methods; visualization and image processing.

GRAD 544A-C 01(1-0-0). Ethical Conduct of Research. F, S.

A) Arts and Humanities. B) Life/human sciences. C) Physical science/engineering.

GRAD 592 01(0-0-1). Water Resources Seminar. F.

Interdisciplinary seminar emphasizing issues important to water resources community. Content relates to a preselected theme each semester.

GRAD 596 Var [1-3]. Group Study-Graduate Education. SS.

Prerequisite: Graduate School approval.

Preparation for graduate education.

GRAD 792 02(0-0-2). Seminar on College Teaching. F, S.

Role of college teacher emphasizing applied principles and practices derived from empirical research and collective experience of teaching professors.

HUMAN DEVELOPMENT AND FAMILY STUDIES COURSES

Department of Human Development and Family Studies *College of Applied Human Sciences*

HDFS 101 03(3-0-0). Individual and Family Development. (GT-SS3, AUCC 3C). F, S, SS.

Principles of life-span human development in the context of the family. Theory and research on the influence of family systems on individuals. (NT-O/C)

HDFS 175/PSY 175 03. Developmental Psychology Across the Life Span. F, S, SS. Credit not allowed for both HDFS 175 and PSY 175. Offered as telecourse only.

Theory and research on physical, cognitive, and psychosocial human development across the life span. (NT-T)

HDFS 217 03(3-0-0). Creative Experiences for Children. F, S, SS. Prerequisite: HDFS 101, or concurrent registration in HDFS 277. Credit not allowed for both HDFS 217 and HDFS 218.

Theories of play; art, music, literature as related to child development. (NT-O)

HDFS 276 03. Studying Young Children. F, S, SS. Offered as correspondence course only.

Increasing understanding of young children through development of observation skills while participating in an early childhood center. (NT-C)

HDFS 277 01(1-0-0). Professional Skills Development I. F, S, SS.

Professional skills and opportunities relevant to contemporary issues with individuals, families and community. (NT-B)

HDFS 286 04(2-6-0). Practicum-Professional Skills. F, S. Prerequisite: CO 150 or HONR 193; HDFS 101. Required background check through CBI, FBI. Human development and family studies or family and consumer sciences majors only.

Observational and applied experience with children, adolescents, adults, or families. Exploration of professional skills and opportunities. (NT-O, \$)

HDFS 302 03(3-0-0). Marriage and Family Relationships. F, S, SS. Prerequisite: HDFS 101 or SOC 100.

Preparation for and adjustment to marital and family relationships throughout the life cycle. (NT-T/O)

HDFS 310 03(3-0-0). Infant and Child Development in Context. F, S, SS. Prerequisite: HDFS 101 or PSY 100.

Physical, cognitive, and socioemotional development from conception through middle childhood in context of family, relationships, and culture. (NT-O/V)

HDFS 311 03(3-0-0). Adolescent/Early Adult Development in Context. F, S, SS. Prerequisite: HDFS 101 or HDFS 175 or PSY 100 or PSY 260.

Physical, cognitive, and socioemotional development of adolescents and young adults in context of family, relationships, and culture. (NT-O)

HDFS 312 03(3-0-0). Adult Development-Middle Age and Aging. F, S, SS. Prerequisite: HDFS 101 or HDFS 175 or PSY 100 or PSY 260.

Developmental issues and processes pertaining to middle and later adulthood. Contexts in which adult development and aging occur are emphasized. (NT-C/O)

HDFS 317 03(0-0-3). Special Needs in Early Childhood. F, S, SS. Prerequisite: HDFS 310 or PSY 260. Offered as an online course only through the Division of Continuing Education.

Atypical development in early childhood and recommended practices for fostering development of young children with special needs. (NT-O)

HDFS 318 03(3-0-0). Infancy and Toddlerhood. F, S, SS. Prerequisite: HDFS 101.

Physical, cognitive, language, and socio-emotional development from pre-birth through 36 months with an emphasis on applied settings. (NT-O)

HDFS 320 03(3-0-0). Cognitive and Language Development. F, S, SS. Prerequisite: HDFS 310 or PSY 260.

Cognitive and language development from birth to adulthood; including biological, social, and cultural influences. (NT-O)

HDFS 332 03(3-0-0). Death, Dying, and Grief. F, S, SS. Prerequisite: HDFS 101 or HDFS 175 or PSY 100 or PSY 260.

Developmental processes of death and dying related to dying individuals and their families and for human service agencies. (NT-O)

HDFS 334 03(3-0-0). Parenting Across the Lifespan. F, S, SS. Prerequisite: HDFS 310 or PSY 260.

Parenthood as a developmental process; child rearing as a function of variations in risk status, family systems, and ecological contexts. (NT-O)

HDFS 350 03(2-2-0). Applied Research Methods. F, S, SS.

Prerequisite: HDFS 101 or PSY 100; STAT 201 or STAT 301.

Interpret, apply and write about research findings in human development and family studies. (NT-O)

HDFS 351 03(0-0-3). Promoting Early Socioemotional Competence. F, S, SS. Prerequisite: HDFS 277; HDFS 310. Offered only online through the Division of Continuing Education.

Promoting positive socioemotional development and preventing challenging behaviors in early childhood, based on the Pyramid Model. (NT-O)

HDFS 374 03. Children's Programming/Curriculum Development. F, S, SS. Offered as correspondence course only.

Principles of designing and evaluating developmentally appropriate programs for children. (NT-C)

HDFS 375 03(3-0-0). Programming for Children and Families. F, S. Prerequisite: HDFS 310 or PSY 260.

Prevention and intervention programs for children and families. (NT-O)

HDFS 401 03(3-0-0). Childhood Socialization. F, S, SS. Prerequisite: HDFS 310 or PSY 260.

Socialization processes that influence human development within diverse family styles and cultures. (NT-O)

HDFS 402 03(3-0-0). Family Studies. F, S, SS. Prerequisite: HDFS 101 or SOC 100; junior or senior standing.

Theory and research concerning relationships within families; interaction between family and other social institutions. (NT-O)

HDFS 403 03(3-0-0). Families in the Legal Environment. F, SS.

Legal issues related to families, including adoption, marriage, divorce, parent and child rights, consumer issues, disability, and estate planning. (NT-O)

HDFS 404 02(2-0-0). Child Life Theory and Practice. F, S, SS. Prerequisite: HDFS 310 or PSY 260.

Theories and skills related to effective child life practice in hospitals. (NT-O)

HDFS 439 03(3-0-0). Administration of Early Childhood Programs. F, S, SS. Prerequisite: HDFS 310 or PSY 260.

Center administration related to program development and operations, budgeting, state regulations and licensing, and personnel issues. (NT-O)

HDFS 477 01(1-0-0). Professional Skills Development II. F, S, SS. Prerequisite: HDFS 277.

Applications and integration of human development and family background within professional settings. (NT-O, \$)

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HDFS 484 Var [1-3]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

HDFS 488A-D Var [1-14]. Field Placement. Prerequisite: HDFS 477 or concurrent registration.

Application of human development skills in a professional setting. **A)** Childhood education. (NT-O) **B)** Programming for youth and families. (NT-O) **C)** Child life allied health. (NT-O) **D)** Programming for adults and later life families. (NT-O)

HDFS 490 Var [1-3]. Workshop-Human Development.

HDFS 492 03(0-0-3). Seminar-Program Proposal Development. F, S, SS. Prerequisite: HDFS 477 or concurrent registration or EDUC 400.

Research, development, and oral presentations of program proposals from a family systems and development perspective. (NT-O)

HDFS 493 03(0-0-3). Specialized Seminar. Prerequisite: Written consent of instructor.

Advanced study of theory, research, and application in a specialized area.

HDFS 495A-C Var. Independent Study.

A) Human development. **B)** Family studies. **C)** Early childhood education.

HDFS 497 Var. Group Study. S.

HDFS 498A-B Var [1-3]. Research.

A) Human development. **B)** Family studies.

HDFS 499 Var [1-6]. Thesis. Prerequisite: Written consent of department head.

Independent research project presented to a faculty committee.

HDFS 500 03(2-3-0). Issues in Human Development and Family Studies. F.

A selected, broad issue in human development and family studies emphasizing principles of research (\$).

HDFS 501 01(1-0-0). Readings in the Discipline. S. Prerequisite: Admission to HDFS master's program.

Research in human development and family studies content areas; skills in writing an extended literature review.

HDFS 520 03(1-2-1). Family Therapy Practice: Treatment Planning. S. Prerequisite: Admission to the Marriage and Family Therapy Program.

Integration of family/couple therapy theories and practice related to treatment planning and internal family systems therapy. (\$)

HDFS 521 03(1-2-1). Family Therapy Practice: Common Factors. S. Prerequisite: Admission to the Marriage and Family Therapy Program.

Application of common factors - e.g., therapeutic alliance - in family and couple therapy. (\$)

HDFS 524 03(3-0-0). Family Theory. F. Prerequisite: One family studies course.

Major theories and conceptual frameworks for family analysis.

HDFS 528 04(2-4-0). Child and Family Assessment. F. Prerequisite: Nine credits in human development and family studies or behavioral science at 300-400 level.

Assessment procedures for children and families related to test selection and effective intervention.

HDFS 534 03(3-0-0). Marriage and Family Therapy. F. Prerequisite: HDFS 524.

Theories and techniques.

HDFS 550 03(3-0-0). Research Methods I. S. Prerequisite: Three credits of statistics, three credits of upper-division behavioral sciences.

Research strategies and ethical considerations.

HDFS 590A-B Var [1-3]. Workshop.

A) Human development. **B)** Family studies.

HDFS 592 03(1-0-2). Grant Writing-Human Services and Research. F, S. Prerequisite: STAT 201.

Writing grant proposals that support client services or for research.

HDFS 600B-E 03(3-0-0). Advanced Studies. F, S, SS.

B) Grief and loss. Prerequisite: Six credits in behavioral sciences. **C)** Intimacy and human sexuality. Prerequisite: Six credits in behavioral sciences. **D)** Program planning and evaluation. Prerequisite: HDFS 550 or concurrent registration. **E)** Parenting. Prerequisite: Six credits in behavioral sciences.

HDFS 610 03(3-0-0). Risk and Resilience. S. Prerequisite: Six credits in behavioral sciences.

Risk and resilience processes in human development.

HDFS 612 03(3-0-0). Adolescent Development. F. Prerequisite: One course in adolescence, three credits of upper-division behavioral science.

Classical and contemporary theory; review of research related to major developmental processes.

HDFS 613 03(3-0-0). Adult Development and Aging. S. Prerequisite: One course in adult development or three credits of upper-division behavioral science.

Advanced study of developmental change and adaptation during adult years. (NT-O)

HDFS 620 03(1-2-1). Family Therapy Practice: Addictions. F. Prerequisite: Admission to the Marriage and Family Therapy Program.

Application of marriage and family therapy theories to clinical practice with a focus on addiction and self-of-the-therapist. (\$)

HDFS 621 03(1-2-1). Family Therapy Practice: Topics in Sexuality. F. Prerequisite: Admission to the Marriage and Family Therapy Program.

Integration of family therapy theories and practice related to topics in sexuality, termination and referral, and one's personal theory of change. (\$)

HDFS 624 03(3-0-0). Skills and Techniques in Family Therapy. F. Prerequisite: HDFS 534.

Elaboration of techniques and therapy skills based on theory and research.

HDFS 630 03(3-0-0). Socioemotional Development. S. Prerequisite: Six credits of upper-division behavioral sciences.

Examination of theory and research on issues in social, emotional, and personality development.

HDFS 631 03(3-0-0). Cognitive Development. F. Prerequisite: Six credits of upper-division behavioral sciences.

Examination of child and adolescent cognitive development, including perceptual, linguistic, memory, and social cognitive skills.

HDFS 636 03(3-0-0). Aging and the Family. S. Prerequisite: One course in adult development or six credits of upper-division behavioral science.

Theory and research relating to topics on aging during middle and late years of family life cycle.

HDFS 644 03(3-0-0). Foundations in Family Therapy. F, SS. Prerequisite: HDFS 524.

Contemporary research and treatment strategies for parenting problems, family violence, and substance abuse.

HDFS 650 03(2-0-1). Research Methods II. F. Prerequisite: HDFS 550, STAT 301.

Statistical concepts and analysis.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HDFS 676 03(3-0-0). Professional Skills Development. F. Prerequisite: Admission to Marriage and Family Therapy Program.

Fundamental skills of marriage and family therapy; clinic procedures; case assessment, planning, and management.

°**HDFS 677 03(3-0-0). Ethical and Legal Issues.** S.

Ethical and legal issues in the field of human development and family studies.

HDFS 684 Var. Supervised College Teaching. F, S.

HDFS 686A-E Var [1-15]. Practicum. Prerequisite: Nine credits in human development.

Application of human development skills in a variety of professional settings. **A)** Human development. **B)** Family studies. **D)** Developmental assessment. **E)** Early childhood education.

HDFS 687A-C Var. Internship.

Application of advanced human development skills in professional settings. **A)** Human development. Prerequisite: Nine graduate credits in human development. **B)** Family studies. Prerequisite: Nine graduate credits in human development. **C)** Marriage and family therapy. Prerequisite: HDFS 677 or concurrent registration; HDFS 678 or concurrent registration; HDFS 688 or concurrent registration.

HDFS 692 03(3-0-0). Seminar-Contemporary Family Issues. Prerequisite: Six credits in behavioral sciences.

Current issues in the family with implications for intervention and therapy.

HDFS 695A-C Var. Independent Study.

A) Human development. **B)** Family studies. **C)** Early childhood education.

HDFS 697 Var [1-6]. Group Study.

HDFS 698A-B Var [1-3]. Research.

A) Human development. **B)** Family studies.

HDFS 699 Var. Thesis. Prerequisite: HDFS 550.

°**HDFS 710 03(3-0-0). Theories of Applied Developmental Science.** F. Prerequisite: HDFS 500.

Theories of applied developmental science, and implications for intervention and policy.

°**HDFS 740 03(3-0-0). Family Policy and Programming.** F. Prerequisite: HDFS 500.

Social and family policy initiatives, with attention toward vulnerable populations, using a lifespan developmental perspective.

°**HDFS 750 03(3-0-0). Multivariate Research Methods.** S. Prerequisite: HDFS 650.

Applications of multivariate methods to research in applied developmental science.

HDFS 772 03(2-0-1). Marriage and Family Therapy Supervision. S, SS. Prerequisite: Written consent of instructor.

Prepares professionals to supervise marriage and family therapists in a variety of settings.

***HDFS 792 03(3-0-0). Issues in Applied Developmental Science.** S. Prerequisite: HDFS 500.

Current issues in applied developmental science involving a synthesis of theory, research, and application.

HDFS 799 Var. Dissertation.

HEALTH AND EXERCISE SCIENCE COURSES

Department of Health and Exercise Science College of Applied Human Sciences

HES 100A-P 01(0-3-0). Beginning Physical Education. F, S, SS.

Physical activities for the development of personal motor skills. **A)** Aerobic exercise. **C)** Soccer. **D)** Self-defense. **E)** Tennis. **J)** Volleyball. **K)** Swimming. **L)** Golf. **(S)** **M)** Basketball. **N)** Racquetball. **O)** Weight training. **P)** Ice skating. **(S)**

HES 101B-J 01(0-3-0). Intermediate Physical Education. F, S, SS. Prerequisite: HES 100 or meet departmental standards.

Physical activities for the development of personal motor skills. **B)** Tennis. **C)** Volleyball. **D)** Swimming. **E)** Golf. **(S)** **F)** Soccer. **G)** Basketball. **H)** Racquetball. **I)** Aerobics. **J)** Ice skating. **(S)**

HES 102A-G 01(0-3-0). Physical Education Activities. F, S, SS.

Physical activities for the development of personal motor skills. **A)** Aquatic conditioning. Prerequisite: Intermediate swimming ability. **C)** Special activities. **D)** Advanced swimming. **F)** Conditioning and fitness. **G)** Athletics.

HES 106 01(0-3-0). Scuba Diving. F, S. Prerequisite: Intermediate ability. **(S)**

HES 120 01(1-0-0). Introduction to Health and Exercise Science. F, S.

Health and Exercise Science major, career options, campus resources, tools for academic success, various health-related topics.

HES 123 02(1-2-0). Fitness and Wellness. F, S, SS.

Health, fitness, and wellness; design, implement, and evaluate a complete personal fitness and wellness program. **(S)**

HES 143 02(1-0-1). Survey of Health and Wellness. F, S, SS. Credit not allowed for both HES 143 and HES 145.

Socioeconomic, environmental, physiological, and behavioral factors that affect the health and well being of humans.

HES 145 03(3-0-0). Health and Wellness. F, S, SS. Credit not allowed for both HES 143 and HES 145.

Personal health behaviors and personal choice in response to wellness. **(NT-O)**

HES 203 03(3-0-0). Motor Learning. F, S, SS. Prerequisite: PSY 100.

Motor skill acquisition as function of maturation and experience. Emphasis on strategies for facilitating skill learning in normal school-age population.

HES 207 03(2-2-0). Anatomical Kinesiology. F, S, SS.

Anatomical, physiological, and mechanical fundamentals of human movement.

HES 214 03(2-2-0). Water Safety Instruction. F, S.

Pool management and methods of teaching swimming skills and water safety practices. Red Cross Water Safety Instructor Certificate upon completion.

HES 240 02(1-2-0). First Aid and Emergency Care. F, S.

Principles, applied techniques emphasizing emergency rescue and care. Meets requirements for Red Cross Advanced First Aid and Emergency Care Credential. **(S)**

HES 307 03(3-0-0). Biomechanical Principles of Human Movement. F, S, SS. Prerequisite: BMS 301 or HES 207; PH 121 or PH 141.

Identify with and utilize biomechanical principles pertinent to human movement.

HES 309 02(2-0-0). Methods of Coaching. F, S, SS.

Preparation to coach in an interscholastic athletic situation. **(NT-O)**
HES 319 03(3-0-0). Neuromuscular Aspects of Human Movement. F, S. Prerequisite: BMS 300 or BMS 360; BMS 301.

Neuromuscular anatomy and physiology of human movement. Applied/integrated topics: aging, muscle fatigue, training, and neuromuscular disease.

HES 331A-D 01(0-2-0). Techniques of Teaching Team Sports. F, S. Prerequisite: Corresponding laboratory or competency in area.

Practical and theoretical aspects of teaching team sports with special emphasis on materials, teaching techniques, and analyzing skills. **A)** Soccer. **B)** Basketball. **C)** Field sports. **D)** Volleyball.

HES 332A-H 01(0-2-0). Techniques of Teaching Individual Sports. F, S. Prerequisite: Corresponding laboratory or competency in area.

Practical and theoretical aspects of teaching individual sports with special emphasis on materials, teaching techniques, and analyzing skills. **A)** Badminton. **B)** Golf. **C)** Tennis. **D)** Track and field. **F)** Weight training. **H)** Aerobics.

HES 340 01(1-0-0). Exercise Prescription. F, S, SS. Prerequisite: Concurrent registration in HES 386A.

Theory and practice of exercise prescription for healthy individuals, cardiac patients, and other special populations.

HES 344 03(3-0-0). Methods of Health Education. F, S. Prerequisite: HES 145.

Prepare teaching units and methods for health education in the public schools, K-12.

HES 345 03(3-0-0). Population Health and Disease Prevention. F, S, SS. Prerequisite: HES 145.

Causes of disease throughout the lifespan and interventions designed to prevent disease. **(NT-O)**

HES 346 03(2-2-0). Training Room Methods. F, S. Prerequisite: HES 207.

Preventive measures, taping, bandaging, massage and manipulation, diet and conditioning of athletes.

HES 356 03(3-0-0). Wellness Programming. F, S, SS. Prerequisite: HES 145; HES 386A; HES 386B or concurrent registration.

Assessment of wellness concerns and organizational problems; selection and implementation of program design.

HES 365 02(2-0-0). Program Administration. F, S.

Problems and nature of organization and administration in health and physical education.

HES 379 03(3-0-0). Psychology and Sport. F, S. Prerequisite: PSY 100; minimum GPA of 2.5 in the following courses, with no grade lower than C: HES 145; HES 207; BMS 300.

Psychological and social implications involved in teaching of physical education and coaching of athletics.

HES 386A-B. Practicum.

A) Adult fitness. 02(1-3-0). Prerequisite: BMS 300 with a C or better; FSHN 150 with a C or better; HES 145 with a C or better; HES 207 with a C or better; 2.5 GPA in BMS 300, FSHN 150, HES 145, and HES 207; HES 240; HES 332F; HES 332H; concurrent registration in HES 340. **B)** Wellness program management. 03(1-6-0). Prerequisite: HES 386A.

HES 403 04(3-2-0). Physiology of Exercise. F, S, SS. Prerequisite: BMS 300 or BMS 360; LIFE 102.

Effects of exercise on tissues, organs, and systems of the body. **(S)**

HES 405 02(1-2-0). Exercise Testing Instrumentation. F, S. Prerequisite: HES 403.

Theory and operation of devices commonly employed in quantifying factors related to exercise. **(S)**

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HES 420 03(2-2-0). Electrocardiography and Exercise Management. F, S. Prerequisite: BMS 300.

Interpretation of 12-lead ECG tracings, administering exercise tests, and prescribing exercise program for healthy individuals and special populations. (\$)

HES 430 03(3-0-0). Advanced Athletic Training. F, S. Prerequisite: HES 240; HES 346.

Theory and techniques of habilitative and rehabilitative sports medicine. Emphasis on contemporary evaluative procedures and rehabilitative modalities.

HES 444 02(2-0-0). Successful Aging: Role of Physical Activity. F, S, SS. Prerequisite: BZ 110 or LIFE 102.

Biology and physiology of healthy aging and impact of disease and physical activity on aging processes. (NT-O)

HES 456 03(3-0-0). Advanced Wellness Programming. F, S. Prerequisite: HES 356 or concurrent registration; HES 386B or concurrent registration.

Investigation of established wellness programs with special emphasis on design, implementation, and evaluation of programming models.

HES 476 03(3-0-0). Exercise and Chronic Disease. F, S, SS. Prerequisite: BC 351; FSHN 350; HES 403.

Interaction of physical activity with pathophysiology and treatment of chronic diseases and conditions.

HES 484 Var [1-5]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

HES 486A-C Var [1-3]. Practicum.

A) Adaptive correctives. B) Wellness program management. Prerequisite: BMS 300 with a C or better; FSHN 150 with a C or better; HES 145 with a C or better; HES 207 with a C or better; HES 386B; 2.500 GPA. C) Coaching.

HES 487 15(0-0-40). Internship. Prerequisite: BMS 300 with a C or better; FSHN 150 with a C or better; HES 145 with a C or better; HES 207 with a C or better; HES 486B and all course work; 2.500 GPA.

Practical application of knowledge and skills in a professional situation.

HES 492 02(0-0-2). Health and Exercise Science Seminar. F, S.

Integration and reflection on health and exercise science disciplinary knowledge.

HES 495A-E Var. Independent Study.

A) Health. B) Biomechanics. C) Exercise science. D) Neuromuscular physiology. E) Honors.

HES 496A-E Var. Group Study.

a) Health. B) Athletics. C) Biomechanics. D) Exercise science. E) Neuromuscular physiology.

HES 520 03(2-2-0). Advanced Exercise Testing and Prescription. S. Prerequisite: HES 403.

Theory and practice of exercise testing and prescription in apparently healthy and diseased populations. (\$)

HES 530 03(3-0-0). Clinical Biomechanics. S. Prerequisite: BMS 301; HES 307.

Effect of external loads on internal tissues; concern for injury, injury prevention, and rehabilitation.

***HES 531 03(3-0-0). Muscle and Joint Mechanics.** F. Prerequisite: BMS 301; HES 307.

Integrate muscle, tendon, and location of bone attachment into a comprehensive understanding of human movement at the single- and multi-joint level.

HES 540 03(3-0-0). Human Performance in Environmental Extremes. F. Prerequisite: HES 403.

Ability of humans to exercise or work in extremes of temperature, barometric pressure, air pollution, and sleep deprivation.

HES 545 03(3-0-0). Evolutionary Basis for Health and Fitness. S. Prerequisite: FSHN 350; HES 403.

Evolutionary basis for human health and fitness based upon dietary and exercise patterns of pre-agricultural humans.

HES 556 03(3-0-0). Wellness and Health Promotion Concepts. F.

Discussion of theory and application of health promotion in various settings.

HES 600 03(3-0-0). Research Design in Health/Exercise Science. F.

Prerequisite: One course in statistics.

The research.

HES 603 03(3-0-0). Advanced Topics in Exercise Physiology. F. Prerequisite: HES 403.

Advanced principles of theoretical and applied exercise physiology at molecular, cellular, and systemic levels.

HES 604 03(3-0-0). Oxygen Transport in Exercise and Health. S. Prerequisite: HES 403.

Role of oxygen transport mechanisms in exercise performance and in health at the cellular and systemic levels.

HES 610 03(3-0-0). Exercise Bioenergetics. F. Prerequisite: BC 351 or FSHN 350; HES 403.

Biology of energy transfer reactions related to human locomotion and exercise performance in both healthy individuals and disease states.

°HES 619 03(3-0-0). Advanced Neural Control of Movement. F. Prerequisite: BMS 300; BMS 301; HES 403.

Neuroanatomical, neurophysiological, and applied topics on the control of force and human movement.

HES 630/FSHN 630 03(3-0-0). Integrative Exercise and Nutrition Metabolism. S. Prerequisite: FSHN 551; HES 610. Credit not allowed for both HES 630 and FSHN 630.

Advances in integrative human metabolism under conditions of changing energy flux.

HES 645 03(3-0-0). Epidemiology of Health and Physical Activity. S. Prerequisite: HES 600.

Foundation in chronic disease epidemiology that will enable students to evaluate the current epidemiologic literature.

HES 650 03(3-0-0). Health Promotion Programming. F, S.

Development of skills in health promotion program design, implementation and evaluation.

HES 656 03(3-0-0). Comprehensive Stress Management. F, S, SS.

Relationship between stress and illness emphasizing methods to impact its detrimental effects.

HES 684 Var. Supervised College Teaching.

HES 686A-E Var [1-3]. Practicum. Prerequisite: Current CPR certification.

A) Adult fitness-human performance clinical/research laboratory. B) Wellness management. C) Youth fitness and skill development. D) Health and exercise science research. E) Applied health and exercise science.

HES 687 Var [3-9]. Internship. Prerequisite: HES 686A or HES 686B or HES 686C or HES 686D or HES 686E.

Practical application of knowledge and skills in a professional situation.

HES 692 01(0-0-1). Seminar.

Consideration of graduate education in health and exercise science.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HES 693 01(0-0-1). Seminar.

Maximum of 2 credits allowed in course.

Current topics and issues in health and exercise science.

HES 695A-D Var. Independent Study.

A) Health. B) Exercise science. C) Biomechanics. D) Neuromuscular physiology.

HES 696A-E Var. Group Study.

A) Health. B) Exercise and nutrition. C) Exercise science. D) Biomechanics. E) Neuromuscular physiology.

HES 698 Var. Research.

Non-thesis research in health and exercise science.

HES 699 Var. Thesis.

HES 700 03(2-0-1). Professional Skills in Bioenergetics. F. Prerequisite: Admission to doctoral program or admission to M.S. program and written consent of instructor.

Grant writing, authorship, peer review process, responsible conduct of science, research ethics, professional conduct, career opportunities.

HES 704 03(3-0-0). Advanced Topics in Human Bioenergetics. S.

Prerequisite: HES 610.

Selected topics in basic, clinical, and applied energetics exploring pathogenesis and treatment of chronic disease.

°HES 710 03(3-0-0). Exercise in Disease Prevention. S. Prerequisite:

HES 403; HES 520.

Role of exercise/physical activity in the prevention, pathophysiology and treatment of chronic diseases.

°HES 730 03(3-0-0). Cardiovascular Pathophysiology. F. Prerequisite:

HES 403; HES 520.

Cardiovascular physiology with emphasis on the development, progression, and treatment of diseases of the cardiovascular system.

***HES 735 03(2-0-1). Human Cardiovascular Control.** F. Prerequisite:

HES 403.

Dynamics of cardiovascular control in human health and disease.

HES 784 Var [1-3]. Supervised College Teaching.

HES 786 Var [1-3]. Practicum.

HES 793 01(0-0-1). Bioenergetics Seminar. F, S.

HES 795 Var [1-3]. Independent Study.

HES 796 Var [1-3]. Group Study.

HES 798 Var [1-6]. Research.

HES 799 Var. Dissertation.

HISTORY COURSES

Department of History *College of Liberal Arts*

HIST 100 03(3-0-0). Western Civilization, Pre-Modern. (GT-HI1, AUCC 3D). F, S, SS.

Historical development of Western civilization from antiquity to the early modern era (c. 1600 C.E.).

HIST 101 03(3-0-0). Western Civilization, Modern. (GT-HI1, AUCC 3D). F, S, SS.

Historical development of Western civilization from c. 1600 C.E. to the contemporary era.

HIST 115 03(3-0-0). Islamic World to 1800. (GT-HI1, AUCC 3D). F.

Religion, society, and culture in the Islamic world from the time of Muhammad to 1800.

HIST 120 03(3-0-0). Asian Civilizations I. (GT-HI1, AUCC 3D). F.

Major traditional intellectual and cultural patterns of Asia during the formative years.

HIST 121 03(3-0-0). Asian Civilizations II. (GT-HI1, AUCC 3D). S.

Transformation of major intellectual and cultural patterns and the process of globalization in Asia.

HIST 150 03(3-0-0). U.S. History to 1876. (GT-HI1, AUCC 3D). F, S, SS.

Major issues and themes in the development of the United States from the colonial period through reconstruction.

HIST 151 03(3-0-0). U.S. History Since 1876. (GT-HI1, AUCC 3D). F, S, SS.

Major issues and themes in the historical development of the United States since reconstruction.

HIST 170 03(3-0-0). World History, Ancient-1500. (GT-HI1, AUCC 3D). F, S, SS.

Historical developments and interactions of world societies from the ancient to modern periods.

HIST 171 03(3-0-0). World History, 1500-Present. (GT-HI1, AUCC 3D). F, S, SS.

Historical developments and interactions of world societies from 1500 to the present.

HIST 250/ETST 250 03(3-0-0). African American History. (GT-HI1, AUCC 3D). F. Credit not allowed for both HIST 250 and ETST 250.

Slavery, emancipation, labor, political, socioeconomic, and cultural history of African Americans since colonial times.

HIST 252/ETST 252 03(3-0-0). Asian American History. (GT-HI1, AUCC 3D). F. Credit not allowed for both HIST 252 and ETST 252.

Asian-American historical experience in the United States from 1850s to the present time.

HIST 255/ETST 255 03(3-0-0). Native American History. (GT-HI1, AUCC 3D). S. Credit not allowed for both HIST 255 and ETST 255.

History of Native American peoples in the United States to the present, including origin stories.

HIST 300 03(3-0-0). Ancient Greece to 323 B.C.E. F. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 300 and HY 305.

From the Bronze Age to the death of Alexander the Great, emphasizing political, social, intellectual, and cultural developments.

HIST 301 03(3-0-0). Roman Republic. S. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 301 and HY 304.

Roman history from the monarchy to the fall of the republic; special emphasis on political, cultural, and social history.

HIST 302 03(3-0-0). Roman Empire. S. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits.

Roman history from the principate of Augustus to the reign of Constantine; special emphasis on political, intellectual, cultural, and social history.

HIST 303 03(3-0-0). Hellenistic World: Alexander to Cleopatra. S. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 303 and HY 306.

From Alexander the Great to Cleopatra VII, emphasizing intellectual, social, military, political, and cultural developments.

HIST 304 03(3-0-0). Women in Ancient Greece and Rome. F. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 304 and HY 309.

Comparative study of roles of women and gender in Ancient Greece and Rome.

HIST 308 03(3-0-0). Ancient Christianity to 500 A.D. F. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 308 and HY 451.

Growth of Christian Church from 1st to 5th century; emphasis on its role in Roman Empire; development of ecclesiastical institutions and literature.

HIST 309 03(3-0-0). Medieval Christianity, 500-1500. S. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 309 and HY 452.

Christian Church in Eastern and Western Christendom emphasizing its role in medieval society, relationship with the state, and its institutions.

HIST 310 03(3-0-0). Medieval Europe. F, S, SS. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits.

Political, legal, socioeconomic development of Europe from 300-1500 emphasizing emergence of major states.

HIST 311 03(3-0-0). Medieval England. S. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 311 and HY 410.

Political, social, and intellectual development of England from Romans to end of Middle Ages.

HIST 312 03(3-0-0). Women in Medieval Europe. F. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits.

Women in the European Middle Ages; political, social, economic, religious, and cultural developments.

HIST 315 03(3-0-0). Tudor Stuart England, 1485-1689. F, SS. Prerequisite: HIST 100 or HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 315 and HY 414.

Political, economic, and social history of England from 1485-1689 emphasizing religious movements, revolution, and constitutional development.

HIST 317 03(3-0-0). Renaissance and Reformation Europe. F. Prerequisite: HIST 100 or HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 317 and HY 310.

Development of European society during Renaissance and Reformation eras; religion, society, and the rise of nation-states.

HIST 318 03(3-0-0). The Age of the Enlightenment. S. Prerequisite: HIST 100 or HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 318 and HY 312.

Development of European society from settlement of religious wars to French Revolution emphasizing political, economic, and intellectual trends.

HIST 319 03(3-0-0). Early Modern France, 1500-1789. S. Prerequisite: HIST 100 or HIST 101 or HIST 171; completion of 45 credits. Credit not

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

allowed for both HIST 319 and HY 415.

Political, social, economic, religious, and cultural developments in France (16th-18th centuries) emphasizing formation of the absolutist state.

HIST 320 03(3-0-0). Women and Gender in Europe, 1450-1789. F. Prerequisite: HIST 100 or HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 320 and HY 417.

Women and gender in western Europe (15th-18th centuries); political, social, economic, religious, and cultural developments.

°**HIST 321 03(3-0-0). Industrial Society in Europe, 1600-1871.** F. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 321 and HY 474.

Causes and consequences of European industrialization and its impact on society, 1600-1871; emphasis on northwest Europe.

HIST 322 03(3-0-0). Industrial Society in Europe, 1871-1989. S. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 322 and HY 475.

Causes and consequences of industrialization and its impact on European societies between 1871 and 1989; completion of 45 credits.

HIST 323 03(3-0-0). Russia Before 1700. F. Prerequisite: HIST 100 or HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 323 and HY 438.

Russia's political predecessors; contacts with Byzantium, Western Europe, and the Mongol Empire, and resulting cultural, religious, and social change.

HIST 324 03(3-0-0). Imperial Russia. F, S, SS. Prerequisite: HIST 100 or HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 324 and HY 440.

Tsarist Russia from its beginnings to November 1917 Revolution with emphasis on modern period. (NT-C)

°**HIST 327 03(3-0-0). Habsburg Empire.** F. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 327 and HY 422.

From Charles V through World War I emphasizing significance, uniqueness, and crucial role of Danubian Europe in modern history.

HIST 328 03(3-0-0). Modern Europe, 1815-1914. F, SS. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 328 and HY 316.

Europe in 19th century emphasizing growth of liberalism, nationalism, and industrialism.

HIST 329 03(3-0-0). Europe in Crisis, 1914-1941. F. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 329 and HY 318.

Political, social, economic developments since 1914; consequences of world wars, Great Depression, spread of totalitarianism, decline of imperialism.

***HIST 330 03(3-0-0). Eastern Europe Since 1918.** S. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 330 and HY 423.

Breakup of Austrian, German, Russian, Turkish Empires; successor states between wars; communist revolutions and character of East European socialist regimes.

HIST 331 03(3-0-0). The Soviet Union. F, S, SS. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 331 and HY 442.

Formation of Soviet system in 1918 to its demise in 1991 emphasizing emergence of an advanced socialist state.

HIST 332 03(3-0-0). Germany Since World War I. F. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 332 and HY 435.

German history, culture, and everyday life from 1914 to present.

HIST 333 03(3-0-0). Contemporary Europe. F, SS. Prerequisite: HIST 101 or HIST 171. Credit not allowed for both HIST 333 and HY 319.

Political, economic, social, and cultural history of major European nations since World War II; completion of 45 credits.

HIST 334 03(3-0-0). European Culture in the 20th Century. S. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 334 and HY 463.

Cultural developments since World War I emphasizing science, art, clash of ideologies, existentialism, youth culture, and environmental issues.

***HIST 335 03(3-0-0). Britain in the 20th Century.** F. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 335 and HY 418.

Political, economic, and social developments emphasizing role of Britain in world affairs and internal changes that led to welfare state.

***HIST 336 03(3-0-0). Germany from Napoleon to WWI.** F. Prerequisite: HIST 101 or HIST 171; completion of 45 credits.

Modern Germany for the late eighteenth to the early twentieth centuries.

HIST 337 03(3-0-0). Modern Italy: Politics, Society, and Culture. F, SS. Prerequisite: HIST 101 or HIST 171; completion of 45 credits.

Political, social, and cultural developments in Italian history from 1860 to the present.

HIST 339 03(3-0-0). World War II in Europe. F, SS. Prerequisite: HIST 101 or HIST 171; completion of 45 credits.

WWII in Europe (1939-1945): military strategy, tactics; political and diplomatic events; economic and social impacts; ethnic and gender consequences.

HIST 340 03(3-0-0). Colonial North America, 1492-1800. F, SS. Prerequisite: HIST 101 or HIST 150 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 340 and HY 360.

New World encounters between native Americans, Europeans, and Africans, and the colonial societies they built.

HIST 341 03(3-0-0). Eighteenth Century America. S, SS. Prerequisite: HIST 101 or HIST 150 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 341 and HY 362.

Politics, culture, and society in Colonial British America and the new United States, 1700-1815.

***HIST 342 03(3-0-0). The Old South.** F. Prerequisite: HIST 150 or HIST 151; completion of 45 credits.

Old South, 1607-1865; plantation system, slavery, gender, honor, interactions with Native Americans, southern nationalism, secession, Civil War.

°**HIST 343 03(3-0-0). Early U.S. Republic.** F, SS. Prerequisite: HIST 101 or HIST 150 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 343 and HY 364.

Major themes of U.S. cultural, economic, social, and political history, 1787 to 1815.

HIST 344 03(3-0-0). Age of Jackson. S, SS. Prerequisite: HIST 101 or HIST 150 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 344 and HY 368.

National growth, 1815 to 1850, emphasizing political, social, and economic developments.

HIST 345 03(3-0-0). Civil War Era. S. Prerequisite: HIST 101 or HIST 150 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 345 and HY 370.

U.S. history between 1848 and 1865 emphasizing causes and results of the Civil War.

HIST 346 03(3-0-0). Reconstruction and the New South. F. Prerequisite:

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HIST 101 or HIST 150 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 346 and HY 372.

Reconstruction Era, 1865-1877, and the South to present with emphasis on purposes and results of Reconstruction.

***HIST 347 03(3-0-0). United States, 1876-1917.** S. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 347 and HY 375.

Victorian way of life; rise of industry; reform movements; imperialism; World War I.

HIST 348 03(3-0-0). United States, 1917-1945. F, SS. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 348 and HY 376.

World War I, the 1920s, the Great Depression, and World War II.

HIST 349 03(3-0-0). United States Since 1945. S, SS. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 349 and HY 377.

The Cold War, foreign and domestic affairs from Truman to present.

HIST 350 03(3-0-0). United States Foreign Relations Since 1914. S. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 350 and HY 457.

Main problems in U.S. foreign relations in the 20th century, especially causes and consequences of the two world wars, Great Depression, and the Cold War.

HIST 351 03(3-0-0). American West to 1900. F. Prerequisite: HIST 101 or HIST 150 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 351 and HY 470.

Social, political, economic, environmental developments and intercultural relations in trans-Mississippi West to 1900.

HIST 352 03(3-0-0). American West Since 1900. S. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 352 and HY 471.

Social, political, economic, environmental developments and intercultural relationships in trans-Mississippi West since 1900.

HIST 353 03(3-0-0). U.S.-Mexico Borderlands. F, S, SS. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 353 and HY 472.

Borderlands, northern Mexico, southwestern U.S.; intercultural relationships among Indian, Spanish, Mexican, U.S. cultures. (§)

HIST 354 03(3-0-0). American Architectural History. S. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 354 and HY 443.

Broad historical interpretation of the North American built environment from 1500 to present.

HIST 355 03(3-0-0). American Environmental History. S. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 355 and HY 464.

Interaction of humans and nature in American history with emphasis on relationships between environmental, social, and cultural change.

HIST 356 03(3-0-0). American Cultural and Intellectual History. F, S, SS. Prerequisite: HIST 100 or HIST 101 or HIST 115 or HIST 120 or HIST 121 or HIST 150 or HIST 151 or HIST 170 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 356 and HY 466.

Role of American cultural and intellectual developments in American society and the world.

HIST 357/MLSC 357 03(3-0-0). The American Military Experience. F, SS. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 357/MLSC 357 and HY 401/MS 401.

Role of the armed forces in American society; development of military

traditions, institutions, and practices.

HIST 358 03(3-0-0). American Women's History to 1800. F. Prerequisite: HIST 100 or HIST 101 or HIST 150 or HIST 151 or HIST 170 or HIST 171; completion of 45 credits.

History of Indian, African, and European women in North America from early colonial contact through the American Revolution and into Early Republic.

HIST 359 03(3-0-0). American Women's History Since 1800. S. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 359 and HY 468.

Social, cultural, economic, and political history of women in the United States since 1800.

HIST 360 03(3-0-0). United States Immigration History. S. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 360 and HY 469.

Examines central themes of U.S. immigration from perspective of major immigrant groups and within context of U.S. immigration policy.

***HIST 361 03(3-0-0). American Indians in the Age of Conquest.** S. Prerequisite: HIST 101 or HIST 150 or HIST 171 or HIST 255; completion of 45 credits. Credit not allowed for both HIST 361 and HY 461.

American Indian history from pre-contact to the era of Indian removal (1840s) focused on the impact of colonization.

°HIST 362 03 (3-0-0). American Indian Renaissance in Modern America. S. Prerequisite: HIST 101 or HIST 151 or HIST 171 or HIST 255; completion of 45 credits. Credit not allowed for both HIST 362 and HY 462.

American Indian history from the reservation era to the present with a focus on cultural and political renewal.

***HIST 363 03(3-0-0). Colorado History.** S. Prerequisite: HIST 100 or HIST 101 or HIST 150 or HIST 151 or HIST 170 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 363 and HY 260.

History of Colorado from pre-history to present.

HIST 364/ETST 364 03(3-0-0). Asian American Social Movements, 1945-Present. F, S. Prerequisite: HIST 151 or HIST 252/ETST 252; completion of 45 credits. Credit not allowed for both HIST 364 and ETST 364.

Historical relationships between Asian Americans and social movements for social, economic, and political equity in the U.S. since 1945.

+HIST 365 03(2-3-0). American West Field Study. SS. Students may take course only once for credit toward degree completion.

Explore western U.S. history through primary sources and field trips to sites in Colorado and the West. Topic varies by semester and instructor. Required field trips.

HIST 366 03(3-0-0). African-American History to 1865. F, S. Prerequisite: HIST 150 or HIST 151; completion of 45 credits.

African-American history from the colonial era to the end of the Civil War.

HIST 367 03(3-0-0). African-American History Since 1865. F, S. Prerequisite: HIST 150 or HIST 151; completion of 45 credits.

African-American history from the end of the Civil War to the late twentieth century.

HIST 379/ECON 379 03(3-0-0). Economic History of the United States. F. Prerequisite: AREC 202 or ECON 101 or ECON 202 or any two courses in American history; completion of 45 credits. Credit not allowed for both HIST 379 and ECON 379.

Economic analysis of growth and welfare from beginning of industrialization to present.

HIST 410 03(3-0-0). Colonial Latin America. F, S. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; § Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HIST 410 and HY 354.

Spanish and Portuguese America from pre-Columbian times through independence (c. 1825).

HIST 411 03(3-0-0). Latin America Since Independence. F, S, SS. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits.

Major trends in the social, cultural, political, and economic evolution of Spanish America and Brazil since independence.

HIST 412 03(3-0-0). Mexico. S. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 412 and HY 350.

Social, economic, and political development of Mexican people from pre-Columbian times to present.

HIST 413 03(3-0-0). Caribbean Civilization. F. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 413 and HY 352.

Socioeconomic, political, and cultural development of the nations of the Caribbean.

HIST 414 03(3-0-0). Revolutions in Latin America. F, S. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 414 and HY 444.

Historical and theoretical issues arising from revolutionary episodes in Latin America, with emphasis on 20th century case studies.

HIST 420 03(3-0-0). Africa-Precolonial States and Empires. F. Prerequisite: HIST 100 or HIST 101 or HIST 115 or HIST 120 or HIST 170 or HIST 171; completion of 45 credits.

Origins of societal and political development in Africa before 1800; technology, the environment, human migrations, and trade.

HIST 421 03(3-0-0). Africa: Colonialism to Independence. S. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 421 and HY 330.

Africa from abolition of the slave trade to independence, focusing on economic, social, and political change under colonialism.

HIST 422 03(3-0-0) Modern Africa. S. Prerequisite: HIST 101 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 422 and HY 429.

Colonial roots of modern Africa focusing on the period since 1935. Case studies of social and political change in Africa since World War II.

HIST 423 03(3-0-0). South African History. F. Prerequisite: HIST 101 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 423 and HY 425.

South African history from human origins to the end of Apartheid.

HIST 424 03(3-0-0). East African History. F, S. Prerequisite: HIST 100 or HIST 101 or HIST 115 or HIST 120 or HIST 121 or HIST 170 or HIST 171.

Overview of east African history from human origins to modern times, focusing on Kenya, Tanzania, and Uganda.

HIST 430 03(3-0-0). Ancient Near East. S. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 430 and HY 302.

Neolithic period to 500 B.C.E. emphasizing political, social, intellectual, and cultural developments.

HIST 431 03(3-0-0). Ancient Israel. F. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 431 and HY 303.

Ancient Israel and the Near Eastern world of the Hebrew Bible/Old Testament.

HIST 432 03(3-0-0). Sacred History in the Bible and the Qur'an. F, S, SS. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 432 and HY

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Conceptions of sacred history in the Biblical and Qur'anic traditions, emphasizing pre-modern historiography and exegesis.

HIST 433 03(3-0-0). Muhammad and the Origins of Islam. F. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 433 and HY 344.

Emergence of Islam and growth of the Islamic community from time of Muhammad to decline of the Arab Caliphate.

HIST 435 03(3-0-0). Jihad and Reform in Islamic History. F. Prerequisite: HIST 100 or HIST 101 or HIST 115 or HIST 120 or HIST 121 or HIST 170 or HIST 171; completion of 45 credits.

Jihad and reform in classical and modern Islamic thought and practice.

HIST 438 03(3-0-0). The Modern Middle East. S. Prerequisite: HIST 101 or HIST 115 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 438 and HY 348.

Historical developments in the Middle East in 19th and 20th centuries.

HIST 440 03(3-0-0). Modern South Asia. F, S. Prerequisite: HIST 101 or HIST 120 or HIST 121 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 440 and HY 331.

Major political, social, economic and cultural developments in South Asia from the seventeenth century to the present.

HIST 441 03(3-0-0). South Asia Since Independence. S. Prerequisite: HIST 101 or HIST 120 or HIST 121 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 441 and HY 332.

Major political, social, economic, and cultural developments in South Asia since independence.

HIST 450 03(3-0-0). Ancient China. F. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 450 and HY 337.

Development of civilization in China from Neolithic times to 200 B.C.E.

HIST 451 03(3-0-0). Medieval China and Central Asia. S. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 121 or HIST 170; completion of 45 credits. Credit not allowed for both HIST 451 and HY 339.

Historical developments in China and Central Asia from 200 B.C.E. to 1300 A.D.

HIST 452 03(3-0-0). China in the Modern World, 1600-Present. S, SS. Prerequisite: HIST 101 or HIST 120 or HIST 121 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 452 and HY 341.

Historical developments in China since 1600.

HIST 455 03(3-0-0). Tokugawa and Modern Japan, 1600-Present. F, S. Prerequisite: HIST 101 or HIST 120 or HIST 121 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 455 and HY 335.

Historical developments in Japan since 1600.

HIST 456 03(3-0-0). East Asia in the Age of Empire, 1800-Present. F. Prerequisite: HIST 120 or HIST 121 or HIST 171; completion of 45 credits.

Rise of modern imperialism in East Asia, both from without (the "West") and from within (Japan), 1800-present.

HIST 460 03(3-0-0). Slavery in the Americas. F. Prerequisite: HIST 101 or HIST 150 or HIST 171 or HIST 250; completion of 45 credits.

Slave labor; Atlantic world economy; African contributions to American culture; gender and racial dynamics; emancipation movements.

HIST 461 03(3-0-0). Rise and Fall of British Empire. S. Prerequisite: HIST 100 or HIST 101 or HIST 121 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 461 and HY 416.

Beginnings of globalization; its origins in the spread of the British Empire; major causes of expansion, forms of control, long-term effects.

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HIST 462 03(3-0-0). Themes in World History. F, S. Prerequisite: HIST 100 or HIST 101 or HIST 115 or HIST 120 or HIST 121 or HIST 150 or HIST 151 or HIST 170 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 462 and HY 445.

Major themes in world history including urbanization, technology, religion, politics, and economics.

HIST 463 03(3-0-0). Science and Technology in Modern History. S. Prerequisite: HIST 101 or HIST 121 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 463 and HY 447.

Impact of science and technology on industry, agriculture, medicine, education, etc. Issues in science and technology policy.

HIST 464 03(3-0-0). Pacific Wars: Philippines-WWII. F. Prerequisite: HIST 101 or HIST 121 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 464 and HY 402.

Diplomatic, ideological, political, cultural, and military aspects of war in the Pacific from the Philippines war through WWII.

HIST 465 03(3-0-0). Pacific Wars: Korea and Vietnam. S. Prerequisite: HIST 101 or HIST 121 or HIST 151 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 465 and HY 403.

Diplomatic, ideological, political, cultural, and military aspects of war in the Pacific from the war in Korea through the war in Vietnam.

HIST 466 03(3-0-0). U.S. China Relations Since 1800. F, S. Prerequisites: HIST 120 or HIST 121 or HIST 171; completion of 45 credits. Credit not allowed for both HIST 466 and HY 460.

United States-China relations as represented in travel narratives, memoirs, journalistic and diplomatic writing, biography, and autobiography.

***HIST 468 03(3-0-0). Islamic Gunpowder Empires, 1500-1800.** F. Prerequisite: HIST 100 or HIST 101 or HIST 115 or HIST 120 or HIST 121 or HIST 170 or HIST 171; completion of 45 credits.

History of the Ottoman, Safavid, and Timurid/Mughal Empires, 1500-1800.

HIST 469 03(3-0-0). The Crusades. S. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170; completion of 45 credits. Credit allowed for only one of the following: HIST 434, HIST 469, or HY 346.

The Crusades, emphasizing religion, politics, and warfare in Western Europe, Byzantium, the Near East, and the Mongol world empire, c. 1050-1300.

HIST 470 03(3-0-0). World Environmental History, 1500-Present. F. Prerequisite: HIST 101 or HIST 121 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits.

World environmental history since 1500, emphasizing the dynamic interaction of nature, culture, and human activity.

HIST 471 03(3-0-0). History of Antarctica, 1800-Present. S. Prerequisite: HIST 101 or HIST 171; completion of 45 credits.

History of Antarctica from discovery in the early nineteenth century to the present.

HIST 476 03(3-0-0). History of America's National Parks. S. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits.

The national park system and its development from concept to design to implementation.

HIST 477 03(3-0-0). Teaching History. F. Prerequisite: EDUC 465 or concurrent registration; admittance to teacher licensure; completion of 45 credits.

Teaching history, emphasizing teaching historical literacy, research, and writing at the middle and high school levels.

°HIST 478/°ANTH 478 03(3-0-0). Heritage Resource Management. S. Prerequisite: Junior standing. Credit not allowed for both HIST 454 and

ANTH 454. Credit not allowed for both HIST 478/ANTH 478 and HY 454/AP 454.

Cultural resource laws and policy; practices commonly employed in the management and preservation of these diverse resources.

***HIST 479 03(3-0-0). Practice of Public History.** F. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits.

Public history methodology.

HIST 484 Var. Supervised College Teaching. Prerequisite: Completion of 45 credits.

Assisting the instructor in teaching introductory history courses; relevant readings and discussions.

HIST 487 Var [1-3]. Internship. Prerequisite: Completion of 45 credits. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Application of historical methods in museums, libraries, and at historic sites.

HIST 492 03(0-0-3). Capstone Seminar. F, S. Prerequisite: Senior status. History majors only. To count toward the major, the course must be completed with a C or better.

Seminar involving critical reading, writing, research, and discussion. Topics vary by instructor.

HIST 495 Var [1-3]. Independent Study. Prerequisite: Completion of 45 credits.

HIST 497 Var [1-3]. Group Study. Prerequisite: Completion of 45 credits.

HIST 501 03(0-0-3). Historical Method: Historiography. F, S, SS. Prerequisite: Written consent of instructor.

Historiographical skills and methods; emphasis on research, writing, and interpretation.

HIST 502 03(0-0-3). Historical Method: Archives. F, S, SS. Prerequisite: Written consent of instructor.

Historiographical skills and methods; emphasis on fundamentals of archival science.

HIST 503 03(0-0-3). Historical Method: Preservation. F, S, SS. Prerequisite: Written consent of instructor.

Historiographical skills and methods; emphasis on theory and practice of historic preservation.

HIST 504 03(0-0-3). Historical Method: Museums. F, S, SS. Prerequisite: Written consent of instructor.

Historiographical skills and methods; emphasis on philosophy and practices of history museums.

HIST 511 03(0-0-3). Reading Seminar-U.S. to 1877. F, S, SS. Prerequisite: HIST 501.

Readings on United States history to 1877.

HIST 512 03(0-0-3). Reading Seminar-U.S. Since 1877. F, S, SS. Prerequisite: HIST 501.

Readings on United States history since 1877.

°HIST 515 03(3-0-0). Records Management. S. Prerequisite: HIST 501.

Basic records management techniques and concepts such as retention, vital records, disaster planning, and electronic records.

HIST 520 03(0-0-3). Reading Seminar-Europe to 1815. F, S, SS. Prerequisite: HIST 501.

Readings on European history to 1815.

HIST 521 03(0-0-3). Reading Seminar-Europe Since 1815. F, S, SS. Prerequisite: HIST 501.

Readings on European history since 1815.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HIST 530 03(0-0-3). Reading Seminar-Africa. F, S, SS. Prerequisite: HIST 501.

Readings on major historiographical issues in African history.

HIST 531 03(0-0-3). Reading Seminar-Latin America. F, S, SS. Prerequisite: HIST 501.

Readings on major historiographical issues in Latin American history.

HIST 532 03(0-0-3). Reading Seminar-Middle East. F, S, SS. Prerequisite: HIST 501.

Readings on major historiographical issues in Middle East history.

HIST 533 03(0-0-3). Reading Seminar-East Asia. F, S, SS. Prerequisite: HIST 501.

Readings on major historiographical issues in East Asian history.

HIST 534 03(0-0-3). Reading Seminar-South Asia. S. Prerequisite: HIST 501.

Major historiographical issues in South Asian history.

HIST 539 03(0-0-3). Reading Seminar—World Environmental History. S. Prerequisite: Graduate standing.

Major works in the field of world environmental history and the major historiographical debates.

HIST 540 03(0-0-3). Material Culture. F, S, SS. Prerequisite: HIST 501.

Social, cultural, economic, and political developments in history as interpreted through artifacts.

HIST 586 Var. Practicum. Prerequisite: HIST 501.

HIST 587 Var [1-6]. Internship. Prerequisite: HIST 501.

Work-oriented instruction involving implementation of classroom or laboratory experiences coordinated by faculty member.

HIST 611 03(0-0-3). Research Seminar: United States. F, S, SS. Prerequisite: HIST 501.

Research on United States history.

HIST 621 03(0-0-3). Research Seminar: Europe. F, S, SS. Prerequisite: HIST 501.

Research on European history.

HIST 640 03(0-0-3). Research Seminar: State and Local History. F, S, SS. Prerequisite: Written consent of instructor.

Research in and interpretation of state and local history within the broader context of United States history.

HIST 684 Var. Supervised College Teaching.

Discussions and readings to enhance teaching proficiency.

HIST 695 Var. Independent Study. Prerequisite: HIST 501.

HIST 697 Var [1-3]. Group Study.

HIST 699 Var. Thesis. Prerequisite: HIST 501.

HONORS COURSES

Nondepartmental

University Honors Program

Office of Provost and Executive Vice President

HONR 192 04(3-0-1). Honors First Year Seminar. F, S. Prerequisite: Participation in University Honors Program.

Humanistic and scientific studies; emphasis on literate activities, written communication; student development and transition to university life.

HONR 193 03(0-0-3). Honors Seminar. (AUCC 1A). F, S. Prerequisite: HONR 192; participation in University Honors Program.

Humanistic and scientific studies with emphasis on rigorous literate activities, especially written communication.

HONR 195 Var [1-3]. Honors Independent Study. Prerequisite: Participation in University Honors Program.

HONR 197 Var [1-4]. General Honors Colloquium. Prerequisite: Participation in University Honors Program. Limited to qualified freshmen and sophomores.

Students from all major fields meet in small groups to focus on a problem of concern to all.

HONR 384 Var. Supervised College Teaching. F, S. Prerequisite: Participation in University Honors Program. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

HONR 392 03(0-0-3). Honors Seminar. (AUCC 3B). F, S. Prerequisite: HONR 193, participation in University Honors Program.

Various topics in humanistic and scientific studies.

HONR 397 Var [1-4]. General Honors Colloquium. Prerequisite: Participation in University Honors Program. Normally limited to qualified juniors and seniors.

Students from all major fields meet in small groups to focus on a problem of concern to all.

HONR 399 01(0-0-1). Pre-thesis. F, S. Prerequisite: Participation in University Honors Program.

Preparation for Honors senior thesis.

HONR 492 03(0-0-3). Honors Senior Seminar. (AUCC 3C). Prerequisite: HONR 392; participation in University Honors Program.

Variable topics on humanistic and scientific studies.

HONR 495 Var [1-5]. Independent Study. Prerequisite: Participation in University Honors Program.

Individual projects developed by the student and the major adviser at the upper-division level but which transcends basic course content.

HONR 498 Var[1-4]. Honors Undergraduate Research. F. Prerequisite: Junior standing; participation in University Honors program.

HONR 499 03(0-0-3). Senior Honors Thesis. Prerequisite: HONR 399; participation in University Honors Program.

HORTICULTURE COURSES

Department of Horticulture and Landscape

Architecture

College of Agricultural Sciences

HORT 100 04(3-2-0). Horticultural Science. (AUCC 3A). F, S, SS.

Principles of plant science and related disciplines as the base and context for the introduction of horticulture practices. (\$)

HORT 171/SOCR 171 03(2-0-1). Environmental Issues in Agriculture. (GT-SS3, AUCC 3E). F. Credit not allowed for both HORT 171 and SOCR 171.

Historical development of agriculture, environmental consequences of modern food production, and other cultural approaches to agriculture.

+HORT 221 04(2-4-0). Landscape Plants. F, S.

Identification, landscape features, cultural requirements, and landscape use of coniferous and deciduous trees and shrubs, vines, and evergreens. (\$)

HORT 231 04(2-4-0). Landscape Graphics Studio. F.

Mechanical and freehand graphic techniques for landscape design. Use of pencil, ink, and colored markers. Plan, sectional, and perspective views.

HORT 232 04(2-4-0). Principles of Landscape Design. S. Prerequisite: HORT 231.

Basic concepts in the art and process of landscape design. (\$)

HORT 260 04(3-2-0). Plant Propagation. S. Prerequisite: BZ 120 or concurrent registration or HORT 100 or concurrent registration or LIFE 103 or concurrent registration.

Theories, principles, and techniques of sexual and asexual propagation. (\$)

HORT 270 02(2-0-0). Fundamentals of Horticultural Therapy. F.

Theory and practice of horticultural therapy in health care and human services; applications, settings, and professional career topics. (NT)

°HORT 277 01(1-0-0). Introduction to Enology. F.

Methods/criteria to evaluate, compare, and describe aroma and flavor characteristics in sound commercial wines; identification of common wine defects.

HORT 310 04(3-2-0). Greenhouse Management. F, S, SS.

Design and use of enclosed structures to manipulate controlled environments, effects on growth as applied to crops, production, and marketing crops. (\$, NT-O)

+HORT 321 04(3-2-0). Nursery Production and Management. S. Prerequisite: BZ 120 or HORT 100 or LIFE 103.

Nursery industry organization, management, equipment, field and container production, storage, shipping, marketing, and business management practices. (\$)

+HORT 322 03(2-2-0). Herbaceous Plants. F.

Identification, landscape features, cultural requirements, and uses of ornamental annual, perennial, and bulb plants. (\$)

HORT 330 02(1-2-0). Computers for Landscape Design. S.

Applications and techniques of computer software utilized in small-scale landscape design-build.

HORT 331 02(2-0-0). Landscape Design. S, SS. For non-design majors only.

Fundamentals of landscape design theory and plant composition as presented in simple problems. For non-design majors only.

+HORT 335 04(2-4-0). Landscape Structures. F. Prerequisite: CON 131; HORT 232.

Design and construction methods for structures commonly used in

residential landscaping. Preparation of construction documents. (\$)

HORT 336 04(2-4-0). Landscape Grading and Drainage Studio. S. Prerequisite: HORT 221; HORT 322; HORT 335; MATH 118.

Basic design principles for grading, drainage, and earth forms for small-scale projects. (\$)

+HORT 341 03(2-2-0). Turfgrass Management. F. Prerequisite: HORT 100 or concurrent registration.

Principles and practices of turfgrass propagation and maintenance. (\$)

***HORT 344 01(1-0-0). Organic Greenhouse Production.** S. Prerequisite: HORT 310.

Fundamentals of greenhouse production using organic production methods.

***HORT 345/*SOCR 345 02(0-4-0). Diagnosis and Treatment in Organic Fields.** SS. Prerequisite: BSPM 302 or BSPM 308 or BSPM 361; HORT 100 or SOCR 100; SOCR 240. Credit not allowed for both HORT 345 and SOCR 345.

Field experience in diagnosis of pest and nutrient problems on organic farms and development of treatment recommendations. (\$)

HORT 367 03(2-2-0). Landscape Irrigation. S. Credit allowed for only one of the following: HORT 367, HORT 368, LAND 368.

Practical design of sprinkler and trickle irrigation systems for commercial and residential landscapes.

HORT 368/LAND 368 03(2-2-0). Landscape Irrigation and Water Conservation. F, S. Prerequisite: HORT 100 or LAND 110. Credit allowed for only one of the following: HORT 367, HORT 368, LAND 368.

Practical approaches and methods of irrigation, water conservation, and water management in the designed landscape.

HORT 370 01(1-0-0). Landscape Irrigation. S. Prerequisite: HORT 100 or concurrent registration.

Necessary skills to design and manage irrigation systems commonly used in the landscape industry.

HORT 377 01(1-0-0). Horticultural Methods for Therapy Programs. S. Prerequisite: HORT 100; HORT 270.

Horticultural methods for health care and human service settings, including indoor and outdoor growing techniques, management and plant selection (NT)

HORT 382 03(0-0-3). Origins of Agriculture in the Andes of Peru. SS. Prerequisite: HORT 100 or BZ 120 or LIFE 103.

Study abroad experience focused on understanding the agricultural, biological, cultural and geographical diversity of the Andes region of Peru.

HORT 384 Var [1-5]. Supervised College Teaching. F, S, A. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

***HORT 401 03(3-0-0). Medicinal and Value-Added Uses of Plants.** S. Prerequisite: BZ 120 or HORT 100 or LIFE 103.

Chemical, biochemical and ethnobotanical perspective on the medicinal and value-added uses of plants.

+HORT 412 04(3-0-1). Floriculture Crops. F, S, SS.

Commercial production and marketing of bedding plants, potted container crops, and cut flowers. (\$, NT-O)

HORT 421 02(2-0-0). Horticultural Therapy Techniques. S. Prerequisite: HORT 270.

Clinical skills in horticultural therapy; communication, safety, leadership, therapeutic relationships, adaptation of tools and activities. (NT)

HORT 423 02(2-0-0). Horticultural Therapy Programming. S. Prerequisite: HORT 421.

Methods for individual treatment planning, intervention, documentation, and reporting within therapy, social, and vocational HT programs. (NT)

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

***HORT 424/SOCR 424 03(3-0-0). Topics in Organic Agriculture.** S. Prerequisite: AREC 202 or ECON 202; AREC 328; HORT 100 or SOCR 100; HORT 171/SOCR 171; SOCR 240. Credit not allowed for both HORT 424 and SOCR 424.

Examination of issues specific to organic food production systems and marketing.

HORT 425 03(2-0-1). Horticultural Therapy Management. F. Prerequisite: HORT 423.

Horticultural therapy program and site design, proposals, funding, marketing, management, and evaluation. (NT)

HORT 431 04(2-4-0). Planting Design Studio. F. Prerequisite: HORT 221; HORT 322; HORT 336.

Functional and aesthetic values of plant materials; their creative use in landscape design. (\$)

+HORT 432 05(2-6-0). Intensive Landscape Design Studio. S. Prerequisite: HORT 431; HORT 487.

Site planning and design for landscape projects of a limited scale. Problems of increasing complexity. Emphasis on real sites and clients. (\$)

+HORT 441 03(3-0-0). Turfgrass Science. S Prerequisite: BZ 120 or HORT 100 or SOCR 240.

Examination of turfgrass management practices from a scientific perspective; discussion of advanced turfgrass management technologies. (\$)

+°HORT 450A-D 01(1-0-0). Horticulture Food Crops. F. Prerequisite: BZ 120 or HORT 100 or LIFE 103 or SOCR 100

. *A) Cool season vegetable production. (\$) *B) Warm season vegetable production. (\$) °C) Small fruit production. (\$) °D) Tree fruit production. (\$)

***HORT 452 01(1-0-0). Viticulture-Grape Production.** F. Prerequisite: BZ 120 or HORT 100 or LIFE 103 or SOCR 100.

Grape production in temperate zone climates. (\$)

HORT 454 02(2-0-0). Horticulture Crop Production and Management. S. Prerequisite: HORT 310 or HORT 450A-B.

Production and management of horticulture crops.

°HORT 460/SOCR 460 03(2-0-1). Plant Breeding. F. Prerequisite: BZ 350 or concurrent registration or LIFE 201A or concurrent registration or SOCR 330 or concurrent registration. Credit not allowed for both SOCR 460 and HORT 460.

Theory and practice of plant breeding using principles of genetics and related sciences.

°HORT 461/SOCR 461 01(0-2-0). Plant Breeding Laboratory. S. Prerequisite: HORT 460/SOCR 460 or concurrent registration. Credit not allowed for both HORT 461 and SOCR 461.

Techniques and procedures used in public and commercial plant breeding programs.

°HORT 462 03(3-0-0). Viticulture Practices in Grape Production. F.

Biology of grape vines and cultural practices including planning, training, pest control, pruning, and harvesting; special emphasis on Colorado.

+HORT 464 03(2-2-0). Arboriculture. F. Prerequisite: HORT 100; SOCR 240.

Care of trees in the landscape including planting, pruning, appraisal, and diagnosis.

HORT 465 03(2-2-0). Landscape Estimating. F. Prerequisite: MATH 117; MATH 118; MATH 124 or MATH 125 or MATH 141 or MATH 155; HORT 221.

Landscape construction estimating and bidding, contract documentation, and other business practices relevant to landscape design-build and

contracting. (\$)

***HORT 466 03(2-2-0). Community Forestry.** S. Prerequisite: HORT 221.

Policies and management of public and privately owned community forests in urbanized areas.

°HORT 476 03(3-0-0). Environmental Plant Stress Physiology. S. Prerequisite: BZ 440. Credit not allowed for both HORT 476 and HORT 576.

Plant growth, development and physiology, major sources of stress in plants, global issues in environment and plant stress.

***HORT 477 03(3-0-0). Enology-History and Winemaking.** F. Prerequisite: CHEM 107 or concurrent registration and CHEM 108 or concurrent registration or CHEM 111 or concurrent registration and CHEM 112 or concurrent registration.

History and development of the wine industry; mechanics of various processes and factors affecting wine quality and consumer acceptance.

HORT 479 02(2-0-0). Professional Landscape Practices. S. Prerequisite: HORT 100; HORT 465.

Business skills involved in a successful career in the green industry.

HORT 486A-B. Practicum.

A) Floriculture. 02(0-4-0). F, S. Prerequisite: HORT 310. Directed experience in applications of floriculture. B) General. Var [1-6]. F, S, SS. Directed experiences in applications of horticulture techniques and procedures.

HORT 487 Var. Internship.

HORT 495 Var. Independent Study.

HORT 496 Var. Group Study.

***HORT 571 03(3-0-0). Soil-Plant-Water Relations/Water Stress.** S. Prerequisite: BZ 440.

Movement of water in the soil-plant-atmosphere continuum. Instrumentation for measuring plant-water relations. Plant responses to drought and salinity.

***HORT 575 02(2-0-0). Plant Germplasm Conservation.** S. Prerequisite: HORT 460/SOCR 460.

Principles, concepts, and methodology for collection, conservation, and utilization of plant genetic resources.

°HORT 576 04(3-0-1). Advanced Environmental Plant Stress Physiology. S. Prerequisite: BZ 440. Credit not allowed for both HORT 576 and HORT 476.

Advanced aspects of plant growth, development and physiology, major sources of stress in plants, global issues in environment and plant stress.

HORT 588 Var. Supervised Extension Practices.

Field experiences in extension practices in horticulture.

°HORT 601 02(1-0-1). Topics in Root and Rhizosphere Biology. S. Prerequisite: One course in plant physiology; one course in biochemistry.

In-depth overview of the biology of roots and the rhizosphere processes related to roots.

HORT 675 03(3-0-0). Plant Stress Physiology. F. Prerequisite: BZ 440.

Research concepts based on physiological, biochemical, and molecular mechanisms controlling environmental stresses in plants.

HORT 698 Var. Research.

HORT 699 Var. Thesis.

HORT 784 Var. Supervised College Teaching.

HORT 792 01(0-0-1). Seminar. F, S.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HORT 795 Var. Independent Study.

HORT 799 Var. Dissertation.

^oAlternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

INTERNATIONAL EDUCATION COURSES

Nondepartmental, Interdisciplinary Office of Provost and Executive Vice President

IE 116/AGRI 116 03(2-0-1). Plants and Civilizations. (GT-SS3, AUCC 3E). F, S. Credit not allowed for both IE 116 and AGRI 116.

Plant origins and their relationships with cultures/civilizations as food, spices, perfumes, and medicines and in art, religion, wars, slavery, etc.

IE 179 03(3-0-0). Globalization: Exploring Our Global Village. F. Prerequisite: Residents of Global Village Residential Learning.

Analysis and implications of social, cultural, economic, and political change in the context of globalization and transnational relationships.

IE 270/AGRI 270 03(3-0-0). World Interdependence-Population and Food. (GT-SS3, AUCC 3E). S. Credit not allowed for both IE 270 and AGRI 270.

Survey of world population and food; emphasis on understanding the problems and opportunities in a world context.

IE 271 03(3-0-0). India. S.

Interdisciplinary interpretation of philosophical, historical, cultural, physical, social, and technological influences shaping modern India.

IE 272 Var[1-3]. World Interdependence-Current Global Issues. F.

Current global issues, using guest speakers and focusing on global/international topics that are in the news.

IE 370 03(3-0-0). Model United Nations. (AUCC 3E) F.

Structure and function of the United Nations; role of international organizations in international relations; opportunity to practice modeling role of UN representatives.

IE 450/SOWK 450 03(2-0-1). International Social Welfare and Development. F. Credit not allowed for both IE 450 and SOWK 450.

Framework of social welfare and development in international area; social need with focus on cultures/countries in transition.

IE 470 03(3-0-0). Women and Development. F.

Research and policy issues related to women in developing countries.

IE 471 03(3-0-0). Children and Youth in Global Context. S.

Global issues affecting children and youth are examined in cultural context. (NT-O)

IE 472 03(3-0-0). Education for Global Peace. F, S. Prerequisite: Upper-division status.

Peacekeeping, peacemaking and peace-building on micro and macro levels, and education's role in them, as key components for sustaining global peace.

IE 479/ANTH 479 03(3-0-0). International Development Theory and Practice. F. Prerequisite: Junior or senior standing.

Contemporary issues in international community and economic development with practical and theoretical analysis from interdisciplinary perspectives.

IE 482A-G Var [1-6]. Travel Study-Global Studies. F, S.

Current global issues, topics, traditions studies in one or more countries of the region. **A)** Africa. **B)** Asia. **C)** Australia/Oceania. **D)** Canada/North America. **E)** Europe. **F)** Latin America and the Caribbean. **G)** Middle East.

IE 492 Var[1-3]. International Education Seminar. F, S, SS.

Topics in international education.

***IE 517/*PSY 517 03(0-0-3). Perspectives in Global Health.** S. Credit

not allowed for both IE 517 and PSY 517.

Science, skills, and beliefs directed at the maintenance and improvement of health for all people.

IE 550/PHIL 550 03(3-0-0). Ethics and International Development. F. Prerequisite: Written consent of instructor. Credit not allowed for both IE 550 and PHIL 550.

Ethical reflection applied to development goals, strategies of Third World countries; relations between developed and developing countries.

IE 679/ANTH 679 03(3-0-0). Applications of International Development. F, S. Prerequisite: Graduate standing.

In-depth interdisciplinary analysis of theoretical and practical issues in implementing economic and community-based international development programs.

IE 692 Var[1-3]. International Education Seminar. F, S, SS.

Topics in international education.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

INTERNATIONAL STUDIES COURSES

Nondepartmental

College of Liberal Arts

INST 300 03(0-0-3). Approaches to International Studies. F.
Prerequisite: GR 100.

Interdisciplinary and comparative analytical approaches to the field of international studies.

INST 484 Var[1-5]. Supervised College Teaching. F, S, SS.

A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

INST 487 Var[1-3]. Internship. F, S, SS.

INST 492 03(0-0-3). Seminar. F, S. Prerequisite: INST 300; International Studies concentration students only.

INTERIOR DESIGN COURSES

Department of Design and Merchandising *College of Applied Human Sciences*

INTD 129 03(3-0-0). Introduction to Interior Design. F, S, SS.

Interior design discipline's professional values with emphasis on elements and principles of design. (NT-O)

INTD 166 03(0-6-0). Visual Communication/Sketching. F, S, SS.

Hand drafting, free-hand sketching and conceptualization to communicate interior design concepts visualizing 2 and 3 dimensional representations.

INTD 200 03(3-0-0). Housing Values in America. F, S.

Housing issues in the U.S.; values, norms, roles of government and building professions; interaction of issues with U.S. public values to meet housing needs.

INTD 201 03(0-6-0). Two-Dimensional Fundamentals-Interior Design.

F. Prerequisite: INTD 129; INTD 166; design scenario advancement.

Demonstration of 2-dimensional elements and principles of design incorporating creative thinking, design fundamentals, design communication skills.

INTD 210 03(3-0-0). Interior Design Anatomy. F. Prerequisite: INTD 129; INTD 166; design scenario advancement.

Applying basic concepts of human behavior, anthropometrics, and space planning to residential interiors.

INTD 235 03(2-2-0). Interior Design Technologies. F. Prerequisite: CON 151; INTD 166.

Principles and procedures required in interpreting and producing building site plans, floor plans, elevations, sections, and interior details.

INTD 236 03(0-6-0). Three Dimensional Thinking. F. Prerequisite: INTD 129; INTD 166; design scenario advancement.

Demonstration and application in visualizing interior space in three dimensions.

INTD 255 03(3-0-0). Residential Interiors. F, S, SS. Offered as an online course only.

Theories, issues, and planning elements that impact the design of residential interiors. (NT-O)

INTD 256 03(1-4-0). Computer-Aided Design for Interior Designers. F. Prerequisite: INTD 129; INTD 166; design scenario advancement.

Use of computer-aided design (CAD), specifically two-dimensional and three-dimensional drafting using PC software.

INTD 266 03(0-6-0). Visual Communication-Multi-Media. S. Prerequisite: INTD 210; INTD 236.

Visual communication using advanced sketching rendering, manually and with technology, and alternative presentation methods.

INTD 276 03(0-6-0). Interior Design I. S. Prerequisite: CON 235; INTD 210; INTD 236; INTD 256.

Application of design process to small interior design projects. Design solutions communicated using manual and technology tools.

INTD 296A-B Var [1-3]. Group Study. F, S, SS. Prerequisite: Design scenario advancement.

A) Space planning and application. B) Design application.

INTD 330 03(2-2-0). Lighting Design. F. Prerequisite: CON 371 or concurrent registration; INTD 276 with a C or better.

Application of lighting design in interior environments. (\$)

INTD 336 03(3-0-0). Color. F, S, SS. Offered only through the Division

of Continuing Education.

Color theories, principles, trends and application in design. (NT-O)

INTD 340 03(3-0-0). Interior Materials and Finishes. F. Prerequisite: DM 120; INTD 276 with a C or better.

Analysis of materials and resources for interiors.

INTD 350 03(3-0-0). Codes-Health and Safety. S. Prerequisite: INTD 210; INTD 276 or concurrent registration or INTD 376 or concurrent registration.

Health and safety issues in interior design, including codes, regulations, and universal design.

INTD 356 03(3-0-0). Professional Communications-Interior Design.

S. Prerequisite: CO 150 or HONR 193; INTD 276 with a C or better.

Mastery of written communication skills required in the field of interior design.

INTD 359 03(3-0-0). History of Interior Design. S. Prerequisite: INTD 276 with grade of C or better.

Survey of interior design history from ancient through the present.

INTD 376 03(0-6-0). Interior Design II. S. Prerequisite: CON 371; INTD 330; INTD 340.

Application of design components to medium-scale residential and non-residential interior design projects.

INTD 384 Var. Supervised College Teaching. F, S. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

INTD 400 04(1-4-1). Interior Design Research Proposal. F. Prerequisite: INTD 376 with a C or better.

Research, development, and presentation of a programming proposal for a large scale interior design project with service learning component.

INTD 450/CON 450 03(3-0-0). Travel Abroad-Sustainable Building. SS. Credit not allowed for both INTD 450 and CON 450.

Major components of sustainable design and construction, energy, healthy buildings, natural resources, and other environmental issues.

INTD 476 04(0-8-0). Interior Design Project. S. Prerequisite: INTD 400 with a C or better.

Large scale projects representing research-based design solutions, illustrating synthesis and analysis of entry-level concepts, portfolio development. (\$)

INTD 487 Var Internship. Prerequisite: INTD 356; INTD 376 with a C or better.

INTD 495 Var. Independent Study. Maximum of 10 credits allowed in course.

INTD 496A-B Var [1-3]. Group Study. Maximum of 10 credits allowed in course.

A) Program skills. B) Design application.

INTD 550 03(3-0-0). Universal Design. F. Prerequisite: INTD 376 with a C or better.

Analysis and evaluation of universal design as it applies to diverse population segments and interior environments.

INTD 575 Var [1-8]. Problems-Interior Design. F, S, SS. Prerequisite: INTD 376 with a C or better or undergraduate degree in interior design or related field. (NT-O)

INTD 578 03(2-0-1). Trends/Issues in Interior Design. F, S, SS. Prerequisite: INTD 376 with a C or better. (NT-O)

INTD 675 Var [1-8]. Problems-Interior Design. F, S, SS. Prerequisite: Three credits of INTD 575. (NT-O)

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

INTRA-UNIVERSITY COURSES

Nondepartmental

Office of Provost and Executive Vice President

IU 150 02(2-0-0). Diverse Students in Higher Education. S. Prerequisite: None.

Issues surrounding educational opportunity and social mobility through direct mentoring with high school students.

IU 170 02(1-0-1). A Call to Lead I: Theories and Skills. F. Prerequisite: Must be a member of the President's Leadership Program; written consent of instructor.

Fundamentals of leadership theories and skills.

IU 171 02(1-0-1). A Call to Lead II: Social Change Model. S. Prerequisite: Must be a member of the President's Leadership Program; IU 170; written consent of instructor.

Social change model of leadership development.

IU 193 01(0-0-1). Freshman Seminar. F, S, SS. Prerequisite: Students who have earned fewer than 30 credits (CSU and transfer) only. Maximum of 1 credit allowed.

Academic study in small-class setting. Topics vary by instructor. (\$)

IU 198 01(0-3-0). Freshman Laboratory Research. Prerequisite: Freshmen only; written consent of instructor.

Hands-on research on an academic research project.

IU 263 03(1-0-2). Academic and Career Decision-Making. F.

Prerequisite: Participation in the Key Learning Community.

Enhance academic and career development and decision-making through self-authorship, critical thinking, and reflection.

IU 270 02(1-0-1). Leadership Styles I: Personal Application. F.

Prerequisite: Must be a member of the President's Leadership Program; written consent of instructor.

Leadership styles and contexts for personal application.

IU 271 02(1-0-1). Leadership Styles II: Prominent Leaders. S.

Prerequisite: Must be a member of the President's Leadership Program; IU 270; written consent of instructor.

Leadership styles and contexts of prominent leaders for personal application.

IU 272 03(2-0-1). Leadership-Higher Education Environment. F.

Personal leadership and diversity theories.

IU 273 02(1-0-1). Leadership Techniques for Greeks. F, S.

Critical elements of analytical and intellectual examination and reflection of certain core issues in the practice of leadership.

IU 470 03(2-0-1). Effective Leadership I: Success as a Leader. F.

Prerequisite: Must be a member of the President's Leadership Program; written consent of instructor. Personal leadership skill development and its relationship to success as a leader.

IU 471 03(2-0-1). Effective Leadership II: Vision and Change. S.

Prerequisite: Must be a member of the President's Leadership Program; IU 470; written consent of instructor.

Individual personal leadership styles; relationship between personal skill development and successful leadership.

JOURNALISM AND TECHNICAL COMMUNICATION COURSES

Department of Journalism and Technical Communication

College of Liberal Arts

JTC 100 03(3-0-0). Media in Society. (GT-SS3, AUCC 3C). F, S.
Role of media in American democracy; impact of media on individuals and society.

JTC 192 03(1-4-0). Freshman Seminar. F, S. Prerequisite: Admission to major. Credit not allowed for both JTC 192 and JTC 210.
Basic journalism skills; newsgathering and newswriting.

JTC 200 03(1-0-2). Professional Writing. F, S. Prerequisite: CO 150 or HONR 193.
Basic elements of writing for professional and specialized audiences.

JTC 210 03(1-4-0). Newswriting. F, S, SS. Prerequisite: Satisfactory performance on typing and diagnostic test. Credit not allowed for both JTC 210 and JTC 192.
Theory and practice in newswriting.

JTC 211 03(3-0-0). Computer-Mediated Visual Communication. F, S. Prerequisite: JTC 210.
Theory, techniques for using computer-related techniques for visual presentation of news, specialized, and technical information.

JTC 300 03(3-0-0). Professional and Technical Communication. (AUCC 2B). F, S, SS. Prerequisite: CO 150 or HONR 193.
Professional writing and presentation skills applied to students' major fields. (NT-O)

JTC 301 03(2-0-1). Business Communication. F, S. Prerequisite: CO 150 or HONR 193.
Principles and practice of effective business communication with emphasis on written professional reports. (NT-O)

JTC 310 03(2-2-0). Copy Editing. F, S. Prerequisite: JTC 100; JTC 210.
Theory of copy preparation and editing; publication layout.

JTC 311 03(3-0-0). History of Media. F, S. Prerequisite: None.
Media development, growth, trends within context of political, social, and economic change. (NT-O)

JTC 316/ETST 316 03(3-0-0). Multiculturalism and the Media. S. Credit not allowed for both JTC 316 and ETST 316.
Media and multiculturalism with emphasis on race, ethnicity, and other protected groups.

JTC 320 03(1-4-0). Reporting. F, S. Prerequisite: JTC 210.
Theory, methods, and practice of gathering information and reporting news.

JTC 326 03(2-2-0). Online Writing and Journalism. F, S. Prerequisite: JTC 210; JTC 211.
Website and message design and creation for media practitioners based on understanding of online attributes and technological context of journalism. (NT-O)

JTC 328 03(3-0-0). Feature Writing. S. Prerequisite: JTC 210.
Theory, methods and practice of reporting and writing feature stories, including human-interest, travel/adventure, reflective and in-depth articles.

JTC 335 03(2-2-0). Digital Photography. F, S. Prerequisite: JTC 211.
Basic photographic theory and practice using digital camera and image processing technology. (\$)

+JTC 340 03(2-2-0). Digital Video Editing. F, S. Prerequisite: JTC 210.
Theory and technique of editing picture and sound on digital platforms. (\$) (NT-O)

JTC 341 03(2-2-0). TV News Writing, Reporting and Producing. F, S. Prerequisite: JTC 210.
Practical application of principles, theory, and methods used in television newswriting, reporting, and producing. (\$)

JTC 342 03(2-2-0). Writing for Specialized Electronic Media. F. Prerequisite: JTC 210.
Audience and subject research; script structure and development; narrative techniques; visual story and role of visual media as change agents.

JTC 343 03(2-2-0). Advanced Television News Production. F, S. Prerequisite: JTC 341.
Advanced theory and practice of reporting and producing television news; basics of television news management. (\$)

+JTC 345 03(2-2-0). Electronic Field Production. F, S. Prerequisite: JTC 340.
Theory and techniques of video field production emphasizing news, current affairs, and special interest programs. (\$)

JTC 350 03(3-0-0). Public Relations. F, S.
Public relations principles and practices of business, industry, education, and public agencies. (NT-O)

JTC 351 03(2-2-0). Public Relations Practices. F, S. Prerequisite: JTC 210.
Planning, preparation, and application of public relations techniques.

JTC 353 03(3-0-0). Public Relations Campaigns. F, S. Prerequisite: JTC 210; JTC 350.
Development of professional public relations programs and campaigns, including analysis and research, strategy, implementation and evaluation.

JTC 355 03(3-0-0). Advertising. F, S.
Advertising principles and techniques used to develop effective advertising campaigns. (NT-O)

JTC 356 03(3-0-0). Advertising Creativity and Copywriting. F, S. Prerequisite: JTC 211; JTC 355.
Principles and practices producing advertising materials-print, broadcast, digital, out-of-home media, direct response, and collateral.

JTC 358 03(3-0-0). Advertising Media Buying and Selling. F, S. Prerequisite: JTC 211; JTC 355.
Principles of advertising planning, assessment and sales for client, agency and media organization personnel.

JTC 361 03(2-2-0). Writing for Specialized Magazines. S. Prerequisite: JTC 210.
Writing articles for agricultural, business, hobby, technical, trade, and other specialized periodicals whose readers use information to make decisions. (NT-O)

JTC 365 03(3-0-0). Computer Mediated Communication Foundations. F. Prerequisite: JTC 210.
Issues and research in computer mediated communication relating to individuals, groups, community, and society.

JTC 371 03(2-2-0). Publications Design and Production. F, S. Prerequisite: JTC 211.
Principles of producing publications for print and electronic delivery, including newspapers, magazines, newsletters, brochures, and printed ephemera.

JTC 372 03(2-2-0). Web Design and Management. F, S. Prerequisite: JTC 210; JTC 211.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Design, development, and management of World Wide Web content. (NT-O)

JTC 373 03(3-0-0). Digital Promotion Management. F. Prerequisite: JTC 211.

How organizations use digital technologies for advertising, publicity, promotional, and information purposes.

JTC 386 Var [1-3]. Communication Practicum. F, S, SS.

Practicum in using the different communication tools that comprise student media.

JTC 410 02(2-0-0). Newspaper Editing. F. Prerequisite: JTC 310.

Editorial techniques, responsibilities, news evaluation.

JTC 411 03(3-0-0). Media Ethics and Issues. F, S. Prerequisite: Junior or senior status.

Professional ethics, issues of media performance and of the relation of media systems to the social systems. (NT-O)

JTC 412 03(3-0-0). International Mass Communication. S.

Media communication systems, their roles throughout the world; news flow; propaganda in national development; role of foreign correspondents.

JTC 413 03(3-0-0). New Communication Technologies and Society. F, S.

Political, economic, social, philosophical, legal, and educational impacts of new technologies. (NT-O)

JTC 414 03(3-0-0). Media Effects. F, S.

Perspectives on audience processes and media effects on individuals and society.

JTC 415 03(3-0-0). Communications Law. F, S. Prerequisite: Junior or senior status.

Constitutional, statutory law of political speech, obscenity, advertising, libel; privacy, copyright, information ownership and access.

JTC 420 03(1-4-0). Advanced Reporting. F, S. Prerequisite: JTC 211; JTC 310; JTC 320.

Advanced techniques for gathering and evaluating information; interpretive reporting of public affairs issues.

JTC 433 03(3-0-0). Advanced Video Editing. S. Prerequisite: JTC 345.

Professional video editing practices, theories, and techniques with practical applications using current hardware and software.

JTC 435 03(2-3-0). Documentary Video Production. F. Prerequisite: JTC 345.

Writing, directing, and editing of long-form television documentaries. (\$)

+JTC 440 03(2-2-0). Advanced Electronic Media Production. F, S. Prerequisite: JTC 341; JTC 345.

Techniques and concepts used in advanced media production for television. (\$)

JTC 450 03(2-2-0). Public Relations Cases. S. Prerequisite: JTC 351; JTC 353; JTC 371 or JTC 372 or JTC 373.

Preparation of materials, use of media to achieve objectives with target audiences; work with nonprofit organizations in actual campaigns.

JTC 456/LB 456 03(2-2-0). Documentary Film as a Liberal Art. F. Prerequisite: Junior or senior standing. Credit not allowed for both JTC 456 and LB 456.

Documentary film and its role in human history, culture, and social interaction.

***JTC 460 03(3-0-0). Media Development.** S. Prerequisite: JTC 326; 27 additional credits of JTC.

Creation, design, production, and management of media.

JTC 461 03(2-2-0). Writing about Science, Health, and Environment. F. Prerequisite: JTC 210 or JTC 300 or LB 300.

Writing about science, health, and the environment for lay audiences from a journalistic perspective.

JTC 464 03(2-2-0). Technical Communication. F, S. Prerequisite: JTC 210 or JTC 300 or LB 300.

Writing and producing technical and scientific information for electronic and print media for professionals.

JTC 465 03(2-2-0). Specialized and Technical Editing. S. Prerequisite: JTC 211; JTC 310; JTC 361; JTC 371 or JTC 372; JTC 461 or JTC 464.

Editorial purpose, techniques, and evaluation of specialized and technical print and online information.

JTC 468 03(3-0-0). Convergence and Hypermedia. S. Prerequisite: JTC 310; JTC 365; 9 credits selected from JTC 326, JTC 372, JTC 373, or JTC 487.

Applications of theories of convergence, hypermedia, and social practices in computer-mediated communication. Development of a professional portfolio.

JTC 471 03(3-0-0). Communication Research Methods. F. Prerequisite: One statistics course. Credit not allowed for both JTC 471 and JTC 500.

Quantitative, qualitative methods of analyzing process and effects of mass and interpersonal communication.

JTC 484 Var [1-3]. Supervised College Teaching. F, S. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

JTC 487 Var [1-3]. Internship. Prerequisite: Written consent of department.

JTC 490 Var [1-3]. Workshop.

JTC 495A-G Var [1-3]. Independent Study.

A) Electronic reporting. B) Editing. C) Photojournalism. D) Public relations. E) Readings. F) Reporting. G) Technical communication.

JTC 496 Var [1-3]. Group Study.

JTC 500 04(4-0-0). Communication Research and Evaluation Methods. F. Credit not allowed for both JTC 500 and JTC 471.

Theory and applied communication research and evaluation methodologies for assessing and improving communication in technological environment.

JTC 501 04(4-0-0). Process and Effects of Communication. F. Prerequisite: JTC 500 or concurrent registration.

Examination of communication theory including communicator credibility, messages, channels, audiences, and information, behavior, and attitude change.

JTC 513 Var [1-2]. Impacts of New Communication Technologies. F, S.

Current topics and issues regarding uses and impacts of video and computer-based communication technologies.

JTC 535 03(3-0-0). Electronic Media Regulation and Policy. F.

Role of legislators, regulatory agencies, judiciary and public in the evolution of U.S. broadcast and digital media. Implications for free press.

JTC 544 03(2-3-0). Corporate and Institutional Media Production. S.

Advanced techniques in media production and management in corporate and institutional settings. (\$)

JTC 550 03(3-0-0). Public Relations. F, S. Offered only off campus.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Contemporary public relations principles and practices. (NT)

JTC 560 03(3-0-0). Managing Communications Systems. S. Prerequisite: JTC 501.

Examination of role, responsibilities of communication managers in translating theory into effective, applied communication programs.

JTC 568A-C Var [1-3]. Journalism for High School Advisers. F, S, SS. A) Journalism concepts. B) Newspapers. C) Yearbooks.

***JTC 570 03(3-0-0). Political Economy of Global Media.** F. Prerequisite: ECON 505 or JTC 500 or POLS 531 or SOC 667 or 18 credits in JTC classes.

Examination of the changing media information system worldwide and the role of social, political, legal and economic forces upon it.

JTC 601 03(3-0-0). Cognitive Communication Theory. F. Prerequisite: JTC 501.

Theories of information technology and communication as they relate to cognitive and social cognitive processing.

JTC 602 03(3-0-0). Social and Cultural Communication Theory. F. Prerequisite: JTC 500.

Theories of information technology and communication as they relate to the field of media systems, organizations, and culture.

JTC 614 03(3-0-0). Public Communication Campaigns. F. Prerequisite: JTC 501.

Conceptual, methodological issues and decisions underpinning determination of communication campaign effects, planning, implementation, and evaluation.

***JTC 630 03(3-0-0). Health Communication.** F. Prerequisite: JTC 501. Role of health communication in public health programs and campaigns.

JTC 640 03(3-0-0). Public Communication Technologies. S. Prerequisite: JTC 501.

Analysis of evolving and emergent communication technologies.

JTC 650 03(3-0-0). Public Relations Management. F. Prerequisite: JTC 501 or concurrent registration.

Theoretical and practical management techniques for public relations campaigns including societal, ethical, and legal issues involved.

JTC 660 03(3-0-0). Communication in Technology Transfer. F. Prerequisite: JTC 501 or concurrent registration.

Communication's role in technology transfer as related to nature, process, and effects of technology transfer, knowledge dissemination, and utilization.

JTC 661 03(3-0-0). Information Design. S. Prerequisite: JTC 501.

Theoretical and empirical review of creation, presentation, storage, and distribution of information.

JTC 662 03(3-0-0). Communicating Science and Technology. S. Prerequisite: JTC 501.

Examination of theoretical and empirical studies concerning communication of science and technology subject matter.

JTC 664 03(3-0-0). Quantitative Research in Communication. F. Prerequisite: JTC 500; one 300-level or higher statistics course.

Advanced quantitative research methods used in communication research.

JTC 665 03(3-0-0). Qualitative Methods in Communication Research. S. Prerequisite: JTC 500.

Techniques for collecting; interpreting, analyzing qualitative communication data.

JTC 684 Var. Supervised College Teaching. Prerequisite: Written

consent of instructor.

Philosophy, techniques, and approaches to teaching journalism skills courses, as supervised by faculty.

JTC 687 Var [1-3]. Internship. Prerequisite: Written consent of instructor.

JTC 690 Var [1-3]. Workshop. Prerequisite: Written consent of instructor.

JTC 695 Var [1-3]. Independent Study. Prerequisite: Written consent of instructor.

JTC 698 03(0-0-3). Research. Prerequisite: JTC 500.

Development of theoretical basis and methodology for thesis or research project.

JTC 699 Var. Thesis.

JTC 701 01(1-0-0). Colloquium in Communication and IT. F, S. Course may be taken up to four times for credit.

Orientation to graduate studies; communication theories, processes, media, and technology.

JTC 784 Var. Supervised College Teaching. F, S.

JTC 790 Var. Workshop. F, S.

JTC 792A-E 03(0-0-3). Seminar. F, S. Prerequisite: JTC 601; JTC 602.

A) Health and risk. B) Human computer interaction. C) Communication technology in organizations. D) Ethics, law, and policy. E) Strategic communication.

JTC 793A-F 03(0-0-3). Seminar. F, S. Prerequisite: JTC 601; JTC 602.

A) Experimental design. B) Survey design. C) Content analysis. D) Qualitative methods. E) Human factors. F) Critical and cultural methods.

JTC 795 Var. Independent Study.

JTC 798 03(0-0-3). Research. F, S. Prerequisite: JTC 601; JTC 602.

JTC 799 Var. Dissertation.

KEY ACADEMIC COMMUNITY COURSES

Nondepartmental

Office of Provost and Executive Vice President

KEY 192A-C Var[1-3]. Key Community Seminar. F, S. Prerequisite:
Concurrent registration in companion courses in the Key Course Cluster.
Examination of an intellectual problem or theme. Topics vary by
instructor. A) 01(0-0-1). B) 02(0-0-2). C) 03(0-0-3).

LANDSCAPE ARCHITECTURE COURSES

Department of Horticulture and Landscape Architecture

College of Agricultural Sciences

LAND 110 03(1-2-1). Introduction to Landscape Architecture. F.
Introductory theories, methods, and applications of landscape studies.

LAND 120 03(3-0-0). History of the Designed Landscape. S.
Major monuments and spaces from ancient Middle East through classical antiquity, the Renaissance, and Western tradition.

LAND 220/LIFE 220 03(3-0-0). Fundamentals of Ecology. (GT-SC2, AUCC 3A). F. Prerequisite: Three credits of 100-level biology or HORT 100; three credits of 100-level mathematics. Credit allowed for only one of the following: BIO 220, BIO 320, LAND 220, LIFE 220, LIFE 320, SOCR 320.
Interrelationships among organisms and their environments. (NT-O)

LAND 230 04(2-4-0). Drawing the Landscape. F.
Visual communication techniques; exploration of symbology, model building, design development drawing, and construction documentation draughting. (\$)

LAND 240 04(1-4-1). Fundamentals of Landscape Design Process. S. Prerequisite: LAND 230.
Initiation of formal exploration of design elements, materials, and principles, and introduction of design process as a defensible methodology. (\$)

LAND 241 03(1-4-0). Environmental Analysis. S. Prerequisite: LAND 230; concurrent registration in LAND 240.
Exploration and understanding of natural and cultural landscapes through analytical simulation techniques. (\$)

LAND 357 04(0-8-0). Omnibus Field Studies. SS. Prerequisite: Three credits in landscape drawing and analysis.
Theories and methods for the analysis, design, and planning of garden and landscape scale environments.

LAND 360 03(0-6-0). Basic Landscape Design and Construction. F. Prerequisite: LAND 240.
Site programming, analysis, design, and construction, including skill development in specifying earthwork, drainage, and vegetative composition. (\$)

LAND 361 03(2-2-0). Digital Methods. F. Prerequisite: LAND 360 or concurrent registration.
Landscape research, analysis, and design with ARCVIEW, AutoCAD, Microstation, and Photoshop. (\$)

LAND 362 03(0-6-0). Form and Expression in Garden Design. S. Prerequisite: LAND 361.
Formal decision making for site scale environments, including creative processes for form-giving, and generation of experimental solutions. (\$)

LAND 363 04(2-4-0). Advanced Landscape Site Engineering. S. Prerequisite: LAND 360.
Understanding and documenting the built environment with emphasis on construction and surveying as integral parts of design process. (\$)

LAND 364 04(1-6-0). Design and Nature. F. Prerequisite: LAND 361.
Computer-aided processes for siting, organizing, and evaluating cultural activities within ecologically fragile, landscape-scale environments. (\$)

LAND 365 03(2-2-0). Landscape Contract Drawing and Specifications. F. Prerequisite: LAND 363.
Construction details, design development, and construction

documentation emphasizing implementation of design projects.
LAND 366 04(0-8-0). Landscape Design Expression. S. Prerequisite: LAND 365.

Idea, values, and process landscape form applied to interactions of natural, cultural systems at the site and community scale; design competitions. (\$)

LAND 368/HORT 368 03(2-2-0). Landscape Irrigation and Water Conservation. F, S. Prerequisite: HORT 100 or LAND 110. Credit not allowed for both LAND 368 and HORT 368.

Practical approaches and methods of irrigation, water conservation, and water management in the designed landscape.

LAND 384 Var [1-5]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

LAND 392 02(0-0-2). Seminar-Designed Landscapes-Theory and Criticism. F. Prerequisite: LAND 365.
Readings, discussions, and writing in landscape architectural design theory; critical analysis of the designed and constructed landscape.

+LAND 444 03(3-0-0). Ecology of Landscapes. S. Prerequisite: LAND 220/LIFE 220; LIFE 320. Field trips required.
Theories, methods, and practices for interpreting, describing, and representing natural and human modified landscapes. (\$)

LAND 446 04(0-8-0). Urban Design. F. Prerequisite: LAND 366.
Designing the urban landscape, including precedent exploration about overall image, materials, and structure of the city and its components. (\$)

LAND 447 04(0-8-0). Comprehensive Landscape Design. S. Prerequisite: LAND 446.
Terminal studio; research, analysis, and synthesis for comprehensive project identified by student and approved in advance by faculty committee.

LAND 449 01(1-0-0). Professional Practice. S. Prerequisite: LAND 447 or concurrent registration.
Theory and skills of landscape architectural professional practice including functional, human, business, legal, and political aspects.

LAND 454 05(1-6-1). Landscape Field Studies. SS. Prerequisite: LAND 366.
Field observation of spatial and temporal landscape patterns resulting from natural and cultural processes and interactions.

LAND 455 05(1-6-1). Travel Abroad-European Landscape Architecture. SS. Prerequisite: LAND 362.
Exploration of major theoretical platforms in design through drawing, photographing, and measuring landscape architecture precedents in Europe.

LAND 495A-B Var [1-4]. Landscape Architectural Independent Study.
A) Design projects. B) Field service.

LAND 496 Var [1-8]. Group Study. Maximum of 8 credits allowed in course.

LAND 510 03(2-2-0). Virtual Design Methods. F.
Exploration and application of advanced computing technology and methods for analyzing and organizing natural and cultural landscapes.

LAND 520 03(1-4-0). Geographic Information Systems. S. Prerequisite: LAND 241.
Theories and applications of geographic information systems in spatial analysis and land planning.

LAND 560 03(2-2-0). Structure of Landscape Patterns. S. Prerequisite: 300-level ecology course.
Mechanisms and concepts in landscape structure for planning, design, and environmental management.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC-*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

LAND 610 04(2-6-0). Topics in Garden Design. F. Prerequisite: Graduate standing.

Garden design theories, methods, and operations.

LAND 620 04(2-6-0). Topics in Park Design. S. Prerequisite: Graduate standing.

Ideas, values, and processes of landscape form applied to interactions of natural and cultural systems for park and recreation applications.

LAND 630 04(2-6-0). Topics in Urban Design. F. Prerequisite: Graduate standing.

History and application of urban design principles, practices, and policies.

LAND 640 04(2-6-0). Major Landscape Change.S. Prerequisite: Graduate standing.

Addresses social and ecological resilience of large-scale landscapes through theory and application.

LAND 670 04(1-6-1). Landscape Architecture Studio Option. F, S. Prerequisite: Graduate standing. Course may be taken up to 5 times for credit.

Ideas, values, and processes of landscape architectural studio practice.

LAND 695A-B Var[1-4]. Landscape Architectural Independent Study. F, S, SS. Prerequisite: Graduate Standing.

A) Design projects. B) Field service.

LAND 698 Var[1-5]. Research. F, S, SS. Prerequisite: Graduate standing.

Guided research experience in landscape architecture.

ARABIC LANGUAGE COURSES

*Department of Foreign Languages and
Literatures
College of Liberal Arts*

LARA 105 05(5-0-0). First-Year Arabic I. F, S, SS. Prerequisite: No previous study in Arabic.

Essentials of Arabic for the beginner: aural comprehension, speaking, reading, writing.

LARA 107 05(5-0-0). First-Year Arabic II. F, S, SS. Prerequisite: LARA 105.

Essentials of Arabic for the continuing student: aural comprehension, speaking, reading, writing.

LARA 200 04(4-0-0). Second-Year Arabic I. (GT-AH4, AUCC 3B). F, S. Prerequisite: LARA 107 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing.

LARA 201 04(4-0-0). Second-Year Arabic II. (GT-AH4, AUCC 3B). F, S. Prerequisite: LARA 200 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing.

LARA 250 03(3-0-0). Arabic Language, Literature, Culture in Translation. (GT-AH2, AUCC 3B). F, S.

Selected works in translation from different periods and genres which represent the interrelationship of language, literature, and culture.

LARA 296 Var [1-5]. Group Study-Arabic. F, S.

LARA 300 03(3-0-0). Third Year Arabic. F. Prerequisite: LARA 201.

Develop reading and writing skills.

LARA 301 03(3-0-0). Oral Communication-Arabic. S. Prerequisite: LARA 201.

In-depth language study to improve proficiency, emphasizing oral communication.

LARA 495 Var[1-6]. Independent Study-Arabic. Prerequisite: Three years of college-level Arabic.

LIBERAL ARTS COURSES

Nondepartmental

College of Liberal Arts

LB 170 03(3-0-0). World Literatures to 1500. (GT-AH2, AUCC 3E). F, S.

Culturally significant literary texts from the beginnings of writing to 1500 from Europe, Asia, and Africa.

LB 171 03(3-0-0). World Literatures-The Modern Period. (GT-AH2, AUCC 3E). F, S.

Culturally significant literary texts from 1500 to the present from Europe, Asia, Africa, the Americas.

LB 192 03(0-0-3). College of Liberal Arts First-Year Seminar. F.

Traditions, concepts, and topics integral to the liberal arts; cultivates reading, communication, and critical thinking.

LB 200 01(1-0-0). Liberal Arts Research Methods. F, S.

Research methods for the liberal arts, evaluation of sources, various style manuals (MLA/APA), essay format, note cards, and selected reference works.

LB 300 03(2-0-1). Specialized Professional Writing. (AUCC 2) F, S, SS. Prerequisite: CO 150 or HONR 193.

Emphasizes specialized writing skills used in professional letters, resumes, manuals, critiques complaints, and interest-specific research projects. (NT-O)

LB 386A-E Var[1-3]. Practicum. F, S. Prerequisite: None.

Practicum at CTV, KCSU, The Collegian, College Avenue, or in Arts Production. A) CTV. B) KCSU. C) Collegian. D) College Avenue. E) Arts Production.

LB 455/SPCM 455 03(2-3-0). Narrative Fiction Film as a Liberal Art. S. Prerequisite: Senior standing. Credit not allowed for both LB 455 and SPCM 455.

Narrative fiction film and its role in human history, culture, and social interaction.

LB 456/JTC 456 03(2-2-0). Documentary Film as a Liberal Art. F. Prerequisite: Junior or senior standing. Credit not allowed for both LB 456 and JTC 456.

Documentary film and its role in human history, culture, and social interaction.

LB 484 Var[1-5]. Supervised College Teaching. F, S, SS.

A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

LB 487 Var[1-3]. Internship. F, S, SS.

LB 492 03(3-0-0). Liberal Arts Capstone Seminar. F, S.

Integration and reflection for graduating liberal arts majors with a career component that will prepare them for the job market. (NT-O)

LB 495 Var. Independent Study.

CHINESE LANGUAGE COURSES
*Department of Foreign Languages and
Literatures*
College of Liberal Arts

LCHI 105 05(5-0-0). First-Year Chinese I. F, S, SS. Prerequisite: No previous study in Chinese.

Essentials of Chinese for the beginner: aural comprehension, speaking, reading, writing.

LCHI 107 05(5-0-0). First-Year Chinese II. F, S, SS. Prerequisite: LCHI 105.

Essentials of Chinese for the continuing student: aural comprehension, speaking, reading, writing.

LCHI 200 05 (5-0-0). Second-Year Chinese I. (GT-AH4, AUCC 3B). F, S. Prerequisite: LCHI 107 or placement exam. Credit not allowed for both LCHI 200 and LCHI 228A.

Grammar review and extensive practice in conversation, reading, and writing.

LCHI 201 05(5-0-0). Second-Year Chinese II. (GT-AH4, AUCC 3B). F, S. Prerequisite: LCHI 200 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing.

LCHI 205 03(3-0-0). Intermediate Written Chinese. S. Prerequisite: LCHI 200 or placement exam.

Development of fundamental language skills emphasizing writing and reading.

LCHI 250 03(3-0-0). Chinese Language, Literature, Culture in Translation-Chinese. (GT-AH2, AUCC 3B). F, S.

Selected works in translation from different periods and genres which represent the interrelationship of Chinese literature, and culture.

LCHI 296 Var [1-5]. Group Study-Chinese.

Group study in language/literature/culture.

LCHI 304 03(3-0-0). Third-Year Chinese I. F. Prerequisite: LCHI 201 or placement exam.

Development of reading comprehension, communicative competence, and cultural understanding.

LCHI 305 03(3-0-0). Third-Year Chinese II. S. Prerequisite: LCHI 304 or placement exam.

Development of reading comprehension, communicative competence, and cultural understanding.

LCHI 309 03(3-0-0). Contemporary Chinese Literature and the Arts. S.

Trends resulting from traditional Chinese and contemporary foreign influences in Chinese literature and the arts.

LCHI 365 03(3-0-0). Introduction to Chinese Cinema Studies. F, S. Prerequisite: LCHI 305.

Terminology, techniques, and approaches specific to Chinese cinema. Taught in Chinese.

LCHI 408 01(1-0-0). Chinese Calligraphy. F, S. Prerequisite: LCHI 304.

History of Chinese calligraphy and basic Chinese calligraphy skills.

LCHI 495 Var [1-6]. Independent Study-Chinese. Prerequisite: Three years of college-level Chinese.

LCHI 496 Var [1-5]. Group Study-Chinese. F.

FRENCH LANGUAGE COURSES

Department of Foreign Languages and Literatures

College of Liberal Arts

LFRE 105 05(5-0-0). First-Year French I. F, S, SS. Prerequisite: No previous study in French. Credit not allowed for both LFRE 105 and LFRE 106.

Essentials of French for the beginner: aural comprehension, speaking, reading, writing.

LFRE 106 03(3-0-0). First-Year French Review. F, S, SS. Prerequisite: Placement exam or instructor placement. For students with minimal proficiency. Credit not allowed for both LFRE 106 and LFRE 105.

Basic review of essential skills: aural comprehension, speaking, reading, writing.

LFRE 107 05(5-0-0). First-Year French II. F, S, SS. Prerequisite: LFRE 105 or LFRE 106.

Essentials of French for the continuing student: aural comprehension, speaking, reading, writing.

LFRE 108 05(5-0-0). Intensive French I. F. Prerequisite: Grade of A in LFRE 105 or LFRE 106 with written consent of instructor; or placement by exam.

Accelerated practice in speaking, reading, writing, and aural comprehension.

LFRE 120 03(3-0-0). Reading for Proficiency. F, S, SS. Credit for LFRE 120 not allowed if LFRE 107 or LFRE 108 has been completed.

Essentials of language for developing reading proficiency.

LFRE 200 03(3-0-0). Second-Year French I. (GT-AH4, AUCC 3B). F, S. Prerequisite: LFRE 107 or LFRE 108 or placement exam. Credit not allowed for both LFRE 200 and LFRE 228A.

Grammar review and extensive practice in conversation, reading, and writing.

LFRE 201 03(3-0-0). Second-Year French II. (GT-AH4, AUCC 3B). F, S. Prerequisite: LFRE 200 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing.

LFRE 208 05(5-0-0). Intensive French II. S. Prerequisite: LFRE 108 or placement exam.

Accelerated practice in speaking, reading, writing, and aural comprehension.

LFRE 250 03(3-0-0). French Language, Literature, Culture in Translation-French. (GT-AH2, AUCC 3B). F, S.

Selected works in translation from different periods and genres which represent the interrelationship of language, literature, and culture.

LFRE 296 Var [1-5]. Group Study-French. F, S.

LFRE 300 03(3-0-0). Reading and Writing for Communication-French. F, S, SS. Prerequisite: LFRE 201 or LFRE 208 or placement.

Development of reading and writing proficiency through an in-depth examination of contemporary writing.

LFRE 301 03(3-0-0). Oral Communication-French. F, S. Prerequisite: LFRE 201.

In-depth language study to improve proficiency in all language skills emphasizing oral.

LFRE 310 03(3-0-0). Approaches to French Literature. F, S. Prerequisite: LFRE 300.

Appreciation and critical readings of representative works in prose, drama, and poetry.

LFRE 312 03(3-0-0). Introduction to French Linguistics. F. Prerequisite: LFRE 300 or concurrent registration.

French linguistics, phonetics, phonology, morphology, syntax, semantics, and pragmatics.

LFRE 313 03(3-0-0). Introduction to French Translation and Interpreting. F, S. Prerequisite: LFRE 300.

Translation and interpreting of written and oral texts into and from the foreign language.

LFRE 326 03(3-0-0). French Phonetics. F, S. Prerequisite: LFRE 300 or concurrent registration.

Phonetic principles and their application to language sound system; intensive practice in pronunciation, intonation.

LFRE 335 03(3-0-0). Issues in French/Francophone Culture. F, S. Prerequisite: LFRE 300.

Historical context of contemporary issues in the culture of French-speaking countries.

LFRE 345 03(3-0-0). Business French. F, S, SS. Prerequisite: LFRE 300.

Business and commercial aspects of the French language and culture.

LFRE 355 03(3-0-0). 20th Century French Literature. F, S. Prerequisite: LFRE 310.

Representative literary works from the 20th century.

LFRE 365 03(3-0-0). Introduction to French Cinema Studies. F, S. Prerequisite: LFRE 310 or LFRE 335.

Terminology, techniques, and approaches specific to French cinema. Taught in French.

LFRE 400 03(3-0-0). Advanced French Communication Skills. F. Prerequisite: LFRE 300.

Development of speaking, reading, and writing proficiency through an in-depth examination of representative writings and media communications.

LFRE 413 03(3-0-0). Advanced French Translation and Interpreting. F, S. Prerequisite: LFRE 313.

Advanced practice in translation and interpreting of written and oral texts into and from French.

LFRE 433A-B 03(3-0-0). Advanced French/Francophone Culture. F. Prerequisite: LFRE 400.

French and Francophone cultural identities and their history. A) Representations. B) Center and margins.

LFRE 441 03(3-0-0). Advanced Business French. F, S. Prerequisite: LFRE 345.

Advanced business and commercial aspects of the French language and culture.

LFRE 450 03(3-0-0). Selected French Literary Movements and Periods. F, S. Prerequisite: LFRE 300; LFRE 310. May be taken up to 3 times for credit.

Studies in selected literary movements and periods of France, such as classicism, realism, naturalism, existentialism.

LFRE 452 03(3-0-0). Genre Studies in French. F, S. Prerequisite: LFRE 300; LFRE 310. May be taken up to 3 times for credit.

Development of critical approaches to major works in literature through selected literary genres and subgenres.

LFRE 453 03(3-0-0). Author Studies in French. F, S. Prerequisite: LFRE 300; LFRE 310. May be taken up to 3 times for credit.

Development of critical approaches to authors through the appreciation and analysis of selected works.

LFRE 454 03(3-0-0). Topic Studies in French. F, S. Prerequisite: LFRE 300; LFRE 310. May be taken up to 3 times for credit.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

LFRE 695 Var [1-6]. Independent Study-French.

Selected topic studies such as themes, topoi, and interdisciplinary subjects in literature.

LFRE 460 03(3-0-0). French/Francophone Women Writers. S. Prerequisite: LFRE 300; LFRE 310. May be taken up to 3 times for credit.

Selected French and Francophone women writers in a variety of genres emphasizing relationships among gender, culture, and writing.

***LFRE 470 03(3-0-0). French Grammatical Constructions.** S. Prerequisite: LFRE 312.

Linguistic analysis of selected French grammatical constructions (word order, word formation, and sentence structure), their relationship to meaning.

LFRE 492 03(0-0-3). Seminar-French Language, Literature, and Society. F, S. Prerequisite: LFRE 310; two 400-level L*** courses; senior status.

Integrative study of language, literature, and society.

LFRE 495 Var [1-6]. Independent Study-French. Prerequisite: Three years of college-level French.

LFRE 500 03(3-0-0). Language Analysis/Stylistics-French. F. Prerequisite: LFRE 400.

Analysis of language structure through the examination of style in literary and non-literary texts.

LFRE 508 04(3-3-0). Intensive French-Graduate Review. SS. Prerequisite: Admission to Summer Institute for Foreign Language Teaching.

Immersion review of language for the teacher, developing intermediate-level proficiency in culture and the four skills.

LFRE 514 01(1-0-0). Issues in Teaching Language-French. F, S. Prerequisite: Concurrent graduate teaching assistantship.

Current theory and practice in second-language instruction; technological applications.

LFRE 525 03(3-0-0). History of the French Language. S. Prerequisite: LFRE 400.

Investigation of both internal (strictly linguistic) and external (sociolinguistic) factors in development of the language.

LFRE 536 03(3-0-0). Topics in French Linguistics. F, S. Prerequisite: LFRE 500.

Acquisition, discourse analysis, and language change and variation over time and space.

LFRE 551 03(3-0-0). Selected French Literary Movements/Periods. F. Prerequisite: Undergraduate degree in French.

Advanced studies in and critical approaches to selected literary movements or periods.

LFRE 552 03(3-0-0). Advanced Studies in French Literary Genres. F. Prerequisite: Undergraduate degree in French.

Advanced studies in and critical approaches to literary genres through study of major works in foreign literatures.

LFRE 553 03(3-0-0). Advanced French Author Studies. S. Prerequisite: Undergraduate degree in French.

Critical approaches to the study of selected authors through appreciation and analysis of their major works.

LFRE 554 03(3-0-0). Advanced Topic Studies-French. S. Prerequisite: Undergraduate degree in French.

Selected topics (theme, topoi, and interdisciplinary subjects) in foreign literatures.

LFRE 692 03(0-0-3). Seminar-French. F, S. Prerequisite: Undergraduate degree in French.

Treatment of selected topics in seminar.

FOREIGN LANGUAGES AND LITERATURES – GENERAL COURSES

Department of Foreign Languages and Literatures *College of Liberal Arts*

LGEN 114 Var [1-10]. First-Year Language I. SS. Offered only through the Division of Continuing Education.

Critical language immersion courses taught abroad by members of the Council of American Overseas Research Centers.

LGEN 115 Var [1-10]. First-Year Language II. SS. Offered only through the Division of Continuing Education.

Critical language immersion courses taught abroad by members of the Council of American Overseas Research Centers.

LGEN 192 03(3-0-0). Modern Languages/Cultures: Italian and Japanese. S.

Language, cultural issues, and historical heritage of modern Italian and Japanese societies.

LGEN 214 Var [1-10]. Second-Year Language I. SS. Offered only through the Division of Continuing Education.

Critical language immersion courses taught abroad by members of the Council of American Overseas Research Centers.

LGEN 215 Var [1-10]. Second-Year Language II. SS. Offered only through the Division of Continuing Education.

Critical language immersion courses taught abroad by members of the Council of American Overseas Research Centers.

LGEN 290 Var [1-3]. Theatre Workshop in a Foreign Language. F, S. Prerequisite: LARA 105 or LCHI 105 or LFRE 105 or LGER 105 or LITA 105 or LJPJ 105 or LKOR 105 or LRUS 105 or LSPA 105.

Application of communication skills in a foreign language through informal staging of dramatic scripts.

LGEN 296 Var [1-5]. Group Study-General.

Group study in language/literature/culture.

LGEN 314 Var [1-10]. Third-Year Language I. SS. Offered only through the Division of Continuing Education.

Critical language immersion courses taught abroad by members of the Council of American Overseas Research Centers.

LGEN 315 Var [1-10]. Third-Year Language II. SS. Offered only through the Division of Continuing Education.

Critical language immersion courses taught abroad by members of the Council of American Overseas Research Centers.

LGEN 365 03(3-0-0). Introduction to Foreign Cinema Studies. F, S. Prerequisite: LCHI 305 or LFRE 310 or LFRE 335 or LGER 310 or LGER 335 or LJPJ 305 or LRUS 305 or LSPA 310 or LSPA 335.

Terminology, techniques, and approaches specific to foreign cinema. Taught in English.

LGEN 382/ETST 382 03(2-0-1). Italian Ethnic Identity, Culture, and Gender. SS.

Different ethnic identities in southern and northern Italy. Historical and contemporary culture and feminism. Enhancement of linguistic skills.

LGEN 414 Var [1-10]. Fourth-Year Language I. SS. Offered only through the Division of Continuing Education.

Critical language immersion courses taught abroad by members of the Council of American Overseas Research Centers.

LGEN 415 Var [1-10]. Fourth-Year Language II. SS. Offered only

through the Division of Continuing Education.

Critical language immersion courses taught abroad by members of the Council of American Overseas Research Centers.

LGEN 465A-D 03(3-0-0). Studies in Foreign Film. F, S.

Representation of foreign societies through film, taught in English. **A)** The Americas. **B)** Asia. **C)** Europe. **D)** Africa.

LGEN 487 Var [1-12]. Internship.

LGEN 492 03(0-0-3). Language, Literature, and Society-General. F, S. Prerequisite: LFRE 310 or LGER 310 or LSPA 310; two 400-level L*** courses; senior status.

Integrative study of language, literature, and society.

LGEN 505 02(2-1-0). Methods/Technologies in Language Instruction. SS. Prerequisite: Admission to Summer Institute for Foreign Language Teaching.

Theory and methodology of teaching foreign languages and cultures, including video and computer-assisted technology.

LGEN 510 01(1-0-0). Research Methods. F. Prerequisite: Written consent of instructor.

Resources and reference tools appropriate to research in foreign languages and literatures.

LGEN 516 03(3-0-0). Theory/Methods-Foreign Language Instruction. F. Prerequisite: Admission to graduate studies in foreign languages. Foreign language teaching methodology.

LGEN 530 3(3-0-0). Literary and Cultural Theory. F. Prerequisite: Written consent of instructor.

Theoretical approaches to contemporary literary and cultural criticism.

LGEN 535 03(3-0-0). Graduate Studies in Civilization. S. Prerequisite: LFRE 433A-B or LGER 434 or LSPA 436 or LSPA 437.

Critical and analytical approaches to a foreign civilization and culture. Research related to language of specialization.

LGEN 545 Var [1-3]. Literary Translation Theory and Practice. S. Prerequisite: Reading knowledge of foreign language.

Theory and practice of translating literary texts from foreign language to comparable English.

LGEN 684 Var. Supervised College Teaching. F, S.

LGEN 694 Var[1-6]. Independent Study: Portfolio. F, S, SS.

LGEN 699 Var [1-6]. Thesis.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

GERMAN LANGUAGE COURSES

Department of Foreign Languages and Literatures

College of Liberal Arts

LGER 105 05(5-0-0). First-Year German I. F, S, SS. Prerequisite: No previous study in German.

Essentials of German for the beginner: aural comprehension, speaking, reading, writing.

LGER 107 05(5-0-0). First-Year German II. F, S, SS. Prerequisite: LGER 105.

Essentials of German for the continuing student: aural comprehension, speaking, reading, writing.

LGER 108 05(5-0-0). Intensive German I. F. Prerequisite: Grade of A in LGER 105 and written consent of instructor; or placement by exam.

Accelerated practice in speaking, reading, writing, and aural comprehension.

LGER 120 03(3-0-0). Reading for Proficiency. F, S, SS. Credit for LGER 120 not allowed if LGER 107 or LGER 108 has been completed.

Essentials of language for developing reading proficiency.

LGER 200 03(3-0-0). Second-Year German I. (GT-AH4, AUCC 3B). F, S. Prerequisite: LGER 107 or LGER 108 or placement exam. Credit not allowed for both LGER 200 and LGER 228A.

Grammar review and extensive practice in conversation, reading, and writing.

LGER 201 03(3-0-0). Second-Year German II. (GT-AH4, AUCC 3B). F, S. Prerequisite: LGER 200 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing.

LGER 208 05(5-0-0). Intensive German II. S. Prerequisite: LGER 108 or placement exam.

Accelerated practice in speaking, reading, writing, and aural comprehension.

LGER 250 03(3-0-0). German Language, Literature, Culture in Translation. (GT-AH2, AUCC 3B). F, S.

Selected works in translation from different periods and genres which represent the interrelationship of language, literature, and culture.

LGER 296 Var [1-5]. Group Study-German.

Group study in language/literature/culture.

LGER 300 03(3-0-0). Reading and Writing for Communication-German. F, S, SS. Prerequisite: LGER 201 or LGER 208 or placement.

Development of reading and writing proficiency through an in-depth examination of contemporary writing.

LGER 301 03(3-0-0). Oral Communication-German. S. Prerequisite: LGER 201 or placement exam.

In-depth language study to improve proficiency in all language skills emphasizing oral.

LGER 310 03(3-0-0). Approaches to German Literature. F, S. Prerequisite: LGER 201 or LGER 208.

Appreciation and critical readings of representative works in prose, drama, and poetry.

LGER 313 03(3-0-0). Introduction to German Translation and Interpreting. F, S. Prerequisite: LGER 300.

Translation and interpreting of written and oral texts into and from German.

LGER 326 03(3-0-0). German Phonetics. F, S. Prerequisite: LGER 300.

Phonetic principles and their application to language sound system; intensive practice in pronunciation, intonation.

LGER 335 03(3-0-0). Issues in German Culture. S. Prerequisite: LGER 300.

Historical context of contemporary issues in the culture of German-speaking countries.

LGER 336 03(3-0-0). Issues in Swiss and Austrian Culture. S. Prerequisite: LGER 300.

Swiss and Austrian culture focusing on the development of their respective cultures from the medieval to the modern periods. Taught in German.

LGER 345 03(3-0-0). Business German. F, S, SS. Prerequisite: LGER 300.

Business and commercial aspects of the German language and culture.

LGER 355 03(3-0-0). 20th Century German Literature. F, S. Prerequisite: LGER 310.

Representative literary works from the 20th century.

LGER 365 03(3-0-0). Introduction to German Cinema Studies. F, S. Prerequisite: LGER 310 or LGER 335.

Terminology, techniques, and approaches specific to German cinema. Taught in German.

LGER 400 03(3-0-0). Advanced German Communication Skills. F. Prerequisite: LGER 300.

Development of speaking, reading, and writing proficiency through an in-depth examination of representative writings and media communications.

LGER 401 03(3-0-0). Advanced German Oral Communication. S. Prerequisite: LGER 300.

Advanced language study to improve proficiency in German language skills, with an emphasis on oral communication.

LGER 413 03(3-0-0). Advanced German Translation and Interpreting. F, S. Prerequisite: LGER 313.

Advanced practice in translation and interpreting of written and oral texts into and from German.

LGER 434 03(3-0-0). Advanced German Culture. F, S. Prerequisite: LGER 335.

Critical examination of selected topics in culture and cultural history of German-speaking countries.

LGER 441 03(3-0-0). Advanced Business German. F, S. Prerequisite: LGER 345.

Advanced business and commercial aspects of the German language and culture.

LGER 450 03(3-0-0). Selected German Literary Movements and Periods. F, S. Prerequisite: LGER 300; LGER 310. May be taken up to 3 times for credit.

Studies in selected literary movements and periods of Germany such as classicism, realism, naturalism, existentialism.

LGER 452 03(3-0-0). Genre Studies in German. F, S. Prerequisite: LGER 300; LGER 310. May be taken up to 3 times for credit.

Development of critical approaches to major works in literature through selected literary genres and subgenres.

LGER 453 03(3-0-0). Author Studies in German. F, S. Prerequisite: LGER 300; LGER 310. May be taken up to 3 times for credit.

Development of critical approaches to authors through the appreciation and analysis of selected works.

LGER 454 03(3-0-0). Topic Studies in German. F, S. Prerequisite:

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

LGER 300; LGER 310. May be taken up to 3 times for credit.

Selected topic studies such as themes, topics, and interdisciplinary subjects in literature.

LGER 465 03(3-0-0). Advanced Studies in German Film. S.

Prerequisite: LGER 365.

Representation of German society and culture through film. Taught in German.

LGER 492 03(0-0-3). Seminar-German Language, Literature, and Society. F/S. Prerequisite: LGER 310; two 400-level LGER courses; senior status.

Integrative study of language, literature, and society.

LGER 495 Var [1-6]. Independent Study-German. Prerequisite: Three years of college-level German.

LGER 500 03(3-0-0). Language Analysis/Stylistics-German. F. Prerequisite: LGER 400.

Analysis of language structure through the examination of style in literary and non-literary texts.

LGER 508 04(3-3-0). Intensive German-Graduate Review. SS. Prerequisite: Admission to Summer Institute for Foreign Language Teaching.

Immersion review of language for the teacher, developing intermediate-level proficiency in culture and the four skills.

LGER 514 01(1-0-0). Issues in Teaching German. F, S. Prerequisite: Concurrent graduate teaching assistantship.

Current theory and practice in second-language instruction; technological applications.

LGER 525 03(3-0-0). History of the German Language. S. Prerequisite: LGER 400.

Investigation of both internal (strictly linguistic) and external (sociolinguistic) factors in development of the language.

LGER 551 03(3-0-0). Selected German Literary Movements/Periods. F. Prerequisite: Undergraduate degree in German.

Advanced studies in and critical approaches to selected literary movements or periods.

LGER 552 03(3-0-0). Advanced Studies in German Literary Genres. F. Prerequisite: Undergraduate degree in German.

Advanced studies in and critical approaches to literary genres through study of major works in foreign literatures.

LGER 553 03(3-0-0). Advanced German Author Studies. S. Prerequisite: Undergraduate degree in German.

Critical approaches to the study of selected authors through appreciation and analysis of their major works.

LGER 554 03(3-0-0). Advanced German Topic Studies. S. Prerequisite: Undergraduate degree in German.

Selected topics (theme, topoi, and interdisciplinary subjects) in foreign literatures.

LGER 692 03(0-0-3). Seminar-German. F, S. Prerequisite: Undergraduate degree in German.

Treatment of selected topics in seminar.

LGER 695 Var [1-6]. Independent Study-German.

GREEK LANGUAGE COURSES

*Department of Foreign Languages and
Literatures
College of Liberal Arts*

***LGRK 152 03(3-0-0). Classical Greek I. S.**

Essentials of the language, reading, and translation.

***LGRK 153 03(3-0-0). Classical Greek II. S. Prerequisite: LGRK 152.**

Essentials of the language, reading, and translation.

LIBRARY INFORMATION COURSE

Nondepartmental

Dean, University Libraries

LI 301 01(1-0-0). Research in the Information Age. F, S, SS.

Developing strategies for library research; locating appropriate resources; and selecting, evaluating, and recording relevant information.
(NT-O)

LIFE SCIENCE COURSES

Nondepartmental, Interdisciplinary

Office of Provost and Executive Vice President

LIFE 102 04(3-3-0). Attributes of Living Systems. (GT-SC1, AUCC 3A) F, S, SS. Prerequisites: High school chemistry. Intended for students requiring additional courses in biology or areas related to biological science.

Levels of organization, stability, and change in living systems. (\$)

LIFE 103 04(3-3-0). Biology of Organisms-Animals and Plants. F, S, SS. Prerequisite: LIFE 102.

Diversity of animals and plants; their structural and functional characteristics. (\$)

LIFE 201A-B 03(3-0-0). Introductory Genetics. (GT-SC2, AUCC 3A) F, S. Prerequisite: LIFE 102. Credit not allowed for both LIFE 201A and LIFE 201B.

A) Emphasis on applied genetics, population genetics, and conservation/ecological genetics. **B)** Emphasis on molecular, immunological, and developmental genetics.

LIFE 202A-B 01 (0-0-1). Introductory Genetics Recitation. F, S. Credit not allowed for both LIFE 202A and LIFE 202B.

Case studies and problems solving in: **A)** Applied genetics, population genetics, and conservation/ecological genetics. Prerequisite: LIFE 201A or concurrent registration. **B)** Honors Recitation. Molecular genetics. Prerequisite: LIFE 201B or concurrent registration; participation in University Honors program.

LIFE 203 02(0-3-1). Introductory Genetics Laboratory. S. Prerequisite: LIFE 201A or concurrent registration or LIFE 201B or concurrent registration.

Basic molecular genetics and molecular aspects of development laboratory.

LIFE 205 03(3-0-0). Survey of Microbial Biology. S.

Introduction to the microbial world, covering both eukaryotic and prokaryotic microbes; emphasis on applied and environmental microbiology.

LIFE 206 02(0-4-0). Microbial Biology Laboratory. F, S. Prerequisite: LIFE 205 or concurrent registration. (\$)

LIFE 210 03(3-0-0). Introductory Eukaryotic Cell Biology. F, S. Prerequisite: CHEM 111; CHEM 112 or concurrent registration; LIFE 102.

Solid understanding of a cell, different cell types, molecular aspects of cellular and subcellular biology and biochemistry.

LIFE 211 01(0-0-1). Introductory Cell Biology Honors Recitation. F, S. Prerequisite: LIFE 210 or concurrent registration; participation in University Honors program.

Molecular aspects of cellular and subcellular biology and introductory biochemistry recitation.

LIFE 212 02(0-3-1). Introductory Cell Biology Laboratory. F, S. Prerequisite: CHEM 112 or concurrent registration.; LIFE 210 or concurrent registration.

Molecular aspects of cellular and subcellular biology and introductory biochemistry laboratory.

LIFE 220/LAND 220 03(3-0-0). Fundamentals of Ecology. (GT-SC2, AUCC 3A). F. Prerequisite: Three credits of 100-level biology or HORT 100; three credits of 100-level mathematics. Credit allowed for only one of the following: BIO 220, BIO 320, LAND 220, LIFE 220, LIFE 320, SOCR 220.

Interrelationships among organisms and their environments. (NT-O)

LIFE 320 03(3-0-0). Ecology. F, S. Prerequisite: BZ 101 or BZ 104 or BZ

110 or BZ 120 or LIFE 102; MATH 141 or MATH 155 or MATH 160. Credit allowed for only one of the following: BIO 220, BIO 320, LAND 220, LIFE 220, LIFE 320, SOCR 220.

Interrelationships among organisms and their environments using conceptual models and quantitative approaches.

ITALIAN LANGUAGE COURSES
*Department of Foreign Languages and
Literatures*
College of Liberal Arts

LITA 105 05(5-0-0). First-Year Italian I. F, S, SS. Prerequisite: No previous study in the language.

Essentials of Italian for the beginner: aural comprehension, speaking, reading, writing.

LITA 107 05(5-0-0). First-Year Italian II. F, S, SS. Prerequisite: LITA 105.

Essentials of Italian for the continuing student: aural comprehension, speaking, reading, writing.

LITA 200 03(3-0-0). Second-Year Italian I. F, S. Prerequisite: LITA 107 or placement exam. Credit not allowed for both LITA 200 and LITA 228A.

Grammar review and extensive practice in conversation, reading, and writing.

LITA 201 03(3-0-0). Second-Year Italian II. F, S. Prerequisite: LITA 200 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing.

LITA 296 Var [1-5]. Group Study-Italian.

Group study in language/literature/culture.

LITA 365 03(3-0-0). Studies in Foreign Film-Italian. F, S.

Representation of Italian society through film. Taught in Italian.

LITA 495 Var [1-6]. Independent Study-Italian. Prerequisite: Three years of college-level Italian.

JAPANESE LANGUAGE COURSES

Department of Foreign Languages and Literatures *College of Liberal Arts*

LJPN 105 05(5-0-0). First-Year Japanese I. F, S, SS. Prerequisite: No previous study in Japanese.

Essentials of Japanese for the beginner: aural comprehension, speaking, reading, writing.

LJPN 107 05(5-0-0). First-Year Japanese II. F, S, SS. Prerequisite: LJPN 105.

Essentials of Japanese for the continuing student: aural comprehension, speaking, reading, writing.

LJPN 200 05(5-0-0). Second-Year Japanese I. (GT-AH4, AUCC 3B). F, S. Prerequisite: LJPN 107 or placement exam. Credit not allowed for both LJPN 200 and LJPN 228A.

Grammar review and extensive practice in conversation, reading, and writing.

LJPN 201 05(5-0-0). Second-Year Japanese II. (GT-AH4, AUCC 3B). , S. Prerequisite: LJPN 200 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing.

LJPN 208 01(1-0-0). Kanji Study. F, S. Prerequisite: LJPN 105. May be taken up to 4 times for credit.

Kanji (Chinese characters) learning strategies, through examination and analysis of Kanji characters.

LJPN 250 03(3-0-0). Japanese Language, Literature, Culture in Translation. (GT-AH2, AUCC 3B). F, S.

Selected works in translation from different periods and genres which represent the interrelationship of Japanese language, literature, and culture.

LJPN 296 Var [1-5]. Group Study-Japanese.

Group study in language/literature/culture.

LJPN 304 03(3-0-0). Third-Year Japanese I. F. Prerequisite: LJPN 201 or placement exam.

Development of reading comprehension, communicative competence, and cultural understanding.

LJPN 305 03(3-0-0). Third-Year Japanese II. S. Prerequisite: LJPN 304 or placement exam.

Enhanced development of reading comprehension, communicative competence, and cultural sensitivity.

LJPN 365 03(3-0-0). Introduction to Japanese Cinema Studies. F, S. Prerequisite: LJPN 305.

Terminology, techniques, and approaches specific to Japanese cinema. Taught in Japanese.

LJPN 404 03(3-0-0). Historical Aspects of the Language and Society. F. Prerequisite: LJPN 305.

Advanced Japanese language course designed to further enhance proficiency through a variety of activities.

LJPN 405 03(3-0-0). Integrated Japanese: Beyond Words. S. Prerequisite: LJPN 305.

Advanced Japanese language course designed to further enhance proficiency through a variety of activities for the continuing student.

LJPN 408 01(1-0-0). Advanced Kanji Study. F, S. Prerequisite: LJPN 201. May be taken up to four times for credit.

Kanji learning strategies and acquisition of advanced Kanji characters.

LJPN 495 Var [1-6]. Independent Study-Japanese. Prerequisite: Three years of college-level Japanese.

LJPN 496 Var [1-5]. Group Study-Japanese. Prerequisite: LJPN 305. Group study in language/literature/culture.

KOREAN LANGUAGE COURSES
*Department of Foreign Languages and
Literatures*
College of Liberal Arts

LKOR 105 05(5-0-0). First-Year Korean I. F, S, SS. Prerequisite: No previous study in Korean.

Essentials of Korean for the beginner: aural comprehension, speaking, reading, writing.

LKOR 107 05(5-0-0). First-Year Korean II. F, S, SS. Prerequisite: LKOR 105.

Essentials of Korean for the continuing student: aural comprehension, speaking, reading, writing.

LKOR 202 03(3-0-0). Intermediate Korean and Culture I. F, S, SS. Prerequisite: Prerequisite: LKOR 107.

LKOR 203 03(3-0-0). Intermediate Korean and Culture II. F, S, SS. Prerequisite: LKOR 202.

LATIN LANGUAGE COURSES

*Department of Foreign Languages and
Literatures
College of Liberal Arts*

LLAT 105 05(5-0-0). First Year Latin I. F.

Essentials of Latin grammar, vocabulary, and phonology.

LLAT 107 05(5-0-0). First-Year Latin II. S. Prerequisite: LLAT 105.

Six tenses of verbs, active and passive; use subjunctive review of the five declensions of nouns and adjectives; new vocabulary.

LLAT 296 Var [1-5]. Group Study-Latin. F, S.

RUSSIAN LANGUAGE COURSES
*Department of Foreign Languages and
Literatures*
College of Liberal Arts

LRUS 105 05(5-0-0). First-Year Russian I. F, S, SS. Prerequisite: No previous study in Russian.

Essentials of Russian for the beginner: aural comprehension, speaking, reading, writing.

LRUS 107 05(5-0-0). First-Year Russian II. F, S, SS. Prerequisite: LRUS 105.

Essentials of Russian for the continuing student: aural comprehension, speaking, reading, writing.

LRUS 200 03(3-0-0). Second-Year Russian I. (GT-AH4, AUCC 3B). F, S. Prerequisite: LRUS 107 or placement exam. Credit not allowed for both LRUS 200 and LRUS 228A.

Grammar review and extensive practice in conversation, reading, and writing.

LRUS 201 03(3-0-0). Second-Year Russian II. F, S. (GT-AH4, AUCC 3B). Prerequisite: LRUS 200 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing.

LRUS 250 03(3-0-0). Russian Literature, Culture in Translation. (GT-AH2, AUCC 3B). F, S.

Selected works in translation from different periods and genres which represent the interrelationship of language, literature, and culture.

LRUS 296 Var [1-5]. Group Study-Russian.

Group study in language/literature/culture.

LRUS 304 03(3-0-0). Third-Year Russian I. F. Prerequisite: LRUS 201 or placement exam.

Development of reading comprehension, communicative competence, and cultural understanding.

LRUS 305 03(3-0-0). Third-Year Russian II. S. Prerequisite: LRUS 304 or placement exam.

Enhanced development of reading comprehension, communicative competence, and cultural sensitivity.

LRUS 365 03(3-0-0). Introduction to Russian Cinema Studies. F, S. Prerequisite: LRUS 305.

Terminology, techniques, and approaches specific to Russian cinema. Taught in Russian.

LRUS 495 Var [1-6]. Independent Study-Russian. Prerequisite: Three years of college-level Russian.

LRUS 496 Var [1-5]. Group Study-Russian. Prerequisite: LRUS 305 or placement exam.

Group study in language/literature/culture.

SIGN LANGUAGE COURSES

Department of Foreign Languages and Literatures College of Liberal Arts

LSGN 109 05(5-0-0). American Sign Language I. F.

Vocabulary, grammar and basic conversational skill in ASL, with information on deaf culture.

LSGN 110 05(5-0-0). American Sign Language II. F, S, SS. Prerequisite: LSGN 109.

Development of communicative competence in ASL skill and expansion of knowledge of deaf culture.

LSGN 296 Var [1-5]. Group Study–American Sign Language. F, S.

SPANISH LANGUAGE COURSES

Department of Foreign Languages and Literatures

College of Liberal Arts

LSPA 105 05(5-0-0). First-Year Spanish I. F, S, SS. Prerequisite: No previous study in Spanish. Credit not allowed for both LSPA 105 and LSPA 106.

Essentials of Spanish for the beginner: aural comprehension, speaking, reading, writing.

LSPA 106 03(3-0-0). First-Year Spanish Review. F, S, SS. Prerequisite: Placement exam or instructor placement. For students with minimal proficiency. Credit not allowed for both LSPA 106 and LSPA 105.

Basic review of essential skills: aural comprehension, speaking, reading, writing.

LSPA 107 05(5-0-0). First-Year Spanish II. F, S, SS. Prerequisite: LSPA 105 or LSPA 106.

Essentials of Spanish for the continuing student: aural comprehension, speaking, reading, writing.

LSPA 108 05(5-0-0). Intensive Spanish I. F. Prerequisite: Grade of A in LSPA 105 or LSPA 106 with written consent of instructor; or placement by exam.

Accelerated practice in speaking, reading, writing, and aural comprehension.

LSPA 120 03(3-0-0). Reading for Proficiency-Spanish. F, S, SS. Credit for LSPA 120 not allowed if LSPA 107 or LSPA 108 has been completed.

Essentials of language for developing reading proficiency.

LSPA 200 03(3-0-0). Second-Year Spanish I. (GT-AH4, AUCC 3B). F, S. Prerequisite: LSPA 107 or LSPA 108 or placement exam. Credit not allowed for both LSPA 200 and LSPA 228A.

Grammar review and extensive practice in conversation, reading, and writing.

LSPA 201 03(3-0-0). Second-Year Spanish II. (GT-AH4, AUCC 3B). F, S. Prerequisite: LSPA 200 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing.

LSPA 208 05(5-0-0). Intensive Spanish II. S. Prerequisite: LSPA 108 or placement exam.

Accelerated practice in speaking, reading, writing, and aural comprehension.

LSPA 230 03(3-0-0). Spanish for Heritage Speakers. S. Prerequisite: Instructor's written permission.

Expands vocabulary, oral communication, writing and reading skills, as well as the contents and contexts of communication in the language.

LSPA 250 03(3-0-0). Spanish Language, Literature, Culture in Translation. (GT-AH2, AUCC 3B). F, S.

Selected works in translation from different periods and genres which represent the interrelationship of Spanish literature, and culture.

LSPA 296 Var [1-5]. Group Study-Spanish.

Group study in language/literature/culture.

LSPA 300 03(3-0-0). Reading and Writing for Communication. F, S, SS. Prerequisite: LSPA 201 or placement exam.

Development of reading and writing proficiency through an in-depth examination of contemporary writing.

LSPA 301 03(3-0-0). Spanish Oral Communication. F, S. Prerequisite: LSPA 201 or placement exam.

In-depth language study to improve proficiency in all language skills emphasizing oral.

LSPA 310 03(3-0-0). Approaches to Spanish Literature. F, S. Prerequisite: LSPA 300 or placement exam.

Appreciation and critical readings of representative works in prose, drama, and poetry.

LSPA 312 03(3-0-0). Introduction to Spanish Linguistics. F. Prerequisite: LSPA 300 or concurrent registration.

Phonetics, phonology, morphology, syntax, semantics, and pragmatics.

LSPA 313 03(3-0-0). Introduction to Spanish Translation and Interpreting. F, S. Prerequisite: LSPA 300.

Translation and interpreting of written and oral texts into and from the foreign language.

LSPA 326 03(3-0-0). Spanish Phonetics. F, S. Prerequisite: LSPA 300 or concurrent registration.

Phonetic principles and their application to Spanish sound system; intensive practice in pronunciation, intonation.

LSPA 335 03(3-0-0). Issues in Hispanic Culture. F. Prerequisite: LSPA 300.

Historical context of contemporary issues in the culture of Spanish-speaking countries.

LSPA 345 03(3-0-0). Business Spanish. F, S, SS. Prerequisite: LSPA 300.

Business and commercial aspects of the Spanish language and culture.

LSPA 346 03(3-0-0). Spanish for Health Care. F, S. Prerequisite: LSPA 300.

Specific linguistic and cultural issues necessary to function in the Hispanic health care world.

LSPA 365 03(3-0-0). Studies in Foreign Film-Spanish. F, S. Prerequisite: LSPA 310.

Representation of Spanish society through film. Taught in Spanish. (NT-O)

LSPA 379 01(0-2-0). Service Learning-Spanish. F, S, SS. Prerequisite: Concurrent registration with 300-level Spanish course with written consent of instructor.

Language-related voluntary community work.

LSPA 400 03(3-0-0). Advanced Spanish Communication Skills. F, S, SS. Prerequisite: LSPA 300.

Development of speaking, reading, and writing proficiency through an in-depth examination of representative writings and media communications.

LSPA 401 03(3-0-0). Advanced Spanish Oral Communication. S. Prerequisite: LSPA 300.

Advanced language study to improve proficiency in Spanish language skills, with an emphasis on oral communication.

LSPA 413 03(3-0-0). Advanced Spanish Translation and Interpreting. F, S. Prerequisite: LSPA 313.

Advanced practice in translation and interpreting of written and oral texts into and from Spanish.

LSPA 435 03(3-0-0). Caribbean Culture in Hispanic Literature. S. Prerequisite: LSPA 335.

Hispanic-Caribbean cultures with emphasis on African heritage and cultural identity.

LSPA 436 03(3-0-0). Advanced Latin American Culture. F, S, SS. Prerequisite: LSPA 335.

Latin American cultural identities and their history.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

LSPA 437 03(3-0-0). Advanced Spanish Culture. F, S. Prerequisite: LSPA 335.

Cultural characteristics of Spanish society through the ages.

LSPA 441 03(3-0-0). Advanced Business Spanish. F, S. Prerequisite: LSPA 345.

Advanced business and commercial aspects of the Spanish language and culture.

LSPA 442 03(3-0-0). Colonial Latin American Literature. F.

Prerequisite: LSPA 300; LSPA 310.

Literature and literary culture of colonial Latin America.

LSPA 443 03(3-0-0). Spanish Theatre. F, S. Prerequisite: LSPA 300; LSPA 310.

Major authors and works of Spanish theatre.

LSPA 445 03(3-0-0). Women Writers in the Hispanic Worlds. F. Prerequisite: LSPA 300; LSPA 310.

Selected Hispanic women writers in a variety of genres emphasizing relationships among gender, culture, and writing.

LSPA 449 03(3-0-0). Spanish-American Literary Movements and Periods. F. Prerequisite: LSPA 300; LSPA 310.

Studies in selected literary movements and periods of Spanish America such as classicism, realism, naturalism, existentialism.

LSPA 450 03(3-0-0). Selected Spanish Literary Movements and Periods. F, S. Prerequisite: LSPA 300; LSPA 310.

Studies in selected literary movements and periods of Spain, such as classicism, realism, naturalism, existentialism.

LSPA 452 03(3-0-0). Genre Studies in Spanish. F, S. Prerequisite: LSPA 300; LSPA 310. May be taken up to 3 times for credit.

Development of critical approaches to major works in literature through selected literary genres and subgenres.

LSPA 453 03(3-0-0). Author Studies in Spanish. F, S. Prerequisite: LSPA 300; LSPA 310. May be taken up to 3 times for credit.

Development of critical approaches to authors through the appreciation and analysis of selected works.

LSPA 454 03(3-0-0). Topic Studies in Spanish. F, S. Prerequisite: LSPA 300; LSPA 310. May be taken up to 3 times for credit.

Selected topic studies such as themes, topoi, and interdisciplinary subjects in literature.

LSPA 465A 03(3-0-0). Studies in Foreign Film—Spain. S, SS. Prerequisite: LSPA 310 and LSPA 335.

Representation of Spanish society or specific topics through film. Taught in Spanish.

LSPA 465B 03(3-0-0). Studies in Foreign Film—Latin America. S, SS. Prerequisite: LSPA 310 and LSPA 335.

Representation of Latin American societies or specific topics through film. Taught in Spanish.

LSPA 468 03(3-0-0). Spanish Vocabulary and Word Formation. F, S. Prerequisite: LSPA 312.

Spanish vocabulary: meaning relations, word formation through prefixation, suffixation, and composition, and meaning change over time and space.

LSPA 470 03(3-0-0). Spanish Grammatical Constructions. S. Prerequisite: LSPA 400.

Linguistic analysis of selected Spanish grammatical constructions (word order, word formation, and sentence structure), their relationship to meaning.

LSPA 479 01(0-2-0). Service Learning-Spanish. F, S, SS. Prerequisite:

Concurrent registration with 400-level Spanish course. May be taken up to 3 times for credit.

Language-related voluntary community work in conjunction with a 400-level departmental course with written consent of instructor.

LSPA 492 03(0-0-3). Seminar-Spanish Language, Literature, and Society. F, S. Prerequisite: LSPA 310; two 400-level Spanish courses; senior status.

Integrative study of language, literature, and society.

LSPA 495 Var [1-6]. Independent Study-Spanish. Prerequisite: Three years of college-level Spanish.

LSPA 500 03(3-0-0). Language Analysis/Stylistics-Spanish. F. Prerequisite: LSPA 400.

Analysis of language structure through the examination of style in literary and non-literary texts.

LSPA 508 04(3-3-0). Intensive Spanish-Graduate Review. SS. Prerequisite: Admission to Summer Institute for Foreign Language Teaching.

Immersion review of language for the teacher, developing intermediate-level proficiency in culture and the four skills.

LSPA 514 01(1-0-0). Issues in Teaching Spanish. F, S. Prerequisite: Concurrent graduate teaching assistantship.

Current theory and practice in second-language instruction; technological applications.

LSPA 525 03(3-0-0). History of the Spanish Language. S. Prerequisite: LSPA 400.

Investigation of both internal (strictly linguistic) and external (sociolinguistic) factors in development of the language.

LSPA 536 03(3-0-0). Topics in Spanish Linguistics. F, S. Prerequisite: LSPA 500.

Acquisition, discourse analysis, and language change and variation over time and space.

LSPA 549 03(3-0-0). Literary Periods of Spanish America. F. Prerequisite: Undergraduate degree in Spanish.

Advanced studies in critical approaches to selected literary movements or periods of Spanish America.

LSPA 551 03(3-0-0). Selected Spanish Literary Movements/Periods. F. Prerequisite: Undergraduate degree in Spanish.

Advanced studies in and critical approaches to selected literary movements or periods.

LSPA 552 03(3-0-0). Advanced Studies in Spanish Literary Genres. F. Prerequisite: Undergraduate degree in Spanish.

Advanced studies in and critical approaches to literary genres through study of major works in foreign literatures.

LSPA 553 03(3-0-0). Advanced Spanish Author Studies. S. Prerequisite: Undergraduate degree in Spanish.

Critical approaches to the study of selected authors through appreciation and analysis of their major works.

LSPA 554 03(3-0-0). Advanced Spanish Topic Studies. S. Prerequisite: Undergraduate degree in Spanish.

Selected topics (theme, topoi, and interdisciplinary subjects) in foreign literatures.

LSPA 692 03(0-0-3). Seminar-Spanish. F, S. Prerequisite: Undergraduate degree in Spanish.

Treatment of selected topics in seminar.

LSPA 695 Var [1-6]. Independent Study-Spanish.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC-*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

MATHEMATICS COURSES

Department of Mathematics

College of Natural Sciences

MATH 117 01(1-0-0). College Algebra in Context I. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: Mathematics Placement Examination.

Functions as mathematical models. Linear, quadratic, and polynomial functions considered symbolically, graphically, numerically, and contextually.

MATH 118 01(1-0-0). College Algebra in Context II. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 117.

Reciprocals of linear functions, rational functions, and power functions considered symbolically, graphically, numerically, and contextually.

MATH 122/CS 122 01(0-0-1). Theory for Introductory Programming. F, S, SS. Prerequisite: MATH 118; concurrent registration in CS 161. Credit not allowed for both MATH 122 and CS 122. Credit not allowed for students who have completed CS 160.

Set theory, definitions operations, Venn diagrams, power sets, propositional logic and proofs. Functions; loop invariants. (NT-O)

MATH 124 01(1-0-0). Logarithmic and Exponential Functions. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 118 or placement.

Definition and graphs of exponential and logarithmic functions, properties of logarithmic functions, exponential and logarithmic equations, applications.

MATH 125 01(1-0-0). Numerical Trigonometry. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 118 or placement.

Definition and graphs of trigonometric functions, laws of sines and cosines, solutions of right and oblique triangles, applications.

MATH 126 01(1-0-0). Analytic Trigonometry. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 125 or placement.

Inverse trigonometric functions, trigonometric identities, solving trigonometric equations.

MATH 130 03(2-2-0). Math in the Social Sciences. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: Mathematics Placement Examination.

Voting theory, power indices, fair division, apportionment, circuits and trees, list processing, descriptive statistics, probability.

MATH 133 03(2-2-0). Financial Mathematics. (GT-MA1, AUCC 1B). F. Prerequisite: Mathematics Placement Examination. Calculator required.

Pricing, taxes, insurance, interest, annuities, amortization, investments using financial calculators and spreadsheets.

MATH 135 03(2-0-1). Patterns of Phenomena. (GT-MA1, AUCC 1B). S. Prerequisite: Mathematics Placement Examination.

Applications of mathematical ideas and mode of thought in the arts and humanities, focusing on classification, recognition.

MATH 141 03(3-0-0). Calculus in Management Sciences. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 118. Credit allowed for only one of the following courses: MATH 141, MATH 155, or MATH 160.

Analytic geometry, limits, equilibrium of supply and demand, differentiation, integration, applications of the derivative, integral.

MATH 151 01(0-2-0). Mathematical Algorithms in Matlab I. S. Prerequisite: MATH 141 or MATH 155 or MATH 160.

Statements, expressions and variable assignments, scripts, control statements and logical statements. Newton's method, Simpson's rule, recursion.

MATH 152 01(0-2-0). Mathematical Algorithms in Maple. S. Prerequisite: MATH 141 or MATH 155 or MATH 160.

Iteration and recursion, control and logical statements, expressions, functions, data types, binary numbers, symbolic manipulation of terms.

MATH 155 04(4-0-0). Calculus for Biological Scientists I. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 124; MATH 125. Credit allowed for only one of the following courses: MATH 141, MATH 155, or MATH 160.

Limits, continuity, differentiation, and integration of elementary functions with applications in the biosciences. Programmable graphing calculator required.

MATH 158/CS 158 01(0-2-0). Mathematical Algorithms in C. S. Prerequisite: CS 156; MATH 151; MATH 160. Credit not allowed for both MATH 158 and CS 158.

Compilers, expressions, variable types, control statements, pointers, logical statements, plotting, secant method, trapezoidal rule, recursion.

MATH 160 04(3-2-0). Calculus for Physical Scientists I. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 124; MATH 126. Credit allowed for only one of the following: MATH 141; MATH 155; MATH 160.

Limits, continuity, differentiation, and integration of elementary functions with applications; conic sections.

MATH 161 04(3-2-0). Calculus for Physical Scientists II. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 124; MATH 160.

Transcendental functions, integration techniques, polar coordinates, sequences and series, with mathematical software.

MATH 192 01(0-0-1). First-Year Seminar in Mathematical Sciences. F.

Introduction to the richness and variety of problems addressed by mathematical language and techniques; resources and available careers.

MATH 229 02(2-0-0). Matrices and Linear Equations. F, S, SS. Prerequisite: MATH 141 or MATH 155 or MATH 160.

Linear systems, matrix arithmetic, homogeneous coordinates, complex numbers, eigenvalues, eigenvectors, applications to discrete dynamical systems.

MATH 230 03(2-2-0). Discrete Mathematics for Educators. F. Prerequisite: EDUC 275 or concurrent registration; MATH 161. Credit allowed for only one of the following: MATH 230, MATH 301, MATH 330.

Voting theory, fair division, graph theory, linear programming, probability, teaching in small groups, proof techniques, mathematical technology.

MATH 255 04(4-0-0). Calculus for Biological Scientists II. (GT-MA1, AUCC 1B). F, S. Prerequisite: Concurrent registration in MATH 126; MATH 155. Credit not allowed for both MATH 255 and MATH 261.

Derivatives and integrals of functions of several variables, differential and difference equations, matrices, applications in the biosciences. Programmable graphing calculator required.

MATH 261 04(4-0-0). Calculus for Physical Scientists III. F, S, SS. Prerequisite: MATH 161. Credit not allowed for both MATH 261 and MATH 255.

Vector functions, partial differentiation, cylindrical and spherical coordinates, multiple integrals, line integrals, Green's theorem.

MATH 301 03(3-0-0). Introduction to Combinatorial Theory. F. Prerequisite: MATH 160. Credit not allowed for both MATH 301 and MATH 330.

Matrices, orthogonal Latin squares, designs, difference sets, sets, binomial coefficients, inclusion and exclusion, recurrence, Ramsey's theorem, SDRs.

MATH 317 04(4-0-0). Advanced Calculus of One Variable. F, S, SS. Prerequisite: MATH 161.

Convergence of sequences, series: limits, continuity, differentiation, integration of one-variable functions; development of skills for proving theorems.

MATH 331 03(3-0-0). Introduction to Mathematical Modeling. F. Prerequisite: MATH 161 or concurrent registration; MATH 229 or

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concurrent registration or MATH 369 or concurrent registration.

Problem formulation. Modeling, theoretical and empirical. Variable selection. Derivation and simulation of solutions. Model testing including predication.

MATH 332 03(3-0-0). Partial Differential Equations. S. Prerequisite: MATH 340 or MATH 345. Credit not allowed for both MATH 332 and MATH 530.

Partial differential equations, separation of variables, Fourier series and transforms, Laplace, heat, and wave equations.

MATH 340 04(3-2-0). Introduction to Ordinary Differential Equations. F, S, SS. Prerequisite: MATH 255 or MATH 261. Credit not allowed for both MATH 340 and MATH 345.

First and second order equations, series, Laplace transforms, linear algebra, eigenvalues, first order systems of equations, numerical techniques.

MATH 345 04(3-2-0). Differential Equations. F, S. Prerequisite: MATH 161 or MATH 255; MATH 229 or MATH 369. Credit not allowed for both MATH 345 and MATH 340.

First and second order equations, Laplace transforms, first order systems of equations, numerical methods, applied linear algebra, linearization.

MATH 348/BZ 348 04(3-3-0). Theory of Population and Evolutionary Ecology. F. Prerequisite: MATH 155 or MATH 160. Credit allowed for only one of the following: MATH 348, BZ 348, BZ 548. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Principles and methods for building, analyzing, and interpreting mathematical models of ecological and evolutionary problems in biology.

MATH 360 03(3-0-0). Mathematics of Information Security. F. Prerequisite: MATH 229 or MATH 369.

Codes, ciphers, Chinese remainder theorem, primality testing, public key ciphers, RSA, finite fields, discrete algorithms, advanced encryption standard.

MATH 366 03(3-0-0). Introduction to Abstract Algebra. F, S, SS. Prerequisite: MATH 161.

Sets, integers, polynomials, real and complex numbers, groups, integral domains, and fields; development of skills for proving theorems.

MATH 369 03(3-0-0). Linear Algebra. F, S, SS. Prerequisite: MATH 161.

Linear systems, matrices, subspaces of Euclidean spaces, linear transformations on Euclidean spaces, eigenvalues, eigenvectors.

MATH 384 01(1-0-0). Supervised College Teaching. F, S. Prerequisite: Written consent of instructor. May not be used to satisfy Mathematics degree requirements. Maximum of 1 credit allowed in course.

Skills for effective tutoring of precalculus mathematics; design and implementation of the Individualized Mathematics Program.

***MATH 405 03(3-0-0). Introduction to Number Theory.** S. Prerequisite: MATH 360 or MATH 366.

Diophantine equations; distribution of primes; multiplicative functions; finite fields; quadratic reciprocity; quadratic number fields.

MATH 417 03(3-0-0). Advanced Calculus I. F. Prerequisite: MATH 369.

Topology of Euclidean spaces, limits, derivatives and integrals on Euclidean spaces. Implicit functions and the implicit function theorem.

MATH 418 03(3-0-0). Advanced Calculus II. S. Prerequisite: MATH 417.

Line and surface integrals, series, sequences and series of functions.

MATH 419 03(3-0-0). Introduction to Complex Variables. F. Prerequisite: MATH 261.

Analyticity, Cauchy integral theorem and formula, Taylor and Laurent series, residue calculus, conformal mapping and harmonic functions.

MATH 425 03(3-0-0). History of Mathematics. F. Prerequisite: ED 331; two of the following courses: MATH 317, MATH 366, MATH 369.

Historical development of geometry, arithmetic, algebra, and calculus from ancient times to 20th century.

MATH 430/ECE 430 03(3-0-0). Fourier and Wavelet Analysis with Apps. S. Prerequisite: MATH 345. Credit not allowed for both MATH 430 and ECE 430.

Fourier analysis and transforms, FFTs; sampling theorems, computational algorithms; wavelets; applications to communication, imaging, and compression.

MATH 435 03(1-4-0). Projects in Applied Mathematics. S. Prerequisite: CS 156 or CS 160 or CS 253 or MATH 151; MATH 229 or MATH 369; MATH 340 or MATH 345.

Open-ended projects with emphasis on problem identification and formulation, team approach, and reporting results.

MATH 450 03(3-0-0). Introduction to Numerical Analysis I. F. Prerequisite: CS 156 or CS 160 or CS 253 or MATH 151; MATH 255 or MATH 261.

Solutions of systems of linear and nonlinear equations, interpolation, approximation.

MATH 451 03(3-0-0). Introduction to Numerical Analysis II. S. Prerequisite: CS 156 or CS 160 or CS 253 or MATH 151; MATH 340 or MATH 345.

Numerical computation of eigenvalues, numerical solution of ordinary and partial differential equations.

°MATH 455 03(3-0-0). Mathematics in Biology and Medicine. F. Prerequisite: MATH 255 or MATH 348/BZ 348 or MATH 340 or MATH 345.

Models in population biology, cell division, host-parasitoid systems, bacterial growth and predator-prey systems.

MATH 460 03(3-0-0). Information and Coding Theory. S. Prerequisite: MATH 360; MATH 369; STAT 321.

Entropy, mutual information, channel capacity, channel coding theorem, syndrome decoding, BCH codes, recent developments.

MATH 466 03(3-0-0). Abstract Algebra I. F. Prerequisite: MATH 360 or MATH 366 or MATH 369.

Comprehensive introduction to groups, rings, and fields

MATH 467 03(3-0-0). Abstract Algebra II. S. Prerequisite: MATH 369 or concurrent registration; MATH 466.

Advanced topics in abstract algebra: Euclidean domains, abstract vector spaces, extension fields, Galois theory.

MATH 469 03(3-0-0). Linear Algebra II. S. Prerequisite: MATH 369.

Abstract vector spaces, general theory of linear transformations, theory of determinants, canonical forms.

MATH 470 03(3-0-0). Euclidian and Non-Euclidian Geometry. S. Prerequisite: MATH 229 or MATH 369; MATH 261.

Topics from real Euclidean, affine metric and non-Euclidean geometries emphasizing methods and connections with other areas of mathematics.

***MATH 472 03(3-0-0). Introduction to Topology.** F. Prerequisite: MATH 317.

Topologies on sets, continuous functions, homeomorphisms. Sequences and convergence, metric spaces, Connectedness, path-connectedness. Separation properties. Compactness, Countability axioms.

°MATH 474 03(3-0-0). Introduction to Differential Geometry. S. Prerequisite: MATH 261; MATH 369.

Local and global geometry of curves and surfaces in Euclidean space, curvature, covariant differentiation, geodesics and the Gauss-Bonnet

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theorem.

MATH 476 03(3-0-0). Topics in Mathematics. F, S, SS. Prerequisite: Written consent of instructor.

Study experiences which deal with established content areas in mathematics.

MATH 484 Var [1-3]. Supervised College Teaching. F, S. Prerequisite: Written consent of instructor. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

MATH 487 Var [1-16]. Internship. Prerequisite: Written consent of instructor.

A work-learn experience integrating classroom theory with practical experience.

MATH 495 Var. Independent Study. Prerequisite: Written consent of instructor.

MATH 498 Var [1-3]. Undergraduate Research in Mathematics. Prerequisite: Written consent of instructor.

Research skills and techniques taught to suit student's level and interests. Includes both oral and written communication of results.

MATH 501 03(3-0-0). Combinatorics I. F. Prerequisite: MATH 301; MATH 360 or MATH 366.

Puzzles, numbers and counting, subsets, recurrence relations, generating functions, inversion, counting with symmetry, networks, matchings.

MATH 502 03(3-0-0). Combinatorics II. S. Prerequisite: MATH 501.

Graph algorithms, external set theory; partitions, Hadamard matrices, q-binomials, finite geometries, strongly regular graphs, triple systems, designs.

MATH 505 03. Teaching Problem Solving in Mathematics K-12. F, S. Prerequisite: Teacher licensure. Offered as telecourse only.

Problem-solving strategies, cooperative learning, and manipulatives for K-12 classroom. (NT-T)

MATH 510 03(3-0-0). Linear Programming and Network Flows. F, S, SS. Prerequisite: MATH 261 or MATH 315. Credit not allowed for both MATH 510 and ENGR 510.

Optimization methods; linear programming, simplex algorithm, duality, sensitivity analysis, minimal cost network flows, transportation problem. (NT-V)

MATH 517 03(3-0-0). Introduction to Real Analysis. F. Prerequisite: MATH 417; MATH 369.

Euclidean and metric spaces, compactness, continuity, sequences, series, multivariable differentiation, inverse and implicit function theorems.

MATH 519 03(3-0-0). Complex Variables I. S. Prerequisite: MATH 317.

Analytic functions, complex integration theory, singularities, elementary functions, and mappings.

MATH 520 03(3-0-0). Nonlinear Programming. S. Prerequisite: MATH 510.

Theoretical, computational, practical aspects of nonlinear programming (NLP); unconstrained, constrained NLP; quadratic programming; large-scale NLP.

***MATH 525 03(3-0-0). Optimal Control.** S. Prerequisite: MATH 340 or MATH 345.

Theory and application of optimal control and optimal estimation theory; continuous and discrete time systems; Pontryagin maximum principle.

MATH 530 04(4-0-0). Mathematics for Scientists and Engineers. F. Prerequisite: MATH 340 or MATH 345. Not for mathematics graduate students. Credit not allowed for both MATH 530 and MATH 332.

Proof-oriented linear algebra, ordinary and partial differential equations.

MATH 532 03(3-0-0). Mathematical Modeling of Large Data Sets. S.

Prerequisite: MATH 369 or MATH 530.

Mathematical theory and algorithms for modeling large data sets. Application to real world problems. Emphasis on geometric ideas.

MATH 535 03(3-0-0). Foundations of Applied Mathematics. F. Prerequisite: MATH 340 or MATH 345.

Calculus of variations, perturbation methods, models of continuum, dimensional analysis, stochastic models, integral equations, diffusion.

MATH 540 03(3-0-0). Dynamical Systems. F. Prerequisite: MATH 340 or MATH 345 or MATH 530.

Linear and nonlinear systems, orbits, phase space, flows of vector fields, stability, bifurcation theory, chaos, strange attractors and applications.

MATH 545 03(3-0-0). Partial Differential Equations I. F. Prerequisite: MATH 340 or MATH 345 or MATH 530.

Second order linear PDEs, elliptic and parabolic equations, equations of math physics, separation of variables, Fourier series.

MATH 546 03(3-0-0). Partial Differential Equations II. S. Prerequisite: MATH 545.

Distribution theory, Green's functions, Sobolev spaces, elliptic and parabolic equations.

MATH 550 03(3-0-0). Intro to Numerical Methods for PDEs. S. Prerequisite: MATH 340 or MATH 345 or MATH 530.

Finite elements, finite differences, spectral methods, method of lines, conservation laws; stability and convergence analysis for PDEs.

MATH 560 03(3-0-0). Linear Algebra. F. Prerequisite: MATH 369.

Finite dimensional vector spaces, inner products, dual spaces, transformations, projections, adjoints, norms, eigenvalues, eigenvectors.

MATH 561 04(4-0-0). Numerical Analysis I. S. Prerequisite: CS 156 or CS 160 or CS 253 or MATH 151; MATH 560.

Numerical linear algebra, solving nonlinear systems, least squares, and minimization.

MATH 566 03(3-0-0). Introduction to Abstract Algebra I. F. Prerequisite: MATH 366.

Analysis of algebraic structures including groups, rings, fields, and vector spaces.

MATH 567 03(3-0-0). Introduction to Abstract Algebra II. S. Prerequisite: MATH 566.

Field theory, Galois theory, and advanced linear algebra.

***MATH 570 03(3-0-0). Topology I.** F. Prerequisite: MATH 417 or MATH 472.

Point-set topology including basic set theory, continuity, product and quotient spaces, metrization, compactness, and connectedness.

***MATH 571 03(3-0-0). Topology II.** S. Prerequisite: MATH 566; MATH 570.

Fundamental group, free groups and presentations, and manifolds.

MATH 584 01(1-0-0). Supervised College Teaching. F, S. Prerequisite: Written consent of instructor.

MATH 592 01(0-0-1). Seminar in Mathematics. Prerequisite: Written consent of instructor.

MATH 601 03(3-0-0). Advanced Combinatorics I. F. Prerequisite: MATH 502; MATH 566.

Special numbers, mobius inversions, transversals, partial orders, different sets, codes, t-designs.

MATH 602 03(3-0-0). Advanced Combinatorics II. S. Prerequisite: MATH 601.

Hypergeometric functions, graph algorithms, hadamard matrices,

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strongly regular graphs, association schemes.

MATH 605A-C 03(3-0-0). Number Theory. S. Prerequisite: MATH 519 or concurrent registration; MATH 566; MATH 567.

A) Algebraic Number Theory. B) Arithmetic Geometry. C) Elliptic Curves.

MATH 617 04(4-0-0). Integration and Measure Theory. S. Prerequisite: MATH 517.

Riemann-Cauchy integration theory, sigma-algebras, Lebesgue theory of measure and integration, Fubini's Theorem, radon-Nikodym Theorem, L^p spaces.

MATH 618 03(3-0-0). Advanced Real Analysis. F. Prerequisite: MATH 560; MATH 617.

Normed linear spaces, Banach and Hilbert spaces, elements of functional analysis.

MATH 619 03(3-0-0). Complex Variables II. S. Prerequisite: MATH 519.

Infinite products, entire functions, analytic continuation, Riemann surfaces, other topics.

MATH 620 03(3-0-0). Variational Methods and Optimization I. F. Prerequisite: MATH 517; MATH 560.

Unconstrained and constrained infinite dimensional optimization, calculus of variations, applications.

MATH 621 03(3-0-0). Variational Methods and Optimization II. S. Prerequisite: MATH 620.

Unconstrained and constrained infinite dimensional optimization, variational inequalities, Lagrange multipliers, control, applications.

MATH 633 03(2-2-0). Industrial and Applied Mathematics. S. Prerequisite: MATH 530 or MATH 560 or MATH 561; preparedness to do programming in a standard language.

Team solution of problems arising in industrial and applied mathematics. Problem formulation, solution proposal, implementation and analysis.

MATH 640 03(3-0-0). Ordinary Differential Equations I. F. Prerequisite: MATH 340 or MATH 345 or MATH 530; MATH 369; MATH 517.

Existence and uniqueness, continuation, continuous dependence, linear systems, and stability.

MATH 641 03(3-0-0). Ordinary Differential Equations II. S. Prerequisite: MATH 640.

Topics selected from nonlinear boundary value problems, periodic phenomena, differential operators, and others.

MATH 645 03(3-0-0). Advanced Partial Differential Equations I. F. Prerequisite: MATH 546.

Abstract methods for linear partial differential equations.

MATH 646 03(3-0-0). Advanced Partial Differential Equations II. S. Prerequisite: MATH 645.

Problems in nonlinear partial differential equations.

MATH 651 04(4-0-0). Numerical Analysis II. F. Prerequisite: CS 156 or CS 160 or CS 253 or MATH 151; MATH 340 or MATH 345 or MATH 369 or MATH 530.

Interpolation, approximation, quadrature, initial and boundary value problems.

MATH 652 03(3-0-0). Advanced Numerical Methods for PDEs. F. Prerequisite: MATH 617 or MATH 456 or MATH 560.

Theory of numerical methods for solution of PDEs: convergence and stability properties; error estimation; approximation theory.

MATH 666 03(3-0-0). Advanced Algebra I. F. Prerequisite: MATH 567.

Theory of rings and algebras with applications.

MATH 667 03(3-0-0). Advanced Algebra II. S. Prerequisite: MATH 666. Advanced topics from algebra: representation theory, Wedderburn theory, bilinear forms, multilinear and homological algebra.

MATH 670 03(3-0-0). Introduction to Differential Manifolds. S. Prerequisite: MATH 517 or MATH 570.

Finite-dimensional differential manifolds, submanifolds, vector fields and flows, Lie groups and algebras.

MATH 672 03(3-0-0). Projective Geometry I. F. Prerequisite: MATH 567.

Algebraic sets in projective space, the Nullstellensatz, rational maps and functions, coordinate rings, Hilbert functions, dimension, degree.

MATH 673 03(3-0-0). Projective Geometry II. S. Prerequisite: MATH 672.

Topics selected from curves and surfaces, sheaf theory, algebraic geometry, singularity theory, vector bundles.

MATH 676 03(3-0-0). Topics in Mathematics. F, S, SS. May be taken up to 5 times for credit.

Advanced study experiences which deal with established content areas in mathematics.

MATH 687 Var [1-9]. Internship.

A work-learn experience integrating classroom theory with practical experience.

MATH 693 03(0-0-3). Seminar in Mathematics.

MATH 695 Var. Independent Study.

MATH 699 Var. Thesis.

MATH 717 03(3-0-0). Functional Analysis I. F. Prerequisite: MATH 618.

Topological vector spaces; Banach and Hilbert spaces.

MATH 718 03(3-0-0). Functional Analysis II. S. Prerequisite: MATH 717.

Spectral theory, operator theory, semigroups of transformations, and distribution theory.

MATH 750 03(3-0-0). Numerical Methods and Models I. F. Prerequisite: MATH 561.

Derivation of model equations, introduction to solution techniques and computing.

MATH 751 03(3-0-0). Numerical Methods and Models II. S. Prerequisite: MATH 561.

Convergence, stability, error estimates and computing.

MATH 793 Var. Seminar in Mathematics.

MATH 798 Var. Research.

MATH 799 Var. Dissertation.

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MECHANICAL ENGINEERING COURSES

Department of Mechanical Engineering

College of Engineering

MECH 100 01(1-0-0). Introduction to Mechanical Engineering. F. Prerequisite: Mechanical engineering freshmen majors only.

The profession of mechanical engineering; history, educational process, ethics, licensing, problem solving, technology.

MECH 102 03(3-0-0). Mechanical Engineering Problem Solving. F, S. Prerequisite: MATH 160; PH 141 or concurrent registration.

Programming and engineering problem solving techniques, algorithms and processes from physics and calculus first principles.

MECH 200 03(2-2-0). Introduction to Manufacturing Processes. F. Prerequisite: Mechanical engineering and engineering science majors only.

Engineering drawings, materials, manufacturing, and safety. Hand tools, cutting, drilling, the lathe, mill and numerical control. (\$)

MECH 201 02(1-2-0). Engineering Design I. F. Prerequisite: MECH 102 with a C or better.

Engineering design process and the roles of visual communication with emphasis on 3D physical solid modelers and Pro/ENGINEER.

MECH 202 03(2-2-0). Engineering Design II. S. Prerequisite: MECH 200 with a C or better or concurrent registration; MECH 201 with a C or better.

Engineering design process with emphasis on teamwork, ideation, decision-making, project planning applied to a group design project. (\$)

MECH 237 03(3-0-0). Introduction to Thermal Sciences. F, S. Prerequisite: MATH 160; PH 141.

First and second laws of thermodynamics, properties of materials, energy conversion, statistical aspects, heat transfer.

MECH 302 03(3-0-0). Engineering Design III. S. Prerequisite: CIVE 360 with a C or better; MECH 202 with a C or better; MECH 324 with a C or better; MECH 337 with a C or better; MECH 342 with a C or better.

Design fundamentals, including design processes, project planning, creativity, manufacturing, and human factors.

MECH 303 03(3-0-0). Energy Engineering. F. Prerequisite: CBE 310 or ECE 341 or MECH 237 or MECH 339 or PH 361.

Energy generation (coal, oil, natural gas, solar, wind, geothermal, hydropower, tidal, biofuel, nuclear), conversion, distribution, storage, efficiency.

MECH 307 04(3-3-0). Mechatronics and Measurement Systems. F, S. Prerequisite: CIVE 261 with a C or better; ECE 204 with a C or better; MATH 340 with a C or better.

Instrumentation and measurement system analysis and design; sensors and actuators; computer data acquisition and control. (\$)

MECH 324 04(3-2-0). Dynamics of Machines. F. Prerequisite: CIVE 261; MATH 340 with a C or better or concurrent registration.

Analysis and synthesis of moving machinery. (\$)

MECH 325 03(3-0-0). Machine Design. S. Prerequisite: CIVE 360 with a C or better.

Design of mechanical components to avoid failure during operation. Stress analysis, failure theories, and specific mechanical components in design context.

MECH 331 04(3-2-0). Introduction to Engineering Materials. F, S. Prerequisite: CHEM 111 with a C or better; CHEM 112 with a C or better; PH 142 with a C or better.

Characteristics of metallic, plastic, and ceramic material; basic principles which relate properties of materials to their atomic and microstructure. (\$)

MECH 337 04(3-0-1). Thermodynamics. F, S. Prerequisite: MATH 261

with a C or better; PH 141 with a C or better.

First and second laws, property relationships, characteristic functions, thermodynamics solver, various thermodynamics applications.

MECH 338 01(0-3-0). Thermosciences Laboratory. F, S. Prerequisite: Prerequisite: MECH 337 with a C or better; MECH 342 with a C or better.

Experimental methods in heat transfer, fluid flow, and thermodynamics.

MECH 342 03(3-0-0). Mechanics and Thermodynamics of Flow Processes. F. Prerequisite: MATH 340 with a C or better; MECH 337 with a C or better or concurrent registration; PH 141 with a C or better.

Engineering details of viscous flow with losses, measurements, compressibility, turbomachinery, convective heat transfer.

MECH 344 03(3-0-0). Heat and Mass Transfer. S. Prerequisite: MECH 342 with a C or better.

Transport and rate processes, conduction, convection, and radiation.

MECH 407 03(3-0-0). Laser Applications in Mechanical Engineering. F. Prerequisite: PH 142.

Review of electromagnetic waves; applications of lasers and optics in engineering, e.g. position sensing, flowfield measurement, cutting and welding.

MECH 408 03(2-0-1). Applied Engineering Economy. F. Prerequisite: MATH 161. Credit not allowed for both MECH 408 and MECH 410.

The basic principles and calculations of engineering economy with application to real problems, including energy and the environment.

MECH 410 01(0-0-1). Engineering Economy Principles/Calculations. F, S, SS. Prerequisite: MATH 161. Offered as an online course only.

Basic principles and calculation of engineering economy. (NT-O)

MECH 411 03(3-0-0). Manufacturing Engineering. S. Prerequisite: CIVE 360; MECH 331.

Casting, forming, machining, and welding processes used in manufacturing operations. (NT-V)

MECH 417 03(2-2-0). Control Systems. F. Prerequisite: MATH 340; MECH 307.

Feedback and forward loop control design and simulation; discrete time and frequency domain methods with implementation considerations.

MECH 424 03(3-0-0). Advanced Dynamics. S. Prerequisite: MECH 324.

Kinematics and dynamics of rigid bodies. Hamilton's principle and Lagrange's equations for lumped parameter extended bodies and distributed systems.

MECH 431 03(3-0-0). Metals and Alloys. F. Prerequisite: MECH 331.

Engineering metals and alloys, modification of properties by alloying, plastic deformation, and heat treatment. Fundamentals of physical metallurgy. (NT-V)

***MECH 432 03(3-0-0). Engineering of Nanomaterials.** F. Prerequisite: MECH 331.

Structure, properties and processing of extremely small (10^{-9} m) synthetic and natural materials.

MECH 437 03(2-0-1). Internal Combustion Engines. F. Prerequisite: MECH 344.

Application of thermodynamics, heat transfer, and fluid mechanics to internal combustion engines.

MECH 460 03(3-0-0). Aeronautics. S. Prerequisite: MECH 342.

Thermodynamics and fluid mechanics principles applied to the mechanics, aerodynamics, performance, stability, and control of airplanes.

MECH 463 03(3-0-0). Building Energy Systems. S. Prerequisite: MECH 344.

Comfort, psychrometrics, loads, solar radiation, heating and cooling

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system design, transport, solar system design, economics.

MECH 468 03(3-0-0). Space Propulsion and Power Engineering. F. Prerequisites: ECE 204; MECH 337; MECH 342.

Orbital mechanics and space missions; chemical, nuclear, and electric rockets; nuclear heat sources; thermoelectric and photovoltaic devices.

MECH 470/ BIOM 470 03(3-0-0). Biomedical Engineering. F. Prerequisite: MATH 155 or MATH 160; PH 141. Credit not allowed for both MECH 470 and BIOM 470.

Engineering application in human/animal physiology, diagnosis of disease, treatment, rehabilitation, human genome manipulation.

MECH 486A-B 04(1-12-0). Engineering Design Practicum.

Capstone engineering design project; transition experience to the mechanical engineering profession in industry and graduate education. **A) Practicum I.** F. Prerequisite: MECH 302 with a C or better; MECH 307 with a C or better; MECH 325 with a C or better; MECH 331 with a C or better; MECH 344 with a C or better. (\$) **B) Practicum II.** S. Prerequisite: CIVE 363 with a C or better; MECH 338 with a C or better; MECH 486A with a C or better. (\$)

MECH 495 Var. Independent Study.

MECH 498 Var[1-3]. Undergraduate Research. Var[1-3]. Prerequisite: Participation in the University Honors or instructor's permission. ***MECH 507 03(3-0-0). Laser Diagnostics for Thermosciences.** F. Prerequisite: PH 142.

Basics of optics, spectroscopy, and lasers. Physics and applications of laser diagnostic techniques used in thermosciences.

MECH 509 03(3-0-0). Design and Analysis in Engineering Research. S. Prerequisite: MATH 340; STAT 315.

Design, model building, analysis and reporting in engineering and manufacturing research and experimentation. (NT-O/V)

***MECH 510 02(1-0-1). Advanced Engineering Economy.** SS. Prerequisite: MECH 410; STAT 315.

Evaluation of independent and interrelated proposals with compound interest, discrete and continuous cash flows, complete and incomplete information. (NT-O/V)

MECH 512 03(3-0-0). Reliability Engineering. F. Prerequisite: MECH 513; STAT 315.

Models to predict time to failure of mechanical or electronic devices, reliability data analysis and case studies. (NT-O/V)

MECH 513 03(3-0-0) Simulation Modeling and Experimentation. F. Prerequisite: STAT 315.

Logic/analytic modeling in simulations. Event and transient entity-based simulation languages. Simulation design, experimentation and analysis. (NT-O)

°MECH 514 03(2-2-0). Manufacturing and Robotic Systems. S. Prerequisite: MECH 417.

Examination of electromechanical systems of manufacturing applications and robotics.

MECH 520 03(3-0-0). Finite Element Analysis in Mechanical Engr. S. Prerequisite: CIVE 360; MATH 340.

Application of FEA as a tool to analyze mechanical engineering problems.

MECH 523 03(3-0-0). Vehicle Energy Storage System Design. S. Prerequisite: MECH 331.

Develop vehicle system designs utilizing electrochemical energy storage systems such as batteries and capacitors.

MECH 524 03(3-0-0). Principles of Dynamics. F. Prerequisite: MECH 324.

Kinematics and dynamics of rigid body motion; Lagrangian and

Hamiltonian formulations of mechanics; applications to engineering problems. (NT-V)

***MECH 525/*BIOM 525 03(0-0). Cell and Tissue Engineering.** S. Prerequisite: BC 351 or BMS 300 or BMS 500/NB 501 or BZ 310. Credit allowed for only one of the following: BIOM 525, CBE 525, and MECH 525. Cell and tissue engineering concepts and techniques with emphasis on cellular response, cell adhesion kinetics, and tissue engineering design.

MECH 526 03(3-0-0). Fundamentals of Vehicle Dynamics. S. Prerequisite: MECH 324.

Kinetics of vehicle suspensions, steady-state and transient stability and control, tires, wheel and suspension geometry and loads, dampers, steering.

MECH 527 03(3-0-0). Hybrid Electric Vehicle Powertrains. F. Prerequisite: MECH 307.

Hybrid powertrains and modeling including vehicle dynamics, internal combustion engine, electric motor, energy storage, and control.

°MECH 529 03(3-0-0). Advanced Mechanical Systems. S. Prerequisite: MECH 307.

Modeling, analysis, and synthesis of practical mechanical devices in which dynamic response is dominant consideration.

MECH 530 03(3-0-0). Advanced Composite Materials. F. Prerequisite: CIVE 360; MECH 331.

Materials aspects of advanced composite constituents and how their combination yields synergistic results. (NT-V)

MECH 531/BIOM 531 03(3-0-0). Materials Engineering. S. Prerequisite: MECH 331 or MECH 431. Credit not allowed for both MECH 531 and BIOM 531. Selection of structural engineering materials by properties, processing, and economics; materials for biomedical and biotechnology applications. (NT-O)

MECH 532/BIOM 532 03(3-0-0). Materials Issues in Mechanical Design. F. Prerequisite: MECH 331. Credit not allowed for both MECH 532 and BIOM 532.

Failure mechanisms from materials viewpoint with emphasis on use in design. Fracture, creep, fatigue, and corrosion. (NT-V/O)

+MECH 536 03(3-0-0). Materials Applications in Renewable Energy. F. Prerequisite: MECH 331.

Materials science applied to renewable energy, transmission and storage; study of solar cells, fuel cells, Li-ion batteries and related technologies. Required field trips.

MECH 538 03(3-0-0). Mechanical Engineering Thermodynamics. F. Prerequisite: MECH 337.

First and second laws of thermodynamics applied to engineering devices and systems. Introduction to availability, energy, and lost work analysis.

MECH 539 03(3-0-0). Advanced Fluid Mechanics. F. Prerequisite: MECH 342 or CIVE 300.

Properties, kinematics; vorticity; exact solutions; instability; boundary layers; turbulence; wakes; compressible flow; supersonic flow; shockwaves.

°MECH 551 03(3-0-0). Physical Gas Dynamics I. F. Prerequisite: MECH 342.

Characteristics of real gases in reacting and nonequilibrium systems; equilibrium air; statistical mechanics; chemical thermodynamics.

°MECH 552 03(3-0-0). Applied Computational Fluid Dynamics. F. Prerequisites: CBE 331 or CIVE 300 or MECH 342.

Introductory theory of CFD, formulation of engineering problems for CFD analyses, mesh generation, solver settings, and postprocessing.

MECH 555 03(3-0-0). Ceramic Materials Engineering. S. Prerequisite: MECH 331.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Ceramic materials engineering and its application to materials technologies.

MECH 557 03(3-0-0). Turbomachinery. S. Prerequisite: MECH 337; MECH 342.

Application of fundamental principles of thermodynamics and fluid mechanics to turbomachinery.

***MECH 558 03(3-0-0). Combustion.** F. Prerequisite: MECH 342.

Combustion processes: explosions, detonations, flame propagation, ignition, generation of pollutants in moving and stationary energy conversion systems.

***MECH 561 04(4-0-0). Space Propulsion and Mission Analysis.** S. Prerequisite: MATH 340.

Analysis of space flight missions and propulsion systems.

***MECH 564 03(3-0-0). Fundamentals of Robot Mechanics and Controls.** S. Prerequisite: MECH 417.

Kinematics of robots, controls for robots.

°MECH 567 03(3-0-0). Broad-Beam Ion Sources. S. Prerequisite: MATH 340.

Physical processes in broad-beam electron-bombardment ion sources for space propulsion and ion machining applications.

***MECH 569*/ECE 569 03(3-0-0). Micro-Electro-Mechanical Devices.** S. Prerequisite: ECE 331 with a C- or better or MECH 344. Credit not allowed for both MECH 569 and ECE 569.

Micro-electro-mechanical processes and applications in sensors, optics, and structures. (NT-O)

MECH 570/BIOM 570 03(3-0-0). Bioengineering. S. Prerequisite: MECH 307; MECH 324. Credit not allowed for both MECH 570 and BIOM 570.

Physiological and medical systems analysis using engineering methods including mechanics, fluid dynamics, control, electronics, and signal processing. (NT-O)

MECH 573/BIOM 573 03(3-0-0). Structure and Function of Biomaterials. S. Prerequisite: MECH 331. Credit not allowed for both MECH 573 and BIOM 573.

Structure-function relationships of natural biomaterials; application to analysis of biomimetic materials and biomaterials used in medical devices. (NT-V/O)

MECH 575 03(3-0-0). Solar and Alternative Energies. F. Prerequisite: MECH 337; MECH 342; MECH 344.

Solar radiation, flat-plate collectors, energy storage, space heating and cooling, power generation, applications, simulation.

°MECH 609 03(1-0-2). Experimental Optimization. S, SS. Prerequisite: STAT 315.

Application of design of experiments, response surface and optimization methods to experimental investigations. (NT-O)

MECH 626 03(3-0-0). Race Car Vehicle Dynamics. F. Prerequisites: CIVE 562; MECH 524; MECH 526.

Quasi-static, steady-state and transient analyses of racing suspensions including modal analysis in roll, pitch, heave, yaw and warp.

***MECH 628 03(3-0-0). Applied Fracture Mechanics.** S. Prerequisite: CIVE 560.

Stress distribution near cracks; energy criteria for fracture; design criteria; fracture toughness testing. (NT-T)

°MECH 644 03(3-0-0). Conduction Heat Transfer. F. Prerequisite: MECH 344.

Linear and nonlinear, isotropic and nonisotropic conduction; analytical, numerical techniques; inverse methods.

***MECH 645 03(3-0-0). Radiation Heat Transfer.** S. Prerequisite: MECH 344.

Radiation fundamentals; properties; spectral, directional variations;

transfer between surfaces; participating media; numerical, Monte Carlo methods. (NT-V)

°MECH 646 03(3-0-0). Convection Heat Transfer. S. Prerequisite: MECH 344.

Fundamentals; conservation, constitutive equations; second law; forced, free convection; internal, external flows; laminar, turbulent flows. (NT-V)

MECH 650 03(3-0-0). Computational Materials from First Principles.

F. Prerequisite: CHEM 461 or MECH 331; CHEM 474 or MECH 337 or PH 361; MATH 340.

Ab initio calculations for molecules, clusters, solutions and solid state materials. Ab initio and classical molecular dynamics simulations.

°MECH 661 03(3-0-0). Theory/Control of Internal Combustion Engines. S. Prerequisite: MECH 437.

Theory and applications of internal combustion engines. Alternative fuels, engine control, and pollution prevention.

°MECH 671/BIOM 671 03(3-0-0). Orthopedic Tissue Biomechanics. F. Prerequisite: CIVE 560. Credit not allowed for both MECH 671 and BIOM 671 or for MECH 671/BIOM 671 and MECH 571/BIOM 571.

Linear elastic, finite deformation, and viscoelastic theories applied to the mechanical behavior of orthopedic tissues (bone, tendon, cartilage).

MECH 676 03(2-2-0). Building Energy Design. S. Prerequisite: MECH 575. Credit not allowed for both MECH 676 and MECH 463.

Design of space heating and cooling systems. Solar thermal electric power systems, industrial and agricultural process heat.

MECH 684 Var. Supervised College Teaching.

MECH 692 Var. Seminar. F, S.

MECH 695A-M Var. Independent Study.

A) Bioengineering. B) Energy conversion. C) Environmental engineering. D) Heat and mass transfer. E) Industrial and systems engineering. F) Mechanics and design. G) Computer-assisted engineering. H) Robotics. I) Solar engineering. J) Computational fluids. K) Materials. L) Plasma engineering. M) Motorsport engineering..

MECH 699A-M Var. Thesis.

A) Bioengineering. B) Energy conversion. C) Environmental engineering. D) Heat and mass transfer. E) Industrial and systems engineering. F) Mechanics and design. G) Computer-assisted engineering. H) Robotics. I) Solar engineering. J) Computational fluids. K) Materials. L) Plasma engineering. M) Motorsport engineering.

°MECH 721 Var. Special Topics in Design and Manufacturing. S. Prerequisite: MECH 514 or MECH 620.

Special topics in engineering design and manufacturing.

***MECH 727 03(3-0-0). Continuum Mechanics.** S. Prerequisite: CIVE 502.

Mechanics of continuous media; cartesian tensors, vector analysis, kinematics of deformation, balance of momentum, mass and energy, constitutive equations.

MECH 729 03(3-0-0). Special Topics in Mechanics and Materials. S. Prerequisite: MECH 524 or MECH 530.

Advanced topics in discipline of engineering mechanics and materials; associated analysis and manufacturing techniques.

MECH 784 Var. Supervised College Teaching.

MECH 799A-M Var. Dissertation.

A) Bioengineering. B) Energy conversion. C) Environmental

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engineering. **D**) Heat and mass transfer. **E**) Industrial and systems engineering. **F**) Mechanics and design. **G**) Computer-assisted engineering. **H**) Robotics. **I**) Solar engineering. **J**) Computational fluids. **K**) Materials. **L**) Plasma engineering. **M**) Motorsport engineering.

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MANAGEMENT COURSES

Department of Management College of Business

MGT 301 03(3-0-0). Supply Chain Management. F, S, SS. Prerequisite: AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160.

Concept of value-driven supply chains; design and management of effective supply chains; emphasis on current practice and recent trends.

MGT 305 03(3-0-0). Fundamentals of Management. F, S, SS. Credit not allowed for both MGT 305 and MGT 320.

Managerial process of planning, directing, and controlling inputs of an organization. Analysis, decision making, and survey of research literature. (NT-O)

MGT 310 03(3-0-0). Human Resource Management. F, S.

Principles and practices of employee management including hiring, development, compensation, and employee relations.

MGT 320 03(3-0-0). Contemporary Management Principles/Practices. F, S, SS. Prerequisite: BUS 300; AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160. Credit not allowed for both MGT 320 and MGT 305.

Principles of management in combination with practices of the new economy to achieve managerial goals. (NT-O)

MGT 325 03(3-0-0). Leadership Communication. F. Prerequisite: BUS 300.

Interpersonal communication for leaders and managers in organizational settings.

MGT 330 03(3-0-0). Corporate Innovation and Entrepreneurship. F, S. Prerequisite: ACT 210; MGT 320.

Process of creating new ventures and generating innovations within existing organizations.

MGT 340 03(3-0-0). Entrepreneurship in the Contemporary World. F, S, SS.

Concepts of entrepreneurship and role of entrepreneurs in the economy.

MGT 350 03(3-0-0). Employment Relations: The Legal Environment. F, S.

Legal principle and policy issues arising from the employment relationship.

MGT 360 03(3-0-0). Social and Sustainable Venturing. S.

Prerequisite: Junior standing or higher.

Entrepreneurship and economic opportunities in the transition to a socially and ecologically sustainable global economy.

MGT 375 03(3-0-0). Advanced Supply Management. F. Prerequisite: MGT 301.

Advanced design of purchasing and supply management within global supply chains.

MGT 410 03(3-0-0). Leadership and Organizational Behavior. F, S. Prerequisite: MGT 305 or MGT 320.

Behavior of people and groups as members of organizations.

MGT 411 03(3-0-0). Leading High Performance Teams. F, S. Prerequisite: MGT 305 or MGT 320.

Design, management, and leadership of teams in organizational settings.

MGT 420 03(3-0-0). New Venture Creation. F. Prerequisite: MGT 340.

Entrepreneurs and the entrepreneurial process. Growth of an independent business.

MGT 425 03(3-0-0). Organizational Communication Strategies. S. Prerequisite: FIN 300 or FIN 305; MGT 305 or MGT 320; MKT 300 or MKT 305.

Strategic communications in organizations; contribution that organizational members make whether acting as individual or group communicators.

MGT 430 03(3-0-0). Leadership and Social Responsibility. S.

Social responsiveness of managers as they face expectations in the firm's internal and external environment.

MGT 440 03(3-0-0). New Venture Management. S. Prerequisite: MGT 420.

Theories and skills necessary for managing startup and existing small firms.

MGT 450 02(2-0-0). Biomedical Entrepreneurship I. S. Prerequisite: BIOM 470/MECH 470 or MGT 340.

Commercialization process for biomedical inventions; market and competitor analysis, regulations, patents; preliminary feasibility study.

MGT 451 01(1-0-0). Biomedical Entrepreneurship II. F. Prerequisite: MGT 450.

Financing (especially regulatory financing) and operational issues.

MGT 470 03(3-0-0). Managerial Decisions-Issues and Analysis. F, S. Prerequisite: MGT 301; MGT 305 or MGT 320.

Investigation and application of managerial decision-making processes and methods to solve problems in business functions.

MGT 471 03(3-0-0). Micro Issues in Supply Chain Management. F. Prerequisite: MGT 301.

Managing the supply function (locally or globally) and the productive flow of materials in goods and services-producing supply chains.

MGT 472 03(3-0-0). Macro Issues in Supply Chain Management. S. Prerequisite: MGT 301.

Application of analytical and computer-based tools in the analysis and improvement of supply chains with variable demand and supply.

MGT 473 03(3-0-0). Employment Relations: Labor and Manpower. F, S.

Managerial decision making and action in labor-management relations as affected by labor legislation and administrative practices.

MGT 474 03(3-0-0). Human Resource Planning and Development. S. Prerequisite: MGT 310.

Human resource planning, recruitment, selection, training, and development.

MGT 475 03(3-0-0). International Business Management. F, S. Prerequisite: FIN 300 or FIN 305; MGT 305 or MGT 320; MKT 300 or MKT 305.

Multinational corporations: their scope, activities, managerial problems and decisions.

MGT 476 03(3-0-0). Negotiation and Conflict Management. F, S. Prerequisite: MGT 305 or MGT 320.

Principles and practice of negotiation and conflict management including bargaining as a social and managerial activity.

MGT 477 03(3-0-0). Advanced Logistics. S. Prerequisite: MGT 301; junior standing.

Advanced design and management of logistics and distribution operations within global supply chains.

MGT 486 03(1-4-0). Practicum in Supply Chain Management. S. Prerequisite: MGT 301; MGT 375 or MGT 477.

Research and recommend solutions to "real world" supply chain management problems.

MGT 487 Var. Internship.

MGT 495 Var. Independent Study.

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MGT 496 Var. Group Study.

MGT 498 Var [1-3]. Research.

MGT 600 03(3-0-0). Manufacturing Process and Systems Design. S.
Prerequisite: BUS 620; BUS 625.

Strategic understanding of alternate manufacturing processes and systems design support needed to manage those processes.

MGT 601/CIS 601 03(3-0-0). Enterprise Computing and Systems Integration. F. Prerequisite: Admission to one of the following programs: M.S. in Business, M.B.A., or Systems Engineering specialization in Master of Engineering. Credit not allowed for both MGT 601 and CIS 601.

Integrated extended enterprise planning and execution systems concepts including ERP, CRM, SCM, MRPII, business processes, front/back office systems. (NT-O)

MGT 610 03(3-0-0). Strategic Human Resource Management. S.
Prerequisite: Admission to masters program.

Strategic issues associated with recruiting, staffing, evaluating, compensating, and developing employees; leadership issues associated therein.

MGT 611 03(3-0-0). Management of Organization Development. S.
Prerequisite: MGT 305 or MGT 320.

Methods for managing organizational change.

MGT 612 03(3-0-0). Managing in a Global Context. F. Prerequisite: Admission to GSSE program.

Global management and HR development issues/practices. Cross-cultural issues in organization behavior, recruitment, selection, training, compensation.

MGT 620 03(3-0-0). Management. F, S.

Practices, policies, philosophies, and behavior.

MGT 625 03(3-0-0). Managerial Communication Practices. F.
Prerequisite: Admission to a masters program in business.

Internal, external, and managerial communication. Managerial speaking and writing skills enhancement.

MGT 640 02(2-0-0). Supply Chain Management Strategies. F.
Prerequisite: MGT 600.

How to create an effective supply chain management system to establish an efficient network for supplying final consumption.

MGT 667 03(3-0-0). Global Social Sustainable Entrepreneurship. F.
Prerequisite: Admission to GSSE program.

Global challenges-poverty, environmental degradation, public health, agriculture. Role of entrepreneurial management in private and public sector.

MGT 668 03(3-0-0). New Venture Development for Social Enterprise. S.
Prerequisite: ACT 501; MGT 667; MKT 601.

Early stages of a new venture, including creation of business plan. Additional study of social entrepreneurship and sustainable business strategies.

MGT 671 03(3-0-0). Labor Management Relations. S.

Collective bargaining process, administration of contract, and impact of public policy on industrial relations.

MGT 675 03(3-0-0). Service Operations/Supply Chain Management. S.
Prerequisite: Admission to a master's program in business.

Supply chain management (SCM) and operations function. Primary focus on service sector.

MGT 679 03(3-0-0). Principles of Strategic Management. S.
Prerequisite: Admission to a master's program in business.

Processes through which firms choose and implement strategies.

Formulation and implementation of strategic management process in variety of industries.

MGT 695 Var. Independent Study.

MGT 696 Var. Group Study.

MGT 699 Var. Thesis.

MICROBIOLOGY, IMMUNOLOGY, AND PATHOLOGY COURSES

Department of Microbiology, Immunology, and Pathology

College of Veterinary Medicine and Biomedical Sciences

MIP 101 03(3-0-0). Introduction to Human Disease. (GT-SC2, AUCC 3A). S.

Survey of human systems and diseases.

MIP 149 03(3-0-0). The Microbial World. F.

Importance of microbiology in daily life, with emphasis on positive and negative roles of microbes, infectious disease, and current microbiology issues.

MIP 192 02(0-0-2). Microbiology First-Year Seminar. F.

Introduction to microbiology major and faculty; academic and career planning; information sources in biomedical sciences.

MIP 260 03(3-0-0). The World of Parasites. S. Prerequisite: BZ 110 or LIFE 102; CHEM 111.

Introduction to general parasitology; evolution, ecology, epidemiology, physiology, and morphology of representative parasites of every group.

MIP 275 02(1-0-1). Microcomputing Applications in Microbiology. S.

Network software on MS-DOS microcomputers will be used to acquire and analyze data and information that are commonly encountered in microbiology.

MIP 298 Var [1-3]. Introductory Research. Prerequisite: Written consent of instructor.

Freshman/sophomore research experience in a working research environment.

MIP 300 03(3-0-0). General Microbiology. F, S, SS. Prerequisite: BZ 110 or BZ 120 or LIFE 102; CHEM 245 or concurrent registration or CHEM 341 or concurrent registration or CHEM 345 or concurrent registration.

Structure, function, development, physiology, and molecular biology of microorganisms emphasizing bacteria. (NT-O)

MIP 302 02(0-4-0). General Microbiology Laboratory. F, S. Prerequisite: MIP 300 or concurrent registration.

Laboratory skills and techniques for isolating, characterizing, and identifying bacteria. (\$)

MIP 303 01(0-0-1). General Microbiology--Honors Recitation. F, S. Prerequisite: Concurrent registration in MIP 300—Honors Section; participation in the Honors Program.

Research and present topics related to the material presented in MIP 300.

MIP 315A-B. Human and Animal Disease. F, S. Credit not allowed for both MIP 315A and MIP 315B.

Biological systems critical to mammalian physiology and how each is affected by metabolic, genetic, environmental, and infectious agents. **A)** 03(3-0-0). **B)** 04(3-0-1). Prerequisite: BMS 300 or BMS 305.

MIP 334 03(3-0-0). Food Microbiology. F. Prerequisite: LIFE 205 or MIP 300.

Microorganisms in production of foods, in preservation and spoilage, and in food-borne diseases. Control of microorganisms in foods.

MIP 335 02(0-4-0). Food Microbiology Laboratory. F. Prerequisite: LIFE 206 or MIP 302; MIP 334 or concurrent registration.

Laboratory skills and techniques related to the presence of microorganisms in food, production, and preservation.

MIP 342 04(3-0-1). Immunology. F, S. Prerequisite: CHEM 245 or concurrent registration or CHEM 341 or concurrent registration or CHEM 345 or concurrent registration; LIFE 201B or LIFE 210 or MIP 300.

Principles of immunology; components of the immune system, interactions of humoral and cellular elements, and clinical applications of basic concepts.

MIP 343 02(0-4-0). Immunology Laboratory. S. Prerequisite: MIP 302; MIP 342 or concurrent registration.

Techniques used in research and clinical immunology, including diagnostic problem solving and data analysis. (\$)

MIP 350 03(3-0-0). Microbial Diversity. S. Prerequisite: MIP 300.

Physiological, taxonomic, and phylogenetic aspects of microbial diversity. Yeasts and filamentous fungi as microbial entities.

MIP 351 03(3-0-0). Medical Bacteriology. S. Prerequisite: MIP 342.

Bacteria which cause human and veterinary diseases; host-parasite relationships; disease mechanisms, prevention, and therapy.

MIP 352 03(0-6-0). Medical Bacteriology Laboratory. S. Prerequisite: MIP 302; MIP 351 or concurrent registration.

Laboratory skills and techniques necessary for identifying medically important bacteria. (\$)

MIP 384 Var [1-5]. Supervised College Teaching. Prerequisite: Written consent of department. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

MIP 400A-G Capstones in Microbiology. F, S.

A) Medical microbiology 02(2-0-0). Prerequisite: MIP 342; MIP 351 or concurrent registration or MIP 420 or concurrent registration; written consent of instructor. **B)** Biotechnology 02(0-0-2). Prerequisite: BC 351 or BC 401; MIP 300. **C)** Immunology 02(2-0-0). Prerequisite: MIP 342; MIP 351 or concurrent registration or MIP 420 or concurrent registration. **D)** Microbial diversity, ecology 02(2-0-0). Prerequisite: MIP 342; MIP 351 or concurrent registration or MIP 420 or concurrent registration. **E)** Microbial genetics 02(2-0-0). Prerequisite: MIP 342; MIP 351 or concurrent registration or MIP 420 or concurrent registration. **F)** Virology. 02(2-0-0). Prerequisite: MIP 342; MIP 351 or concurrent registration or MIP 420 or concurrent registration. **G)** Service learning. 02(2-0-0). Prerequisite: MIP 342; MIP 351 or concurrent registration or MIP 420 or concurrent registration.

MIP 420 04(4-0-0). Medical and Molecular Virology. F. Prerequisite: BC 351 or concurrent registration or BC 401 or concurrent registration; MIP 342.

Principles of animal virology: structure, classification, assay, diagnosis, control, replication, genetics, host-parasite relationships.

MIP 425 02(0-4-0). Virology and Cell Culture Laboratory. F. Prerequisite: MIP 302; MIP 420 or concurrent registration.

Isolation and characterization of viruses. Viral diagnostic and cell culture techniques. (\$)

MIP 432 03(2-0-1). Microbial Ecology. S. Prerequisite: MIP 300.

Principles of microorganism interaction with their living and non-living environments: implication for the environment, plants and animals.

MIP 433 01(0-3-0). Microbial Ecology Laboratory. S. Prerequisite: MIP 432 or concurrent registration.

Experimental microbial ecology; the design, conduct and interpretation of experiments that illustrate basic principles of microbial ecology.

MIP 436 04(2-4-0). Industrial Microbiology. F. Prerequisite: LIFE 206 or MIP 302.

Use of microorganisms for producing commercially valuable products.

MIP 443 04(3-0-1). Microbial Physiology. S. Prerequisite: BC 351 or BC 401; MIP 300.

Structure, function of bacterial constituents; comparison with other

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organisms. Bacterial growth, energy production, biosynthesis.

MIP 450 03(3-0-0). Microbial Genetics. F. Prerequisite: BC 351 or concurrent registration or BC 401 or concurrent registration; MIP 300.

Principles of genetics at molecular level: mutation, recombination, complementation, suppression, control of gene expression, and recombinant DNA.

MIP 462/BZ 452/BSPM 462 05(3-4-0). Parasitology and Vector Biology. F. Prerequisite: BZ 110 or LIFE 103; BZ 212 or LIFE 206 or MIP 302. Credit allowed for only one of the following: MIP 462, BSPM 462, BZ 462.

Protozoa, helminthes, and insects and related arthropods of medical importance; systematics, epidemiology, host damage and control.

MIP 495 Var. Independent Study. Prerequisite: MIP 300; written consent of department.

MIP 496 Var [1-3]. Group Study. F, S. Prerequisite: Written consent of instructor.

Faculty-supervised investigation of areas of special interest in microbiology, virology, microbial physiology, or microbial genetics.

MIP 498 Var [1-3]. Research. Prerequisite: MIP 302; written consent of department.

*MIP 530 04(3-0-1). **Advanced Molecular Virology.** S. Prerequisite: BC 351 or BC 401; BC 463 or MIP 450.

Virus-host interactions at the molecular and cellular level.

MIP 533/VS 533 03(2-0-1). Epidemiology of Infectious Diseases/Zoonoses. S. Prerequisite: MIP 300. Credit not allowed for both MIP 533 and VS 533.

Epidemiologic features of infectious and parasitic diseases that have a major impact on community medicine.

MIP 540 02(2-0-0). Biosafety in Research Laboratories. S. Prerequisite: MIP 300.

Practical applications of biosafety principles, including lab practices and regulatory aspects of research involving infectious microorganisms and rDNA.

°MIP 543 03(3-0-0). **RNA Biology.** F. Prerequisite: BC 351 or concurrent enrollment or BC 401 or concurrent enrollment.

Gene expression and regulation that occurs at the level of RNA (e.g., splicing, stability, export, translation, RNAi, etc.).

MIP 550 04(2-6-0). Microbial and Molecular Genetics Laboratory. S. Prerequisite: MIP 302; MIP 450; written consent of department.

Use of both in vivo genetics and in vitro molecular techniques to study gene structure, function, and regulation in bacteria. (\$)

MIP 555 03(3-0-0). Principles and Mechanisms of Disease. F. Prerequisite: BMS 300.

Principles of disease processes; emphasis on reactivity of the diseased cell, tissue, organ, or organism.

°MIP 563 03(3-0-0). **Biology of Disease Vectors.** S. Prerequisite: MIP 462/ BSPM 462/BZ 462.

Vector physiology and genomics, new strategies in vector control, and vector/host interactions.

MIP 570 03(2-2-0). Functional Genomics. F. Prerequisite: MIP 300; MIP 302; MIP 443; MIP 450.

State-of-the-art genomic tools with applications to studies of pathogenesis and pathophysiology of infectious diseases.

MIP 576/BSPM 576 03(3-0-0). Bioinformatics. F, S. Prerequisite: BC 463 or BZ 310 or BZ 350 or CM 501 or CS 155 or ERHS 332 or MIP 275 or MIP 300 or MIP 450 or STAT 307. Credit not allowed for both MIP 576 and BSPM 576.

Technical computing across platforms using bioinformatics tools in molecular analyses.

MIP 577/BZ 577 02(0-4-0). Computer Analysis in Population Genetics. F. Prerequisite: MIP 578/BZ 578 or concurrent registration. Credit not allowed for both MIP 577 and BZ 577.

Computational and statistical techniques and practical exercises in discrete and quantitative genetics.

MIP 578/BZ 578 04(3-0-1). Genetics of Natural Populations. F. Prerequisite: BZ 350 or LIFE 201A or LIFE 201B or SOCR 330; STAT 201 or STAT 301 or STAT 307. Credit not allowed for both MIP 578 and BZ 578.

Theoretical and empirical aspects of the genetics of natural populations; current molecular techniques and statistical analysis.

MIP 615 01(1-0-0). Ophthalmic Pathology. F.

Background in normal ocular histology as well as pathologic changes in the eye, taught through a combination of lectures and class discussions.

°MIP 624 02(1-0-1). **Advanced Topics in Microbial Ecology.** F. Prerequisite: MIP 300; MIP 432.

Recent conceptual developments in microbial ecology, emphasizing theoretical aspects of microbial ecology, particularly in an evolutionary context.

MIP 628 03(3-0-0). Immunity to Infection. S.

How microorganisms have evolved to counteract the immune system, and how the immune system has evolved to resist microbes.

*MIP 630 03(3-0-0). **Advances in Microbial Physiology.** F. Prerequisite: MIP 443.

Contemporary developments in bacterial structure, function, metabolism, and genetics.

°MIP 636 04(3-0-1). **Mechanisms of Viral Infection and Disease.** S. Prerequisite: MIP 420 or MIP 530.

Cytopathic mechanisms, pathogenetic events in viral diseases; host response and antiviral immunity; cancer induction by DNA and RNA viruses.

MIP 651 03(3-0-0). Immunobiology. F. Prerequisite: MIP 342.

Structure, function, regulation of immunoglobulins and the immune system. Cellular immunity including transplantation and cancer.

MIP 654 01(1-0-0). Research Policies and Regulations. F.

Reviews CSU and federal policies, rules, and regulations on integrity, use of humans and animals, authorship, data, genetics, etc., using case studies.

*MIP 666 03(0-0-3). **Writing Scientific Manuscripts.** F. Prerequisite: Written consent of instructor.

Writing biological science manuscripts for publication.

°MIP 670 03(3-0-0). **Molecular Immunology and Immunogenetics.** F. Prerequisite: MIP 651.

Molecular basis and genetics of immune response. Biochemistry of immunologically mediated diseases.

MIP 698 Var. Research. Prerequisite: M.S. candidates only.

MIP 699 Var. Thesis. Prerequisite: M.S. candidates only.

MIP 700 01(1-0-0). Topics in Microbiology. F, S. Prerequisite: MIP 300. Current literature in bacteriology, virology, genetics, and immunology.

°MIP 720 02(1-3-0). **Methods in Carbohydrate Analysis.** S. Prerequisite: CHEM 346.

Structural analysis of complex carbohydrates using gas chromatography, mass spectrometry, and nuclear magnetic resonance.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

°MIP 740 03(2-0-1). **Microbial and Molecular Genetics.** S. Prerequisite: MIP 450.

Molecular biology and genetics of prokaryotic and eukaryotic cells and their viruses; strategies for genetic manipulation.

°MIP 760 03(2-0-1). **Mechanisms of Bacterial Pathogenesis.** F. Prerequisite: BC 351; MIP 342.

Mechanisms of bacterium-host interaction at molecular and cellular levels in pathogenesis of bacterial disease.

°MIP 765 02(1-2-0). **Comparative Neuropathology.** S.

Spontaneous diseases of nervous system of domesticated, laboratory, and wild animals.

*MIP 778 03(3-0-0). **Pathobiology of Laboratory Animals.** S.

Unique natural biology and diseases of laboratory animal species emphasizing clinical, diagnostic, morphologic and clinical pathologic features.

MIP 784 Var. **Supervised College Teaching.** Prerequisite: Written consent of department.

MIP 786A-D Var. **Practicum.** Prerequisite: Post-DVM graduate students only.

A) Comparative gross and histologic pathology. B) Surgical pathology. C) Clinical pathology. D) Comparative medicine.

MIP 792A-E Var [1-3]. **Seminar.** Prerequisite: M.S. and Ph.D. candidates only. Maximum of 3 credits allowed per subtopic.

A) Histopathology. B) Research. D) Clinical pathology. E) Anatomic pathology.

MIP 795 Var. **Independent Study.** Prerequisite: Written consent of department.

MIP 796 Var. **Group Study.**

MIP 798 Var. **Research.** Prerequisite: Ph.D. candidates only.

MIP 799 Var. **Dissertation.** Prerequisite: Ph.D. candidates only.

MARKETING COURSES

Department of Marketing College of Business

MKT 300 03(3-0-0). Marketing. F, S, SS. Prerequisite: AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160. Credit not allowed for both MKT 300 and MKT 305.

Market and buyer analysis, product and service development, pricing, promotion, advertising, selling, and distribution.

MKT 305 03(3-0-0). Fundamentals of Marketing. F, S. Prerequisite: AREC 202 or ECON 101 or ECON 202. Credit not allowed for both MKT 305 and MKT 300.

Overview of marketing activities involved in provision of products and services to consumers, including target markets and managerial aspects. (NT-O)

MKT 310 03(3-0-0). Marketing Decision Making. F, S. Prerequisite: FIN 300 or FIN 305; MKT 300 or MKT 305.

Developing decision making skills including analysis and evaluation of alternatives, creativity, application of financial tools, persuasion.

MKT 320 03(3-0-0). Integrated Marketing Communications. F, S. Prerequisite: MKT 300 or MKT 305.

Principles and practices of managing promotional activities including advertising, sales promotion, and other major media.

MKT 330 03(3-0-0). Business Customer Relationships. F, S. Prerequisite: MKT 300 or MKT 305.

Managing relationships with distribution channel intermediaries and business customers.

MKT 360/DM 360 03(3-0-0). Retailing. F, S, SS. Prerequisite: MKT 300 or MKT 305. Credit not allowed for both MKT 360 and DM 360.

Retail markets, institutions, operations, and problems. (NT-O)

MKT 361 03(3-0-0). Buyer Behavior. F, S. Prerequisite: MKT 300 or MKT 305.

Marketing analysis of buying behavior of individuals, households, businesses, and not-for-profit organizations.

MKT 362 03(3-0-0). Professional Selling. F, S. Prerequisite: MKT 300 or MKT 305.

Persuasive personal communications in selling consumer and industrial products and services.

MKT 363 03(3-0-0). Sales Management. S. Prerequisite: MKT 300 or MKT 305.

Recruiting, selecting, training, compensating, motivating, supervising, and evaluating a sales force.

MKT 364 03(3-0-0). Product Development and Management. F. Prerequisite: MKT 300 or MKT 305.

Consumer and industrial product development and management issues as an integral part of the marketing mix.

MKT 365 03(3-0-0). International Marketing. F, S. Prerequisite: MKT 300 or MKT 305.

Analysis of international markets and development of strategic and tactical options for marketing across national boundaries.

MKT 366 03(3-0-0). Services Marketing. S, SS. Prerequisite: MKT 300 or MKT 305.

Customer service issues and unique challenges involved in marketing and management of services operations.

MKT 410 03(3-0-0). Marketing Research. F, S. Prerequisite: MKT 300

or MKT 305; STAT 204 or STAT 301 or STAT 307 or STAT 311 or STAT 315.

Role and methodology of research in business emphasizing selection of study's direction, collecting data, and choosing techniques for analyzing these data.

MKT 440 03(3-0-0). Pricing and Financial Analysis in Marketing. F, S. Prerequisite: MKT 300 or MKT 305.

Financial analysis involved in addressing marketing problems; advanced study of pricing strategy and tactics.

MKT 479 03(3-0-0). Marketing Strategy and Management. F, S. Prerequisite: MKT 310; MKT 410.

Marketing decisions involving integration of elements of the marketing mix.

MKT 487 03(0-9-0). Internship. Prerequisite: Written consent of instructor. Maximum of 3 credits allowed in course.

MKT 492 03(0-0-3). Seminar. Prerequisite: MKT 300 or MKT 305; written consent of instructor.

MKT 495 Var [1-5]. Independent Study. Prerequisite: 2.750 GPA or better.

MKT 496 Var [1-3]. Group Study.

MKT 498 Var [1-3]. Research.

MKT 600 03(3-0-0). Marketing Management and Strategy. S. Prerequisite: Admission to a master's program in business.

Processes of customer value creation and value capture; marketing strategy analysis.

MKT 601 03(3-0-0). Marketing for Social Sustainable Enterprises. F. Prerequisite: Admission to GSSE Program.

Customer and stakeholder value creation and capture. Marketing strategy with emphasis on social sustainable organizations.

MKT 692 03(0-0-3). Seminar.

Critical review and discussion of relevant marketing topics.

MKT 695 Var [1-3]. Independent Study. Prerequisite: 3.250 GPA or better.

MILITARY SCIENCE COURSES

Department of Military Sciences

Office of Provost and Executive Vice President

+MLSC 101 02(2-0-0). Leadership and Personal Development. F.

Leadership principles and techniques; first aid; weapons common to U.S. forces; rifle marksmanship; branches of the Army; physical fitness training. (\$)

+MLSC 102 02(2-0-0). Introduction to Tactical Leadership. S.

Small unit leadership; survival techniques; knots, rappelling; map reading, land navigation; plant/animal identification; physical fitness training. (\$)

MLSC 196 01(0-2-0). Military Science Group Study I. F. Prerequisite: concurrent registration in MLSC 101.

MLSC 197 01(0-2-0). Military Science Group Study II. S. Prerequisite: Concurrent registration in MLSC 102.

+MLSC 201 02(2-0-0). Innovative Team Leadership. F.

Leadership assessment; principles of war; small unit operations; basic management skills; oral communication; counseling/behavioral evaluation techniques. (\$)

+MLSC 202 02(2-0-0). Foundations of Tactical Leadership. S.

Operation orders; theories of conflict; small unit operations; troop leading procedures; observing and classifying behavior; physical fitness training. (\$)

MLSC 250 Var [2-8]. Basic Camp Leader Internship. SS. Maximum of 8 credits allowed in course.

Practical leadership development and management skills in a military operations environment.

MLSC 294 Var [1-2]. Independent Study. Prerequisite: MLSC 101; MLSC 102.

MLSC 295 Var [1-2]. Independent Study.

MLSC 296 01(0-2-0). Military Science Group Study III. F. Prerequisite: Concurrent registration in MLSC 201.

MLSC 297 01(0-2-0). Military Science Group Study IV. S. Prerequisite: Concurrent registration in MLSC 202.

+MLSC 301 03(3-0-0). Adaptive Tactical Leadership. F. Prerequisite: Concurrent registration in MLSC 396.

Leadership theory review; leadership assessment program to further develop leadership and management skills; physical fitness training. (\$)

+MLSC 302 03(3-0-0). Leadership in Changing Environments. S. Prerequisite: MLSC 301; concurrent registration in MLSC 397.

Command and staff functions; operations orders; tactical unit operations; military skills; physical fitness training; field training exercises. (\$)

MLSC 357/HIST 357 03(3-0-0). The American Military Experience. F, SS. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171; completion of 45 credits.. Credit not allowed for both MLSC 357/HIST 357 and MS 401/HY 401.

Role of the armed forces in American society; development of military traditions, institutions, and practices.

MLSC 386 08(1-12-1). Advanced Camp Practicum. SS. Prerequisite: MLSC 301.

Leadership principles and skills applied to actual field situations.

MLSC 395 Var [1-3]. Independent Study.

Leadership theory and skills as applied to the military.

MLSC 396 01(0-2-0). Military Science Group Study V. F. Prerequisite: Concurrent registration in MLSC 301.

MLSC 397 01(0-2-0). Military Science Group Study VI. S. Prerequisite: Concurrent registration in MLSC 302.

+MLSC 401 03(3-0-0). Developing Adaptive Leaders. F. Prerequisite: MLSC 302; MLSC 357/HIST 357; concurrent registration in MLSC 496.

Role of the Army officer; ethics, professionalism; military justice; law of land warfare; preparation for active duty; physical fitness training. (\$)

+MLSC 402 03(3-0-0). Leadership in a Complex World. S. Prerequisite: MLSC 301; MLSC 302; concurrent registration in MLSC 497.

Military staff functions and issues in leadership. (\$)

MLSC 495 Var [1-3]. Independent Study.

MLSC 496 01(0-2-0). Military Science Group Study VII. F. Prerequisite: Concurrent registration in MLSC 401.

MLSC 497 01(0-2-0). Military Science Group Study VIII. Prerequisite: Concurrent registration in MLSC 402.

MUSIC COURSES

Department of Music, Theatre, and Dance *College of Liberal Arts*

MU 100 03(3-0-0). Music Appreciation. (GT-AH1, AUCC 3B). F, S, SS. Previous musical training not necessary.

Survey of music from a wide range of periods and styles. (\$, NT-O)

MU 111 03(3-0-0). Music Theory Fundamentals. (GT-AH1, AUCC 3B). F, S, SS. For non-music majors and majors needing basic skills.

Basic visual and aural fundamentals of music including intervals, scales, key and time signatures, chord construction, basic harmony, melodic writing. (\$)

MU 117 04(3-2-0). Music Theory I. F. Prerequisite: Satisfactory completion of placement examination.

Introduction to diatonic harmony and part-writing; basic sight singing, ear training, and keyboard harmony skills. (\$)

MU 118 04(3-2-0). Music Theory II. S. Prerequisite: MU 117.

Four-part diatonic writing; diatonic modulation; diatonic sight singing, ear training, and keyboard harmony skills. (\$)

MU 131 03(3-0-0). Introduction to Music History and Literature. (GT-AH1, AUCC 3B). F, S.

Landmarks of music history and literature from 1300 to the present.

MU 150 02(2-0-0). Piano Class I. F, S, SS.

Basic piano technique; keyboard harmony and music rudiments. (\$)

MU 151 02(2-0-0). Piano Class II. F, S. Prerequisite: MU 150.

Intermediate piano technique; introduction to ensemble playing. (\$)

MU 152 02(2-0-0). Piano Class III. F, S. Prerequisite: MU 151.

Advanced piano techniques; further development of technical skills. (\$)

MU 153 02(2-0-0). Piano Class IV. F, S. Prerequisite: MU 152.

Practical application of piano skills as a teaching tool in the classroom. (\$)

MU 154 01(0-2-0). Jazz Piano Class. S. Prerequisite: None.

Basic jazz piano skills that serve as the foundation for a jazz pianist or composer.

MU 155 02(2-0-0). Guitar Class I. F, S, SS.

Fundamental techniques for guitar emphasizing chord study and related literature.

MU 156 02(2-0-0). Guitar Class II. F, S. Prerequisite: MU 155.

Fundamentals of guitar emphasizing solo literature and accompaniment.

MU 157 02(2-0-0). Voice Class I. F, S.

Techniques of singing, emphasizing posture, breathing, tone production and diction, as applied to song literature.

MU 158 02(2-0-0). Voice Class II. F, S. Prerequisite: MU 157.

Techniques of singing, emphasizing resonance, articulation, projection, and repertoire.

MU 172A 02(1-2-0). Freshman Voice Studio—English/Italian. F. Prerequisite: Concurrent registration in any music ensemble.

Applied voice study and English/Italian diction in a group setting for freshman voice majors.

MU 172B 02(1-2-0). Freshman Voice Studio—German/French. S. Prerequisite: Concurrent registration in any music ensemble.

Applied voice study and German/French diction in a group setting for freshman voice majors.

MU 201 01(0-3-0). Men's Chorus. F, S.

Rehearsal and performance of a variety of types and styles of music for men's voices. (\$)

MU 202 01(0-3-0). University Chorus. F, S.

Rehearsal and performance of a variety of types and styles of music for mixed voices.

MU 204 01(0-5-0). Marching Band. F.

Marching routines utilizing popular and jazz musical idioms with performances at all home football games and other athletic events. (\$)

MU 205 01(0-3-0). Concert Band. S.

Rehearsal and performance of basic concert literature.

MU 206 01(0-3-0). Colorado State University Concert Orchestra. F, S.

Performance opportunity for music majors and non-music majors to perform standard orchestral literature.

MU 217 04(3-2-0). Music Theory III. F. Prerequisite: MU 118.

Harmonic and formal language of the 17th and 18th centuries; diatonic and chromatic sight singing, ear training, and keyboard harmony skills. (\$)

MU 218 04(3-2-0). Music Theory IV. S. Prerequisite: MU 217.

Late 18th and early 19th century harmonic and formal language; diatonic, chromatic and modal sight singing, ear training, and keyboard harmony skills. (\$)

MU 225 02(2-0-0). Jazz Theory. F. Prerequisite: MU 118.

Music theory as it pertains to the jazz idiom; the aural language of jazz.

MU 230 03(3-0-0). Music of Black Americans. S.

Music indigenous to or composed by Black Americans.

MU 231 03(3-0-0). Women in Music. F.

Examination of the role of women in music from historical and societal perspectives.

MU 241 03(3-0-0). Introduction to Music Therapy. F.

Overview of music therapy, related helping professions, and problems in human functioning; emphasizes basic skills for managing behavior problems. (\$)

MU 250 03(2-2-0). Music Therapy Practice. F.

Development of fundamental interactive and professional skills used in music therapy practice. (\$)

MU 251 01(0-2-0). Voice Techniques. S. Prerequisite: Instrumental music education majors only.

Basic voice production, exercises, materials and methods for teaching, including child and adolescent voice concerns.

MU 252A-D Var[1-2]. Instrumental Techniques. F, S.

Tone production, tuning, fingerings, care, materials, and teaching methods for brass, percussion, string, and woodwind instruments. **A)** Brass 02(1-2-0). **B)** Woodwinds 02(1-2-0). **C)** Strings 01(0-2-0). **D)** Percussion 01(0-2-0). (\$)

MU 254 02(2-0-0). Beginning Conducting. S. Prerequisite: MU 117.

Basic conducting patterns and techniques.

MU 272A-V Var [1-2]. Applied Music Instruction. F, S. Prerequisite: Concurrent registration in any music ensemble. One or two half-hour lessons per week and one hour weekly performance class. May be repeated up to 9 times for credit.

BRASS: **A)** Euphonium. (\$) **B)** French horn. (\$) **C)** Trombone. (\$) **D)** Trumpet. (\$) **E)** Tuba. (\$) **KEYBOARD:** **G)** Harpsichord. (\$) **H)** Organ. (\$) **I)** Piano. (\$) **PERCUSSION:** **J)** Percussion. (\$) **STRING:** **K)** Guitar. (\$) **L)** Harp. (\$) **M)** String bass. (\$) **N)** Viola. (\$) **O)** Violin. (\$) **P)** Violoncello.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

(S) VOICE: **Q** Voice. (\$) WOODWIND: **R** Bassoon. (\$) **S** Clarinet. (\$) **T** Flute. (\$) **U** Oboe. (\$) **V** Saxophone (Alto). (\$)

MU 273 Var [1-2]. Composition Instruction. F, S. Prerequisite: MU 118; MU 131.

One or two half-hour lessons per week.

MU 274A-G Var[1-2]. Applied Jazz Instruction. F, S. Prerequisite: Written consent of instructor. May be repeated up to 9 times for credit.

MU 286 01(0-2-0). Practicum-Music Education. (\$)

MU 300 01(0-3-0). Women's Chorus. F, S.

Rehearsal and performance of a variety of types and styles of music for women's voices. (\$)

MU 302 01(0-5-0). University Orchestra. F, S. Prerequisite: Audition required for this ensemble.

Rehearsal and performance of standard orchestral literature. (\$)

MU 304 01(0-3-0). Symphonic Band. F, S, SS. Prerequisite: Audition required for this ensemble.

Preparation for public performance of full symphonic instrumentation of concert band literature. (\$)

MU 305 01(0-5-0). Colorado State University Concert Choir. F, S. Prerequisite: Audition required for this ensemble.

Rehearsal and performance of choral literature emphasizing extended works with orchestral accompaniment. (\$)

MU 309 01(0-3-0). Jazz Ensemble. F, S. Prerequisite: Audition required for this ensemble.

Rehearsal and performance of jazz ensemble literature of standard and experimental types. (\$)

MU 310 01(0-2-0). Jazz Combo. F, S. Prerequisite: Audition required for this ensemble.

Small group jazz performance practice and standard jazz repertoire.

MU 317 02(1-2-0). Music Theory V. F. Prerequisite: MU 218.

Late 19th and 20th century systems of composition and analysis; chromatic, modal, and atonal sight singing, ear training, and keyboard harmony skills.

MU 318 02(2-0-0). Arranging and Orchestration. S. prerequisite: MU 218.

Techniques for writing music for the standard orchestral and band instruments; basic arranging skills for various instrumental and choral ensembles.

MU 320 01(0-2-0). Jazz Improvisation. F, S. Prerequisite: MU 118; written consent of instructor.

Jazz improvisation skills through training in jazz theory, ear training, and improvisatory concepts.

MU 325 02(2-0-0). Jazz Composition/Arranging. S. Prerequisite: MU 225.

Arranging jazz music for a variety of ensembles; composition of music in the jazz idiom.

MU 332 03(3-0-0). History of Jazz. S, SS.

Jazz since the 1880s emphasizing its various influences and developments. (NT-O)

MU 333 03(3-0-0). History of Rock and Roll. SS.

Historical overview of rock and roll with emphasis on listening skills, musical analysis, the artists, and the industry. (NT-O)

MU 334 03(3-0-0). Music History I. F, S. Prerequisite: MU 100 or MU 131; MU 118.

Music of the medieval, Renaissance, and baroque periods.

MU 335 03(3-0-0). Music History II. S. Prerequisite: MU 100 or MU 131; MU 118.

Music of the classical, Romantic, and contemporary periods.

MU 338 02(2-0-0). Opera History and Literature. S. Prerequisite: MU 131.

Historical and musical development of opera from its roots through the 20th century.

Private jazz instruction covering jazz improvisation and style, including articulation and p

MU 342 03(3-0-0). Psychology of Music. F. Prerequisite: PSY 100.

Psychological aspects of music: perception, psychoacoustics, aesthetics, musical function, communication, measurement, and affective responses.

MU 343 03(3-0-0). Research Methods in Music Therapy. S. Prerequisite: STAT 201.

Techniques of observing, measuring, and recording behavior. Basic experimental methods and procedures used in music therapy research.

MU 351A-C 02(2-0-0). String Pedagogy I. F, S.

A) Violin/viola. B) Violoncello. C) String bass.

MU 352A-C 02(1-2-0). String Pedagogy II. F, S. Prerequisite: MU 351.

A) Violin/viola. B) Violoncello. C) String bass.

MU 355 02(1-2-0). Choral Conducting and Literature. F. Prerequisite: MU 254.

Basic techniques of choral conducting and analysis of selected works as an aid to interpretation.

MU 356 02(1-2-0). Instrumental Conducting and Literature. S. Prerequisite: MU 254.

Essentials of instrumental conducting and analysis of selected works.

MU 365A-B 01(0-2-0). Advanced Diction. Prerequisite: MU 272Q.

Practical application of lyric diction through performance of art song and arias. A) Italian and English. F. B) French and German. S.

MU 400 01(0-5-0). Colorado State University Chamber Choir. F, S. Prerequisite: Audition required for this ensemble.

Performance of chamber choral literature from all musical periods ranging from madrigals to music in a contemporary idiom. (\$)

MU 401 Var [1-2]. Opera Theater. F, S, SS. Prerequisite: Audition required for this ensemble.

Performance of opera and/or operatic scenes emphasizing operatic singing and acting techniques. (\$)

MU 402 01(0-5-0). Theater/Chamber Orchestra. F, S, SS. Prerequisite: Audition required for this ensemble.

Performance of selected operas, musicals, oratorio, orchestral accompaniments, and chamber music. (\$)

MU 404 01(0-5-0). Symphonic Wind Ensemble. F, S. Prerequisite: Audition required for this ensemble.

Performance of wind ensemble and band literature emphasizing most challenging of repertoire, using a select ensemble of performers. (\$)

MU 407 01(0-3-0). Accompanying. F, S. Prerequisite: MU 272I.

Practical experience in the interpretation and execution of piano accompaniments. (\$)

MU 408 01(0-3-0). Chamber Music. F, S. Prerequisite: Written consent of instructor.

Performance literature for small instrumental ensembles: duets, trios, quartets, and quintets.

MU 415 02(1-2-0). Advanced Jazz Techniques. S. Prerequisite: MU 320.

Advanced jazz theory and rhythmic concepts, free improvisation and other modern performance techniques.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

MU 417 03(3-0-0). Counterpoint. F. Prerequisite: MU 218.

Contrapuntal techniques from the Middle Ages through the 20th century; development of compositional skills in counterpoint.

MU 418 02(2-0-0). Advanced Orchestration. S. Prerequisite: MU 318.

Advanced writing for modern orchestra and related ensembles; advanced study of traditional and contemporary writing for the individual instruments.

MU 419 02(2-0-0). Electronic Music Composition. S. Prerequisite: MU 218.

Fundamentals of electronic music composition, including hardware, software, digital audio, MIDI, and computer music.

MU 420 02(2-0-0). Marching Band Techniques. S. Prerequisite: MU 204.

Marching band conducting, design, and performance techniques. (\$)

MU 421 02(1-3-0). Orchestral Techniques. S. Prerequisite: MU 252C.

Orchestral conducting and rehearsal techniques.

MU 425 02(2-0-0). Jazz Pedagogy. F, S.

Jazz ensemble, instrumentation, literature, performance practice and rehearsal techniques.

MU 430 03(3-0-0). 20th Century Music. S.

Musical styles from 1900 to present; major 20th-century movements which reflect a changing society.

MU 431 03(3-0-0). American Music. S.

Sacred, patriotic, popular, and cultivated musical developments from the Pilgrims to 1900 including music on the Western frontier.

***MU 432 02(2-0-0). Hymnology.** F. Prerequisite: MU 100 or MU 131.

Hymns and congregational singing in the Christian tradition.

°MU 433 02(2-0-0). Music and Rites of Christian Liturgy. S. Prerequisite: MU 100 or MU 131.

History of the music and rites of Christian liturgy from its beginnings to the present.

°MU 434 02(2-0-0). Psalms in Music and Liturgy. F. Prerequisite: MU 100 or MU 131.

Musical traditions of the poetry and psalms of the Hebrew Bible, primarily from the perspective of Jewish and Christian liturgy.

***MU 435 02(2-0-0). Contemporary Liturgical Music in America.** S. Prerequisite: MU 100 or MU 131.

History and practice of contemporary liturgical music in America.

MU 437 02(1-2-0). History and Structure of the Organ. F. Prerequisite: MU 472H.

Physical structure, tonal disposition, acoustical surroundings, and historical development.

MU 440 03(3-0-0). Music Therapy Methods I. S. Prerequisite: MU 241; admission to professional curriculum.

Basic characteristics of handicapped children encountered in the music classroom; methods and materials for educating them in music. (\$)

MU 443 03(3-0-0). Music Therapy Methods II. S. Prerequisite: BMS 300; MU 241.

Relation of music to health; current and future music therapy scenes; and emphasis on cognitive, affective, and psychomotor approaches to therapy. (\$)

MU 444 03(3-0-0). Music Therapy Methods III. S. Prerequisite: Admission to professional curriculum.

Music therapy techniques: assessment, formulating objectives, designing and implementing programs, evaluation, problem solving, and creativity. (\$)

MU 445 02(2-0-0). Improvisation Techniques in Music Therapy. S. Prerequisite: Admission to professional curriculum.

Music/movement improvisation techniques with clinical populations. (\$)

MU 451A-C 02(1-2-0). String Pedagogy III. F, S. Prerequisite: MU 352.

A) Violin/viola. B) Violoncello. C) String bass.

MU 464A-C 02(2-0-0). String Literature. F, S.

A) Violin/viola. Prerequisite: MU 272N or MU 272O. B) Violoncello. Prerequisite: MU 272P. C) String bass. Prerequisite: MU 272M.

MU 465 02(1-2-0). Keyboard Literature. F.

Survey of early keyboard literature from pre-piano to early Romantic period; problems in present-day performance.

°MU 466 02(1-2-0). Song Literature. S.

Development of song as an art form from monody to German Lieder, French school, and contemporary songs of England and America.

°MU 467 02(2-0-0). Vocal Pedagogy. S. Prerequisite: MU 265A; MU 265B; concurrent registration in MU 472Q.

Pedagogical foundations, techniques, resources, methods, and terminology for teaching singing.

MU 468 02(1-2-0). Organ Literature. S. Prerequisite: MU 437.

Survey of literature from earliest known works to present; stylistic content and interpretation.

MU 469 02(1-2-0). Instrumental Literature. S.

Survey of literature for string, woodwind, and brass ensembles.

MU 471 01(0-0-1). Recital. F, S, SS. Prerequisite: Written consent of instructor.

Demonstration of individual musical proficiency through public performance.

MU 472A-V Var [1-2]. Applied Music Instruction. F, S. Prerequisite: MU 272A-V; concurrent registration in any music ensemble; successful completion of upper-division qualifying exam. One or two half-hour lessons per week and one hour weekly performance class, emphasizing pedagogical methods. May be repeated up to 9 times for credit.

BRASS: **A)** Euphonium. (**\$ B)** French horn. (**\$ C)** Trombone. (**\$ D)** Trumpet. (**\$ E)** Tuba. (**\$ KEYBOARD: G)** Harpsichord. (**\$ H)** Organ. (**\$ I)** Piano. (**\$ PERCUSSION: J)** Percussion. (**\$ STRING: K)** Guitar. (**\$ L)** Harp. (**\$ M)** String bass. (**\$ N)** Viola. (**\$ O)** Violin. (**\$ P)** Violoncello. (**\$ VOICE: Q)** Voice. (**\$ WOODWIND: R)** Bassoon. (**\$ S)** Clarinet. (**\$ T)** Flute. (**\$ U)** Oboe. (**\$ V)** Saxophone (Alto). (\$)

MU 473 Var [1-2]. Composition Instruction. F, S. Prerequisite: MU 273; successful completion of upper-division qualifying exam.

One or two half-hour lessons per week; emphasizing pedagogical methods.

MU 474 Var[1-2]. Applied Jazz Instruction. F, S. Prerequisite: MU 274A-G (any one subtopic); concurrent registration in any jazz ensemble; successful completion of upper division qualifying exam.

Private jazz instruction covering advanced aspects of jazz improvisation and performance.

MU 486A-B Var [1-3]. Practicum.

A) Music therapy. Prerequisite: Piano proficiency. (**\$ B)** Music education. Prerequisite: Admission to teacher licensure. (\$)

MU 487 Var. Internship. Prerequisite: Completion of all course work in the music therapy curriculum.

Six-month field experience that students must complete to become eligible for registration and board certification.

MU 495A-H Var [1-3]. Independent Study.

A) Composition and theory. **B)** Conducting. **C)** Improvisation. **D)** Music

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

history. **E)** Music literature. **F)** Music therapy. **G)** Pedagogy. **H)** Performance.

MU 496A-I Var [1-3]. Group Study.

A) Composition and theory. **B)** Conducting. **C)** Improvisation. **D)** Music education. **E)** Music history. **F)** Music literature. **G)** Music therapy. **H)** Pedagogy. **I)** Performance.

MU 498 Var [1-3]. Research in Music Therapy. Prerequisite: MU 241; MU 286.

Participation of undergraduate music therapy majors in departmental research projects.

MU 499 Var. Thesis. Prerequisite: Music majors only.

MU 510 03(3-0-0). Foundations of Music Education. F, SS. Prerequisite: MU 526A.

Cultural, philosophical, psychological, and historical applications of music education. (NT-O)

MU 517 02(2-0-0). Analytic Techniques I. F. Prerequisite: Satisfactory completion of placement examination.

Appropriate analytic techniques for Middle Ages, Renaissance, and baroque music.

MU 518 03(3-0-0). Analytic Techniques II. S. Prerequisite: Satisfactory completion of placement examination.

Appropriate analytic techniques for classical, Romantic, and 20th-century music. (NT-O)

MU 519 03(3-0-0). History of Music Theory. S. Prerequisite: MU 317.

Important authors, treatises, and texts dealing with acoustics, composition, counterpoint, harmony, notation, orchestration, thoroughbass, and tuning.

MU 520 03(3-0-0). Elementary School Music. F. Prerequisite: EDUC 450.

Musical concepts and teaching strategies for grades K-6; contemporary influences on music education.

MU 521 03(3-0-0). Junior and Senior High School Music. S. Prerequisite: EDUC 450.

Music for grades 7-12. General music classes, choral and instrumental organizations, common problems, practices, and new concepts.

MU 525A-C 03(1-0-2). Orff-Schulwerk Training Program. SS. Prerequisite: MU 590L.

A) Orff-Schulwerk Training I. **B)** Orff-Schulwerk Training II. **C)** Orff-Schulwerk Training III.

MU 526A-C 05(2-2-2). Kodaly Training Program. F, SS.

A) Level I. **B)** Level II. **C)** Level III.

+MU 527A 04(0-0-4). Conducting Seminar—Level 1. SS. Prerequisite: Audition and acceptance into the graduate school.

Music score analysis, preparation and conducting problems; various conducting projects to sharpen skills and increase gestures. Field trips required.

+MU 527B 04(0-0-4). Conducting Seminar—Level 2. SS. Prerequisite: MU 527A.

Further techniques learned in MU 527A; focuses on rehearsal techniques, performance practice, and asymmetrical meters. Field trips required.

MU 527C 04(0-0-4). Conducting Seminar—Level 3. SS. Prerequisite: MU 527B.

Further study from MU 527A-B; recitative technique through both operatic and choral examples; final project is a group conducted Broadway musical.

***MU 530 03(3-0-0). Music Through the Middle Ages.** F. Prerequisite: MU 334.

Music in Western civilization from its beginnings through Middle Ages.

°MU 531 03(3-0-0). Music of the Renaissance. F. Prerequisite: MU 334.

Music of 15th and 16th centuries.

MU 532 03(3-0-0). Music of the Baroque. SS. Prerequisite: MU 334.

Style and musical language of baroque from Gabriellis through Johann Sebastian Bach.

***MU 533 03(3-0-0). Music of the Classical Era.** S. Prerequisite: MU 335.

Vocal and instrumental music of middle and late 18th century.

MU 534 03(3-0-0). Music of the Romantic Era. F, S, SS. Prerequisite: MU 335.

Musical works, philosophies, and related arts of 19th century.(NT-O)

°MU 535 03(3-0-0). Contemporary Music. S. Prerequisite: MU 430.

20th-century music emphasizing stylistic and theoretical concepts.

MU 543 03(3-0-0). Advanced Research Methods in Music Therapy. S. Prerequisites: MU 241; MU 250.

Research techniques used in measuring and recording behavior. Advanced methods used in music therapy research.

MU 544 03(3-0-0). Advanced Techniques-Neurologic Music Therapy. S. Prerequisites: BMS 300; MU 241; MU 250.

Advanced neurologic music therapy techniques used with various clinical populations.

MU 545 03(2-2-0). Composition for Music Therapy Practitioners. S, SS.

Music composition techniques for the music therapy clinician. (NT-O)

MU 555 03(3-0-0). Choral Techniques, Style, and Interpretation. F. Prerequisite: MU 355.

Techniques for achieving expressive conducting, problems of tone and diction, musical style and interpretation, and rehearsal techniques.

MU 556 03(3-0-0). Advanced Instrumental Conducting and Techniques. S. Prerequisite: MU 356.

Score reading and analysis, preparation of instrumental scores for performance; expressive baton techniques, rehearsal methods and procedures.

***MU 564 03(3-0-0). Collaborative Piano Literature.** F.

Literature and historical performance practices of collaborative piano music.

MU 565 02(2-0-0). Piano Literature-1800 to Present. S. Prerequisite: MU 465.

Keyboard music representing Romantic and Impressionistic periods, nationalism, twelve-tone, and recent developments including aleatory elements.

MU 566 02(2-0-0). Choral Literature-Renaissance and Baroque. F, SS. Prerequisite: MU 355.

Analytical and comparative survey of choral literature from Renaissance to 1750.

MU 567 02(2-0-0). Choral Literature-1750 to Present. S, SS. Prerequisite: MU 356.

Analytical and comparative survey of choral literature from 1750 to present.

MU 569 02(1-2-0). Symphonic Literature. F. Prerequisite: MU 469.

Symphonic development from early classicism through Impressionism; emphasis on formal structure, thematic sources, and social and historical influence.

MU 590A-N Var [1-3]. Workshop. SS.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

A) Choral music. B) Conducting. C) Beginning guitar. D) Humanities. E) Music for exceptional children. F) Organ. G) Orff music. I) Kodaly. J) Beginning handbells. K) Computers in music education. L) Advanced handbells. N) Neurologic music therapy.

MU 608 01(0-3-0). Graduate Chamber Music. F, S. Prerequisite: Graduate standing; audition required

Graduate-level performance literature for small instrumental ensembles: duets, trios, quartets, and quintets.

MU 630 03(3-0-0). Methods of Music Research. F. Prerequisite: MU 317.

Research, documentation, and bibliography for music history, literature, performance, theory, acoustics, music education, and quantitative testing. (NT-O)

MU 647 03(3-0-0). Historical Foundations of Music Therapy. S.

Historical foundations of music therapy in the United States from 1750 to the present. (NT-O)

MU 648 03(3-0-0). Neuroscience/Music Foundations in Therapy. S.

Prerequisite: MU 544.

Historical and scientific foundations of neurologic music therapy. (NT-O)

MU 669 02(2-0-0). Instrumental Literature. S. Prerequisite: MU 469.

Solo and small ensemble literature for string, woodwind, and brass instruments.

MU 671 01(0-0-1). Graduate Recital. F, S. Prerequisite: Written consent of instructor.

Demonstration of graduate-level applied musical proficiency through public performance.

MU 672A-V Var [2-3]. Applied Music Instruction. F, S. Prerequisite:

MU 472A-V. One or two half-hour lessons per week and one hour weekly performance class.

BRASS: A) Euphonium. (\$) B) French horn. (\$) C) Trombone. (\$) D) Trumpet. (\$) E) Tuba. (\$) KEYBOARD: G) Harpsichord. (\$) H) Organ. (\$) I) Piano. (\$) PERCUSSION: J) Percussion. (\$) STRING: K) Guitar. (\$) L) Harp. (\$) M) String bass. (\$) N) Viola. (\$) O) Violin. (\$) P) Violoncello. (\$) VOICE: Q) Voice. (\$) WOODWIND: R) Bassoon. (\$) S) Clarinet. (\$) T) Flute. (\$) U) Oboe. (\$) V) Saxophone (Alto). (\$)

MU 673 Var [2-3]. Composition Instruction. Prerequisite: MU 473.

One or two half-hour lesson per week.

MU 684 Var [1-3]. Supervised College Teaching.

Supervised assistance in instruction.

MU 686 03(0-6-0). Music Therapy Practicum. F, S. Prerequisite: Six credits of MU 486A.

Clinical practicum for graduate music therapy students. (NT-C) (\$)

MU 692 Var [1-3]. Seminar.

MU 695A-H Var [1-3]. Independent Study.

A) Composition and theory. B) Conducting. C) Improvisation. D) Music education. E) Music history. F) Music literature. G) Music therapy. H) Pedagogy.

MU 696A-I Var [1-3]. Group Study.

A) Composition and theory. B) Conducting. C) Improvisation. D) Music education. E) Music history. F) Music literature. G) Music therapy. H) Pedagogy. I) Performance.

MU 698 Var [1-3]. Research.

MU 699 Var. Thesis.

NEUROBIOLOGY COURSES

Nondepartmental, Interdisciplinary

Office of Provost and Executive Vice President

NB 500 01(0-0-1). Readings in Cellular Neurobiology. F. Prerequisite: One college-level course in each: biology, biochemistry, physics, calculus; concurrent registration in NB 501 or BMS 500.

Membrane properties of nerve and muscle; molecular mechanisms of synaptic function; neuro-muscular units.

NB 501 02(2-0-0). Cellular and Molecular Neurophysiology. F. Prerequisite: One college-level course in each: biology, biochemistry, physics, calculus. Credit not allowed for both NB 501 and BMS 500.

Membrane properties of nerve and muscle; molecular mechanisms of synaptic function; neuromuscular units.

NB 502/CM 502 02(1-3-0). Techniques in Molecular & Cellular Biology. F. Prerequisite: One college-level course with laboratory in each: biology, biochemistry, physics; written consent of instructor. Credit not allowed for both CM 502 and NB 502.

Current methods in molecular and cellular neurobiology.

NB 503/BMS 503 03(3-0-0). Developmental Neurobiology. S. Prerequisite: One college-level course in each: biology, biochemistry, physics, calculus. Credit not allowed for both NB 503 and BMS 503.

Molecular mechanisms involved in development of nervous system including differentiation, growth, pathfinding, and synaptogenesis.

NB 505/BMS 505 03(3-0-0). Neuronal Circuits, Systems and Behavior. S. Prerequisite: BMS 325 or BMS 500 or NB 501. Credit not allowed for both NB 505 and BMS 505.

Anatomical and physiological organization of the nervous system.

NB 586 01(0-2-0). Practicum-Techniques in Neuroscience II. S. Prerequisite: NB 501; NB 502/CM 502.

Current research projects in the laboratories of neuroscience faculty.

NB 600/PSY 600D 03(3-0-0). Advanced Psychology-Sensation and Perception. S. Prerequisite: PSY 456; fifteen credits in psychology. Credit not allowed for both NB 600 and PSY 600D.

Neural mechanisms of human perception; color and depth perception, pitch, loudness, and the effects of aging.

°NB 650 01(1-0-0). Computer Analysis of Neuronal Proteins. S.

Theory and practice of using computers to study proteins.

NB 660/BMS 660 01(1-0-0). Seizures, Neurodegeneration, and Epilepsy. F. Prerequisite: BMS 325 or NB 505. Credit not allowed for both NB 660 and BMS 660.

Analyzes molecular, cellular and network mechanisms underlying seizures and responsible for epilepsy

°NB 750 02(2-0-0). Physiology of Ion Channels. S. Prerequisite: BMS 500; written consent of instructor.

Physiological and structural analysis of membrane ion channels.

NB 771 01(1-0-0). Writing, Submitting and Reviewing Grants. F.

Preparation of NRSA fellowship proposals; proposal review; possible submission to NIH for funding.

NB 793 01(0-0-1). Neuroscience Seminar.

NB 795 Var. Independent Study.

NB 796A-E Var. Group Study.

A) Ion channels. **B)** Neuronal growth and regeneration. **C)** Topics in neurosciences. **D)** Seizures and epilepsy. **E)** Neuroendocrine mechanisms.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC-*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

NATURAL RESOURCES COURSES

Nondepartmental

Warner College of Natural Resources

NR 120A 03(3-0-0). Environmental Conservation. F, S. (GT-SC2, AUCC 3A). Credit not allowed for both NR 120A and NR 120B.

Overview of natural resources environmental concerns including population, pesticides, energy, and pollution. (NT-O)

NR 120B 04(3-3-0). Environmental Conservation. F, S. Prerequisite: Participation in University Honors Program. Credit not allowed for both NR 120B and NR 120B.

Overview of natural resources environmental concerns including population, pesticides, energy, and pollution.

+NR 130 03(3-0-0). Global Environmental Systems. (AUCC 3A) F, S, SS.

Studies of the earth's lithosphere, hydrosphere, atmosphere, and biosphere systems, and their interrelations with human dimensions. (\$)

NR 150 03(3-0-0). Oceanography. (AUCC 3A) F, S, SS.

Introduction to the geology, physics, chemistry, and biology of the world ocean; oceanic relationships with various human dimensions.

NR 192 02(0-0-2). First Year Seminar in Environmental Studies. F.

Introduction to the disciplines involved in natural resources through exposure to current issues.

+NR 220 05(2-6-0). Natural Resources Ecology and Measurements. SS. Prerequisite: BZ 110 and BZ 111 or BZ 120 or LIFE 103; MATH 118.

Ecology of Rocky Mountain ecosystems. Basic measurements and integrated management of natural resources. Pingree Park Campus. (\$)

NR 300 03(2-0-1). Biological Diversity. S. Prerequisite: NR 120A or NR 120B or one course in biology.

Biological diversity examined in context of species; extinction. Principles, techniques of conservation biology utilized to understand and resolve issues.

+NR 319 04(2-4-0). Geospatial Applications in Natural Resources. F, S. Prerequisite: Junior standing.

Introduction to global positioning systems (GPS), geographic information systems (GIS) and remote sensing (RS) with natural resource applications.

NR 320 03(3-0-0). Natural Resources History and Policy. (AUCC 3D). F, S.

History, values and institutions, and policy process guiding natural resources management and conservation.

NR 322 04(2-4-0). Introduction to Geographic Information Systems. F, S.

Fundamental concepts of spatial data handling and computer-assisted map analysis.

NR 323/GR 323 03(2-2-0). Remote Sensing and Image Interpretation. F. Credit allowed for only one of the following: NR323, GR 323, NR 503, GR 503.

Remote sensing systems and applications; characteristics of photographic, scanner and radar images; imagery interpretation.

NR 326 03(3-0-0). Forest Vegetation Management. F. Prerequisite: NR 220. Credit not allowed for both NR 326 and F 325.

Ecologically-based management to restore and manage forests.

NR 330 03(3-0-0). Human Dimensions in Natural Resources. F. Prerequisite: NR 120A or NR 120B.

Social, political, cultural, and economic considerations in natural

resource management.

NR 353/BZ 353 03(3-0-0). Global Change Ecology, Impacts and Mitigation. S. Prerequisite: LAND 220/LIFE 220 or LIFE 320. Credit not allowed for both BZ 353 and NR 353.

Ecological impacts of human-induced global change, and the strategies that can/are being used to adapt to and mitigate these impacts.

NR 355 03. Contemporary Environmental Issues. F, S, SS. Prerequisite: One course in biology. Offered as telecourse only.

Fundamental concepts of energy, population, and ecology applied to range of contemporary environmental issues. (NT-T)

NR 365 03(3-0-0). Environmental Education. F.

Principles of interpretation related to natural resource management and public informal education.

NR 367 03(3-0-0). Concepts in Vertebrate Nutrition. S. Prerequisite: CHEM 245.

Concepts in suborganismal and organismal vertebrate nutrition; introduction to nutritional ecology.

NR 375 01(1-0-0). Environment and Natural Resources Leadership. S.

Environment and natural resources leadership history, skills, and styles. Creation of leadership path and organization prescriptions.

+NR 383/AGRI 383 02(0-2-1). U.S. Travel-Integrated Resource Management. S. Credit not allowed for both NR 383 and AGRI 383.

Evaluation of integrated ranch management decision alternatives in conjunction with professional resource managers. (\$)

NR 387 01(1-0-0). Internship I.

Preparation for field experience in natural resources management.

NR 400 03(2-0-1). Public Relations in Natural Resources. F, S, SS. Prerequisite: NR 320.

Effective public relations and public information programs applicable to natural resource professions.

NR 401 02(0-4-0). Techniques in Public Relations. F, S. Prerequisite: SPCM 200.

Effective communications methods related to natural resource professions; preparation of graphics, organization of programs using slide show format.

+NR 420 04(3-3-0). Integrated Ecosystem Management. F,S. Prerequisite: LAND 220/LIFE 220 or LIFE 320; NR 220; NR 320; senior standing.

Natural resource management exercises; quantitative integration techniques, group dynamics. (\$)

NR 421 03(3-0-0). Natural Resources Sampling. S. Prerequisite: NR 220; STAT 201 or STAT 301.

Designs, techniques, problems in sampling natural resource populations; analysis, interpretation of data.

NR 422 04(2-4-0). GIS Applications in Natural Resource Management. S. Prerequisite: NR 322.

Development and implementation of GIS projects and problems in spatial data analysis.

NR 423 01(.5-1-0). Applications of Global Positioning Systems. F, S. Prerequisite: NR 322 or NR 505.

Introduction to concepts and use of global positioning systems with applications to natural resources.

NR 425 03(3-0-0). Natural Resource Policy and Sustainability. S. Prerequisite: F 325; NR 320.

Principles, concepts, and operating examples of sustainable resource management with a concentration on forest policies and practices.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

NR 432 01. Foundations of National Forest Lands Program. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

History of U.S. public land law and evolution of National Forests. Nature, policy, trend, and needs of lands program; its integration into management. (NT-C)

NR 433 04. Special Uses Management. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

Authorities, application, and administration; agriculture, aviation, community, public information, industrial, water, treasure trove, and cultural uses. (NT-C)

NR 434 03. Linear Uses and FERC Licenses. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

Rights-of-way authorities and management; road and trail grants and easements; communication uses; Federal Energy Regulatory Commission licenses. (NT-C)

NR 435 05. Valuation and Landownership Adjustment. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

Authorities, coordination, valuation, title; land purchase, donation, exchange, interchange, transfers, sales, condemnation, and negotiation. (NT-C)

NR 436 03. Right-of-Way Acquisition. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

Need, authority, policy, planning, acquiring, negotiating, and managing rights-of-way; cost-share agreements. (NT-C)

NR 437 03. Boundaries, Status, Claims, and Withdrawals. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

Administration of landownership status, title encumbrances, withdrawals, title claims, Native American rights and claims, property boundary management. (NT-C)

NR 440 03(2-2-0). Land Use Planning. F.

Integration of natural resource, social, institutional factors in regional resource planning. (NT-O)

NR 444 03(3-0-0). Fire Economics and Policy. S. Prerequisite: AREC 202 or ECON 202.

Development of wildlife and fuel management economics integrated with critical federal policies.

+NR 460 03(3-0-0). Wilderness Management. S. Prerequisite: LAND 220/LIFE 220; NRRT 231.

Management of wilderness in the U.S. National Wilderness Preservation System and equivalent international wildlands. (\$)

+NR 479 02(0-2-1), Restoration Case Studies. F. Prerequisite: LAND 220/LIFE 220 or LIFE 320; NR326 or F 311 or RS 300; written consent of instructor.

Analysis of ecological restoration projects. Required field trips one week prior to first day of semester.

NR 484 Var [1-5]. Supervised College Teaching. Prerequisite: Written consent of instructor. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

NR 492 Var. Seminar on Environmental Conservation.

NR 493 01(0-0-1). Seminar on GIS and Remote Sensing Applications. S. Prerequisite: NR 322 or NR 323/GR 323.

Techniques, use of remote sensing, GIS technologies for forest, range, wildlife, water, geology, recreation, and other resource management applications.

NR 495 Var. Independent Study.

NR 501 03. Leadership and Public Communications. F, S, SS.

Prerequisite: Introductory course to natural resource management fields, communication course (speech, writing, journalism). Offered as correspondence course only.

Two-way communication skills used to involve publics, write for various media, and understand role of leadership within natural resources profession. (NT-C/O)

NR 503/GR 503 04(3-3-0). Remote Sensing and Image Analysis. F. Credit allowed for only one of the following: NR503, GR 503, NR 323, GR 323.

Interpretation and analysis of photographic, multispectral scanner, and radar data; sensor systems; applications to resource management.

NR 504 04(2-6-0). Computer Analysis of Remote Sensing Data. S. Prerequisite: GR 323/NR 323 or GR 503/NR 503.

Computer-aided analysis techniques for extracting resource information from aerial and satellite remote sensing data.

NR 505 04(2-4-0). Concepts in GIS. F. Prerequisite: STAT 301 or STAT 511.

Concepts of geographic information systems and spatial data analysis.

NR 506 04(2-4-0). GIS Methods for Resource Management. S. Prerequisite: NR 505.

Current methods in applied geographic information systems and spatial data analysis.

NR 512 03(3-0-0). Spatial Statistical Modeling—Natural Resources. F. Prerequisite: NR 322; NR 323/GR 323; STAT 301.

Statistical techniques used to model natural and environmental resources; GIS, remote sensing and spatial statistics.

NR 515 03. Natural Resources Policy and Biodiversity. F, S, SS. Prerequisite: Political science, introductory course to natural resources management fields. Offered as correspondence course only.

Review evolution of natural resource policy, administration, and law emphasizing interdisciplinary concept of managing for biodiversity. (NT-C/O)

NR 520 03(3-0-0). Applied Optimization in Resource Management. S. Prerequisite: One course in each of the following subjects: calculus and economics.

Design optimization models to integrate economics, ecology, ecology and social concerns in natural resource management.

°NR 521 02(2-0-0). Natural Resource Administration. F. Prerequisite: NR 320.

Administration of forest and natural resource projects in developed and developing countries.

NR 522 03(0-6-0). Wilderness Ecosystem Planning. S. Prerequisite: Written consent of instructor.

Expertise developed in preparing effective implementation plans for park and wilderness ecosystems.

NR 523/STAT 523 03(3-0-0). Quantitative Spatial Analysis. S. Prerequisite: STAT 301 or STAT 307. Credit not allowed for both NR 523 and STAT 523.

Techniques in spatial analysis: point pattern analysis, spatial autocorrelation, trend surface and spectral analysis.

NR 525 03(3-0-0). World Natural Resources. S. Prerequisite: Written consent of instructor.

Interdisciplinary approach to overview global problems and solutions in natural resources.

NR 526 04(4-0-0). Techniques for Ecosystem Management. S. Prerequisite: Enrollment in Continuing Education in Ecosystem Management (CEEM) program. Offered only through the Division of

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Continuing Education.

Assessing the biophysical and sociopolitical environment and decision-making techniques used in ecosystem management. (NT)

NR 527 03(2-0-1). Methods-Human Dimensions of Natural Resources. SS. Prerequisite: B.S. degree; participant in Advancing Human Dimensions Expertise Among Fish and Wildlife Agencies training program.

Human dimensions research in areas of problem identification, research process, survey methods, sampling, validity and reliability.

NR 528 03(2-2-0). Analysis: Human Dimensions–Natural Resources. SS. Prerequisite: B.S. degree; participant in Advancing Human Dimensions Expertise Among Fish and Wildlife Agencies training program; STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315.

Human dimensions analysis techniques: codebook development and data entry, univariate statistics, and bivariate/multivariate statistics.

NR 529 02(2-0-0). Concepts: Human Dimensions-Natural Resources. SS. Prerequisite: B.S. degree; participant in Advancing Human Dimensions Expertise Among Fish and Wildlife Agencies training program.

Concepts guiding human dimensions research: motivations/satisfactions, attitudes, values, attitude/behavior change and norms.

NR 530 01(1-0-0). Human Dimensions-Application. SS. Prerequisite: B.S. degree; participant in Advancing Human Dimensions Expertise Among Fish and Wildlife Agencies training program.

Application of human dimensions information; incorporate information into decision-making process.

NR 531 01(1-0-0). Public Participation. SS. Prerequisite: B.S. degree; participant in Advancing Human Dimensions Expertise Among Fish and Wildlife Agencies training program.

Diagnostic tools for public involvement; appropriate methods for specific situations, issues, and stakeholders.

NR 535 03(0-0-3). Action for Sustainable Behavior. F, S, SS. Prerequisite: Graduate student or senior status; one course in human dimensions; one course in science. Offered as a correspondence course only.

Review sustainability issues and develop solutions considering environments; economics; psychology; sociology; law and politics; and administration. (NT-C/O)

NR 540A-D 02. Environmental Issues. F. Prerequisite: Admission to the Conservation Leadership program. Students must enroll in NR 540A-D concurrently.

A) Water Resources 02(1-2-0). B) Biological Diversity 02(1-2-0). C) Ecologic Reconciliation 02(1-2-0). D) Ecosystem Services 02(2-0-0).

NR 541 02(2-0-0). Conservation Policy, Finance, and Governance. F. Prerequisite: Admission to the Conservation Leadership program.

Overview of conservation policy, finance, and governance issues at the local, national, and international levels.

NR 542 02(2-0-0). Global Change and Conservation. F. Prerequisite: Admission to the Conservation Leadership program.

Potential ecological, societal, and economic impacts of global change across scales in the context of conservation.

NR 543A 02(2-0-0). Catalyzing Change: Conflict and Conservation. F. Prerequisite: Admission to the Conservation Leadership program.

Communication, conflict management, group decision-making theories and tools to effectively create change in the field of conservation.

NR 543B 02(2-0-0). Catalyzing Change: Collaborative Conservation. F. Prerequisite: Admission to the Conservation Leadership program.

Collaborative communication theories, methods, and tools to effectively create change in the field of conservation.

NR 544A-E. Conservation Methods. S. Prerequisite: Admission to the Conservation Leadership program. Students must enroll in NR 544A-E

concurrently.

A) Watershed sciences. 01(1-0-0). B) Ecological sciences. 01(1-0-0). C) Social sciences. 01(1-0-0). D) Spatial information. 01(1-0-0). E) Integrative field work. Var [2-4].

NR 545 02(2-0-0). Multi-level Views of Society and Conservation. S. Prerequisite: Admission to the Conservation Leadership program.

Myriad and often opposing views of societal and environmental problems across cultures and across scales.

NR 546 02(2-0-0). Human Ecosystem Context. SS. Prerequisite: Admission to the Conservation Leadership program.

Background for field site-specific conservation: ecosystems, peoples, politics, and development.

NR 547 02(2-0-0). Poverty and Sustainable Development. SS. Prerequisite: Admission to the Conservation Leadership program.

Theoretical and methodological tools to analyze the interactions between poverty and sustainable development in the field site country.

NR 548 02(2-0-0). Conservation Planning and Management. SS. Prerequisite: Admission to the Conservation Leadership program.

Fundamental theories and management practices of protected areas in the context of southern Mexico.

NR 549A Var[1-3]. Conservation/Systems Leadership., S, SS.. Prerequisite: Admission to the Conservation Leadership program.

Conservation leadership development by exposure to leadership models, theories, case studies, assessments and trainings.

NR 549B Var[1-3]. Conservation/Systems Leadership: Field. SS. Prerequisite: Admission to the Conservation Leadership program.

Effective environmental leadership across cultures through exposure to leadership models, theories, case studies, assessments and trainings.

NR 550 03(3-0-0). Sustainable Military Lands Management. F, S, SS. Prerequisite: Completed undergraduate degree.

Overview of military lands in the U.S.—historical, geographical, environmental—and evolution of military lands as part of the federal lands system. (NT-O)

NR 551 03(3-0-0). Cultural Resource Mgmt on Military Lands. F, S, SS. Prerequisite: Completed undergraduate degree; NR 550.

Intro to cultural resource laws and policies for broad range of heritage resources, prehistoric and historic, with emphasis on tools and techniques. (NT-O).

NR 552 03(3-0-0). Ecology of Military Lands. F, S, SS. Prerequisite: Completed undergraduate degree; NR 550.

Landscape ecology of military lands with emphasis on ecological processes and principles as related to militarily-induced disturbances. (NT-O)

NR 554/ANTH 554 03(2-2-0). Ecological and Social Agent-based Modeling. S. Prerequisite: Junior or senior standing. For upper level undergraduates. Credit not allowed for both NR 554 and ANTH 554.

Exploring the use and making of agent-based models featuring interacting individuals in ecological and social simulation, with examples and projects.

NR 555 02(2-0-0). Preparation of Grant Proposals. S. Prerequisite: STAT 301; one course in ecology.

Idea development, preparation, writing, and presentation of research proposals in natural resources.

NR 561 02(2-0-0). Habitat Evaluation Procedures. F, S, SS. Prerequisite: General biological, natural resources, or planning course work.

Rationale, philosophy, and use of habitat as a mechanism for conducting environmental impact assessments.

NR 575 04(3-2-0). Systems Ecology. F. Prerequisite: MATH 255; RS 452;

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

STAT 340.

Modeling and computer simulation for describing and integrating ecosystem concepts.

NR 578 03(3-0-0). Ecology of Disturbed Lands. S. Prerequisite: LAND 220/LIFE 220; SOCR 240. Credit not allowed for both RS 578 and NR 578.

Analysis of basic and applied ecological principles involved in the restoration of drastically disturbed lands.

NR 592 Var. Seminar in Natural Resources.

NR 600 02(1-0-1). Advanced Public Relations in Natural Resources. S. Prerequisite: NR 400.

Public relations aspects of current natural resource management programs; case history approach.

NR 621 03(1-4-0). Design of Geographic Information Systems. F. Prerequisite: CS 110; LAND 520 or NR 322

Algorithms, procedures, and applications of spatial data handling and spatial analysis.

NR 622 03(2-2-0). Analysis of Environmental Impact. F. Prerequisite: Written consent of instructor.

Preparation and evaluation of environmental impact statements.

***NR 625 03(0-0-3). Community-Based Natural Resource Management.** S. Prerequisite: 1 upper division course in natural resource ecology, management, or social science.

History, theory, practice, and evaluation of community-based natural resource management.

NR 660 03(3-0-0). Biogeochemical Cycling in Ecosystems. S. Prerequisite: CHEM 245; SOCR 240; one course in advanced ecology.

Biotic and abiotic processes responsible for distribution and fluxes of elements at ecosystem, landscape, and global scales.

NR 676 04(3-2-0). Ecological Models. S. Prerequisite: NR 575.

Model development for ecosystems, subsystems; deterministic, stochastic models; validation, sensitivity analysis.

NR 678 04(3-0-1). Advanced Ecological Restoration. S. Prerequisite: BZ 450 or F 311 or LAND 220/LIFE 220; SOCR 240. Credit not allowed for both RS 478 and NR 678.

Analysis of environmental factors influencing restoration of disturbed lands and practices for successful restoration of disturbed ecosystems.

NR 684 Var [1-5]. Supervised College Teaching. Prerequisite: Written consent of instructor.

NR 687 Var [1-8]. Natural Resources Internship. Prerequisite: Written consent of instructor.

Field experience and exercises in international natural resources management.

NR 693 Var[1-2]. Natural Resources Stewardship Seminar. F. Prerequisite: Must be enrolled in the Master of Natural Resources Stewardship (Plan C) program.

Invited speakers will present different perspectives on natural resources.

NR 793 01(0-0-1). Seminar on Remote Sensing and GIS. Prerequisite: NR 322 or NR 323/GR 323 or NR 503/GR 503 or NR 505.

Techniques, use of remote sensing, GIS technologies for forest, range, wildlife, water, geology, recreation, and other resource management applications.

NATURAL RESOURCE RECREATION AND TOURISM COURSES

Department of Human Dimensions of Natural Resources Warner College of Natural Resources

NRRT 100 03(3-0-0). Foundations of Recreation and Tourism. F.

Current concepts, terminology, suppliers, and the social, economic, and personal benefits from recreation, leisure, and tourism.

NRRT 231 03(3-0-0). Principles-Parks/Protected Area Management. F.

Tools and strategies used by managers in parks and protected areas.

NRRT 262 03(3-0-0). Principals of Environmental Communications. S.

Principals of environmental communication, education, and interpretation for managing natural and cultural resources.

NRRT 270 03(3-0-0). Principles of Natural Resource Tourism. F, SS.

Tourism and private commercial outdoor recreation industry in America. (NT_O)

NRRT 320 03(3-0-0). International Issues-Recreation and Tourism. F, S.

History, development, and preservation of international parks, preserves, tourist and historical sites. (NT-O)

NRRT 321 03(1-3-1). Travel Abroad-Marine Ecotourism-Bahamas. SS.

Prerequisite: Minimum GPA of 2.500; ability to swim; passport; three credit natural science course.

Environmental and socio-cultural aspects of marine ecotourism in the Bahamas.

NRRT 330 03(3-0-0). Social Aspects of Natural Resource Management. F, S.

Conceptual frameworks of human dimension research and its application to resource management decisions.

NRRT 331 03(2-3-0). Management of Parks and Protected Areas. S.

Prerequisite: NRRT 231; NRRT 330.

Comprehensive assessment of problems confronted by park professionals and the techniques and tools applied to their solution. (\$)

NRRT 350 03(2-2-0). Wilderness Leadership. F.

Practical and philosophical aspects of wilderness usage including safety, group dynamics, and backcountry skills.

NRRT 351 03(2-2-0). Wilderness Instructors. S.

Preparation to safely lead and instruct groups in outdoor wilderness programs; further refine skills including judgment and leadership.

NRRT 360 03(3-0-0). Group Decision Making. F. Prerequisite: NRRT 262.

Theoretical, critical, and practical approaches to group decision making, collaboration, and teamwork related to natural resource management.

NRRT 361 03(3-0-0). Natural Resources and the Media. S. Prerequisite: NRRT 262.

Representations of the environment in the media and strategies for effective media relations about natural resource issues.

NRRT 362 03(3-0-0). Environmental Conflict Management. F. Prerequisite: NRRT 262.

Theoretical, critical, and practical approaches to negotiation, mediation, and conflict management strategies related to natural resources.

NRRT 363 03(2-2-0). Outdoor Recreation Programming. F, S. Prerequisite: NRRT 231 or NRRT 270.

Develop administrative and program planning skills for private, public,

and nonprofit recreation/tourism organizations.

NRRT 370 03(3-0-0). Managing Tourism in the E-Commerce Era. F, S. Prerequisite: NRRT 270.

E-commerce foundations, business models, and practices in the recreation and travel industry.

NRRT 371 03(2-1-0). Techniques in Interpretation. F. Prerequisite: NRRT 262.

Intermediate techniques in interpretation including exhibit design and construction, personal program development and visitor studies.

NRRT 372 03(3-0-0). Tourism Promotion. F, S. Prerequisite: NRRT 270.

Planning development and implementation of marketing programs specifically applied to the recreation, travel, and tourism industries.

NRRT 375 03(2-2-0). Budgeting and Revenue Resources. F. Prerequisite: NRRT 231 or NRRT 270.

Budget development, presentation, types, techniques; computer-aided budgeting using spread sheets; revenue generating sources.

NRRT 376 03(2-2-0). Human Dimensions Research and Analysis. F, S. Prerequisite: STAT 201.

Application of human dimensions (recreation) research and analysis techniques to natural resource issues.

NRRT 384 Var. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

+NRRT 431 03(3-0-0). Park and Protected Area Management. S. Prerequisite: NRRT 231; NRRT 331.

Park management practices; preparation of park operation plans. (\$)

NRRT 432 01. Foundations of Forest Recreation. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

History, philosophy, role, and sources of information of the Forest Service and National Forest System. (NT-C)

NRRT 433 04. Meeting Needs of Recreation Users. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

Visitor behavior, communications and conflicts, working with volunteers, programs, partnerships, quality service, and role of interpretive services. (NT-C)

NRRT 434 03. Recreation Special Uses and Appeals. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

Special use benefits, authorities, planning, terms and conditions, administration and kinds, appeal review, discretionary review and decisions. (NT-C)

NRRT 435 03. Trails, Facility Design, Operation, Maintenance. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

Trail planning, development, maintenance; recreation site planning, design operation, maintenance; visitor and resource protection. (NT-C)

NRRT 436 02. Recreation, Visual, Cultural Resource Management. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

Economic analysis, recreation opportunity spectrum, visual and cultural resource management. (NT-C)

NRRT 437 02. Off-Road Vehicle, River, and Winter Recreation. F, S, SS. Prerequisite: Written consent of instructor. Offered as correspondence course only.

History, authorities, planning, management, and coordination of off-road, river, and winter recreation. (NT-C)

NRRT 438 02. Management of Wilderness. F, S, SS. Prerequisite:

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Written consent of instructor. Offered as correspondence course only.

Forest Service role, management principles, legislative differences, components, public education, visitor management, and wilderness management skills. (NT-C)

NRRT 439 03(3-0-0). Open Space and Natural Area Management. S. Prerequisite: NR 440 or NRRT 331.

Acquisition of, planning for, and management of local government and private open space and natural areas.

NRRT 441 03(2-2-0). Spatial Analysis of Protected Areas. S. Prerequisite: NRRT 231.

Spatial analytical techniques used in planning and managing protected areas, including locating, managing, and assessing parks.

NRRT 442 03(3-0-0). Tourism Planning. F, S. Prerequisite: NRRT 270. Planning for regional tourism resources and programs.

NRRT 450 03. Wilderness Philosophy and Ethic Development. F, S, SS. Offered as correspondence course only.

History, philosophical origin, ethics, and international context of wilderness; history of conservation movement. (NT-C)

NRRT 451 03. National Wilderness Preservation System. F, S, SS. Prerequisite: NRRT 450. Offered as correspondence course only.

Early history and key components of the Wilderness Act, wilderness legislation since 1964, and related natural systems. (NT-C)

NRRT 452 04. Management of the Wilderness Resource. F, S, SS. Prerequisite: NRRT 451. Offered as correspondence course only.

Ecosystem characteristics, basic principles of wilderness management, and management of specific resources and nonconforming uses. (NT-C)

NRRT 453 03. Management of Recreation Resources. F, S, SS. Prerequisite: NRRT 451. Offered as correspondence course only.

Managing for quality visitor experiences and for minimal recreation impacts; techniques for wilderness education/information. (NT-C)

NRRT 454 03. Wilderness Management Planning. F, S, SS. Prerequisite: NRRT 451. Offered as correspondence course only.

Agency differences in planning, basic planning concepts, and the Limits of Acceptable Change. (NT-C)

NRRT 455 03. Wilderness Management Skills and Projections. F, S, SS. Prerequisite: NRRT 451. Offered as correspondence course only.

Using primitive means to achieve management objectives, no-trace camping methods and volunteers, and expectations for the future. (NT-C)

NRRT 457 03. Off-Highway Vehicle Recreation in America. F, S, SS. Offered as correspondence course only.

Overviews the supply and demand of off-highway vehicle recreation. (NT-C)

NRRT 458 03. Planning for Off-Highway Vehicle Recreation. F, S, SS. Prerequisite: NRRT 457. Offered as correspondence course only.

Develop working knowledge of the planning tools, concept, and process for off-highway vehicle recreation. (NT-C)

NRRT 459 03. Managing Off-Highway Vehicle Recreation. F, S, SS. Prerequisite: NRRT 457. Offered as correspondence course only.

Developing working knowledge of the management tools, techniques, trends, and challenges with off-highway vehicle recreation. (NT-C)

NRRT 460/RRM 460 03(3-0-0). Event and Conference Planning. S. Prerequisite: NRRT 270 or RRM 101. Credit not allowed for both NRRT 460 and RRM 460.

Foundation in planning, organizing, and producing special events and conferences. Functions and strategies necessary for effective event management.

NRRT 462 03(3-0-0). Environmental Communication-Natural

Resources. S. Prerequisite: NRRT 262.

Exploration and application of theories, concepts, and techniques for successful environmental communication in natural resources.

NRRT 463 03(3-0-0). Non-Profit Administration in Conservation. S. Prerequisite: NRRT 231; NRRT 262.

Role of NGOs in protected-area management and conservation education; models for development, including grant writing, in conservation.

NRRT 470 03(3-0-0). Tourism Impacts. F, S. Prerequisite: NRRT 270.

Social, cultural, physical, and economic impacts of tourism; techniques for assessing impacts.

NRRT 471 03(3-0-0). Starting and Managing Tourism Enterprise. F, S. Prerequisite: NRRT 231 or NRRT 262 or NRRT 270.

Aspects of starting and managing a tourism enterprise.

NRRT 473 03(3-0-0). Ski Area Management. F, S. Prerequisite: NRRT 270; senior status.

Ski area management; history and trends, ski area operations, human resource management, environmental issues, liability, resort planning and design.

NRRT 483 Var [1-18]. Off-Campus Study.

NRRT 487 Var. Internship.

NRRT 495A-C Var. Independent Study.

A) Administration. B) Management. C) Interpretation.

NRRT 496 Var. Group Study.

NRRT 499 Var. Senior Thesis.

Independent research project culminating in thesis presented to faculty mentor.

NRRT 504 02(2-0-0). Water-Based Recreation. S. Prerequisite: Written consent of instructor.

Identify issues and management strategies for recreation utilization of water resources.

NRRT 505 03(3-0-0). Environmental Education History and Theory. F, S, SS. Prerequisite: Upper-division course in natural resources.

History and theories, planning and instruction; outcomes; historical events; ecological literacy, experiential learning models. (NT-O)

NRRT 506 03(3-0-0). Methods in Environmental Education Research. F, S, SS. Prerequisite: Upper-division course in natural resources.

Research methods and designs; literature reviews, needs assessments and program evaluation of environmental education in informal settings. (NT-C)

NRRT 507 03(3-0-0). Environmental Education Planning. F, S, SS. Prerequisite: One upper-division course in natural resources, biological sciences, or ecology.

Informal learning theory; evaluation models focused on education in informal settings such as nature centers, zoos, etc. (NT-C)

NRRT 508 03(3-0-0). Current Issues in Environmental Education. F, S, SS. Prerequisite: One upper-division course in natural resources, biological sciences, or ecology.

Impact of current events, legislation, demographic changes, and other events on informal environmental education. (NT-C)

NRRT 509 03(3-0-0). Science Education in Informal Settings. S, SS. Prerequisite: Upper division course in natural resources or related field. NOTE: This course does not count towards State teacher licensure.

Theory, application of teaching environmental science in informal settings – nature centers, zoos, etc. Inquiry, safety, group management,

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

experience.

NRRT 550 03(3-0-0). Ecotourism. S. Prerequisite: NRRT 470.

Concept of ecotourism, impacts associated with ecotourism, and role of education/interpretation in mitigating these impacts.

NRRT 565 03(3-0-0). Research-Human Dimensions Natural Resources. F.

Theory, research, literature review, hypothesis development, scientific writing, proposal development.

NRRT 600 02(0-0-2). Tourism Industry Concepts and Practices. F.

Prerequisite: Graduate standing. Offered only as an online course. This is a partial semester course.

Primary conceptual issues of contemporary tourism important to comprehend the practice of tourism. (NT-O)

NRRT 601 02(0-0-2). Tourism Quantitative Analysis I. S. Prerequisite:

STAT 312; graduate student standing. Offered only as an online course. This is a partial semester course.

Statistical techniques used by researchers to inform and support tourism decision-making. (NT-O)

NRRT 602 02(0-0-2). Tourism Quantitative Analysis II. S. Prerequisite:

Graduate student standing. Offered only as an online course. This is a partial semester course.

Explores the domestic and international sources of data and their applications for decision-making in tourism. (NT-O)

NRRT 605 03(3-0-0). Human Dimensions of Natural Resources Theory.

S.

Application of theories and conceptual approaches from social sciences to study of recreation behavior and natural resource issues.

NRRT 610 02(0-0-2). Natural Resource Management and Tourism. F.

Prerequisite: Graduate student standing. Offered only as an online course. This is a partial semester course.

Connection between the management of tourism resources and the changing conditions of the natural world. (NT-O)

NRRT 615 02(0-0-2). Sustainable Tourism Development Foundations.

F. Prerequisite: Graduate student standing. Offered only as an online course. This is a partial semester course.

Theory, practice, history, terminology and issues surrounding sustainable tourism development. (NT-O)

NRRT 625 02(0-0-2). Communication/Conflict Management in Tourism. S. Prerequisite: Graduate student standing. Offered only as an

online course. This is a partial semester course.

Negotiation tools for effective organizational communication/conflict management in tourism. (NT-O)

NRRT 655 02(0-0-2). Tourism Marketing Concepts and Applications.

F. Prerequisite: Graduate student standing. Offered only as an online course. This is a partial semester course.

Marketing processes as they apply to travel and tourism. (NT-O)

NRRT 662 02(0-0-2). Global Tourism Policy. S. Prerequisite: Graduate

student standing. Offered only as an online course. This is a partial semester course.

Major global policies, trends, and challenges facing the travel and tourism industry. (NT-O)

NRRT 665 03(2-2-0). Survey Research and Analysis. S. Prerequisite:

NRRT 565; STAT 301.

Survey research, design, and analysis in human dimensions of natural resources.

NRRT 666 03(3-0-0). Qualitative Research in NRRT. Prerequisite:

NRRT 565.

Qualitative approaches to tourism research and techniques from a range

of disciplinary backgrounds; methodological aspects.

NRRT 671 02(0-0-2). Strategic Management for Travel and Tourism.

S. Prerequisite: Graduate standing. Offered only as an online course. This is a partial semester course.

Factors, tools, and techniques for strategic management of a travel and tourism business or organization. (NT-O)

NRRT 679A-B 01(0-0-1). Current Topics in Nature-Based Tourism. F.

S. Prerequisite: Graduate standing. Students will enroll in this course during both the Fall and Spring semesters.

Current topics in nature-based travel and tourism.

A) Fall. B) Spring.

NRRT 695A-D Var. Independent Study.

A) Administration. B) Management. C) Interpretation. D) Landscape planning.

NRRT 698 Var. Research.

NRRT 699 Var. Thesis.

NRRT 765 03(2-2-0). Applied Multivariate Analysis. F. Prerequisite:

NRRT 665.

Application and interpretation of multivariate statistics to human dimensions in natural resources, recreation, and tourism.

NRRT 784 Var. Supervised College Teaching.

NRRT 798 Var. Research.

NRRT 799 Var. Dissertation.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

NATURAL SCIENCES COURSES

Nondepartmental

College of Natural Sciences

NSCI 192 02(0-0-2). Introductory Seminar. F.

Introduction to the culture and values of science and the College of Natural Sciences.

NSCI 295 Var [1-3]. Independent Study-Natural Sciences. Prerequisite: Written consent of Natural Sciences Dean's Office.

NSCI 296 Var [1-3]. Group Study-Natural Sciences. Prerequisite: Written consent of Natural Sciences Dean's Office.

NSCI 298 Var [1-3]. Undergraduate Research-Natural Sciences. Prerequisite: Written consent of Natural Sciences Dean's Office.

NSCI 384 Var [1-3]. Supervised College Teaching. F, S. Prerequisite: Written consent of instructor. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Supervised experience in computer lab.

NSCI 487 Var [1-3]. Internship-Natural Sciences. Prerequisite: Written consent of Natural Sciences Dean's Office.

NSCI 495 Var [1-3]. Independent Study-Natural Sciences. Prerequisite: Written consent of Natural Sciences Dean's Office.

NSCI 496 Var [1-3]. Group Study-Natural Sciences. Prerequisite: Written consent of Natural Sciences Dean's Office.

NSCI 498 Var [1-3]. Undergraduate Research-Natural Sciences. Prerequisite: Written consent of Natural Sciences Dean's Office.

NSCI 579/VS 579 03(3-0-0). Animal Behavior in Captive Populations. F, S. Prerequisite: Enrollment in the M.P.N.S., Zoo, Aquarium and Shelter Management specialization, or BZ 300. Credit not allowed for both NSCI 579 and VS 579.

How animals learn, perceive their world, and behave, and how all of those intersect to alter behavior in captive settings.

NSCI 590A-G. Workshop in Instruction.

A) Science instruction in rural Colorado. Var [1-3]. Concurrent registration not allowed in NSCI 590A-B and EDUC 591B. **B)** Mathematics instruction in rural Colorado. Var [1-3]. Concurrent registration not allowed in NSCI 590A-B and EDUC 591B. **C)** Small-scale science-teachers as researchers. 04(2-4-0). **D)** Colorado science teacher enhancement project. 07(7-0-0). **E)** Summer mathematics. 03(3-0-0). **G)** Small-scale chemistry. 02(1-2-0).

NSCI 596 Var [1-3]. Small-Scale Science Group Study.

NSCI 610 03(2-2-0). Team Research in Quantitative Ecology. S. Prerequisite: Written consent of instructor.

Interdisciplinary team-based research aimed at studying real life models in quantitative ecology using mathematical and statistical tools.

NSCI 619 03(1-3-1). Physics for Science Educators. F, S, SS. Prerequisite: Admission into the MNS program.

Materials and energy transduction for grade 6-12 science teachers, with emphasis on optics, acoustics, and electromagnetism. (NT-O)

NSCI 620 03(1-3-1). Chemistry for Science Educators. F, S, SS. Prerequisite: Admission into the MNS program.

Theoretical and experimental chemistry for grade 6-12 science teachers, with emphasis on water chemistry. (NT-O)

NSCI 630 03(1-3-1). Spectroscopy for Science Educators. F, S, SS. Prerequisite: Admission into the MSN program.

Theory and applications of spectroscopy for grade 6-12 science teachers. (NT-O)

NSCI 640 03(1-3-1). Energetics for Science Educators. F, S, SS. Prerequisite: Admission into the MNS program.

Production and use of energy for grade 6-12 science teachers, with emphasis on chemical and biological systems. (NT-O)

NSCI 650 03(1-3-1). Pollution and Environmental Biology for Educators. F, S, SS. Prerequisite: Admission to the MNS program. (NT-O)

NSCI 660 03(0-0-3). Evolutionary Biology for Educators. F, S, SS. Prerequisite: Admission to Master of Natural Sciences Education (M.N.S.E.) degree program.

Evolutionary theory, with an emphasis on innovative methods for teaching evolutionary biology in grades 6-12. (NT-O)

NSCI 693 01(0-0-1). Seminar --MPNS. F, S, SS. Prerequisite: Enrollment in the MPNS program.

Students will present and discuss current research relevant to their specializations and present results of their internships and group projects.

NSCI 695 03(0-0-3). Independent Study for the MNSE, SS. Prerequisite: NSCI 698 and written consent of instructor.

Independent study based on review of the primary scientific literature in biology, chemistry, or physics.

NSCI 696A-C Var[1-6]. Group Study. F, S, SS..

A) Science and Mathematics Education. Prerequisite: Enrollment in the MNSE program. **B)** MPNS Internship Preparation. Prerequisite: Enrollment in the MPNS program. **C)** MPNS Internship-related Project. Prerequisite: Enrollment in the MPNS program.

NSCI 698 07(0-0-7). Research Experience in Natural Sciences. SS. Prerequisite: Nine credits MNSE program coursework.

Research experience in biology, chemistry, or physics.

OCCUPATIONAL THERAPY COURSES

Department of Occupational Therapy College of Applied Human Sciences

OT 110 03(3-0-0). Introduction to Occupational Therapy. F, S, SS.
Roles and activities in occupational therapy. (NT-O)

OT 215 01(0-0-1). Medical Terminology. F, S.
Definition and use of medical terms. (NT-O)

OT 355 02(1-0-1). Handicapped Individual in Society. F, S. Prerequisite: PSY 100 or SOC 100.
Description and exploration of handicapping conditions; review of support systems including legal and financial implications.

OT 450 03(0-6-0). Biomechanics of Human Occupation. S, SS.
Prerequisite: Minimum of 4 credits of either combined anatomy and physiology or human anatomy at the 200-level or higher; concurrent registration allowed.

Exploration of performance of the activities of daily living in context as impacted by function/dysfunction of the human musculoskeletal system. (NT-O)

OT 590 Var [1-9]. Workshop.

OT 597 Var. Group Study.

OT 601 03(1-0-2). Occupation and Rehabilitation Science I. F.
Prerequisite: Admission to master's degree program in occupational therapy.

Multidisciplinary perspectives on human performance and participation in everyday occupations.

OT 602 03(2-0-1). Theory and Models of Practice. S. Prerequisite: Admission to program.

Critical analysis of occupational therapy theory base including history, philosophy, and models of practice.

OT 606 02(0-0-2). Occupation and the Individual. F. Prerequisite: Admission to program.

Exploration and study of human occupation and activity, humans as occupational beings, health and well-being across the life span. (\$)

OT 607 02(0-0-2) Indirect Intervention and Consultation. S.
Prerequisite: OT 608; OT 609.

Delivery of OT using educational and consultative approaches.

OT 608 03(3-0-0). Occupational Therapy Process. F. Prerequisite: Concurrent registration in OT 609.

Professional reasoning and skills associated with the design and delivery of occupational therapy services.

OT 609 01(0-2-0). Occupational Therapy Process Laboratory. F.
Prerequisite: Concurrent registration in OT 608.

Application of OT reasoning and skills associated with the design and delivery of OT services defined as the OT process.

OT 610 03(0-2-2). Professional Decision Making. F. Prerequisite: Admission to master's degree program in occupational therapy.

Exploration of the thought processes occupational therapists use when determining how best to address clients' needs.

OT 611 03(0-0-3). Reflective and Evidence-Based Practice. F.
Prerequisite: OT 687 or sufficient exposure in fieldwork to contribute to and complete course requirements.

Development of reflective and evidence-based practice skills through integrating and synthesizing fieldwork experiences in OT practice.

OT 612 03(3-0-0). Psychosocial Intervention I. S. Prerequisite:

Concurrent registration in OT 613.

Evaluation and treatment principles embedded within practice models that address psychiatric occupational therapy I.

OT 613 01(0-2-0). Psychosocial Intervention Laboratory I. S.
Prerequisite: Concurrent registration in OT 612.

Application of practice models for psychiatric occupational therapy I.

OT 614 03(3-0-0). Psychosocial Intervention II. F. Prerequisite: OT 612; concurrent registration in OT 615.

Evaluation and treatment principles embedded within practice models that address psychiatric occupational therapy II.

OT 615 01(0-2-0). Psychosocial Intervention Laboratory II. F.
Prerequisite: OT 612; concurrent registration in OT 614.

Application of practice models for psychiatric occupational therapy II.

OT 620 03(3-0-0). Research to Practice I. F. Prerequisite: Admission to master's degree program in occupational therapy.

Critically evaluate qualitative and quantitative research processes pertaining to individuals.

OT 621 03(1-2-1). Occupational Performance: Infancy-Childhood. F.
Prerequisite: OT 687.

Optimizing occupational performance and participation for infants and children within a contextual framework.

OT 622 03(3-0-0). Biomechanical Intervention I. F. Prerequisite: Course in gross human anatomy; concurrent registration in OT 623.

Occupational therapy principles related to the analysis and assessment of human movement and occupational performance. (\$)

OT 623 01(0-2-0). Biomechanical Intervention Laboratory I. F.
Prerequisite: Course in gross human anatomy; concurrent registration in OT 622.

Application of occupational therapy biomechanical principles and techniques related to the assessment of human movement and occupational performance. (\$)

OT 624 03(3-0-0). Biomechanical Intervention II. S. Prerequisite: OT 622; concurrent registration in OT 625; evidence of professional liability insurance..

Theory and practice related to occupational performance, assessment, and intervention for individuals with biomechanical impairments. (\$)

OT 625 01(0-2-0). Biomechanical Intervention Laboratory II. S.
Prerequisite: OT 622; concurrent registration in OT 624.

Application of theory related to occupational performance and occupational therapy process for individuals with biomechanical impairments. (\$)

OT 630 03(1-2-1). Occupational Performance: Adult to Old Age I. S.
Prerequisite: OT 610; OT 620. Corequisite: OT 660 and OT 686C must be taken concurrently.

Optimizing performance for adults and older adults with attention to roles, satisfaction, competence and activities.

OT 631 03(0-0-3). Program Assessment and Development. F.
Prerequisite: OT 687.

Assessment of program strengths and needs, followed by development of proposals to support occupational performance and participation.

OT 632 03(3-0-0). Neurobehavioral Intervention I. F. Prerequisite: OT 608; concurrent registration in OT 633.

Application of theory and practice concepts related to occupational performance, assessment and intervention with children with neurological deficits.

OT 633 01(0-2-0). Neurobehavioral Intervention Laboratory I. F.
Prerequisite: OT 608; concurrent registration in OT 632.

Application of concepts related to occupational performance,

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

assessment, and intervention with children who have various neurological deficits. (\$)

OT 634 03(3-0-0). Neurobehavioral Intervention II. S. Prerequisite: OT 632; concurrent registration in OT 635.

Theory and practice related to occupational performance, assessment, intervention, and prevention for adults with neurological deficits. (\$)

OT 635 01(0-2-0). Neurobehavioral Intervention Laboratory II. S. Prerequisite: OT 632; concurrent registration in OT 634; evidence of professional liability insurance.

Application of theory and practice concepts related to occupational performance, assessment, and intervention for adults with neurological deficits.

OT 640 03(3-0-0). Research to Practice II. S. Prerequisite: OT 620.

Critically evaluate qualitative and quantitative research processes pertaining to groups and systems.

OT 641 03(1-0-2). Occupation and Rehabilitation Science II. S.

Prerequisite: OT 601; OT 621; OT 631.

Explore historical evolution of topics and the link to future implications for and growth of occupation and rehabilitation science.

OT 645 03(0-0-3). Leadership and Administration. F. Prerequisite: OT 646 or degree in occupational therapy.

Leadership and administration processes applied in occupational therapy.

OT 646 03(0-0-3). Program Development, Funding and Evaluation. S.

Conducting needs assessments for programs, developing new programs, obtaining funding and designing and conducting program evaluation.

OT 650 03(3-0-0). Research Methods I. F. Prerequisite: Admission to M.S. program.

Quantitative and qualitative research methodologies as applied in occupational therapy.

OT 651 03(3-0-0). Research Methods II. S. Prerequisite: OT 650.

Data analysis, interpretation of research in occupational therapy and related fields.

OT 660 03(1-2-1). Occupational Performance: Adult to Old Age II. S.

Prerequisite: OT 610; OT 620. Corequisite: OT 630 and OT 686C must be taken concurrently.

Optimizing occupational performance for adults and older adults with attention to activities and skills.

OT 661 03(1-2-1). Occupational Performance: Adolescent-Young Adult. S.

Prerequisite: OT 621. Corequisite: OT 686D must be taken concurrently.

Optimizing occupational performance and participation for youth and young adults within a contextual framework.

OT 670 03(3-0-0). Evidence-Based Practice Research. F, S. Prerequisite: OT 651.

Participating in an instructor-driven research project through experiential learning in a teamwork context. (\$)

OT 684 Var. Supervised College Teaching. F, S.

OT 686A-E, Fieldwork I. Prerequisite: Evidence of professional liability insurance.

Level I fieldwork in various settings.

A) OT Process Var[1-4]. F, S, SS. Prerequisite: Admission to OT master's degree program. B) Seminar 03(0-2-2). F, S. Prerequisite: Successful completion of all first year courses. C) Adult to Old Age Var[1-4]. S, SS. Prerequisite: OT 686A; OT 610. Corequisite: OT and OT 660 must be taken concurrently. D) Infancy to Young Adult Var[1-4]. S. Prerequisite: OT 687; OT 621. Corequisite: OT 661 must be taken concurrently. E) Special Interest Var[1-4]. F, S, SS. Prerequisite: OT

686A.

OT 687A-T Var[1-12]. Fieldwork IIA. F, S, SS. Prerequisite: Evidence of professional liability insurance; successful completion of first year of OT master's courses and approval of department head.

Level II fieldwork in various settings.

A) Acute In-Patient. B) Rehab In-Patient. C) SNF/Acute LTC. D) General Rehab Out-Patient. E) Hand Therapy Hospital Out-Patient. F) Hand Therapy Private Out-Patient. G) Psych In-Patient. H) Combined Practice. M) Behavioral Health Community. N) Older Adult Community. O) Older Adult Day Program. P) Adult Day Program. Q) Home Health. T) Other.

OT 688A-T Var[1-12]. Fieldwork IIB. F, S, SS. Prerequisite: Evidence of professional liability insurance; successful completion of all coursework and approval of department head or degree in Occupational Therapy.

A) Acute In-Patient. B) Rehab In-Patient. C) Skilled Nursing Facility/Acute Long-Term Care. D) General Rehab Out-Patient. E) Hand Therapy Hospital Out-Patient. F) Hand Therapy Private Out-Patient. G) Psych In-Patient. H) Combined Practice. I) Pediatric Hospital/Unit. J) Pediatric Hospital Out-Patient. K) Pediatric Community. L) Pediatric Out-Patient Clinic. M) Behavioral Health Community. N) Older Adult Community. O) Older Adult Day Program. P) Adult Day Program. Q) Home Health. R) School Early Intervention. S) School (P-12). T) Other.

OT 690 Var [1-9]. Workshop.

OT 692 Var. Seminar.

OT 694 Var. Independent Study.

OT 696 Var. Group Study.

OT 698 Var. Research.

OT 699 Var. Thesis.

OT 701 03(0-0-3). Occupation and Rehabilitation Science III. F. Prerequisite: OT 640 or 3 credits quantitative and 3 credits qualitative research; OT 641.

Investigation of the intersection of occupational science and rehabilitation science research situated in various paradigms.

OT 710 03(0-0-3). Teaching Occupation and Rehab Science. S. Prerequisite: Written consent of instructor.

Design and implementation of teaching and learning philosophies and approaches in occupation and rehabilitation science contexts.

OT 784 Var[1-4]. Supervised College Teaching. F, S, SS. Prerequisite: Admission into a PhD program.

OT 786 Var[1-9]. Practicum. F, S, SS. Prerequisite: Concurrent enrollment in OT 620 or 3 credits of qualitative research.

OT 792 Var[1-3]. Seminar. F, S, SS. Prerequisite: Admission into a PhD program.

OT 794 Var[1-6]. Independent Study. F, S, SS. Prerequisite: Admission into a PhD program.

OT 796 Var[1-6]. Group Study. F, S, SS. Prerequisite: Admission into a PhD program.

OT 799 Var[1-15]. Dissertation. F, S, SS. Prerequisite: None.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

PERFORMING ARTS COURSES

Department of Music, Theatre, and Dance *College of Liberal Arts*

PF 110 03(2-0-1). Performing Arts Around the World. F.

Music, theatre, and dance traditions via exploration of a broad range of representative cultures.

PF 250 02(1-3-0). Performing in Musical Theatre. S. Prerequisites: MU 272Q; TH 151 or D 120A or D 120B or D 120C.

Skills and techniques used in music, theatre, and dance. Brief history and technical production overview of musical theatre.

PHYSICS COURSES

Department of Physics *College of Natural Sciences*

PH 110 03(3-0-0). Descriptive Physics. (GT-SC2, AUCC 3A). F, S, SS. Credit not allowed for both PH 110 and PH 121.

Conceptual aspects of physics applied to phenomena in everyday life and to problems in other fields of science.

PH 111 01(0-2-0). Descriptive Physics Laboratory. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: PH 110 or concurrent registration.

Experiments dealing with basic physics concepts including explorations of everyday phenomena.

PH 121 05(3-2-1). General Physics I. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: MATH 125 or concurrent registration. Credit not allowed for both PH 121 and PH 110; or for both PH 121 and PH 141.

Concepts of force, torque, energy, momentum, work used to cover fluids, waves, sound, temperature, heat; biological, physical examples (noncalculus). (GT-SC1)

PH 122 05(3-2-1). General Physics II. (GT-SC1, AUCC 3A). F, S. Prerequisite: PH 121. Credit not allowed for both PH 122 and PH 142.

Electricity including electrostatics and simple circuits; magnetism; optics; nuclear physics; radiation; biological, physical examples (noncalculus).

PH 141 05(3-2-1). Physics for Scientists and Engineers I. (GT-SC1, AUCC 3A). F, S, SS. Prerequisite: (MATH 126 or concurrent registration; MATH 155 or concurrent registration) or MATH 160 or concurrent registration. Credit not allowed for both PH 141 and PH 121.

Forces, energy, momentum, angular momentum, oscillations, waves, heat, thermodynamics (calculus based).

PH 142 05(3-2-1). Physics for Scientists and Engineers II. (GT-SC1, AUCC 3A). F, S. Prerequisite: MATH 161 or concurrent registration or MATH 255 or concurrent registration; PH 141. Credit not allowed for both PH 142 and PH 122.

Electricity and magnetism, circuits, light, optics (calculus based).

PH 160 03. Basic Physics and Physical Worldview. F, S, SS. Prerequisite: High school algebra or MATH 118; MATH 126. Offered as telecourse only.

Physics, cultural and historical background of physical thought, humans' relationship to physical world. (NT-T)

PH 192 02(0-0-2). The Flying Circus of Physics. F.

Richness and variety of physical phenomena; physical world view including appreciation for the academic community.

PH 245 03(2-3-0). Introduction to Electronics. F. Prerequisite: MATH 161; PH 142.

AC circuits, physical bases and applications of electronic devices.

PH 293 01(1-0-0). Selected Topics in Physics. F, S, SS. Prerequisite: PH 142.

Selected topics in physics with emphasis on depth of understanding.

PH 298 Var [1-6]. Introductory Research. Prerequisite: Written consent of instructor.

PH 314 04(4-0-0). Introduction to Modern Physics. S. Prerequisite: MATH 261 or concurrent registration; PH 142.

Relativity; quantum mechanics; atomic structure; applications to solid-state, nuclear, and elementary particle physics.

PH 315 02(0-4-0). Modern Physics Laboratory. S. Prerequisite: PH 314 or concurrent registration.

Experiments in modern physics.

PH 341 04(4-0-0). Mechanics. F. Prerequisite: MATH 340; PH 141.

Particle dynamics, translation and rotation of rigid bodies, moving coordinate systems, Lagrangian mechanics, matrix and tensor methods.

PH 351 04(4-0-0). Electricity and Magnetism. S. Prerequisite: MATH 340; PH 142.

Electrostatics, magnetostatics, currents, time-dependent electric and magnetic fields, radiation.

PH 353 04(3-3-0). Optics and Waves. F. Prerequisite: MATH 261; PH 142.

Geometrical optics; wave optics; interference, diffraction, and polarization; quantum optics.

PH 361 03(3-0-0). Physical Thermodynamics. S. Prerequisite: MATH 261; PH 142.

Laws of thermodynamics; thermodynamic potentials; applications such as fluids, phase transitions, electrical and magnetic systems, binary mixtures.

PH 384 Var [1-5]. Supervised College Teaching. Prerequisite: PH 121 or PH 141; written consent of department head. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Participation as a physics tutor.

PH 425 02(0-4-0). Advanced Physics Laboratory. S. Prerequisite: PH 315; PH 451.

Advanced experiments in electricity and magnetism, statistical physics and quantum mechanics.

PH 451 03(3-0-0). Introductory Quantum Mechanics I. F. Prerequisite: MATH 340; PH 314.

Schrodinger's theory of wave mechanics, potential wells, harmonic oscillators, wave packets, operators, angular momentum.

PH 452 03(3-0-0). Introductory Quantum Mechanics II. S. Prerequisite: PH 451.

Approximation techniques, perturbation theory, identical particles and spin, structure and spectra of atoms and molecules, hydrogen atom.

PH 462 03(3-0-0). Statistical Physics. F. Prerequisite: MATH 340; PH 314; PH 361.

Maxwell-Boltzmann, Fermi-Dirac, and Bose-Einstein distribution functions; kinetic theory; applications to solids, metals, semiconductors, and gases.

PH 492 01(0-0-1). Seminar. S. Prerequisite: Written consent of instructor.

Preparation and presentation of seminars on selected modern topics.

PH 495 Var [1-6]. Independent Study. Prerequisite: Written consent of instructor.

PH 498 Var [1-6]. Research. Prerequisite: Written consent of instructor.

PH 521 03(3-0-0). Introduction to Lasers. S. Prerequisite: CHEM 476 or PH 451; MATH 340; PH 353.

Stimulated emission; laser resonators; theory of laser oscillation; specific laser systems; applications.

PH 522 01(0-2-0). Introductory Laser Laboratory. S. Prerequisite: PH 521 or concurrent registration.

Experiments providing hands-on experiences with lasers.

PH 531 03(3-0-0). Introductory Solid State Physics. S. Prerequisite: PH 361; PH 451.

Crystal structures and bonding, electronic levels and vibrations, dielectric, optical and magnetic properties, quasiparticles, superconductivity.

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PH 541 03(3-0-0). Classical Physics. S. Prerequisites: PH 341; PH 351.

Linear and orbital motions, rotation, moment-of-inertia matrix, electrostatics, images, magnetostatics, induction, Maxwell's equations.

PH 551 03(3-0-0). Modern Physics. F. Prerequisite: PH 452; PH 462 or concurrent registration.

Wave functions, energy levels, harmonic oscillator, transmission and reflection, perturbation theory, thermodynamic potentials, partition function.

PH 561 03(3-0-0). Elementary Particle Physics. S. Prerequisite: PH 451.

Particle interactions and detection techniques. Quark model, scattering models and standard model of electroweak interactions, physics of colliders.

PH 571 03(3-0-0). Mathematical Methods for Physics I. F. Prerequisite: MATH 340.

Vector analysis, eigenvalues and eigenvectors, infinite series, method of Frobenius, complex variables, contour integration.

PH 572 03(3-0-0). Mathematical Methods for Physics II. S. Prerequisite: PH 571.

Partial differential equations, Sturm-Liouville theory, special functions, Green's functions, Fourier series, Fourier and Laplace transforms.

PH 621 03(3-0-0). Classical Mechanics. F. Prerequisite: PH 341; PH 571 or concurrent registration.

Central forces, scattering, noninertial reference frames, Coriolis force, Lagrange's and Hamilton's equations, small oscillations, continuum mechanics.

PH 631 03(3-0-0). Solid State Physics. S. Prerequisite: PH 531.

Electronic band structure and conduction phenomena; cohesive energy; lattice dynamics and thermal properties; metals; insulators; semiconductors.

PH 641 03(3-0-0). Electromagnetism I. F. Prerequisite: PH 351; PH 572.

Electrostatics in a vacuum and a medium, general solution of Laplace's equation, Green's functions, magnetostatics in a vacuum and a medium.

PH 642 03(3-0-0). Electromagnetism II. S. Prerequisite: PH 641.

Maxwell's equations, electromagnetic waves, radiation by accelerated charges, special relativity, Lagrangian formulation of electromagnetism.

PH 651 03(3-0-0). Quantum Mechanics I. F. Prerequisite: PH 452; PH 571 or concurrent registration.

WKB theory, Heisenberg picture, 3D wells, hydrogen atom, time-independent perturbation theory, angular momentum and spin, Clebsch-Gordan coefficients.

PH 652 03(3-0-0). Quantum Mechanics II. S. Prerequisite: PH 651.

Wigner-Eckhart theorem, symmetries, density matrix, identical particles, interaction picture, time-dependent perturbation theory, scattering.

PH 671 03(3-0-0). Statistical Mechanics II. F. Prerequisite: PH 452; PH 462; PH 571 or concurrent registration.

Canonical and grand-canonical ensembles; Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics; density operator; Bose-Einstein condensation.

PH 672/ECE 672 03(3-0-0). Principles of Semiconductors. S. Prerequisite: ECE 471 or PH 531. Credit not allowed for both PH 672 and ECE 672.

Electronic properties of semiconductors: band structure, statistics, transport properties, photoelectronic properties, potential barriers, interfaces.

PH 692 01(0-0-1). Seminar.

PH 693 03(0-0-3). Current Topics in Physics Research. Prerequisite: Written consent of instructor.

PH 698 Var. Research. Prerequisite: Written consent of instructor.

PH 699 Var. Thesis. Prerequisite: Written consent of instructor.

PH 722 03(3-0-0). Quantum Electronics. S. Prerequisite: PH 521.

One- and two-photon spectroscopy; broadening mechanisms; nonlinear optics; coherent phenomena; experimental methods.

***PH 731 03(3-0-0). Condensed Matter Theory.** F. Prerequisite: PH 462; PH 531; PH 652.

Second quantization; electrons; phonons; electron-phonon interaction; superconductivity; magnetism; spin waves; density-functional methods; symmetry.

***PH 762 03(3-0-0). Elementary Particle Theory.** S. Prerequisite: PH 561; PH 652.

Symmetries, electrodynamics, renormalization, and the running coupling constant. Hadron structure, QCD, gauge symmetry and electroweak interaction.

PH 770 03(3-0-0). Quantum Theory. F. Prerequisite: PH 652.

Formal scattering theory; relativistic quantum mechanics, quantum theory of radiation, symmetries and statistics, many-body theory.

PH 784 Var [1-5]. Supervised College Teaching. Prerequisite: Written consent of instructor.

Supervised teaching of general physics laboratory and recitation sections.

PH 793A-E Var [1-5]. Seminar. Prerequisite: Written consent of instructor.

A) Condensed matter physics. B) Laser spectroscopy/quantum electronics. C) Statistical mechanics. D) Mathematical physics. E) High energy physics.

PH 795 Var [1-6]. Independent Study. Prerequisite: Written consent of instructor.

PH 799 Var. Dissertation. Prerequisite: Written consent of instructor.

PHILOSOPHY COURSES

Department of Philosophy College of Liberal Arts

PHIL 100 03(3-0-0). Appreciation of Philosophy. (GT-AH3, AUCC 3B). F, S, SS.

Basic issues in philosophy including theories of knowledge, metaphysics, ethics, and aesthetics.

PHIL 103 03(3-0-0). Moral and Social Problems. (GT-AH3, AUCC 3B). F, S, SS.

Contemporary ethical issues in the United States, such as abortion, euthanasia, and genetic engineering. (NT-O)

PHIL 106 03(3-0-0). Wisdom of the East-Oriental Philosophy. F, S.

Major philosophical issues and world views of the Orient.

PHIL 110 03(3-0-0). Logic and Critical Thinking. (GT-AH3, AUCC 3B). F, S, SS. Credit not allowed for both PHIL 110 and PHIL 101.

Identify, analyze, and evaluate real arguments in everyday life, politics, the sciences, and the professions.

PHIL 112 03(3-0-0). Reasoning and Problem Solving. F.

Creative and critical techniques in problem solving and decision making.

PHIL 120 03(3-0-0). History and Philosophy of Scientific Thought. (GT-AH3, AUCC 3B). F, S.

Historical development of western, scientific world view from ancient times to the 20th century.

PHIL 130 02(2-0-0). Bioethics and Society. S.

Major issues in bioethics.

PHIL 170 03(3-0-0). World Philosophies. (GT-AH3, AUCC 3E). F, S.

Philosophies of North America, Mesoamerica, West Africa, South Asia, and East Asia.

PHIL 171 03(3-0-0). Religions of the West. F, S.

Major religions of the Near East and West emphasizing their classical development; Judaism, Zoroastrianism, Christianity, Islam.

PHIL 172 03(3-0-0). Religions of the East. F, S.

Major religions of India and the Far East emphasizing their classical development; Hinduism, Buddhism, Confucianism, Taoism.

PHIL 173 03(3-0-0). Philosophy of Traditional Judaism. F.

Concepts and essentials of Jewish philosophy and Judaism, including overview of Jewish lifecycle, history, law, literature, ethics, and mysticism

PHIL 205 03(3-0-0). Introduction to Ethics. F, S. Prerequisite: Sophomore standing or higher.

Problems and theories concerning values and standards, right action, and the good life.

PHIL 206 03(3-0-0). Knowledge and Existence-An Introduction. F, S. Prerequisite: Sophomore standing or higher.

Problems and theories concerning knowledge, being, nature of the world.

PHIL 210 03(3-0-0). Introduction to Formal Logic. F, S. Prerequisite: Sophomore standing or higher.

Elementary principles, techniques in propositional and predicate logic.

PHIL 240 03(3-0-0). Philosophies of Peace and Nonviolence. F.

Classic and contemporary religious and philosophical work on peace

and nonviolence.

PHIL 251 03(3-0-0). Feminist Philosophies. F.

Conceptual, moral, and social analysis of women's issues from a variety of philosophical feminist perspectives.

PHIL 270 03(3-0-0). Issues in the Study of Religion. F, S. Prerequisite: Sophomore standing or higher.

Contemporary religion, its nature, types, forms of expression.

PHIL 295 Var [1-3]. Independent Study.

PHIL 297 Var [1-3]. Group Study.

PHIL 300 03(3-0-0). Ancient Greek Philosophy. F, S, SS. Prerequisite: PHIL 205 or PHIL 206 or PHIL 210.

Philosophy of ancient Greece emphasizing Plato and Aristotle.

PHIL 301 03(3-0-0). 17th and 18th Century European Philosophy. S. Prerequisite: PHIL 206 or PHIL 210 or PHIL 300.

Philosophy from the scientific revolution through Kant.

PHIL 302 03(3-0-0). 19th-Century Philosophy. F. Prerequisite: PHIL 301.

Major figures, movements, concepts in Europe and America from about 1800 to early 20th century.

PHIL 305A-F 03(3-0-0). Philosophical Issues in the Professions. May be repeated for credit with consent of department head.

Philosophical problems, theories relevant to specific professions. **A)** Business ethics. F, S. **B)** Medical-life science. F, S. ***C)** Caring professions. S. **D)** Engineering. F, S, SS. **E)** Animal science. F. **F)** Information science. F, S.

PHIL 310 03(3-0-0). Writing and Reasoning. F, S, SS. Prerequisite: CO 150; PHIL 110 or PHIL 210.

Logic-based, analytic and critical writing and reading of complex argument and explanation types.

PHIL 315 03(3-0-0). Philosophy of Language. S. Prerequisite: PHIL 205 or PHIL 206 or PHIL 210 or any upper-division course in philosophy.

Basic concepts and principles in the theory of language.

PHIL 318 03(3-0-0). Aesthetics-Visual Arts. F, S.

Central, traditional, and contemporary theories of the nature of visual arts.

+PHIL 320 03(3-0-0). Ethics of Sustainability. F, S.

Ethical and conceptual issues surrounding creation of sustainable societies and lifestyles. Required field trips.

PHIL 325 03(3-0-0). Philosophy of Natural Science. F. Prerequisite: PHIL 210; one course in natural sciences. May be repeated for credit with consent of department head.

Structure of theories; basic concepts and assumptions; methods of explanation and confirmation; emphasis varies between physical and life sciences.

PHIL 327 03(3-0-0). Philosophy of Behavioral Sciences. S. Prerequisite: PHIL 120 or PHIL 205 or PHIL 206 or PHIL 210 or any upper-division course in philosophy. May be repeated for credit with consent of department head.

Structure of theories; basic concepts; explanation and confirmation; reductionism and values; emphasis varies between psychology and social sciences.

PHIL 330/AGRI 330 03(3-0-0). Agricultural Ethics. S. Credit not allowed for both PHIL 330 and AGRI 330.

Basic concepts in ethics and their application to agriculture.

PHIL 335 03(3-0-0). Islam: Cosmology and Practice. F.

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Cosmological, spiritual, ritual, and practical aspects of Islam.

PHIL 345 03(3-0-0). Environmental Ethics. F, S. Prerequisite: Sophomore standing or higher.

Scientific, philosophical, and religious concepts of nature as they bear on human conduct; an ecological perspective.

°**PHIL 348 03(3-0-0). Philosophy of Literature and the Arts.** S.

Aesthetic and philosophical issues in literature and the arts.

PHIL 349 03(3-0-0). Philosophies of East Asia. S. Prerequisite: Sophomore standing or higher.

Philosophical traditions of East Asia, including Confucianism, Daoism, and Zen Buddhism.

PHIL 350 03(3-0-0). Social and Political Philosophy. F, S. Prerequisite: PHIL 205 or PHIL 206 or any upper-division course in philosophy.

Moral relationships between persons and institutions.

PHIL 351 03(3-0-0). Interpreting the New Testament. S.

Contemporary methods of New Testament interpretation.

°**PHIL 355 03(3-0-0). Philosophy of Religion.** F. Prerequisite: PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270.

Philosophical analysis of nature of religion and structure of meaning in religious discourse.

°**PHIL 359 03(3-0-0). Philosophy of Human Nature.** F. Prerequisite: PHIL 105 or PHIL 205 or PHIL 206 or any upper-division course in philosophy.

Philosophical study of theories of human nature.

PHIL 360 03(3-0-0). Topics in Asian Philosophy. S. Prerequisite: Sophomore standing or higher.

Examination of major philosophical topics from ethics, sociopolitical philosophy, metaphysics, aesthetics.

PHIL 366 03(3-0-0). Philosophy of Aging. S.

Philosophical problems related to experience of growing old.

PHIL 370 03(3-0-0). Contemporary Western Religious Thought. F. Prerequisite: PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270.

Contemporary interpretations of significant Western religious traditions.

°**PHIL 371 03(3-0-0). Contemporary Eastern Religious Thought.** S.

Transformation of Indian and Chinese religious thought in the modern period.

***PHIL 372 03(3-0-0). Meaning and Truth in Religion.** F. Prerequisite: PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270.

Nature, variety, functions, interpretation, evaluation of religious language.

PHIL 375 03(3-0-0). Science and Religion. S. Prerequisite: PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270.

Encounter of religious belief with Western science, influences on each other, present relations.

PHIL 379 03(3-0-0). Mysticism East and West. F. Prerequisite: PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270.

Varieties of mystical experience in selected Eastern and Western representatives.

PHIL 384 Var [1-5]. Supervised College Teaching. F, S. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Teaching basic philosophy courses.

PHIL 407 03(3-0-0). Phenomenology and Existentialism. F. Prerequisite: PHIL 205 or PHIL 206 or PHIL 300 or PHIL 301.

Methods, epistemology, metaphysics, axiology, ethics of 20th-century phenomenologists and existentialists.

PHIL 409 03(3-0-0). 20th-Century Philosophy. S. Prerequisite: PHIL 301.

Major figures, trends, and concepts in 20th-century philosophy.

PHIL 410 03(3-0-0). Formal Logic. F, S. Prerequisite: PHIL 210 or CS 270.

Quantification theory; axiomatic systems; rigorous axiomatization of some logical or mathematical theory.

PHIL 415 03(3-0-0). Logic and Scientific Method. F, S.

Approaches to analysis, assessment of scientific inference, problems of induction; applications to natural, behavioral, social sciences.

PHIL 425 03(3-0-0). Epistemology. S. Prerequisite: PHIL 210 or PHIL 300 or PHIL 301.

Concepts, problems, and theories of knowledge.

PHIL 435 03(3-0-0). Metaphysics. F. Prerequisite: PHIL 210 or PHIL 300 or PHIL 301.

Philosophical problems concerning nature, structure, and basic constituents of reality.

°**PHIL 438 03(3-0-0). Philosophy of Mind.** S. Prerequisite: PHIL 300 or PHIL 301 or PHIL 302 or PHIL 315 or PHIL 325 or PHIL 327 or PHIL 359.

Nature and status of mind, mental states, mental activity; the mind-body problem, mind and human sciences, mind and self, nature of human action.

PHIL 447 03(3-0-0). Ethical Theory. F. Prerequisite: PHIL 205 or PHIL 300 or PHIL 301.

Fundamental problems and options in ethical theory.

PHIL 455 03(3-0-0). Islamic Philosophy. S. Prerequisite: PHIL 206; PHIL 210.

Development of philosophical thought in early, middle, and late Muslim civilization.

PHIL 460 03(3-0-0). Seminar in Great Philosophers. F. Prerequisite: PHIL 300 or PHIL 301 or PHIL 302. Maximum of 9 credits allowed in course.

Works of one major figure in the history of philosophy.

PHIL 461 03(3-0-0). Seminar in Philosophical Issues and Problems. S. Prerequisite: PHIL 300 or PHIL 301 or PHIL 302.

Thorough examination of a major philosophical problem or issue.

PHIL 462 03(0-0-3). Capstone Seminar. F, S. Prerequisite: Senior standing; any two of the following courses: PHIL 300, PHIL 301, PHIL 302, PHIL 409.

In-depth, integrative study of major topics, texts, and problems in both philosophy and religion.

PHIL 463 03(0-0-3). Seminar in Religious Studies. F, S, SS.

PHIL 479 03(3-0-0). Topics in Comparative Religions. F. Prerequisite: PHIL 171 or PHIL 172 or PHIL 270; 300-level religious studies course.

Comparative study of topics in world religions and philosophy or religion.

PHIL 495 Var [1-9]. Independent Study.

PHIL 497 Var [1-9]. Group Study.

PHIL 499 03(0-0-3). Thesis. Prerequisite: Written consent of department head.

PHIL 500 03(0-0-3). Seminar in Major Philosophical Texts. F. Prerequisite: Admitted graduate student.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC-*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Intensive study of one or two major works in the history of philosophy.

PHIL 501 03(0-0-3). Seminar: Topics in History of Philosophy. S.

Selected figures and periods from the history of western philosophy, from ancient to modern. Topics change from semester to semester.

PHIL 525 03(0-0-3). Seminar in Epistemology. F. Prerequisite: PHIL 425.

Analysis of contemporary theories of knowledge.

PHIL 527 03(0-0-3). Seminar in Philosophy of Science. S. Prerequisite: PHIL 325 or PHIL 327 or PHIL 415.

Systematic survey of major 20th-century philosophies of science.

PHIL 535 03(0-0-3). Seminar in Metaphysics. S. Prerequisite: PHIL 500.

Contemporary topics philosophical metaphysics.

PHIL 545 03(3-0-0). Concept of Natural Value. S. Prerequisite: PHIL 345.

Philosophical analysis of nature as a value carrier. Types of value associated with nature, their interrelations.

PHIL 547 03(0-0-3). Seminar in Meta-Ethics. S. Prerequisite: PHIL 447.

Systematic and historical overview of contemporary theories of meta-ethics.

PHIL 550/IE 550 03(3-0-0). Ethics and International Development. F. Prerequisite: Written consent of instructor. Credit not allowed for both PHIL 550 and IE 550.

Ethical reflection applied to development goals, strategies of Third World countries; relations between developed and developing countries.

***PHIL 555 03(0-0-3). Seminar in Philosophical Models of Nature. F.** Prerequisite: Written consent of instructor.

Comparative inquiry into the "nature" of nature as viewed by philosophers of the past and present.

***PHIL 564 03(0-0-3). Seminar in Animal Rights. S.** Prerequisite: Written consent of instructor.

Contemporary issues concerning nature and moral status of nonhuman animals.

PHIL 565 03(0-0-3). Seminar in Environmental Philosophy. F. Prerequisite: Written consent of instructor.

Aesthetic appreciation of nature, duties concerning fauna, flora, endangered species, ecosystems.

PHIL 566 03(0-0-3). Seminar in Applied Philosophy. S. Prerequisite: Written consent of instructor.

Application of philosophical ideas and methods to analyze practical problems such as distributive justice, abortion, human rights conflicts.

PHIL 570 03(0-0-3). Seminar in Contemporary Philosophical Theory. S. Prerequisite: PHIL 500.

Major concepts and problems in current philosophical theory.

PHIL 593 03(0-0-3). Seminar.

PHIL 662 03(0-0-3). Seminar.

PHIL 666/CM 666 03(3-0-0). Science and Ethics. S. Credit not allowed for both PHIL 666 and CM 666.

Ethical issues of research on humans and animals; biosafety; fraud and deception in science; genetic engineering.

PHIL 684 Var [1-5]. Supervised College Teaching. F, S.

PHIL 695 Var [1-9]. Independent Study.

PHIL 697 Var [1-9]. Group Study.

PHIL 698 Var[1-6]. Research. F, S, SS.

PHIL 699 Var [1-9]. Thesis.

POLITICAL SCIENCE COURSES

Department of Political Science *College of Liberal Arts*

POLS 101 03(3-0-0). American Government and Politics. (GT-SS1, AUCC 3C). F, S, SS.

Principles, structures, and processes of American national government. (NT-O)

POLS 103 03(3-0-0). State and Local Government and Politics. (GT-SS1, AUCC 3C). F, S.

Principles, organization, and operation of American state and local government. (NT-O)

POLS 131 03(3-0-0). Current World Problems. (GT-SS1, AUCC 3E). F, S.

Background and nature of international political events.

POLS 232 03(3-0-0). International Relations. (GT-SS1, AUCC 3E). F, S.

Basic concepts and approaches in international relations.

POLS 241 03(3-0-0). Comparative Government and Politics. (GT-SS1, AUCC 3E). S.

Major foreign political systems stressing cross-national comparison of political forces, parties, ideologies, and institutions. (NT-O)

POLS 302 03(3-0-0). U.S. Political Parties and Elections. F. Prerequisite: POLS 101.

Foundational, institutional, and behavioral features of American political parties and elections. (NT-O)

POLS 303 03(3-0-0). Politics of Organized Interests. F. Prerequisite: POLS 101.

Role of interests in varied forms: social movements, institutions, associations, and membership groups in American politics.

POLS 304 03(3-0-0). Legislative Politics. F, S. Prerequisite: POLS 101.

Structure, organization, behavior, processes, and policy implications of U.S. legislatures.

POLS 305 03(3-0-0). Judicial Politics. F. Prerequisite: POLS 101.

Allocation of powers among judicial structures in American federal system.

POLS 306 03(3-0-0). Executive Politics. F. Prerequisite: POLS 101.

Structure, organization, behavior, processes, and policy implications of U.S. executive leadership.

POLS 309 03(3-0-0). Urban Politics. F, S. Prerequisite: POLS 101 or POLS 103.

Governmental structures and political processes in urban government.

POLS 320 03(3-0-0). Empirical Political Analysis. F, S.

Methods of empirical political inquiry.

POLS 321 01(0-2-0). Empirical Political Analysis Laboratory. F, S. Prerequisite: Concurrent registration in POLS 320.

Laboratory applications of empirical research methods.

POLS 331 03(3-0-0). Politics and Society Along Mexican Border. F, S.

Analysis of U.S.-Mexican relations and domestic politics as these affect regional characteristics and development of U.S.-Mexican border region.

POLS 332/ECON 332 03(3-0-0). International Political Economy. F, S. Prerequisite: AREC 202 or ECON 202; POLS 232. Credit not allowed for both POLS 332 and ECON 332.

Theories on relations between international politics and economics. Policy implications of different theories and case studies.

POLS 341 03(3-0-0). Western European Government and Politics. F. Prerequisite: POLS 241.

Politics in Western European countries such as Britain, France, and Germany, and countries influenced by European traditions.

POLS 345 03(3-0-0). Russian, Central, and East European Politics. S. Prerequisite: POLS 241.

Political structures and processes in Russia, Central and East Europe, and selected post-Communist countries.

POLS 351 03(3-0-0). Public Administration. F, S, SS. Prerequisite: POLS 101.

Government organization and management; decision processes; political and intergovernmental relations in administration.

POLS 361 03(3-0-0). U.S. Environmental Politics and Policy. F, S, SS. Prerequisite: POLS 101.

Public and contemporary issues relating to U.S. environmental policy. (NT-O)

POLS 362 03(3-0-0). Global Environmental Politics. F, S, SS. Prerequisite: POLS 232 or POLS 241.

Cross-national and international contexts of environmental politics and policy.

POLS 371 03(3-0-0). U.S. Space Policy. F.

Analysis of U.S. space politics, space law, and space policy making. (NT-O)

POLS 405 03(3-0-0). Race and Ethnicity in U.S. Politics. S. Prerequisite: POLS 101.

Relationships among American racial/ethnic groups, political attitudes, behavior; race and ethnicity roles in elections; implications for public policy.

POLS 409 03(3-0-0). Urban and Regional Politics. F, S. Prerequisite: POLS 101 or POLS 103.

Governance processes and public policies in metropolitan regions.

POLS 410 03(3-0-0). American Constitutional Law. F. Prerequisite: POLS 101.

Allocation of powers among structures in American federal system.

POLS 413 03(3-0-0). U.S. Civil Rights and Liberties. S, SS. Prerequisite: POLS 101.

U.S. Constitutional provisions and cases pertaining to the rights and liberties of individuals.

POLS 420 03(3-0-0). History of Political Thought. F, S.

Issues and texts related to tradition of political thought from the ancient through the modern period. (NT-O)

POLS 421 03(3-0-0). Contemporary Political Theories. F.

Major political theories and ideologies of contemporary times.

POLS 423 03(3-0-0). American Political Theories. S. Prerequisite: POLS 101.

Major American theories and ideologies: their development and present uses.

POLS 431 03(3-0-0). International Law. F, S. Prerequisite: POLS 232.

Rules and obligations for conduct of relations among states and other international entities.

POLS 433 03(3-0-0). International Organization. F, S. Prerequisite: POLS 232.

History, development, structure, process, and activity of selected public international organizations.

POLS 435 03(3-0-0). United States Foreign Policy. F, S, SS. Prerequisite: POLS 232.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Institutions, responsibilities, processes, and issues in formulation and execution of U.S. foreign policy.

POLS 436 03(3-0-0). Comparative Foreign Policy. S. Prerequisite: POLS 232; POLS 241.

Effect of varying international and domestic contexts on foreign policy choices and outcomes across different countries, cultures, issues, and time.

POLS 437 03(3-0-0). International Security. F, S.

Examines the conditions that make for war and peace in international relations. (NT-O)

POLS 443 03(3-0-0). Comparative Social Movements. F, S. Prerequisite: POLS 241.

Reviews major works dealing with conceptual and theoretical foundations of social movements and examines a number of cases across regions.

POLS 444 03(3-0-0). Comparative African Politics. S, SS. Prerequisite: POLS 241.

African political systems focusing on precolonial, colonial influences; rise of nationalism; approaches to new political order; influences of development.

POLS 445 03(3-0-0). Comparative Asian Politics. F, SS. Prerequisite: POLS 241.

East and South Asian political systems emphasizing issues of development, political culture, and institutional change.

POLS 446 03(3-0-0). Politics of South America. F, S. Prerequisite: POLS 241.

South American political actors and institutions with emphasis on themes of development, democracy, revolution, and international affairs.

POLS 447 03(3-0-0). Politics in Mexico, Central America, Caribbean. F, S. Prerequisite: POLS 241.

Mexican politics with comparison to one or more Central American and Caribbean countries.

POLS 448 03(3-0-0). Comparative Racial/Ethnic Politics. F, S. Prerequisite: POLS 241.

Comparative examination of politics of race and ethnicity and role it plays in formation of nation-states.

POLS 449 03(3-0-0). Middle East Politics. F, S. Prerequisite: POLS 241.

Political issues of the Middle East, including the Palestinian-Israeli conflict, Islamism, and democratization.

POLS 460 03(3-0-0). Public Policy Process. F, S. Prerequisite: POLS 101.

Explanations of policy formation, implementation, and impact.

POLS 462 03(3-0-0). Globalization, Sustainability, and Justice. F, S, SS. Prerequisite: POLS 232 or POLS 241.

Public and private policies to promote sustainability and social justice in a globalizing world.

POLS 486A-B. Practicum.

+A) Legislative politics 06(0-8-2). (\$ B) Government Var [1-6].

POLS 492 03(0-0-3). Capstone Seminar. Prerequisite: Upper-division course in at least four subfields of political science.

POLS 495 Var. Independent Study.

POLS 500 03(3-0-0). Governmental Politics in the U.S. F, S. Prerequisite: Three upper-division credits in American politics with a B or better.

Selected primary source materials on performance of government officials and institutions at federal, state, and local levels.

POLS 501 03(3-0-0). Citizen Politics in the U.S. F, S. Prerequisite: Three upper-division credits in American politics with a B or better.

Selected primary source materials on behavior of individuals and groups in American politics.

POLS 509 03(3-0-0). Gender and the Law. F, S. Prerequisite: POLS 410 or POLS 413.

Relationship between gender and the law and the changing nature of that relationship over time.

POLS 520 03(3-0-0). Theories of Political Action. F, S. Prerequisite: POLS 420 or POLS 421.

Intensive review of primary material on Western political thought.

POLS 530 03(3-0-0). International Relations. F, S. Prerequisite: Nine credits in international relations or related studies.

Theory and methodology utilized in different approaches to international relations.

POLS 531 03(3-0-0). Policy Making, Diplomacy, and World Politics. F, S. Prerequisite: Three upper-division credits in international relations with a B or better.

Theories of policy making and bargaining in international politics as applied to different countries, organizations, and historical periods.

POLS 532 03(3-0-0). Governance of the World Political Economy. F, S. Prerequisite: 9 upper division credits in international relations with a B or better.

Theoretical and practical debates on the organization and governance of the world political economy.

POLS 540 03(3-0-0). Comparative Politics. F, S. Prerequisite: Three upper-division credits in comparative politics with a B or better.

Theories, methods, and approaches to study of comparative politics.

POLS 541 03(3-0-0). Political Economy of Change and Development. F, S. Prerequisite: Three upper-division credits in comparative politics with a B or better.

Responses of the state and its institutions to political, economic, and social change.

POLS 542 03(3-0-0). Democracy and Democratization. F, S.

Theoretical foundations of democracy and democratization across world regions.

POLS 544/ETST 544 03(3-0-0). National Identities and Nation Building. F. Credit not allowed for both POLS 544 and ETST 544.

How statist conceptions of race and ethnicity have been mobilized in nation-building projects.

POLS 550 03(3-0-0). Advanced Public Administration. F, S. Prerequisite: POLS 351; written consent of instructor.

Overview of study of public administration; recent developments in theory and practice.

POLS 552A-C 03(3-0-0). Topics in Public Administration. F, S. Prerequisite: POLS 351; GPA of 3.000 or better.

A) Personnel. B) Budgeting and finance. C) Regulation.

POLS 620 03(3-0-0). Approaches to the Study of Politics. F. Prerequisite: Fifteen credits in political science.

POLS 621 03(3-0-0). Qualitative Methods in Political Science. S. Prerequisite: POLS 620 or concurrent registration or SOC 311. Credit not allowed for both POLS 621 and SOC 610.

Research design, data gathering and organization, ethical issues, and computer applications in qualitative political research.

POLS 624 03(3-0-0). Scope and Methods of Political Science. F, S. Prerequisite: 15 credits of upper division (300-level and above) coursework

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

in Political Science.

Graduate survey of the scope of the Political Science discipline and the range of research designs and methods in the discipline.

POLS 625 03(3-0-0). Quantitative Methods of Political Research. S.
Prerequisite: POLS 320.

Quantitative approaches and methods for study of political life.

POLS 626 01(0-2-0). Political Research Laboratory. S. Prerequisite:
POLS 321; concurrent registration in POLS 625.

POLS 652 03(0-0-3). Public Organization Theory. F. Prerequisite: POLS
351.

Theories of behavior of individuals and organizations in government bureaucracies.

POLS 660 03(3-0-0). Theories of the Policy Process. F, S. Prerequisite:
POLS 351 or POLS 460.

Recent developments in policy analysis.

POLS 670 03(3-0-0). Politics of Environment and Sustainability. F.
Prerequisite: Written consent of instructor.

Domestic, international, and comparative dimensions of environment and natural resource politics and policy.

POLS 684 Var [1-3]. Supervised College Teaching. Prerequisite: One
year of graduate work.

POLS 692 03(0-0-3). Seminar in Environmental Policy.

Topics in domestic and/or global environmental policy.

POLS 695 Var. Independent Study.

POLS 699 Var. Thesis.

POLS 709 03(3-0-0). Environmental Politics in the U.S. F, S.
Prerequisite: POLS 500 or POLS 501; POLS 670.

Selected primary materials on governmental performance, groups, and mass public in American environmental politics.

POLS 729 03(3-0-0). Political Theory and the Environment. F, S.
Prerequisite: POLS 520; POLS 670.

Political thought applied to questions of the environment.

POLS 739 03(3-0-0). International Environmental Politics. F, S.
Prerequisite: POLS 530; POLS 670.

Theories and methodologies used in analyzing international environmental politics and policy.

POLS 749 03(3-0-0). Comparative Environmental Politics. F, S.
Prerequisite: POLS 540 or POLS 541; POLS 670.

Application of comparative political theory to analysis of environmental politics.

POLS 759 03(3-0-0). Environmental Policy and Administration. F, S.
Prerequisite: POLS 670.

Effects of regulation, intergovernmental relations, and resource availability on federal environmental programs in U.S.

POLS 795 Var. Independent Study.

POLS 799 Var. Dissertation.

PSYCHOLOGY COURSES

Department of Psychology

College of Natural Sciences

PSY 100 03(3-0-0). General Psychology. (GT-SS3, AUCC 3C). F, S, SS.

Principles of psychology emphasizing empirical approaches; theories and research on learning, individual differences, perception, social behavior. (NT-O/T)

PSY 121 01(1-0-0). Health and the Mind. F, S.

Maintenance of positive mental health.

PSY 175/HDFS 175 03. Developmental Psychology Across the Life Span. F, S, SS. Credit not allowed for both PSY 175 and HDFS 175. Offered as telecourse only.

Theory and research on physical, cognitive, and psychosocial human development across the life span. (NT-T)

PSY 192 01(0-0-1). Psychology First-Year Seminar. F, S. Prerequisite: none.

Special topics in psychology.

PSY 210 03(3-0-0). Psychology of the Individual in Context. F, S, SS. Prerequisite: PSY 100.

Psychological explanations of cultural, social, and individual differences in behavior.

PSY 228 03(3-0-0). Psychology of Human Sexuality. F, S, SS.

Physiology, psychology of human sexuality; cross cultural issues, development, social perspectives, values, sexual dysfunction. (NT-C/O)

PSY 250 04(4-0-0). Research Methods in Psychology. F, S, SS. Prerequisite: PSY 100.

Design, analysis, and reporting of psychological research.

PSY 252 03(3-0-0). Mind, Brain, and Behavior. F, S, SS. Prerequisite: PSY 100.

Psychological, physiological, and evolutionary explanations of perception, cognition, and behavior.

PSY 260 03(3-0-0). Child Psychology. F, S, SS. Prerequisite: PSY 100.

Description and explanation of development of human behavior emphasizing theory and research concerned with infant and child.

PSY 292 Var[1-3]. Seminar. F, S, SS. Prerequisite: Psychology major.

Special topics in psychology.

¹**PSY 295 Var [1-3]. Independent Study.** Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

Individual investigation of a special topic in psychology under direction of faculty.

¹**PSY 296 Var [1-3]. Group Study.** Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

¹Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

Collective investigation of a special topic in psychology under direction of faculty.

PSY 305 03(3-0-0). Psychology of Religion. F, S, SS. Prerequisite: PSY 100.

Survey of research on religion from a psychological perspective. (NT-O)

PSY 310 03(3-0-0). Basic Counseling Skills. S. Prerequisite PSY 100.

Psychologically-based interpersonal communication skills; rapport thinking, gathering information and bringing about change in others.

PSY 311A-B 02(0-4-0). Basic Counseling Skills Laboratory. Prerequisite: PSY 100; PSY 310 or concurrent registration. Credit not allowed for both PSY 311A and PSY 311B.

A) CACI. Application of psychologically-based interpersonal skills in drug addiction treatment, for students seeking CACI certification. **B)** Non-CACI. Application of psychologically-based interpersonal communication skills.

PSY 315 03(3-0-0). Social Psychology. F, S, SS. Prerequisite: PSY 100.

Social psychological theory and research findings emphasizing research methodology; applications to contemporary social problems. (NT-O)

PSY 316 03(3-0-0). Environmental Psychology. F, S, SS. Prerequisite: PSY 100.

Social psychological theory and research on effects of behavior on the environment; environmental influences on behavior. (NT-C)

PSY 317 02(0-4-0). Social Psychology Laboratory. F, S, SS. Prerequisite: PSY 250; PSY 315 or concurrent registration.

Review of research techniques in social psychology. Computer simulations with applications to contemporary social problems.

PSY 320 03(3-0-0). Abnormal Psychology. F, S, SS. Prerequisite: PSY 100.

Definition and description of behavior pathology; theory and research on factors in etiology and treatment of behavior disorders. (NT-T)

PSY 325 03(3-0-0). Psychology of Personality. F, S, SS. Prerequisite: PSY 100.

Theory and research related to personality as a psychological concept; analytic, phenomenological, and behavioristic views. (NT-O)

PSY 327 03(2-0-1). Psychology of Women. S, SS. Prerequisite: PSY 100.

Contemporary theory and research focusing on emotional, cognitive, biosocial, and interpersonal contributions to female identity and sex role.

***PSY 330 03(3-0-0). Clinical and Counseling Psychology.** S. Prerequisite: PSY 100.

Specialty areas, conceptualization of clients, assessment, intervention techniques for behavior change, research methods, ethical issues.

PSY 335 03(3-0-0). Forensic Psychology. F, S, SS. Prerequisite: PSY 100; junior or senior standing.

The psychology of crime and criminal behavior, including theory on deviance, the criminal mind, and the root causes of violence in society.

PSY 340 03(3-0-0). Organizational Psychology. F. Prerequisite: PSY 250; concurrent registration in PSY 341; STAT 301 or STAT 311.

Theories and research on interpersonal relations, work group processes, decision making, power, and change strategies within organizations.

PSY 341 01(0-2-0). Organizational Psychology Laboratory. F. Prerequisite: Concurrent registration in PSY 340.

Application of organizational psychology through simulations and field involvements.

^oAlternate year offering (odd); ^{*} Alternate year offering (even); ⁺ Field trips; ^{\$} Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

PSY 350 03(3-0-0). Applied Research Methods in Psychology I. F. Prerequisite: PSY 250; STAT 311; enrollment in University Honors Program.

Application of research methods concepts to design and conduct experiments.

PSY 352 03(3-0-0). Learning and Memory. F, S, SS. Prerequisite: PSY 252.

Research, theory, and applications regarding conditioning, learning, and retention in animals and humans.

PSY 354 03(3-0-0). Human-Computer Interaction. S. Prerequisite: PSY 100; PSY 250; PSY 252.

Theoretical and applied areas of psychology and computer science in the area of human-computer interaction.

PSY 360 03(3-0-0). Psychology of Drug Addiction Treatment. S, SS. Prerequisite: PSY 100; PSY 320.

Psychological theory and method for treating substance use addictions.

PSY 362 03(3-0-0). Professional Issues in Addiction Treatment. F, SS. Prerequisite: PSY 360 or concurrent registration.

Diversity, ethno-cultural, and ethical issues in drug addiction treatment.

PSY 364 03(0-0-3). Infectious Diseases and Substance Use. F, S, SS. Prerequisite: PSY 100.

Infectious disease transmission/progression related to substance use, risk assessment and treatment of substance users in alcohol and drug treatment. (NT-O)

PSY 370 03(3-0-0). Psychological Measurement and Testing. F, S, SS. Prerequisite: PSY 100; concurrent registration in PSY 371; STAT 301 or STAT 311.

Measurement theory including scale properties, reliability, and validity; construction and evaluation of psychological tests.

PSY 371 01(0-2-0). Psychological Measurement and Testing Laboratory. F, S. Prerequisite: Concurrent registration in PSY 370.

Exercises and problems in test administration, norming, reliability, validity, and scale construction.

¹PSY 384 Var [1-3]. Supervised College Teaching. Prerequisite: PSY 100; written consent of department head. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements. Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

Supervised teaching, training, and discussion leadership in undergraduate courses.

^{*}PSY 392 02(0-0-2). Honors Seminar: Current Topics in Psychology. F. Prerequisite: PSY 100; PSY 250; enrollment in University Honors Program.

Research areas in psychology; reading and discussing current journal articles.

PSY 401 03(3-0-0). History and Systems of Psychology. F, S. Prerequisite: PSY 250; junior or senior standing.

Philosophical and scientific underpinnings of psychology; major historical developments in psychology; schools of psychological thought.

PSY 410 03(3-0-0). Psychobiology of Addictions. F. Prerequisite: PSY 250, PSY 252.

Biological basis of the psychology of addictions.

PSY 437 03(3-0-0). Psychology of Gender. F. Prerequisite: PSY 210.

Psychology of gender in cultural context.

PSY 440 03(3-0-0). Industrial Psychology. F, S, SS. Prerequisite: PSY 250; concurrent registration in PSY 441; STAT 301 or STAT 311.

Problems and procedures in selection and classification of personnel; work motivation; job satisfaction; leadership. (NT-O)

PSY 441 01(0-2-0). Industrial Psychology Laboratory. F. Prerequisite: Concurrent registration in PSY 440.

Laboratory and field experiences in job analysis, selection strategies, performance appraisal, and criterion development.

PSY 450 04(3-2-0). Applied Research Methods in Psychology II. S. Prerequisite: PSY 350; enrollment in University Honors Program.

Interpretation and reporting of psychological research findings.

PSY 452 03(3-0-0). Cognitive Psychology. F, S, SS. Prerequisite: PSY 252.

Human thinking processes as related to perception, attention, memory, knowledge representation, reasoning, decision making, and problem solving. (NT-C)

PSY 453 02(0-4-0). Cognitive Psychology Laboratory. F, S, SS. Prerequisite: PSY 250; PSY 452 or concurrent registration.

Exercises in laboratory research in perceptual processes, attention, memory, language, problem solving, and decision making.

PSY 454 03(3-0-0). Biological Psychology. F, S, SS. Prerequisite: PSY 252.

Research and theory on the biological basis of behavior.

PSY 455 02(0-4-0). Biological Psychology Laboratory. F, S, SS. Prerequisite: PSY 250; PSY 454 or concurrent registration.

Laboratory exercises in biological psychology.

PSY 456 03(3-0-0). Sensation and Perception. F, S, SS. Prerequisite: PSY 252.

Review of research on physiological substrates of sensation; methods of scaling sensory experience; role of perception in behavioral adaptation.

PSY 457 02(0-4-0). Sensation and Perception Laboratory. F, S, SS. Prerequisite: PSY 250; PSY 456 or concurrent registration.

Review of research on physiological substrates of sensation; methods of scaling sensory experience; role of perception in behavioral adaptation.

PSY 458 03(3-0-0). Cognitive Neuroscience. F, SS. Prerequisite: PSY 252.

Review of human brain and its mediation of cognitive processes.

PSY 459 02(0-4-0). Cognitive Neuroscience Laboratory. F, SS. Prerequisite: PSY 250; PSY 458 or concurrent registration.

Laboratory exercises in cognitive neuroscience.

PSY 460 03(3-0-0). Child Exceptionality and Psychopathology. F, S, SS. Prerequisite: PSY 100.

Definition and description of child exceptionality and psychopathology; theory and research in etiology, educational implications, and treatment. (NT-O)

PSY 465 03(3-0-0). Adolescent Psychology. F, SS. Prerequisite: PSY 100.

Contemporary theory and research on adolescence including physiological and psychological changes, social influences.

¹PSY 486 Var [1-3]. Practicum. Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

Supervised work experience in approved psychological setting with

^oAlternate year offering (odd); ^{*} Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

periodic consultation of faculty.

¹PSY 488 Var [1-3]. Field Placement. Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

Supervised affiliation with and/or service work in approved psychological setting.

PSY 492A-F Var[1-3]. Seminar. F, S, SS. Prerequisite: None.

A) Applied Social Psychology. B) Cognitive Psychology. C) Counseling/Clinical Psychology. D) Industrial/Organizational Psychology. E) Perceptual and Brain Sciences. F) Special Topics in Psychology.

¹PSY 495A-F Var [1-3]. Independent Study. F, S, SS. Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

Individual investigation of a special topic in psychology under direction of faculty.

A) Applied Social Psychology. B) Cognitive Psychology. C) Counseling/Clinical Psychology. D) Industrial/Organizational Psychology. E) Perceptual and Brain Sciences. F) Special Topics in Psychology.

¹PSY 496A-F Var [1-3]. Group Study. F, S, SS. Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

Collective investigation of a special topic in psychology under direction of faculty.

A) Applied Social Psychology. B) Cognitive Psychology. C) Counseling/Clinical Psychology. D) Industrial/Organizational Psychology. E) Perceptual and Brain Sciences. F) Special Topics in Psychology.

¹PSY 498A-F Var [1-3]. Research. F, S, SS. Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

Independent research project culminating in formal research paper.

A) Applied Social Psychology. B) Cognitive Psychology. C) Counseling/Clinical Psychology. D) Industrial/Organizational Psychology. E) Perceptual and Brain Sciences. F) Special Topics in Psychology.

¹PSY 499A-F Var [1-6]. Thesis. F, S, SS. Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PSY 295, PSY 296, PSY 384, PSY 486, PSY 488, PSY 495, PSY 496, PSY 498, PSY 499; enrollment limited to one per student per semester.

Independent research project culminating in a thesis presented to a faculty committee.

A) Applied Social Psychology. B) Cognitive Psychology. C) Counseling/Clinical Psychology. D) Industrial/Organizational Psychology. E) Perceptual and Brain Sciences. F) Special Topics in Psychology.

⁰PSY 515 03(0-0-3). Women's Health. F.

Current issues in women's health.

PSY 516A-C 01(1-0-0). Public Health Practice. Prerequisite: Admission to MPH degree program.

A) History. F. B) Competencies. S. C) Oversight. SS.

***PSY 517/*IE 517 03(0-0-3). Perspectives in Global Health.** S. Credit not allowed for both PSY 517 and IE 517.

Science, skills, and beliefs directed at the maintenance and improvement of health for all people.

PSY 595A-F Var[1-3]. Independent Study. F, S, SS.

Individual investigation of a special topic in psychology under direction of faculty.

A) Applied Social Psychology. B) Cognitive Psychology. C) Counseling/Clinical Psychology. D) Industrial/Organizational Psychology. E) Perceptual and Brain Sciences. F) Special Topics in Psychology.

PSY 596A-F Var[1-3]. Group Study. F, S, SS.

Collective investigation of a special topic in psychology under direction of faculty.

A) Applied Social Psychology. B) Cognitive Psychology. C) Counseling/Clinical Psychology. D) Industrial/Organizational Psychology. E) Perceptual and Brain Sciences. F) Special Topics in Psychology.

PSY 600A-M 03(3-0-0). Advanced Psychology. F, S.

A) History. B) Physiological. C) Neuropsychology. D) /NB 600 Sensation and perception. Credit not allowed for both PSY 600D and NB 600. E) Animal learning. F) Human learning and memory. G) Social. H) Lifespan Development. I) Personality. K) Measurement. L) Human performance: motor and intellectual capacities. M) Cognitive processes.

⁰PSY 601 01(0-2-0). Measurement Laboratory. S. Prerequisite: PSY 600K or concurrent registration.

Laboratory experience using measurement concepts and procedures.

PSY 605 03(0-0-3). Applied Measurement Theory. S. Prerequisite: Admission to the Plan C graduate program in Applied Industrial/Organizational Psychology. Credit not allowed for both PSY 605 and PSY 600K. PSY 605 offered only through Division of Continued Education. (NT-O)

PSY 610 03(3-0-0). Counseling and Clinical Pre-practicum I. F. Prerequisite: Written consent of instructor.

Basic assessment and intervention skills; accurate observation, conceptualization, and response.

PSY 611 03(3-0-0). Counseling and Clinical Pre-practicum II. S. Prerequisite: PSY 610.

Counseling and clinical techniques; assessment and intervention strategies; special applications.

PSY 643 03(3-0-0). Industrial/Organizational Psychology I. F.

Integration of multiple perspectives for examining work organizations, roles, and relationships, and organizational entry and socialization.

PSY 644 03(3-0-0). Industrial/Organizational Psychology II. S.

Multiple perspectives for examining individual and organizational development, orientation to organizations, and science and practice in industrial/organizational psychology.

PSY 645 02(2-0-0). Industrial/Organizational Psychology at Work I. F.

Integrating theory, research, and practice in industrial/organizational settings. Assessment and development of applications of psychology in organizations.

PSY 646 02(2-0-0). Industrial/Organizational Psychology at Work II. S.

Development and application of scientific, ethical, and professional standards and competencies in applying psychology in industrial/organizational settings.

PSY 647 03(0-0-3). Applied Industrial Psychology. F. Prerequisite: Admission to the Plan C graduate program in Applied Industrial/Organizational Psychology. Offered only through Division of Continuing Education.

Applications of theory and methods for recruitment, selection, training, and performance management within organizations. (NT-O)

PSY 648 03(0-0-3). Applied Organizational Psychology. S. Prerequisite: Admission to the Plan C graduate program in Applied Industrial/Organizational Psychology. Offered only through Division of Continued

⁰Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Education. (NT-O)

PSY 652 04(3-2-0). Methods of Research in Psychology I. F.

Prerequisite: One 300- or 400-level STAT course

Psychological research emphasizing hypothesis testing and simple research designs, introducing general linear model approach.

PSY 653 04(3-2-0). Methods of Research in Psychology II. S.

Prerequisite: PSY 652.

Advanced research designs emphasizing general linear model approach.

PSY 655A-B 03(3-0-0). Research Issues and Models in Psychology. S.

Generation and development of research ideas, evaluating approaches, interpreting and reporting findings. **A)** Applied. **B)** Experimental.

PSY 660 03(0-0-3). Applied Cross-Cultural I/O Psychology. S.

Prerequisite: Admission to the Plan C graduate program in Applied I/O Psychology; PSY 647 or PSY 648.

Cultural differences in the application of individual and organizational interventions to improve human and organizational effectiveness. (NT-O)

PSY 661 03(0-0-3). Applied Organizational Development. SS.

Prerequisite: Admission to the Plan C graduate program in I/O Psychology; PSY 648.

Techniques and interventions for developing, improving and effecting change in organizations through diagnosis, planned change, and survey feedback.

PSY 662 04(0-0-4). Applied Psychological Research Methods I. F.

Prerequisite: Admission to the Plan C graduate program in Applied I/O Psychology; any upper division statistics course. Credit not allowed for both PSY 662 and PSY 652. Offered only through the Division of Continuing Education.

Psychological research emphasizing hypothesis testing and simple research designs, the general linear model approach with emphasis on application. (NT-O)

PSY 663 04(0-0-4). Applied Psychological Research Methods II. S.

Prerequisite: Admission to the Plan C graduate program in I/O Psychology; PSY 662. Credit not allowed for both PSY 663 and PSY 653. Offered only through Division of Continuing Education.

Advanced research designs emphasizing general linear model approach with emphasis on application. (NT-O)

PSY 665 03(0-0-3). Applied Psychological Research Design. SS.

Prerequisite: Admission to the plan C graduate program in Applied I/O Psychology; any graduate applied statistics course. Credit not allowed for both PSY 655C and PSY 665. Offered only through Division of Continuing Education.

Review of scientific method, generation of hypotheses, and design of laboratory and field research studies. (NT-O)

PSY 666 03(0-0-3). Succession Planning/Leadership Development. SS.

Prerequisite: Admission to the Plan C graduate program in Applied I/O Psychology; PSY 648.

Examines modern theories of leadership, strategies for succession planning; training, coaching, mentoring, professional development for leadership. (NT-O)

PSY 667 03(0-0-3). Competency Modeling and Criterion Development. F.

Prerequisite: Admission to the Plan C graduate program in I/O Psychology; PSY 647.

Conducting job analyses and competency modeling within organizations, application of the results of those processes to criterion development. (NT-O)

PSY 668 03(0-0-3). Workforce Training and Development. S.

Prerequisite: Admission to the Plan C graduate program in I/O Psychology; PSY 647.

An overview of adult learning theory, emphasizing the role of I/O psychology in identifying, designing, transferring, and evaluating training. (NT-O)

PSY 670 03(3-0-0). Psychological Measurement-Personality. F.

Construction, administration, interpretation of objectionable measures of personality including aptitudes, abilities, interests.

PSY 672 03(3-0-0). Psychological Assessment. S. Prerequisite: PSY 610; PSY 670.

Use of test data to determine cognitive functioning and predict behavior; supervised test administration and interpretation.

PSY 675 03(3-0-0). Ethics and Professional Psychology Practice. F.

Prerequisite: PSY 611.

Ethical practice of psychology, duty-to-warn statutes, Colorado law, problematic ethical situations.

PSY 684 Var [1-3]. Supervised College Teaching.

Supervised teaching, training, and discussion leadership in undergraduate courses.

PSY 686A-G Var. Practicum.

A) Counseling and diagnosis I. Prerequisite: PSY 611. **B)** Public health.

Prerequisite: PSY 516A; PSY 516B; concurrent registration in PSY 516C.

C) Industrial-organizational I. Prerequisite: PSY 692B. **D)** School I.

Prerequisite: PSY 692B. **E)** Applied social I. Prerequisite: PSY 611. **F)**

Perceptual and brain sciences I. Prerequisite: PSY 611. **G)** Cognitive I.

Prerequisite: PSY 611.

PSY 692A-F Var. Seminar. F, S, SS.

A) Applied social psychology. **B)** Cognitive psychology. **C)** Counseling psychology. **D)** Industrial/organizational psychology. **E)** Perceptual and brain sciences. **F)** Special topics in psychology.

PSY 699A-E Var. Thesis. F, S, SS.

A) Applied Social Psychology. **B)** Cognitive Psychology. **C)**

Counseling/Clinical Psychology. **D)** Industrial/Organizational Psychology.

E) Perceptual and Brain Sciences.

PSY 720 03(3-0-0). Psychopathology. F. Prerequisite: Psychology

graduate students only.

Adult and child behavior pathology; theory, research, and methods related to etiology, defining characteristics, and maintaining causes.

PSY 722 03(3-0-0). Empirically Validated Therapies. S. Prerequisite:

PSY 720.

Outline of major empirically validated approaches to assessment and treatment including cognitive-behavioral therapies, interpersonal therapy.

PSY 727 03(3-0-0). Theories of Vocational Development. S, SS.

Prerequisite: Psychology graduate students only.

Nature and current status of vocational development theory with implications for career counseling.

PSY 729 03(3-0-0). Counseling and Psychotherapy II. S. Prerequisite:

PSY 722.

Theory and practice of group psychotherapy and counseling.

***PSY 754 03(3-0-0). Multivariate Analysis in Behavioral Sciences. S.**

Prerequisite: PSY 653.

Multivariate analysis, including factor and component analysis, applied to psychological research.

PSY 775 03(3-0-0). Diversity Issues in Counseling. F. Prerequisite: PSY

611.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Diversity issues in clients and counselors such as gender, race, age, sexual orientation, education, religion, disability, socioeconomic status.

PSY 784 Var. Supervised College Teaching. F, S.

Philosophy, approaches, and techniques of college-level instruction; supervised teaching with consultation of faculty.

PSY 786A-J Var. Advanced Practicum. Prerequisite: Appropriate subtopic of PSY 686A-G.

A) Counseling and diagnosis II. **C)** Industrial-organizational II. **D)** School II. **E)** Clinical. **F)** Supervision. **G)** Applied social II. **H)** Perceptual and brain sciences II. **I)** Cognitive II. **J)** Group psychotherapy. Prerequisite: PSY 610; PSY 727.

PSY 787 Var. Internship.

Supervised work experience under departmental guidelines in approved psychological agency or setting.

PSY 792A-F Var. Seminar. F, S, SS.

A) Applied Social Psychology. **B)** Cognitive Psychology. **C)** Counseling/Clinical Psychology. **D)** Industrial/Organizational Psychology. **E)** Perceptual and Brain Sciences. **F)** Special Topics in Psychology.

PSY 795A-F Var[1-3]. Independent Study. F, S, SS.

Individual investigation of a special topic in psychology under direction of faculty.

A) Applied Social Psychology. **B)** Cognitive Psychology. **C)** Counseling/Clinical Psychology. **D)** Industrial/Organizational Psychology. **E)** Perceptual and Brain Sciences. **F)** Special Topics in Psychology.

PSY 799A-E Var. Dissertation. F, S, SS.

A) Applied Social Psychology. **B)** Cognitive Psychology. **C)** Counseling/Clinical Psychology. **D)** Industrial/Organizational Psychology. **E)** Perceptual and Brain Sciences.

BUSINESS MANAGEMENT SCIENCE COURSES

Department of Computer Information Systems College of Business

QNT 270 03(2-2-0). Basic Business Statistics. F, S, SS. Prerequisite: STAT 204.

Statistical tools applied to business conditions and functions.

QNT 375 03(2-2-0). Models and Applications in Management Science. F, S. Prerequisite: STAT 204.

Introduction and application of operations research techniques to business decision problems.

QNT 570 03(3-0-0). Statistical Decision Making. F, SS. Prerequisite: QNT 270.

Classical statistical techniques including hypothesis testing and multiple regression; model building, control charts, time series and forecasting.

REAL ESTATE COURSES

Department of Finance and Real Estate College of Business

REL 360 03(3-0-0). Real Estate Principles. F, S, SS. Prerequisite: ECON 204.

Broad survey of real estate emphasizing land use, urban structure and growth, market analysis, real estate finance and valuation, and property rights.

REL 367 03(3-0-0). Real Estate Law. S. Prerequisite: BUS 205 or BUS 260 or HDFS 403.

Legal regulations applicable to real property ownership and transfer, to real estate agents, and to use of real property.

REL 430 03(3-0-0). Real Estate Market Analysis and Valuation. F. Prerequisite: REL 360.

Valuation, capital market, regional economic base, real estate cycles, real estate equilibrium models applied to major property types.

REL 435 03(3-0-0). Real Estate Marketing and Brokerage. S. Prerequisite: REL 360.

Practitioner focus including legal forms, valuation, sales techniques, escrow, fiduciary requirements, start-to-finish real estate project.

REL 440 03(3-0-0). Real Estate Development. S. Prerequisite: FIN 300; REL 360; REL 460.

Development process including urban dynamics, architecture, construction, law, public approvals, financing, marketing, and property management.

REL 460 03(3-0-0). Real Estate Finance and Investment. F. Prerequisite: FIN 300 or FIN 305; REL 360.

Financing of real estate resources: real estate financial markets, policies; use of leverage and real estate investment analysis in real estate investment programs.

REL 487 Var [1-3]. Real Estate Internship. Maximum of 3 credits allowed in course.

REL 495 Var [1-3]. Real Estate Independent Study. Maximum of 3 credits allowed in course.

REL 496 Var [1-3]. Real Estate Group Study. Maximum of 3 credits allowed in course.

RESTAURANT/RESORT MANAGEMENT COURSES

Department of Food Science and Human Nutrition *College of Applied Human Sciences*

RRM 101 03(3-0-0). Hospitality Industry. F, S.

Food service, lodging, and tourism industries; exploration of various industry segments and career opportunities.

RRM 200 03(3-0-0). Hotel Operations. F, S. Prerequisite: RRM 101.

Front office and room management as related to resorts and hotels. Computer application, financial controls, employee and guest relations.

RRM 310 03(3-0-0). Food Service Systems-Operations. F, S, SS.

Technical operations: menu planning, evaluation; recipe standardization; forecasting, food cost, sanitation, hospital food distribution systems. (NT-O)

RRM 311 03(3-0-0). Food Service Systems-Production and Purchasing. F, S, SS. Prerequisite: RRM 310.

Quantity food production principles, purchasing specifications, market channels. (NT-O)

RRM 330 02(2-0-0). Alcohol Beverage Control and Management. S. Prerequisite: CHEM 103 or CHEM 107.

Classification, production, and service of controlled beverages; management of facilities and people; safe service training; financial controls.

RRM 350 03(3-0-0). Restaurant and Resort Marketing. F. Prerequisite: RRM 101.

Restaurant and resort operations marketing, including planning, promotion, and special industry considerations.

RRM 400 03(2-0-1). Food and Society. S. Prerequisite: SOC 100; must have completed category 3D and 3E AUCC requirements.

Exploration of the influence of food, dining, and nutrition on cultural aspects of the human experience.

RRM 415 03(0-6-0). Catering Techniques and Culinary Arts. F, S. Prerequisite: RRM 311.

Management of advanced techniques in culinary technique; catering of food and beverages for special functions. (\$)

RRM 440 04(0-8-0). Restaurant Operations. F, S. Prerequisite: RRM 101 or concurrent registration.

Principles, practices, philosophies, systems for daily operations of casual or fine dining restaurant; focus on developing solutions to problems.

RRM 460/NRRT 460 03(3-0-0). Event and Conference Planning. F, S. Prerequisite: NRRT 270 or RRM 101. Credit not allowed for both RRM 460 and NRRT 460.

Foundation in planning, organizing, and producing special events and conferences. Functions and strategies for effective event management.

RRM 487 Var[1-15]. Internship: Restaurant and Resort Management. F, S, SS. Prerequisite: RRM 200; RRM 311.

RRM 492 03(0-0-3). Seminar on Hospitality Management. F, S. Prerequisite: MKT 305.

Applying and synthesizing service knowledge and management functions; project discussions, benchmark presentations, execution of a capstone project.

RRM 500 03(3-0-0). Understanding Food. F. Prerequisite: RRM 400.

Role of food in the creation of identity, as driver of technology, prominent role food plays in the media.

RRM 604 03(3-0-0). Research Methods in Food and Nutrition. S. Prerequisite: ERDM 606 or STAT 301 or STAT 311.

Research techniques used in food and nutrition disciplines. Emphasis on design, preparation, and evaluation of research.

RRM 686 01(0-4-0). Practicum-Food Service Management.

Food production, menu planning, nutritional analysis, and food costing.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC-*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

RANGELAND ECOSYSTEM SCIENCE COURSES

Department of Forest and Rangeland Stewardship Warner College of Natural Resources

RS 300 03(3-0-0). Rangeland Conservation and Stewardship. F. Prerequisite: BZ 120 or LIFE 102.

Conservation and management of rangeland-ecosystem values using sustainable practices. (NT-O)

RS 310/F 310 03(2-2-0). Forest and Rangeland Ecogeography. F, S. Prerequisite: BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 102.

Distribution of wildland plant communities and identification of important grasses, forbs, shrubs and trees common in North America.

RS 312 01(0-2-0). Rangeland Plant Identification Lab. F. Prerequisite: Concurrent registration in RS 310.

Identification of characteristic grasses, forbs, and shrubs common to North American rangelands.

RS 329 01(0-3-0). Rangeland Assessment. SS. Prerequisite: SOCR 240; RS 300; RS 331.

Five-day intensive field-based course on principles of rangeland ecosystem assessment.

+RS 331 03(2-2-0). Wildland Plants and Plant Communities. F. Prerequisite: BZ 223 or F 210 or NR 220.

Distribution of non-forested wildland plant communities and important plant species in the western United States. (NT-O)

+RS 351 03(2-2-0). Wildland Ecosystems in a Changing World. F. Prerequisite: LAND 220/LIFE 220 or LIFE 320; SOCR 240.

Understanding and conserving non-forested wildland ecosystems, processes, and services under changing environmental conditions.

RS 400 02(2-0-0). Rangeland Improvements. F. Prerequisite: RS 300 or SOCR 320.

Improvement of rangelands through biological and cultural methods; management of improved rangelands.

RS 420 03(1-4-0). Grass Taxonomy. S. Prerequisite: BZ 223.

Anatomy, morphology, and identification of grasses.

+RS 432 02(1-3-0). Rangeland Measurements and Monitoring. F. Prerequisite: NR 220 or RS 331; RS 300 or concurrent registration; STAT 201 or STAT 301 or STAT 307.

Vegetation sampling and field measurements emphasizing applications for monitoring and adaptive management. (\$)

+RS 452 03(3-0-0). Rangeland Herbivore Ecology and Management. F, S, SS. Prerequisite: RS 300; LAND 220/LIFE 220. Voluntary field trips.

Ecology and management of large ungulate herbivores including consumer functions at organismal and ecosystem levels. (NT-O)

RS 470 02(2-0-0). Rangeland Economics and Analysis. F. Prerequisite: AREC 202 or ECON 202; RS 300.

Economics of rangeland resource use; analytical techniques for allocation of rangeland resources.

RS 471 02(2-0-0). Rangeland Planning and Grazing Management. F. Prerequisite: RS 300 or SOCR 320.

Definition of grazing management, grazing systems. Synthesis of animal, plant responses to grazing management. Structure, function of rangeland planning.

+RS 472 04(1-6-0). Rangeland Ecosystem Planning. S. Prerequisite: RS 471.

Range allotment, ranch and restoration planning. (\$)

RS 478 03(3-0-0). Ecological Restoration. S. Prerequisite: BZ 450 or F 311 or LAND 220/LIFE 220; SOCR 240. Credit not allowed for both RS 478 and NR 678.

Analysis of environmental factors influencing restoration of disturbed lands and practices for successful restoration of disturbed ecosystems.

RS 495 Var. Independent Study-Rangeland Ecosystem.

RS 496 Var. Group Study-Rangeland Ecosystem.

RS 500 03(3-0-0). Advanced Rangeland Management. F, S, SS. Prerequisite: One course in basic ecology.

Rangeland management concepts. (NT-O)

RS 501 03(3-0-0). Range Habitat Manipulation. F. Prerequisite: RS 300 or SOCR 320.

Improvement of range habitats and effects on ecosystem components.

***RS 520 02(2-0-0). Range Issues and Policy.** F. Prerequisite: RS 300; SOCR 320.

Explores and evaluates current issues and policies concerning range use.

RS 531 03(2-3-0). World Grassland Ecogeography. F. Prerequisite: BZ 223

Distribution, climate, and structure of the world's major grasslands with emphasis on North America. (NT-O)

+RS 532 03(1-3-1). Rangeland Ecosystem Sampling. F. Prerequisite: STAT 301; one ecology course. Credit not allowed for both RS 532 and RS 432.

Measurement, analysis techniques for rangeland vegetation. Applications to management emphasized.

(\$)

RS 552 04(3-0-1). Range Animal Production and Management. F, S, SS. Prerequisite: One course in ecology; one course in animal or wildlife management.

Biological and ecological basis for production of meat from rangelands. (NT-O)

+RS 565 03(2-2-0). Riparian Ecology and Management. S. Prerequisite: LAND 220 or LIFE 220 or LIFE 320.

Analysis of interactions among biotic and abiotic processes as relates to the ecology and management of riparian systems, emphasizing case studies. Field trips required.

RS 630 03(3-0-0). Ecology of Grasslands and Shrublands. F. Prerequisite: One course in ecology.

Distributions and climatic controls on grassland and shrubland plant communities.

***RS 640 03(3-0-0). Vegetation-Environment Analysis.** F. Prerequisite: STAT 301.

Multivariate analyses and ecological interpretations of vegetation communities.

RS 651 04(3-2-0). Primary Production and Decomposition. F. Prerequisite: One course in plant physiology; one course in soils.

Energy transformations within primary producer compartment; dissipation of ecosystem biomass by decomposers, mineralization. (NT-O).

RS 693 01(1-0-0). Seminar.

RS 695 Var. Independent Study-Rangeland Ecosystem.

RS 696 Var. Group Study-Rangeland Ecosystem.

RS 698 Var. Research.

RS 699 Var. Thesis.

RS 793 01(0-0-1). Seminar.

RS 795 Var. Independent Study-Rangeland Ecosystem.

RS 798 Var. Research.

RS 799 Var. Dissertation.

STUDY ABROAD

Nondepartmental

Office of International Programs

Office of Provost and Executive Vice President

SA 482 [Var] Study Abroad. (AUCC 3E).

Students participating in a semester study abroad program register for SA 482. This is not a course for credit.

SA 682 {Var} Graduate Study Abroad. Prerequisite: Approval of graduate committee, Graduate School, and International Programs.

Vehicle to allow graduate students to enroll in a study program abroad as part of their approved program. This is not a course for credit.

SOCIOLOGY COURSES

Department of Sociology *College of Liberal Arts*

SOC 100 03(3-0-0). General Sociology. (GT-SS3, AUCC 3C). F, S, SS.
Analysis of human societies in the U.S. and abroad; major institutions, groups, and interaction patterns from the sociological perspective. (NT-O)

SOC 105 03(3-0-0). Social Problems. (GT-SS3, AUCC 3C). F, S.
Analysis of global and domestic social problems. (NT-O)

SOC 192 03(0-0-3). Civic Culture and Social Responsibility. S.
Erosion of civility in society with particular emphasis on civic culture on the university campus.

SOC 205 03(3-0-0). Contemporary Race-Ethnic Relations. (GT-SS3, AUCC 3E). F, S.
People of color and white ethnic groups in the U.S. and internationally. (NT-O)

SOC 210 03(3-0-0). Quantitative Sociological Analysis. F, S.
Prerequisite: One credit of 100-level mathematics except MATH 133 and MATH 135.
Application of quantitative concepts and methodology to investigation of social problems.

SOC 220 03(3-0-0). Global Environmental Issues. F, S.
Relationship between human societies around the world and the larger natural environment.

SOC 253 03(3-0-0). Introduction to Criminal Justice. F, S, SS.
Criminal justice as a system. History, philosophy, components and administration of criminal justice.

SOC 301 03(3-0-0). Development of Sociological Thought. F, S.
Prerequisite: SOC 100 or SOC 105.
Central themes in sociological thought from Enlightenment to present. (NT-O)

SOC 302 03(3-0-0). Contemporary Sociological Theory. F, S, SS.
Prerequisite: SOC 100 or SOC 105.
Theoretical approaches and models in sociology.

SOC 311 03(3-0-0). Methods of Sociological Inquiry. F, S, SS.
Prerequisite: SOC 100 or SOC 105; MATH 118.
Application of sociological concepts to sociological problems including problem formulation, data gathering, and research design. (NT-O)

SOC 313 01(1-0-0). Computer Methods in Sociology. F. Prerequisite: SOC 210.
Experimental introduction to typical uses of computers in sociology with emphasis on data analysis. (NT-O)

SOC 320 03(3-0-0). Population-Natural Resources and Environment. F.
Prerequisite: SOC 100 or SOC 105.
Population studies; world growth patterns and their relationship to natural resources and environment.

SOC 321 03(3-0-0). Soil, Environment, and Society. F, S. Prerequisite: SOC 100 or SOC 105.
Role of soil in our environment and its value as it relates to the social and economic well-being of society.

SOC 322 03(3-0-0). Introduction to Environmental Justice. F, S.
Prerequisite: SOC 100 or SOC 105.
Unequal distribution of environmental risks, benefits, policies and regulatory practices across different populations.

SOC 330 03(3-0-0). Social Stratification. F. Prerequisite: SOC 100 or

SOC 105.

Theories of social inequality and mobility and their ramifications in American society. (NT-O)

SOC 331 03(3-0-0). Community Dynamics and Development. F.
Prerequisite: SOC 100 or SOC 105; SOC 311.
Nature of community: its institutions, problems and processes, including growth, disintegration, and development.

SOC 332 03(3-0-0). Comparative Majority-Minority Relations. S.
Prerequisite: SOC 100 or SOC 105.
Discrimination, ideology, power, policy issues in the U.S. and selected societies; application of basic concepts in student's self appraisal. (NT-O)

SOC 333 03(3-0-0). Gender Roles in Society. F. Prerequisite: SOC 100 or SOC 105.
Analysis of social organization of gender in contemporary society, emphasizing roles and institutional linkages.

SOC 340 03(3-0-0). Bureaucracy and Modern Organizations. S.
Prerequisite: SOC 100 or SOC 105.
Structure and function of large-scale organization: coordination of activities between organizations and society.

SOC 341 03(3-0-0). Sociology of Rural Life. S. Prerequisite: SOC 100 or SOC 105.
Rural life in U.S. and Third World societies: analysis of sociocultural systems, social differentiation, social institutions, and problems of social change. (NT-T)

SOC 342 03(3-0-0). Leisure and Society. F, S, SS. Prerequisite: SOC 100 or SOC 105.
Nature and purpose of leisure and work in society; influences of culture and social structure on leisure values and behavior.

SOC 343 03(3-0-0). Sport and Society. F, S.
Sport as a microcosm of American society focusing on sport and values, socialization, institutions, stratification, race, and gender.

SOC 352 03(3-0-0). Criminology. F, S, SS. Prerequisite: SOC 100 or SOC 105.
Crime in contemporary society; behavioral, causation, prevention, and justice issues.

SOC 353 03(3-0-0). Criminal Investigations. F, S. Prerequisite: SOC 100 or SOC 105.
Examination of the social, organization, and applied facets of the criminal investigation process.

SOC 354 03(3-0-0). Law Enforcement and Society. F, S. Prerequisite: SOC 100 or SOC 105; SOC 253.
Rise and development of law enforcement as a societal reaction to crime.

SOC 358 03(3-0-0). Correctional Organizations. S. Prerequisite: SOC 100 or SOC 105; SOC 253.
Social and organizational issues in the administration of punishment and correction.

SOC 360 03(3-0-0). Political Sociology. S. Prerequisite: SOC 100 or SOC 105.
Analysis of power as a sociological concept, emphasizing competing theories of the state and power.

SOC 362 03(3-0-0). Social Change. S. Prerequisite: SOC 100 or SOC 105.
Sources of stability and stress in changing societies, consequences of planned and unplanned change; future trends.

SOC 364 03(3-0-0). Agriculture and Global Society. S. Prerequisite: SOC 100 or SOC 105.
Analysis of relationships between global agriculture and social change.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SOC 366 03(3-0-0). Peoples and Institutions of Latin America. F. Prerequisite: SOC 100 or SOC 105.

Change in the cultures and institutions of contemporary Latin America.

SOC 371 03(3-0-0). Symbolic Interaction. F, S. Prerequisite: SOC 100 or SOC 105.

Basic concepts and issues in sociological perspective of social action and interactionism.

SOC 372 03(3-0-0). Sociology of Deviance. F, S, SS. Prerequisite: SOC 100 or SOC 105.

Description, comparison, and analysis of theories and research of deviance.

SOC 375 03(3-0-0). Sociology of Religion and Medicine. F. Prerequisite: SOC 100 or SOC 105.

Descriptions and analyses of the roles and relationships of religion and medicine as modern social institutions.

SOC 403 03(0-0-3). Capstone Seminar. F, S. Prerequisite: SOC 210; SOC 301 or SOC 302; SOC 311; SOC 313.

Student demonstration of central concepts and procedures currently employed in sociology discipline.

***SOC 422/*ANTH 422 03(3-0-0). Comparative Legal Systems.** S. Prerequisite: ANTH 100 or SOC 100. Credit not allowed for both SOC 422 and ANTH 422.

Traditional approaches to law, competing concepts of law in the global system and experiences of minorities in state legal systems.

°SOC 429 03(3-0-0). Comparative Urban Studies. S. Prerequisite: SOC 100 or SOC 105.

World urbanization and metropolitan development, measurement of growth and change in cities, and sociological perspective in planning.

SOC 444/ETST 444 03(3-0-0). Federal Indian Law and Policy. S. Credit not allowed for both SOC 444 and ETST 444.

Indian policy processes and their impact on Native lives and culture, particularly Native sovereignty.

SOC 450 03(3-0-0). Gender, Crime, and Criminal Justice. F. Prerequisite: SOC 100 or SOC 105; SOC 253.

Issues related to women as offenders, victims, and professionals in the criminal justice system.

SOC 455 03(3-0-0). Sociology of Law. F. Prerequisite: SOC 100 or SOC 105; SOC 253.

Social origins, functions, and procedures of law in society.

SOC 460 03(3-0-0). Society and Environment. S. Prerequisite: SOC 100 or SOC 105.

Technology as a social phenomenon interacting with social organization and the natural environment.

SOC 461 03(3-0-0). Water, Society, and Environment. F, S, SS. Prerequisite: SOC 100 or SOC 105.

Social aspects of water resource utilization; interface of social organization with physical environment. (NT-O)

SOC 462 03(3-0-0). Applied Social Change. S. Prerequisite: SOC 100 or SOC 105.

Applied sociology with a focus on research and practice designed to foster social change.

SOC 463 03(3-0-0). Sociology of Disaster. S. Prerequisite: SOC 100 or SOC 105.

Determinants and consequences of behavior and response to environmental extremes including floods, earthquakes, wind, severe storms, and technological emergencies.

°SOC 474 03(0-0-3). Social Movements and Collective Behavior. S. Prerequisite: SOC 100 or SOC 105.

Theory and research on causes, organizational structure, and outcomes of social movements and collective behavior.

SOC 482A-B 03(2-0-1). Travel Abroad. SS. International and comparative issues in sociology. A) Comparative Criminal Justice. B) Crime and Deviance.

SOC 487 03(0-9-1). Internship. Prerequisite: SOC 210; SOC 301 or SOC 302; SOC 311; SOC 313.

Academic-based work experience with selected organizations or agencies. Supervised application of sociological principles and seminar participation.

SOC 492 01(0-0-1). Seminar. F, S, SS. Prerequisite: SOC 210; SOC 301 or SOC 302; SOC 311; SOC 313; concurrent registration in SOC 487.

Examination of work-oriented instruction in seminar setting where sociological principles are analyzed using internship experience.

SOC 495 Var. Independent Study.

SOC 500 01(1-0-0). The Sociological Profession I. F. Prerequisite: Fifteen credits in sociology.

Examination of issues and values affecting sociology as a profession.

SOC 501 03(3-0-0). The Sociological Profession II. F. Prerequisite: Fifteen credits in sociology.

Examination of the activities and procedures critical to the socialization of professional sociologists.

SOC 502 03(3-0-0). Foundations of Theoretical Sociology. F. Prerequisite: SOC 500 or concurrent registration.

Contributions of major sociological theorists prior to mid-20th century.

***SOC 503 03(3-0-0). Contemporary Sociological Theory.** S. Prerequisite: SOC 502.

Contributions of major sociological theorists since mid-20th century.

***SOC 510 03(3-0-0). Sociological Methods I.** F. Prerequisite: SOC 210 or SOC 311.

Linkage of sociological theory and conceptual models; case studies; data-gathering techniques.

***SOC 511 03(3-0-0). Sociological Methods II.** S. Prerequisite: SOC 510.

Linkage of sociological theory and conceptual models; case studies; data-gathering techniques.

SOC 540 03(3-0-0). Community Sociology. F. Prerequisite: SOC 500.

Intellectual roots of community sociology and contemporary community studies.

SOC 555 03(0-0-3). Society, Deviance, and Crime. F. Prerequisite: 12 credits of sociology at the 300 level or above.

Sociological perspectives and research in the areas of deviance and crime, including classical, positivist, and critical approaches.

SOC 562/AGRI 562 03(2-0-1). Sociology of Food Systems and Agriculture. F, S.

How agricultural choices generate intended and unintended consequences for human communities and the natural environment.

SOC 564 03(3-0-0). Environmental Justice. S. Prerequisite: SOC 100 or SOC 105.

Unequal distribution of environmental risks, benefits, policies and regulatory practices across different populations.

°SOC 566/°AREC 566 03(3-0-0). Contemporary Issues of Developing Countries. S. Prerequisite: Two or more courses in AREC or ECON or SOC. Credit not allowed for both SOC 566 and AREC 566.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Social, economic, and technological factors in developing countries.

***SOC 610 03(0-0-3). Seminar in Methods of Qualitative Analysis.** S. Prerequisite: POLS 620 or concurrent registration or SOC 311. Credit not allowed for both SOC 610 and POLS 621.

Examination and application of qualitative techniques of analysis.

***SOC 612 03(0-0-3). Seminar in Methods of Evaluational Research.** S. Prerequisite: SOC 511.

Quantitative and qualitative techniques of evaluating social action programs.

°SOC 613 03(0-0-3). Seminar in Multiple Regression and Path Analysis. F. Prerequisite: SOC 511.

Analysis and application of techniques for multiple regression and path analysis.

***SOC 614 03(3-0-0). Comparative Sociology.** S. Prerequisite: SOC 500.

Examination of problems and prospects in extending and carrying out sociological research across social systems.

***SOC 630 03(3-0-0). Social Stratification.** S. Prerequisite: SOC 500.

Theory and research on class structure, status attainment, ideology, and social change.

***SOC 631 03(3-0-0). Sociology of Rural Development.** F. Prerequisite: SOC 500.

Rural social organization and development, modernization, and social change as it relates to rural social systems; underdeveloped regions of world.

°SOC 633 03(3-0-0). Theories of Modern Organizations. S. Prerequisite: SOC 340.

Comparison of various theoretical perspectives on functioning of modern large-scale organizations.

***SOC 639/CIVE 639 03(3-0-0). Technology Assessment and Social Forecasting.** F. Prerequisite: SOC 500. Credit not allowed for both SOC 639 and CIVE 639.

Interrelationship between technology and society emphasizing procedures for evaluating impacts and forecasting alternatives.

***SOC 660 03(3-0-0). Theories of Development and Social Change.** F. Prerequisite: SOC 500.

Central concepts, issues, and approaches in sociology of development.

°SOC 661 03(0-0-3). Gender and Global Society. S. Prerequisite: SOC 500.

Gender relations and social change in global society.

SOC 662 03(0-0-3). Seminar in Sociological Policy Analysis. S. Prerequisite: SOC 500.

Examination of sociological perspectives on formulation and impact of policies to deal with social problems.

***SOC 663 03(3-0-0). Sociology of Sustainable Development.** S. Prerequisite: SOC 500.

Social dimensions of sustainable Third World development and implications for policy.

°SOC 664 03(3-0-0). Sociology of Water Resources. F. Prerequisite: SOC 500.

Social organization, conflict, and power in arid environments.

SOC 665 03(3-0-0). Sociology of Science and Technology. F. Prerequisite: Ten credits of undergraduate natural sciences; SOC 100.

Examination of connections among science, technology, and social development in national and global context.

***SOC 666 03(0-0-3). Globalization and Socioeconomic Restructuring.** S. Prerequisite: SOC 500.

Sociological theories and issues in globalization; socioeconomic restructuring of the world economy.

°SOC 667 03(3-0-0). Theories of State, Economy, and Society. S. Prerequisite: SOC 500.

Major classical and contemporary sociological theories of state-economy-society relations emphasizing development.

SOC 668 03(3-0-0). Environmental Sociology. S. Prerequisite: SOC 500.

Connections between social organizations, the environment, and science and technology.

SOC 669 03(0-0-3). Global Inequality and Change. F. Prerequisite: SOC 500.

Major issues in global inequality and change from a historical and contemporary perspective.

SOC 671 03(0-0-3). Metatheoretical Issues in Sociology. F. Prerequisite: SOC 502.

Analysis of metatheoretical concepts and issues in sociological theory.

SOC 693A-D 03(0-0-3). Seminar. S. Prerequisite: SOC 602.

A) Structural theory. B) Cultural theory. C) Middle range theory. D) Metatheory.

SOC 695 Var. Independent Study.

SOC 696 Var [1-3]. Group Study. Maximum of 8 credits allowed in course.

SOC 699 Var. Thesis.

°SOC 752 03(0-0-3). Seminar in Utopian Thought. F. Prerequisite: SOC 602.

Sociological analysis of major utopian writings.

SOC 784 Var. Supervised College Teaching.

SOC 787 Var. Internship.

***SOC 793A-D 03(0-0-3). Seminar.** S. Prerequisite: SOC 511.

A) Quantitative data collection. B) Quantitative data analysis. C) Advanced ethnographic methods. D) Comparative methods.

SOC 795 Var. Independent Study.

SOC 799 Var. Dissertation.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SOIL AND CROP SCIENCES COURSES

Department of Soil and Crop Sciences College of Agricultural Sciences

SOCR 100 04(3-2-0). General Crops. F.

Production and adaptation of cultivated crops; principles affecting growth, development, management, and utilization.

SOCR 171/HORT 171 03(2-0-1). Environmental Issues in Agriculture. (GT-SS3, AUCC 3E). F. Credit not allowed for both SOCR 171 and HORT 171.

Historical development of agriculture; environmental consequences of modern food production and other cultural approaches to agriculture.

SOCR 177 01(1-0-0). Applied Information Technology in Agriculture. S.

Introduction to database and project management, GIS/GPS, and remote sensing as they apply to agriculture, the environment, and business management.

SOCR 192 03(0-0-3). Water in the West. F.

History and current status of water resources management and policy in the western United States.

SOCR 200 01(0-2-0). Seed Anatomy and Identification. F, S, SS. Prerequisite: BZ 104 or BZ 110 or BZ 120 or HORT 100 or LIFE 102 or SOCR 100.

Principles of seed anatomy including reproduction, identification, and seed characteristics of plant families. (NT-C/O)

SOCR 201 01(0-2-0). Seed Development and Metabolism. F, S, SS. Prerequisite: BZ 104 or BZ 110 or BZ 120 or HORT 100 or LIFE 102 or SOCR 100.

Basic processes controlling seed development, maturation, dormancy, storage, germination, and how these factors relate to seedling growth. (NT-C/O)

SOCR 240 04(3-2-0). Introductory Soil Science. F, S. Prerequisite: CHEM 107 or CHEM 111.

Formation, properties, and management of soils emphasizing soil conditions that affect plant growth.

SOCR 300 02(0-4-0). Seed Purity Analysis. F, S, SS. Prerequisite: SOCR 201 or written consent of instructor.

Fundamentals for determining physical purity of a seed lot using established rules and procedures. (NT-C/O)

SOCR 301 02(0-4-0). Seed Germination and Viability. F, S, SS. Prerequisite: SOCR 201 or written consent of instructor.

Seed viability tests including standard germination and tetrazolium, seed viability, dormancy, parameters of viability and evaluation. (NT-C/O)

***SOCR 304 03(2-2-0). Seed Production, Conditioning, and Marketing.** S. Prerequisite: SOCR 100.

Scientific principles of seed development, maturation and testing including harvesting, conditioning, and marketing of seed crops.

SOCR 310 02(0-4-0). Agronomic Plant and Seed Identification. S. Prerequisite: BZ 104 or BZ 110 or BZ 120 or HORT 100 or LIFE 102 or SOCR 100.

Evaluate characteristics needed to identify agronomic plant and seed species.

SOCR 320 03(3-0-0). Forage and Pasture Management. S. Credit not allowed for both SOCR 320 and RS 320.

Fundamentals of establishment, management, and utilization of cultivated forages including hay, silage, and pasture production.

SOCR 322 03(3-0-0). Principles of Microclimatology. S. Prerequisite: Three credits in PH.

Principles of microclimatology including energy balance concepts for soil and vegetation surfaces, and their application.

SOCR 330 03(3-0-0). Principles of Genetics. F, S, SS. Prerequisite: BZ 110 or BZ 120 or LIFE 102.

Transmission, population, and molecular genetics; practical applications.

SOCR 331 01(0-2-0). Genetics Laboratory. F, S. Prerequisite: SOCR 330 or concurrent registration.

Experimental techniques in transmission and molecular genetics.

***SOCR 341 01(1-0-0). Microbiology for Sustainable Agriculture.** S. Prerequisite: SOCR 240.

Functional roles and management of soil organisms in organic agriculture, emphasis on ecological interactions with plants and plant pathogens.

***SOCR 342 01(1-0-0). Organic Soil Fertility.** S. Prerequisite: SOCR 240; SOCR 341; SOCR 350.

Organic soil fertility management in framework of holistic organic farming system.

***SOCR 343 01(1-0-0). Composting Principles and Practices.** F. Prerequisite: SOCR 240; SOCR 350.

Fundamentals of compost production, use, and regulation.

***SOCR 344 01(1-0-0). Crop Development Techniques.** S. Prerequisite: BZ 120 or LIFE 102 or LIFE 103.

Conventional and transgenic approaches to crop variety development.

***SOCR 345/*HORT 345 02(0-4-0). Diagnosis and Treatment in Organic Fields.** SS. Prerequisite: BSPM 302 or BSPM 308 or BSPM 361; HORT 100 or SOCR 100; SOCR 240. Credit not allowed for both SOCR 345 and HORT 345.

Field experience in diagnosis of pest and nutrient problems on organic farms and development of treatment recommendations. (\$)

SOCR 350 03(3-0-0). Soil Fertility Management. F. Prerequisite: SOCR 240.

Managing soil fertility and fertilizers to meet plant nutrient requirements in an environmentally sound manner with emphasis on nutrient cycling.

SOCR 351 01(0-2-0). Soil Fertility Laboratory. F. Prerequisite: SOCR 350 or concurrent registration.

Soil chemical analyses and development of fertilizer recommendations for crops.

SOCR 370 02(2-0-0). Irrigation Principles. S. Prerequisite: HORT 100 or SOCR 100 or BZ 120; SOCR 240.

Determination of irrigation water requirements based on the estimation of storage and movement of water in the soil-plant-atmospheric system.

+SOCR 371 01(1-0-0). Irrigation of Field Crops. F. Prerequisite: SOCR 370.

Management of irrigation systems for field crops with emphasis on irrigation methods, irrigation scheduling and strategies for water conservation. Required field trips.

+SOCR 377 03(2-2-0). Geographic Information Systems in Agriculture. F. Prerequisite: Three credits in SOCR or CS. Credit allowed for only one of the following: SOCR 377 or CIVE 377 or SOCR 577.

Introduction to geographic information systems and global positioning systems with applications to agriculture. (\$)

SOCR 384 Var [1-5]. Supervised College Teaching. F, S, SS. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

+SOCR 400 03(2-2-0). Soils and Global Change: Science and Impacts. F. Prerequisite: LIFE 220 or LIFE 320; SOCR 240. Required field trips.

Foundations on the science of global change and its impact on soil processes and biota.

SOCR 410 01(1-0-0). Seed Processes: Storage and Deterioration. F, S, SS. Prerequisite: BZ 104 or BZ 105 or BZ 120.

Environmental conditions and management factors influencing storage and deterioration of seeds, including physiological and biochemical changes. (NT-C/O)

SOCR 411 01(1-0-0). Large Seeded Legume Seed Production. F, S, SS. Prerequisite: BZ 104 or BZ 105 or BZ 120.

Principles for seed production of large-seeded legume crops with emphasis on common bean, peanut and soybean. (NT-C/O)

SOCR 412 01(1-0-0). Seed Processes: Separation and Conditioning. F, S, SS. Prerequisite: SOCR 100.

Understanding the physical process required to separate pure seed from contaminants and maintain viability. (NT-C/O)

SOCR 414 03(2-3-0). Agricultural Experimental Design. S. Prerequisite: STAT 201 or STAT 301. Credit allowed for only one of the following: SOCR 414, SOCR 514, STAT 350, or STAT 514.

Design of agricultural experiments and statistical analysis of resulting data.

SOCR 420 03(3-0-0). Crop and Soil Management Systems I. S. Prerequisite: HORT 100 or SOCR 100; SOCR 240.

Principles of crop, soil management emphasizing environmental factors influencing crop growth and development, interactions with soil organic matter.

SOCR 421 04(3-2-0). Crop and Soil Management Systems II. F. Prerequisite: HORT 100 or SOCR 100; SOCR 240.

Principles of crop and soil management with emphasis on soil erosion control, water conservation, and plant-water relationships. (\$)

***SOCR 424/*HORT 424 03(3-0-0). Topics in Organic Agriculture.** S. Prerequisite: AREC 202 or ECON 202; AREC 328; HORT 100 or SOCR 100; SOCR 171/HORT 171; SOCR 240. Credit not allowed for both SOCR 424 and HORT 424.

Examination of issues specific to organic food production systems and marketing.

***SOCR 430 03(3-0-0). Applications of Plant Biotechnology.** S. Prerequisite: SOCR 330.

Current and potential applications of DNA-based biotechnology in crop agriculture and other plant disciplines.

SOCR 440 04(2-3-1). Pedology. F.

Process of soil formation, characterization, classification of soils; soil survey methods. (\$)

SOCR 441 03(2-3-0). Soil Ecology. S. Prerequisite: SOCR 455.

An integrative, hands-on experience in the theory and application of ecology principles to the soil environment.

SOCR 442 03(3-0-0). Forest and Range Soils. F

Soil and water relationships in forest and rangeland ecosystems; significant properties in their management.

***SOCR 446 02(2-0-0). Physiology of Seeds.** S. Prerequisite: BZ 440.

Effects of environmental factors on germination, dormancy, and longevity of seeds.

***SOCR 448/*ANEQ 448 03(2-2-0). Livestock Manure Management and Environment.** F. Prerequisite: 3 credits 100-level chemistry. Credit not allowed for both ANEQ 448 and SOCR 448.

Manure management; maximizing benefits to soils and crops; minimizing air and water quality hazards; complying with regulations.

SOCR 455 03(3-0-0). Soil Microbiology. F. Prerequisite: MIP 300 or SOCR 240.

Microbial activities in agricultural, forest, and grassland soils; in soil-plant relationships; and in maintenance of environmental quality.

SOCR 456 01(0-3-0). Soil Microbiology Laboratory. F. Prerequisite: SOCR 455 or concurrent registration.

Techniques used in study of ecology and activities of soil microorganisms.

***SOCR 460/*HORT 460 03(2-0-1). Plant Breeding.** F. Prerequisite: BZ 350 or concurrent registration or LIFE 201A or concurrent registration or SOCR 330 or concurrent registration. Credit not allowed for both SOCR 460 and HORT 460.

Theory and practice of plant breeding using principles of genetics and related sciences.

***SOCR 461/*HORT 461 01(0-2-0). Plant Breeding Laboratory.** F. Prerequisite: SOCR 460/HORT 460 or concurrent registration. Credit not allowed for both SOCR 461 and HORT 461.

Techniques and procedures used in public and commercial plant breeding programs.

SOCR 467 03(3-0-0). Soil and Environmental Chemistry. S. Prerequisite: CHEM 335.

Fundamental principles of soil chemistry with respect to environmental reactions between soils and other natural materials and priority pollutants.

SOCR 470 03(3-0-0). Soil Physics. F. Prerequisite: SOCR 240 or GEOL 232.

Physical properties of soils emphasizing mechanical composition, moisture, aeration, temperature, and structure related to management, plant growth.

SOCR 471 01(0-3-0). Soil Physics Laboratory. F. Prerequisite: SOCR 470 or concurrent registration.

Familiarization of techniques and equipment used in evaluation of soil physical properties.

***SOCR 475 03(3-0-0). Global Challenges in Plant and Soil Science.** S. Prerequisite: SOCR 240 or GEOL 122; LIFE 102 or BZ 120.

Evaluation of case studies to define problems and develop solutions to address global challenges in plant and soil science.

SOCR 478 03(3-0-0). Environmental Soil Sciences. S. Prerequisite: SOCR 467 or concurrent registration; SOCR 470.

Chemical, biological, and physical aspects of prevention and remediation of soil and water pollution; environmental impact assessment.

SOCR 479 01(0-3-0). Environmental Soil Science Laboratory. S. Prerequisite: SOCR 478 or concurrent registration.

Laboratory and field studies of soil and groundwater contamination, including monitoring and remediation.

SOCR 486 Var[1-4]. Practicum. Prerequisite: Written consent of instructor.

Directed experiences in the application of soil and crop science principles.

SOCR 487 Var [1-12]. Internship.

SOCR 492 01(0-0-1). Seminar.

SOCR 495 Var. Independent Study.

SOCR 496 Var. Group Study.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC-*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SOCR 498 Var. [1-6]. Undergraduate Research. Prerequisite: Written consent of instructor.

Research in soil and crop sciences.

SOCR 514/STAT 514 04(3-3-0). Agricultural Experimental Design and Analysis. S. Prerequisites: STAT 201 or STAT 301 or STAT 307. Credit allowed for only one of the following: SOCR 414, SOCR 514, STAT 350, or STAT 514.

Design and implementation of agricultural experiments and statistical analysis of resulting data.

SOCR 522 03(3-0-0). Micrometeorology. S. Prerequisite: Three credits in PH.

Microenvironments; physics of environmental variables; plant canopy microclimate; evapotranspiration; surface-atmosphere exchange; instrumentation.

SOCR 530/BSPM 530 01(1-0-0). Scientific Writing. S. Credit not allowed for both SOCR 530 and BSPM 530.

Skills necessary to prepare complete scientific journal articles including writing, editing, and literature searching and assessment.

***SOCR 535 03(3-0-0). Origin and Evolution of Cultivated Plants.** F. Prerequisite: SOCR 330.

Origin of crops from viewpoints of archaeology, history, botany, and taxonomy, and continued evolution of plants under cultivation.

***SOCR 540 03(3-0-0). Soil-Plant-Nutrient Relationships.** S. Prerequisite: SOCR 350.

Soil and plant factors affecting nutrient uptake, mechanistic models of uptake, availability and functions of essential elements, diagnostic techniques.

***SOCR 548/*ANEQ 548 04(2-2-1). Issues in Manure Management.** F. Prerequisite: Three credits 100-level chemistry. Credit allowed for only one of the following: SOCR 548, ANEQ 448, and ANEQ 548.

Manure management practices maximizing benefits to soils and crops while minimizing hazards to air and water quality and complying with regulations.

***SOCR 550 03(3-0-0). Advanced Soil Genesis.** S. Prerequisite: SOCR 440.

Modern concepts of specific mechanisms involved in formation of genetic soil groups and their relationship to environmental factors.

SOCR 560 03(3-0-0). Chemical Equilibria in Soils. F. Prerequisite: SOCR 240 or nine credits of chemistry.

Chemical reactions, solubility relationships, speciation in solution, mineral weathering, redox reactions, metal chelation, fixation of nutrients.

°SOCR 564 03(3-0-0). Soil Chemical Analysis. S. Prerequisite: CHEM 335; SOCR 240.

Theory and applications of soil testing. Total and available nutrients, CEC, salinity, isotopes, and instrumentation.

SOCR 567 04(3-0-1). Environmental Soil Chemistry. S. Prerequisite: CHEM 335. Credit not allowed for SOCR 467 and SOCR 567.

The chemistry of terrestrial environments and the interactions of soil constituents with bacteria, nutrients, and pollutants.

+SOCR 577 03(2-2-0). Principles/Components: Precision Agriculture. F. Prerequisite: Three credits in SOCR or CS. Credit allowed for only one of the following: CIVE 377 or SOCR 377 or SOCR 577.

Principles and components of precision agriculture, including GPS, GIS, remote sensing, and their applications in soil and crop management. (\$)

°SOCR 620 03(2-3-0). Modeling Ecosystem Biogeochemistry. F. Prerequisite: MATH 155 or MATH 160; LAND 220/LIFE 220 or SOCR 240 or ECOL 505.

Design and build biogeochemical process and ecosystem models with

GUI-based software. Analyze and test models and interpret experimental data.

°SOCR 640 01(1-0-0). Crop Physiology. F. Prerequisite: BZ 440.

Developmental, physiological, and biochemical determinants of crop yields as controlled by genetic and environmental effects.

°+SOCR 670 03(2-2-0). Terrestrial Ecosystems Isotope Ecology. S.

Isotopes distribution in biogeochemical cycles; research topics in biosphere-atmosphere interactions; lab experience with isotope techniques. Field trips required.

SOCR 675 01(1-0-0). Presentations for Scientific Audiences. F.

Organization and presentation of scientific information to audiences in oral and poster format.

SOCR 699 Var. Thesis.

SOCR 720A-B 02(2-0-0). Advanced Plant Breeding. Prerequisite: HORT 460/SOCR 460; 3 credits in STAT.

*A) Methods. F (even years). Historical perspectives in plant breeding, plant reproduction, genetic gain, breeding and selection systems in self- and cross-pollinated plants. °B) Tools. S (odd years). Plant breeding strategies, genotype x environment interaction, field plot and genomic tools, breeding for pest resistance, stress tolerance, quality.

***SOCR 725 03(2-2-0). Quantitative Inheritance in Plant Breeding.** S.

Quantitative genetic structure of populations, recognition of genetic, environmental variance. Methods of dealing with quantitatively inherited traits.

SOCR 730 01(1-0-0). Topics in Plant Breeding and Genetics. F.

Current literature regarding mechanisms used for plant improvement.

***SOCR 731 01(1-0-0). Plant Breeding Data Management.** F.

Prerequisite: Three credits in computer science.

Principles and best practices for optimal data management for plant breeding and other data-intensive research programs.

°SOCR 740/°BSPM 740 03(3-0-0). Plant Molecular Genetics. F. Prerequisite: BC 351; SOCR 330. Credit not allowed for both SOCR 740 and BSPM 740.

Advances in study of organization and function of nuclear and organellar genomes, gene expression in higher plants, and plant- microbe interactions.

***SOCR 755 03(3-0-0). Advanced Soil Microbiology.** S. Prerequisite: MIP 624 or SOCR 455.

Ecology of soil microorganisms emphasizing population and activity relationships, nitrogen fixation, and microbe-pesticide interactions.

°SOCR 760 03(3-0-0). Advanced Soil Chemistry. F. Prerequisite: Four semesters of chemistry; one course in computer science; one semester of calculus.

Surface chemistry of soils, electrical double layer models of surface charge and potential, colloid stability, computer modeling of adsorption.

***SOCR 770 04(3-2-0). Advanced Soil Physics.** S. Prerequisite: MATH 261 or SOCR 470.

Description and analysis of principles of storage and movement of water, solutes, heat, and gases in soils.

SOCR 784 Var. Supervised College Teaching.

SOCR 792 01(0-0-1). Seminar.

SOCR 795 Var. Independent Study.

SOCR 796 Var. Group Study.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SOCR 799 Var. Dissertation.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SOCIAL WORK COURSES

School of Social Work

College of Applied Human Sciences

SOWK 110 03(2-0-1). Contemporary Social Welfare. (GT-SS3, AUCC 3C). F, S, SS.

Principles, values and institutions of U.S. social welfare in context of human need within family, groups, and society.

SOWK 150 03(3-0-0). Introduction to Social Work. F, S. Prerequisite: PSY 100 or concurrent registration; SOC 100 or concurrent registration or SOC 105 or concurrent registration.

Introduction to social work; history of social welfare in the U.S.; overview of knowledge, values, skills, practice settings, and populations served. (NT-T)

SOWK 233 03(3-0-0). Human Behavior in the Social Environment. F, S. Prerequisite: HDFS 101 or concurrent registration; SOWK 150 or concurrent registration.

Understanding human behavior theory relevant to social work practice.

SOWK 286A-B 03(0-3-2). Practicum. Prerequisite: SOWK 233 or concurrent registration.

Introductory social work practice skills in communication, relationship development, and professional behavior. **A)** Practicum I. **B)** Practicum II.

SOWK 330 03(3-0-0). Human Diversity Practice Issues. F, S. Prerequisite: SOWK 233 or concurrent registration.

Knowledge about human differences and similarities essential for social work practice.

SOWK 340 03(0-0-3). Generalist Practice-Individuals and Families. F, S. Prerequisite: SOWK 286B or concurrent registration; progression into the major.

Knowledge and techniques used in applying the generalist planned change process to individual and family system assessments and interventions.

SOWK 341 03(0-0-3). Generalist Practice-Small Groups. F, S. Prerequisite: SOWK 340 or concurrent registration.

Within a generalist framework, focuses on the knowledge, skills, and competencies needed for the planned change process in groups.

SOWK 342 03(1-0-2). Generalist Practice-Organizations/Communities. F, S. Prerequisite: SOWK 340 or concurrent registration.

Knowledge regarding the planned change process with organizations and communities.

SOWK 350 03(0-0-3). Legal Issues in Human Services. SS.

Legal principles, procedures, and issues relevant to social work including policy research and courtroom testimony. (NT-O)

SOWK 352/ETST 352 03(3-0-0). Indigenous Women, Children and Tribes. F. Credit not allowed for both SOWK 352 and ETST 352.

Historical and contemporary lives of women, children, and tribal communities.

SOWK 371A-E 03(3-0-0). Social Work with Selected Populations.

Application of practice processes with selected populations. **A)** Children and families. F, S. **B)** Juvenile offenders. F. **C)** Adult offenders. **S. D)** Substance abusers. **S. E)** Social gerontology. F, S.

SOWK 384 Var [1-5]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements. Assist instructor in teaching selected classes, group training, or discussion group leadership.

SOWK 410 03(2-0-1). Social Welfare Policy. F, S. Prerequisite: SOWK 342 or concurrent registration.

Issues and processes shaping social welfare institutions; definitions of social welfare policy; analytical framework for policy analysis.

SOWK 450/IE 450 03(3-0-0). International Social Welfare and Development. F. Credit not allowed for both SOWK 450 and IE 450.

Framework of social welfare and development in international area; social need with focus on cultures/countries in transition.

SOWK 488 Var [5-10]. Field Placement. F, S, SS. Prerequisite: AHS 300 or concurrent registration; SOWK 330; SOWK 341; SOWK 342; SOWK 410 or concurrent registration. Maximum of 10 credits allowed in course.

Engagement, assessment, interventions, and evaluation at multiple levels of service as well as mastery of foundation practice roles.(\$)

SOWK 490A-B Var [1-3]. Workshop.

A) Family centered work I. **B)** Family centered work II.

SOWK 492 03(2-0-1). Seminar. Prerequisite: SOWK 488 or concurrent registration.

Integrates theory with social work core competencies and practice behaviors while in field placement.

SOWK 495 Var [1-12]. Independent Study.

SOWK 496 Var [1-12]. Group Study.

SOWK 500 03(3-0-0). Principles and Philosophy of Social Work. F, S, SS. Prerequisite: Admission to the MSW program.

Knowledge, values, history, and philosophy of social work. (NT-T)

SOWK 511 03(0-0-3). Generalist Practice-Small Client Systems. F. Prerequisite: SOWK 500 or concurrent registration; concurrent registration in SOWK 515.

Generalist practice perspective. Practice knowledge and skills related to intervention with individuals and families within a systems framework.

SOWK 512 01(0-2-0). Small Client Systems Skills Laboratory. F. Prerequisite: SOWK 511; concurrent registration in SOWK 588.

Application of communication and relationship skills for professional practice.

SOWK 515 04(3-0-1). Theoretical Foundations for Social Work. F. Prerequisite: SOWK 500 or concurrent registration.

Socio-behavioral principles relevant to generalist social work practice.

SOWK 520 03(2-0-1). Social Welfare Policy Analysis. F. Prerequisite: Admission to the MSW program.

Historical analysis and impact of social welfare policy..

SOWK 550 03(2-0-1). Animal Assisted Therapy/Human-Animal Bond. SS.

Nature of human-animal bond and animal assisted therapy as an intervention method.

SOWK 551 03(1-0-2). Fundamentals of Mediation. F, S, SS.

Knowledge and skills essential to the successful application of mediation for a wide variety of interpersonal conflicts.

SOWK 552 03(1-0-2). Conflict Management in Healthcare Settings. F, S, SS. Prerequisite: SOWK 551. Offered as an online course only.

Knowledge, values, and skills necessary for the practice of conflict resolution in health care and elder care settings. (NT-O)

SOWK 554 03(1-0-2). Conflict Resolution in the Workplace. F, S, SS. Prerequisite: SOWK 551. Offered as an online course only.

Knowledge, values, and skills necessary for the practice of conflict resolution in the workplace. (NT-O)

SOWK 556 03(1-0-2). Divorce and Family Mediation. F, S, SS. Prerequisite: SOWK 551.

Knowledge and skills essential to the practice of family mediation including divorce and child custody. (NT-O)

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SOWK 558 03(1-0-2). Arbitration. F, S, SS. Prerequisite: SOWK 551. Offered as an online course only.

Knowledge, values, and skills necessary for the practice of arbitration as a component of the arbitration-mediation continuum. (NT-O)

SOWK 560 03(2-0-1). Social Work Practice in Schools. F, S, SS.

Knowledge and skills essential to practice of social work in educational settings.

SOWK 561 03(0-0-3). School/Community: People with Disabilities. F, SS.

Teamwork approach to serving persons with special needs values, issues, and best practices related to creating desirable futures for them. (NT-O)

SOWK 571 03(2-0-1). Small Client Systems: Theory and Practice. SS. Prerequisite: admission to MSW program.

Theories and practice principles relevant to social work practice with small client systems.

SOWK 572 03(2-0-1). Large Client Systems: Theory and Practice. SS. Prerequisite: Admission to MSW Program.

Theories and practice principles relevant to social work practice with large client systems.

SOWK 588 Var [1-6]. Field Placement. S. Prerequisite: SOWK 512 or concurrent registration; SOWK 601 or concurrent registration; SOWK 611 or concurrent registration. Maximum of 6 credits allowed in course.

Supervised professional practice. (\$)

SOWK 590 Var [1-6]. Workshop.

SOWK 600 03(3-0-0). Methods of Research I. F. Prerequisite: Concurrent registration in SOWK 520; STAT 201.

Social work research: role of practitioners as consumers and initiators of research.

SOWK 601 03(3-0-0). Methods of Research II. S. Prerequisite: SOWK 600.

Data analysis, computer processing in social work research, and methods for evaluating one's own practice.

SOWK 602A-B 02(0-0-2). Macro-Level Social Work Practice Research. A) F. B) S. Prerequisite: Concurrent registration in SOWK 688. A) SOWK 601. B) SOWK 602A.

Design and implementation of needs assessment, program implementation, and community research.

SOWK 603A-B 02(0-0-2). Direct Practice Assessment and Evaluation.

Selection and application of techniques for monitoring and evaluating interventions with individuals, families, and groups. A) F. Prerequisite: SOWK 601; concurrent registration in SOWK 688. B) S. Prerequisite: SOWK 603A; concurrent registration in SOWK 688.

SOWK 611 03(1-0-2). Generalist Practice-Large Client Systems. S. Prerequisite: SOWK 511.

Practice knowledge and skills related to intervention with task groups, coalitions, organizations, and communities.

SOWK 630 02(1-0-1). Advanced Generalist Practice with Individuals. F, S. Prerequisite: SOWK 601; (SOWK 571; SOWK 572) or (SOWK 588; SOWK 611).

Knowledge and skills appropriate for clinical assessments and interventions with individuals focusing on contemporary theoretical constructs.

SOWK 631 02(1-0-1). Advanced Practice with Communities. F, S. Prerequisite: SOWK 601; (SOWK 571; SOWK 572) or SOWK 588.

Knowledge, skills, and values regarding the planned change process with communities.

SOWK 632 02(0-0-2). Advanced Practice: Manager/Administrator. F, S, SS. Prerequisite: SOWK 601; (SOWK 571; SOWK 572) or SOWK 588.

Knowledge, values, skills of organizational practice for a social work manager/administrator.

SOWK 633 02(0-0-2). Advanced Practice: Social Welfare Policy. F, S, SS. Prerequisite: SOWK 601; (SOWK 571; SOWK 572) or (SOWK 520; SOWK 588; SOWK 611).

Application of social welfare policy analysis models; normative aspects of policy analysis and assessment skills.

SOWK 634 03(1-0-2). Advanced Practice with Families and Groups. F, S, SS. Prerequisite: SOWK 630.

Apply engagement, assessment, and intervention skills, theoretical models, and evidence-based practice approaches in work with families and groups.

SOWK 684 Var [1-5]. Supervised College Teaching. Maximum of 10 credits allowed in course.

SOWK 688 Var[1-8]. Field Placement. F, S. Prerequisite: SOWK 511, SOWK 571; SOWK 572; SOWK 601. Maximum of 15 credits.

Integrates and applies competencies and measurable practice behaviors comprising knowledge, values, and skills in social work practice.

(S)

SOWK 695 Var. Independent Study. F, S, SS. (NT)

SOWK 696 Var. Group Study. F, SS, S. (NT)

SOWK 698 Var [1-6]. Research. Prerequisite: SOWK 601. Maximum of 6 credits allowed in course.

SOWK 699 Var. Thesis. Maximum of 6 credits allowed in course.

***SOWK 701 03(1-0-2). Contemporary Issues-Social Work Education.** S. Prerequisite: Master's degree in social work.

Issues and trends currently impacting professional education for social work practice.

***SOWK 702 03(1-0-2). Social Welfare Policies in Selected Countries.** S. Prerequisite: SOWK 701.

Social welfare policy analysis and impact on professional social work practice.

***SOWK 703 03(1-0-2). Theoretical Analysis of Social Work Practice.** SS. Prerequisite: SOWK 701.

Social work practice theories; building, evaluating, and teaching for social work educators.

SOWK 704 03(1-0-2). Theoretical Foundations of Social Work. F. Prerequisite: SOWK 701.

Nature and processes of theory building in social work. Issues of epistemology, logic, politics and moral philosophy.

SOWK 784 Var [1-3]. Supervised College Teaching.

SOWK 786 03(0-0-3). Research Practicum. F, S, SS. Prerequisite: EDRM 700; EDRM 704; SOWK 701.

SOWK 792 03(0-0-3). Seminar. F, S, SS. Prerequisite: SOWK 701.

SOWK 795 Var. Independent Study.

SOWK 799 Var. Dissertation.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SPEECH COMMUNICATION COURSES

Department of Communication Studies

College of Liberal Arts

SPCM 100 03(3-0-0). Communication and Popular Culture. (GT-AH1, AUCC 3B). F, S, SS.

Classical tradition of speech communication, its extension to broadcasting, and integration of both in contemporary culture.

SPCM 130 03(2-0-1). Relational and Organizational Communication. F, S, SS.

Basic communication processes and skills central to relating and organizing in interpersonal, small group, and organizational contexts.

SPCM 200 03(3-0-0). Public Speaking. (AUCC 2A). F, S, SS.

Fundamentals of public speaking emphasizing content, organization, delivery, audience response.

SPCM 201 03(3-0-0). Rhetoric in Western Thought. (GT-AH3, AUCC 3B). F, S.

Major concepts of Western rhetoric from Greece to modern times and their relationship to present-day approaches to communication.

SPCM 207 03(3-0-0). Public Argumentation. F, S, SS. Prerequisite: SPCM 200.

Key communication principles for democracy, including issue analysis, evidence, reasoning, decision-making, debate, dialogue, and deliberation.

SPCM 231 03(3-0-0). Performance Studies. F, S.

Analysis and reading of rhetorical and poetic writing leading to understanding, appreciation, and expressive communication.

SPCM 232 03(3-0-0). Group Communication. F, S. Prerequisite: SPCM 200.

Principles and methods of group communication emphasizing face-to-face and electronically mediated problem solving and decision making.

SPCM 278A-G 01(1-0-0). Communication Skills. F, S, SS. A maximum of 3 credits are allowed for SPCM 278A-G.

Applied communication skills in specific contexts.

A) Convention Planning. F, S. B) Interviewing. F. C) Film Festivals. F. D) Friendship. S. E) Intercultural Competence. F. F) Virtual Communication. F, S. G) Parliamentary Procedure. F, S, SS.

SPCM 300 03(0-0-3). Advanced Public Speaking. F, S, SS. Prerequisite: SPCM 200; SPCM 207.

Advanced technique in public speaking; emphasis on argument construction and refutation, style, and manuscript delivery.

SPCM 311 03(3-0-0). Historical Speeches on American Issues. F.

Significant speeches and speakers as they reflected and affected American issues from colonial period through early 20th century.

SPCM 331 03(3-0-0). Nonverbal Communication. S.

Non-language symbols in communication; systems and functions of nonverbal communication behaviors.

SPCM 332 03(3-0-0). Interpersonal Communication Skills. F, S, SS.

Analysis, exploration, and skill enhancement strategies for interpersonal communication in friendship, couple, family, and business relationships.

SPCM 333 03(3-0-0). Professional Communication. F, S. Prerequisite: SPCM 200.

Technological, interpersonal, and ethical dimensions of professional communication, emphasizing interviews, teams, and presentations at work.

SPCM 334 03(3-0-0). Co-Cultural Communication. F, SS.

Cultural concerns of communication among co-cultures of United States;

diversity; self-awareness as cultural imperative for enhanced communication.

SPCM 335 03(3-0-0). Gender and Communication. F.

Analysis and exploration of communication as it relates to gender and women's and men's roles and identities. (NT-O)

SPCM 341 03(3-0-0). Evaluating Contemporary Television. F.

Rhetorical standards applied to content, ethical, and artistic aspects of American televised discourse; emphasizing nonentertainment programming. (NT-O)

SPCM 342 03(3-0-0). Critical Media Studies. F, S.

Analysis of communication media; history; structure, regulation, policy, and impact upon society.

SPCM 346 03(2-2-0). Virtual Culture and Communication. F, S. Prerequisite: SPCM 100 or SPCM 342.

Rhetorical theory applied to planning, producing, and evaluating computer-mediated messages.

SPCM 347 03(3-0-0). Visual Communication. S. Prerequisite: SPCM 100 or SPCM 342.

Media/visual aesthetics and literacy and the symbolic and affective dimensions of the codes, conventions, and formulas of media.

SPCM 349 03(3-0-0). Freedom of Speech. F, S.

Historical and philosophical precedents to freedom of speech; development of free speech principles in the U.S.; ethical obligations of speakers. (NT-O)

SPCM 350 03(2-3-0). Evaluating Contemporary Film. S. Prerequisite: None.

Theory and development of film criticism; application of critical approaches to modern fiction and nonfiction film. (NT-O)

SPCM 354 03(2-3-0). History and Appreciation of Film. F.

Screening and evaluation of landmark fiction and nonfiction films; assessment of cinema as an art form and a social force.

SPCM 357 03(2-3-0). Film and Social Change. F. Prerequisite: None.

Ways in which the medium of motion pictures has sparked significant social changes at home and abroad.

SPCM 378 03(0-0-3). Virtual Workplace Communication. F, S, SS.

Interpersonal/organizational dimensions and communicative processes underpinning virtual/remote/distributed workers and workplaces. (NT-O)

SPCM 384 Var [1-3]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements. Open only to undergraduate students who are invited to assist in teaching selected courses.

SPCM 387 01(1-0-0). Communication Internship. Prerequisite: SPCM 100 or SPCM 342; SPCM 200; SPCM 201; SPCM 207; 2.000 GPA.

SPCM 401 03(3-0-0). Rhetoric in Social Movements. F.

Case studies of campaigns and social movements; genesis, leadership, and use of traditional and electronically mediated rhetoric to achieve objectives.

SPCM 407 03(3-0-0). Public Deliberation. F, S. Prerequisite: SPCM 200; SPCM 207.

Communication in collaborative decision-making and community problem-solving, examined through the lens of deliberative democracy.

SPCM 408 03(3-0-0). Applied Deliberative Techniques. F, S. Prerequisite: Written consent of instructor.

Skills development and direct experience in convening, facilitating, and reporting public forums tied to Center for Public Deliberation activities.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SPCM 411 03(3-0-0). Contemporary Speeches on American Issues. S.

Significant speeches and speakers as they reflect and affect issues, 1930 to present.

SPCM 412 03(3-0-0). Evaluating Contemporary Rhetoric. S.

Exploration and evaluation of contemporary persuasive communication in order to understand and assess a variety of forms of messages and symbols.

SPCM 415 03(3-0-0). Rhetoric and Civility. F. Prerequisite: None.

Relationship between rhetoric and civility historically and in contemporary times.

SPCM 420 03(3-0-0). Political Communication. F.

Rhetoric of political campaigns. (NT-O)

SPCM 429 03(3-0-0). Environmental Discourse. F, S.

Environmental communication in advocacy campaigns, media representations of science, encounters with nature, and public policy.

SPCM 431 03(3-0-0). Communication, Language, and Thought. S.

Influence of rhetoric, ranging from spoken language to electronically mediated communication, on human understanding and Western thought.

SPCM 433 03(3-0-0). Communication and Organizations. F.

Communication theory and strategy for empowerment of non-supervisory and supervisory personnel.

SPCM 434 03(3-0-0). Intercultural Communication. F, S, SS.

Cultural influences on communication between people of different nations; communication rules/norms in specific cultures; cultural adaptation.

SPCM 436 03(3-0-0). Conflict Management and Communication. S.

Theories and principles of communication in conflict management; application to conflict resolution situations.

SPCM 437 03(3-0-0). Studies in Persuasion. S.

Rhetorical and behavioral theories of persuasion applied to persuasive practice in public and interpersonal arenas of social influence.

SPCM 454/ETST 454 03(2-2-0). Chicano/a Film and Video. F. Credit not allowed for both SPCM 454 and ETST 454.

Emergence of Chicano/a cinema from a place of displacement, resistance, and affirmation found in contemporary Chicano/a film, video.

SPCM 455/LB 455 03(2-3-0). Narrative Fiction Film as a Liberal Art. S. Prerequisite: Senior standing. Credit not allowed for both SPCM 455 and LB 455.

Narrative fiction film and its role in human history, culture, and social interaction.

SPCM 479 03(3-0-0). Capstone: Life in Postmodernity. F, S.

Prerequisite: Seniors in communication studies only.

Issues of communication with postmodernity.

SPCM 486 Var. Practicum.

Directed experience of communication techniques and procedures in the community with periodic faculty consultation.

SPCM 495 Var. Independent Study.

SPCM 496 Var. Group Study.

***SPCM 520 03(3-0-0). Rhetoric and Public Affairs. F.** Prerequisite: Graduate standing or 15 additional 300- and 400 level credits in communication studies.

Rhetoric's role in contemporary politics and civil society.

SPCM 523 03(3-0-0). Feminist Theories of Discourse. S. Prerequisite:

Graduate standing or SPCM 335 or WS 200 and 12 additional 300-400 level credits in communication studies.

Exploration and evaluation of contemporary feminist theories of rhetoric and discourse.

SPCM 532 03(3-0-0). Theories of Interpersonal Communication. S.

Prerequisite: Graduate standing or SPCM 332 and 12 additional 300-400 level credits in communication studies.

Theories of communication in development, maintenance, and deterioration of friendship, couple, family, group, and business relationships.

***SPCM 533 03(3-0-0). Discourse, Work, and Organization. F.**

Prerequisite: Graduate standing or SPCM 433 and 12 additional 300- and 400-level credits in communication studies.

How organizing processes and discursive practices create, maintain, and destroy diverse forms of work in society.

***SPCM 534 03(3-0-0). Communication and Cultural Diversity. S.**

Prerequisite: Graduate standing or SPCM 434 and 12 additional 300-400 level credits in communication studies.

Ethnographic approach to communication issues and concerns in a global context.

SPCM 538 03(3-0-0). Communicating in the Health Clinic. S.

Organizational, interpersonal, and intercultural dimensions of communicating in public health clinical settings.

SPCM 539 03(3-0-0). Communication Theory. F. Prerequisite: Graduate

standing or fifteen 300- and 400-level credits in communication studies and/or English.

Examination of communication philosophies and perspectives; analysis of modern theories of face-to-face communication.

SPCM 540/ 03(3-0-0). Rhetoric, Race and Identity. F. Prerequisite:

Graduate status or SPCM 412 and 12 additional 300-400 SPCM credits. Credit not allowed for both SPCM 540 and ETST 540.

Critical race theory and its relevance to rhetorical studies.

***SPCM 547 03(3-0-0). Media Industries. F.** Prerequisite: Graduate

standing or 15 300-400 level credits in communication studies or English.

Political economy of the media both in the U.S. and globally, including how the media system operates and with what effects.

***SPCM 548 03(3-0-0). Media Texts. S.** Prerequisite: Graduate standing or

fifteen 300- and 400-level credits in communication studies or English.

Practical and theoretical implications for criticism in treating media products as texts; various approaches to textual or discourse analysis.

***SPCM 549 03(3-0-0). Media Audiences. F.** Prerequisite: Graduate

standing or fifteen 300- and 400-level credits in communication studies or English.

Theoretical and methodological issues concerning how audiences use and interpret media.

***SPCM 550 03(3-0-0). Contemporary Issues in Media. S.** Prerequisite:

Graduate standing or fifteen 300- and 400-level credits in communication studies or English.

Ever-changing media culture and landscape and how it affects personal, professional, and public lives.

SPCM 570 03(3-0-0). Instructional Communication Theory,

Practice. F, S, SS.

Communication theory and research in instructional contexts.

Designed for current or prospective teachers. (NT-O)

***SPCM 592 03(0-0-3). Seminar-Topics in Speech Communication. S.**

Prerequisite: Graduate standing or fifteen 300-400 level credits in communication studies or English.

°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SPCM 601 03(3-0-0). History of Rhetorical Theory. F. Prerequisite: Fifteen 300- and 400-level credits in communication studies and/or English.

Rhetorical theories and theorists from the classical period to the present.

SPCM 604 03(3-0-0). Rhetoric of Everyday Life. S. Prerequisite: Graduate standing or SPCM 412 and 12 additional 300-400 SPCM credits.

Contemporary theories of rhetoric and of everyday life.

***SPCM 611 03(3-0-0). Topics in Public Address.** F. Prerequisite: Graduate standing or either SPCM 311 or SPCM 411 with additional 300- and 400-level credits in communication studies, history, or English.

Theoretical and methodological issues in public address research; analysis of public discourse of selected movements or periods in U.S. history.

SPCM 612 03(3-0-0). Rhetorical Criticism. F. Prerequisite: Fifteen 300-400 level credits in communication studies and/or journalism.

Traditional and contemporary methods for analyzing persuasive discourse.

SPCM 638 03(3-0-0). Communication Research Methods. S.

Historical and philosophical context of communication research; relationship between theory and method; dominant forms of communication research.

SPCM 646 03(3-0-0). Media Theory. F. Prerequisite: Fifteen 300-400 level credits in communication studies, English, or journalism.

Survey of the broad range of rhetorical/qualitative theories that inform media studies.

SPCM 675 03(3-0-0). Speech Communication Pedagogy. F. Prerequisite: Admission to communication studies master's program.

Instructional practices and theories in speech.

SPCM 684 Var [1-3]. Supervised College Teaching.

SPCM 692 Var. Seminar.

SPCM 695 Var. Independent Study.

SPCM 696 Var. Group Study.

SPCM 699 Var. Thesis.

APPLIED STATISTICS COURSES

Department of Statistics

College of Natural Sciences

STAA 551 02(2-0-0). Regression Models and Applications. F. Prerequisite: Admission to the M.A.S. program or written consent of instructor. This is a partial-semester course.

Estimation/hypothesis testing methods: t-test, ANOVA, regression, residual analyses, transformations, goodness of fit, interactions, confounding. (NT-V)

STAA 552 02(2-0-0). Generalized Regression Models. F. Prerequisite: STAA 551 or written consent of instructor. This is a partial-semester course.

Nonlinear regression, iteratively reweighted least squares, dose-response models, count data, multi-way tables, survival analysis. (NT-V)

STAA 553 02(2-0-0). Experimental Design. S. Prerequisite: (STAA 552 and STAA 562) or written consent of instructor. This is a partial-semester course.

Design/analysis of experiments. Emphasis on balanced design; use of computing packages SAS and R. Example based presentation, rather than theoretical. (NT-V)

STAA 554 02(2-0-0). Mixed Models. S. Prerequisite: STAA 553 or written consent of instructor. This is a partial-semester course.

Topics in linear, generalized linear, and nonlinear models with fixed and random predictors, balanced and unbalanced cases. (NT-V)

STAA 556 03(3-0-0). Statistical Consulting. SS. Prerequisite: (STAA 554; STAA 562) or written consent of instructor.

Effective consulting to meet with clients, analyze real data, and prepare reports. (NT-V)

STAA 561 02(2-0-0). Probability with Applications. F. Prerequisite: Admission to the M.A.S. program or written consent of instructor. This is a partial-semester course.

Random variables, continuous and discrete distributions, expectations, joint and conditional distributions, transformations. (NT-V)

STAA 562 02(2-0-0). Mathematical Statistics with Applications. F. Prerequisite: STAA 561 or written consent of instructor. This is a partial-semester course.

Theory and applications of estimations, testing, and confidence intervals. Computer simulations, sampling from the normal distribution.(NT-V)

STAA 565 01(1-0-0). Quantitative Reasoning. F. Prerequisite: Concurrent registration in STAA 551 or written consent of instructor. This is a partial-semester course.

Confounding, types of bias such as selection bias and regression effect bias, Simpson's paradox, experiments versus observational studies. (NT-V)

STAA 566 01(1-0-0). Computational and Graphical Methods. F. Prerequisite: Admission to the M.A.S. program or written consent of instructor. This is a partial-semester course.

Exploratory data analysis using graphics, effective communication with graphs, data reduction methods. (NT-V)

STAA 567 01(1-0-0). Computational and Simulation Methods. S. Prerequisite: (STAA 551; STAA 561) or written consent of instructor. This is a partial-semester course.

Methods to estimate probability distribution of nonstandard test statistics, find estimators, test hypotheses, and compute confidence intervals.(NT-V)

STAA 568 01(1-0-0). Topics Industrial/Organizational Statistics. S.

Quality management, process control, reliability, decision making. (NT-V)

STAA 571 02(2-0-0). Survey Statistics. F. Prerequisite: Admission to the M.A.S. program or written consent of instructor. This is a partial-semester course.

Survey design, simple random, stratified, and cluster samples. Estimation and variance estimation. (NT-V)

STAA 572 02(2-0-0). Nonparametric Methods. F. Prerequisite: (STAA 551; STAA 561) or written consent of instructor. This is a partial-semester course.

Rank-based methods, nonparametric inferential techniques, scatterplot smoothing, nonparametric function estimation, environmental applications. (NT-V)

STAA 573 02(2-0-0). Analysis of Time Series. S. Prerequisite: (STAA 551; STAA 561) or written consent of instructor. This is a partial-semester course.

Moving average and auto-regression correlation structures, estimation and forecasting, modeling seasonality. Financial and environmental applications. (NT-V)

STAA 574 02(2-0-0). Methods in Multivariate Analysis. S. Prerequisite: (STAA 551; STAA 561) or written consent of instructor. This is a partial-semester course.

Multivariate ANOVA, principal components, factor analysis, cluster analysis, discrimination analysis. (NT-V)

STAA 575 02(2-0-0). Applied Bayesian Statistics. S. Prerequisite: (STAA 552; STAA 562) or written consent of instructor. This is a partial-semester course.

Bayesian analysis of statistical models, prior and posterior distributions, computing methods, interpretation.(NT-V)

STAA 576 02(2-0-0). Methods in Environmental Statistics. S. Prerequisite: (STAA 552; STAA 561) or written consent of instructor. This is a partial-semester course.

Statistical methodologies used in environmental/ecological studies. Topics in spatial statistics, abundance estimation for biological populations. (NT-V)

Prerequisite: (STAA 551; STAA 561) or written consent of instructor. This is a partial-semester course.

STATISTICS COURSES

Department of Statistics College of Natural Sciences

STAT 101 03(2-2-0). Activity Based Statistics. F, SS. Credit not allowed for students who have already taken any 200-level or higher statistics course.

Population, sample, variation, data, relationships, probability and risk, polls, prediction, margin of error, critical assessment of studies.

STAT 110 03(2-0-1). Statistical Thinking: Concepts and Applications. S. Credit not allowed for students who have already taken any 200-level or higher statistics course.

Use of statistical tools in real-life problems using computer packages; integration of critical thinking skills using case studies.

STAT 192 01(0-0-1). First-Year Seminar in Mathematical Sciences. S.

Richness and variety of problems encountered in the mathematical sciences.

STAT 201 03(2-0-1). General Statistics. F, S, SS. Prerequisite: Mathematics placement exam or one credit of 100-level mathematics. Credit not allowed for both STAT 201 and STAT 204. Intended as a one semester terminal course.

Graphs, descriptive statistics, confidence intervals, hypothesis tests, correlation and simple regression, tests of association.

STAT 204 03(2-2-0). Statistics for Business Students. F, S, SS. Prerequisite: Mathematics placement exam or one credit of 100-level mathematics. Credit not allowed for both STAT 204 and STAT 201.

Surveys, sampling, descriptive statistics, confidence intervals, contingency tables, control charts, regression, exponential smoothing, forecasting.

STAT 301 03(3-0-0). Introduction to Statistical Methods. (GT-MA1) F, S, SS. Prerequisite: MATH 117 or MATH 118 or MATH 124 or MATH 125 or MATH 126 or MATH 141 or MATH 155 or MATH 160. Credit allowed for only one of the following: ERHS 307, STAT 301, STAT 307, STAT 311, or STAT 315.

Techniques in statistical inference; confidence intervals, hypothesis tests, correlation and regression, analysis of variance, chi-square tests. (NT-V)

STAT 303/ECE 303 03(3-0-0). Introduction to Communications Principles. F. Prerequisite: ECE 311 or concurrent registration; MATH 261. Credit not allowed for both STAT 303 and ECE 303.

Basic concepts in design and analysis of communication systems.

STAT 305 03(3-0-0). Sampling Techniques. F. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Sample designs: simple random, stratified, systematic, cluster, unequal probability, two phase; methods of estimation and sample size determination.

STAT 307 03(3-0-0). Introduction to Biostatistics. F, S, SS. Prerequisite: MATH 117 or MATH 118 or MATH 124 or MATH 125 or MATH 126 or MATH 141 or MATH 155 or MATH 160. Credit allowed for only one of the following: ERHS 307, STAT 301, STAT 307, STAT 311, or STAT 315.

Biostatistical methods; confidence intervals, hypothesis tests, simple correlation and regression, one-way analysis of variance.

STAT 311 03(3-0-0). Statistics for Behavioral Sciences I. F, S. Prerequisite: MATH 117 or MATH 118 or MATH 124 or MATH 125 or MATH 126 or MATH 141 or MATH 155 or MATH 160. Credit allowed for only one of the following: ERHS 307, STAT 301, STAT 307, STAT 311, or STAT 315.

Classification, descriptive statistics; inference, testing, estimation; categorical data analysis; odds ratio.

STAT 312 03(3-0-0). Statistics for Behavioral Sciences II. F, S. Prerequisite: STAT 311.

One-way analysis of variance, factorial designs, blocked designs, multiple comparisons of means, and multiple regression.

STAT 315 03(3-0-0). Statistics for Engineers and Scientists. F, S, SS. Prerequisite: MATH 161 or MATH 255. Credit allowed for only one course: ERHS 307, STAT 301, STAT 307, STAT 311, STAT 315.

Calculus-based probability and statistics: distribution theory, estimation, hypothesis testing, applications to engineering and the sciences. (NT-V)

STAT 321 03(3-0-0). Elementary Probabilistic-Stochastic Modeling. S. Prerequisite: CS 156 or CS 160 or MATH 151 or MATH 152; MATH 155 or MATH 160.

Probabilistic and stochastic models of real phenomena; distributions, expectations, correlations; averages; simple Markov chains and random walks.

STAT 340 03(3-0-0). Multiple Regression Analysis. S, SS. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Estimation and testing for linear, polynomial, and multiple regression models; analysis of residuals; selection of variables; nonlinear regression.

STAT 350 03(3-0-0). Design of Experiments. F, SS. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Analysis of variance, covariance; randomization; completely randomized, randomized block, latin-square, split-plot, factorial and other designs.

STAT 372 03(3-0-0). Data Analysis Tools. F. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Data analysis principles and practice, statistical packages and computing; ANOVA, regression and categorical data methods.

STAT 420 03(3-0-0). Probability and Mathematical Statistics I. F. Prerequisite: MATH 255 or MATH 261.

Probability, random variables, distribution functions, and expectations; joint and conditional distributions and expectations; transformations.

STAT 430 03(3-0-0). Probability and Mathematical Statistics II. S. Prerequisite: STAT 420.

Theories and applications of estimation, testing, and confidence intervals; sampling distributions including normal, gamma, beta X^2 , t, and F.

STAT 460 03(3-0-0). Applied Multivariate Analysis. S. Prerequisite: STAT 340.

Principles for multivariate estimation and testing; multivariate analysis of variance, discriminant analysis; principal components, factor analysis. (NT-V)

STAT 472 03(0-0-3) Statistical Consulting. S. Prerequisite: STAT 372.

Statistical consulting skills including data analysis, problem solving, report writing, oral communication, and planning experiments.

STAT 495 Var. Independent Study. Prerequisite: Written consent of instructor.

STAT 498 Var [1-3]. Undergraduate Research in Statistics. Prerequisite: Written consent of instructor.

Research skills and techniques; include both oral and written communication of results.

STAT 500 01(0-2-0). Statistical Computer Packages. S. Prerequisite: STAT 340; STAT 350.

Comparison, evaluation, and use of computer packages for univariate and multivariate statistical analyses.

STAT 501 01(1-0-0). Statistical Science. F.

Overview of statistics: theory; use in agriculture, business, environment,

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engineering; modeling; computing; statisticians as researchers/consultants.

STAT 511 04(3-0-1). Design and Data Analysis for Researchers I. F. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Statistical methods for experimenters and researchers emphasizing design and analysis of experiments. (NT-V)

STAT 512 04(3-0-1). Design and Data Analysis for Researchers II. S. Prerequisite: STAT 511.

Statistical methods for experimenters and researchers emphasizing design and analysis of experiments.

STAT 514/SOCR 514 04(3-3-0). Agricultural Experiment Design and Analysis. S. Prerequisites: STAT 201 or STAT 301 or STAT 307. Credit allowed for only one of the following: SOCR 414, SOCR 514, STAT 350, or STAT 514.

Design and implementation of agricultural experiments and statistical analysis of resulting data.

STAT 515 03(2-2-0). Statistical Science and Process Improvement. S. Prerequisite: QNT 570 or STAT 511 or STAT 540.

Statistical methods in process design; statistical methods; measurement processes; customer evaluation.

STAT 520 04(4-0-0). Introduction to Probability Theory. F. Prerequisite: MATH 369; MATH 261; MATH 317.

Probability, random variables, distributions, expectations, generating functions, limit theorems, convergence, random processes.

STAT 521 03(3-0-0). Stochastic Processes I. S. Prerequisite: STAT 520.

Characterization of stochastic processes, Markov chains in discrete and continuous time, branching processes, renewal theory, Brownian motion.

STAT 522 03(3-0-0). Stochastic Processes II. F, SS. Prerequisite: STAT 521.

Martingales and applications, random walks, fluctuation theory, diffusion processes, point processes, queueing theory.

STAT 523/NR 523 03(3-0-0). Quantitative Spatial Analysis. S. Prerequisite: STAT 301 or STAT 307. Credit not allowed for both STAT 523 and NR 523.

Techniques in spatial analysis: point pattern analysis, spatial autocorrelation, trend surface and spectral analysis.

STAT 524/FIN 524 03(3-0-0). Financial Statistics. F. Prerequisite: MATH 345; STAT 420, or Admission to MSBA program with Financial Risk Management specialization.

Probability and statistical concepts and quantitative tools used in financial modeling and decision-making.

STAT 525 03(3-0-0). Analysis of Time Series I. F. Prerequisite: STAT 430.

Trend and seasonality, stationary processes, Hilbert space techniques, spectral distribution function, fitting ARIMA models, linear prediction.

STAT 526 03(3-0-0). Analysis of Time Series II. S, SS. Prerequisite: STAT 525.

Spectral analysis; the periodogram; spectral estimation techniques; multivariate time series; linear systems, optimal control; Kalman filtering, prediction.

STAT 530 03(3-0-0). Mathematical Statistics. S. Prerequisite: STAT 520.

Sampling distributions, estimation, testing, confidence intervals; exact and asymptotic theories of maximum likelihood and distribution-free methods.

STAT 540 03(3-0-0). Data Analysis and Regression. F. Prerequisite: Six credits of upper-division statistics courses.

Introduction to multiple regression and data analysis with emphasis on graphics and computing.

STAT 544/ERHS 544 03(3-0-0). Biostatistical Methods for Quantitative Data. S. Prerequisite: STAT 301 or STAT 307. Credit not allowed for both STAT 544 and ERHS 544.

Regression and analysis of variance methods applied to both observational studies and designed experiments in the biological sciences.

STAT 547/CIVE 547 03(3-0-0). Statistics for Environmental Monitoring. S. Prerequisite: STAT 301. Credit not allowed for both STAT 547 and CIVE 547.

Applications of statistics in environmental pollution studies involving air, water, or soil monitoring; sampling designs; trend analysis; censored data.

STAT 548/CS 548 04(3-2-0). Bioinformatics Algorithms. F. Prerequisite: STAT 301 or STAT 307 or STAT 315; knowledge of a contemporary programming language.

Computational methods for analysis of DNA/protein sequences and other biological data.

STAT 560 03(3-0-0). Applied Multivariate Analysis. F, S. Prerequisite: STAT 520; STAT 540.

Multivariate analysis of variance; principal components; factor analysis; discriminant analysis; cluster analysis. (NT-O/V)

STAT 570 03(3-0-0). Nonparametric Statistics. S, SS. Prerequisite: STAT 430.

Distribution and uses of order statistics; nonparametric inferential techniques, their uses and mathematical properties. (NT-V)

STAT 586 01(0-2-0). Practicum in Consulting Techniques. F, S, SS. Prerequisite: STAT 540.

Instruction on planning studies, writing reports, and interacting with clients. Attend and critique consulting sessions.

STAT 592 01(0-0-1). Seminar.

STAT 600 03(3-0-0). Statistical Computing. F, S. Prerequisite: STAT 520; STAT 540.

Optimization and integration in statistics; Monte Carlo methods; simulation; bootstrapping; density estimation; smoothing.

STAT 604/BUS 604 02(2-0-0). Managerial Statistics. F. Prerequisite: Admission to the MBA Program. Credit not allowed for both STAT 604 and BUS 604.

Introduction to statistical thinking and methods used to support managerial-decision making. (NT-V)

STAT 605 03(3-0-0). Theory of Sampling Techniques. S. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315; STAT 430.

Survey designs; simple random, stratified, cluster samples; theory of estimation; optimization techniques for minimum variance or costs.

STAT 640 04(4-0-0). Design and Linear Modeling I. S. Prerequisite: MATH 369; STAT 540.

Introduction to linear models; experimental design; fixed, random, and mixed models.

STAT 645 03(3-0-0). Categorical Data Analysis and GLIM. S. Prerequisite: Concurrent registration in STAT 640.

Generalized linear models, binary and polytomous data, log linear models, quasilielihood models, survival data models.

STAT 650 03(3-0-0). Design and Linear Modeling II. F. Prerequisite: STAT 640.

Mixed factorials; response surface methodology; Taguchi methods; variance components.

STAT 675A-L Var [1-3]. Topics in Statistical Methods. F, S, SS. Prerequisite: STAT 430.

A) Sampling. B) Design. C) Multivariate and regression methods. D)

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Computer intensive methods. **F)** Robustness and nonparametric methods. **I)** Industrial statistical methods. **J)** Reliability. **K)** Bayesian statistics. (NT-O) **L)** Medical/pharmaceutical statistical methods (NT-V).

STAT 684 Var [1-3]. Supervised College Teaching. Prerequisite: Enrollment in M.S./Ph.D. program in statistics.

Guidance and instruction in effective teaching of college courses in statistics.

STAT 695 Var. Independent Study.

STAT 699 Var. Thesis.

STAT 720 04(4-0-0). Probability Theory. S. Prerequisite: MATH 517; STAT 520.

Measure theoretic probability, characteristic functions; convergence; laws of large numbers; central limit, extreme value, asymptotic theory.

STAT 721 03(3-0-0). Applied Probability and Stochastic Processes I. F, S. Prerequisite: STAT 720.

General theory of processes; Markov processes in discrete, continuous time; review of martingales, random walks; renewal and regenerative processes.

STAT 722 03(3-0-0). Applied Probability and Stochastic Processes II. F, S, SS. Prerequisite: STAT 720.

Brownian motion, diffusion, stochastic differential equations; weak convergence, central limit theorems. Applications in engineering, natural sciences.

STAT 725 03(3-0-0). Time Series and Stationary Processes. F, S, SS. Prerequisite: STAT 720; STAT 730.

Spectral theory of multivariate stationary processes; estimation, testing for spectral, linear, AR-MA representations; best linear predictors, filters.

STAT 730 04(4-0-0). Advanced Theory of Statistics I. F. Prerequisite: STAT 530; STAT 720.

Minimal sufficiency, maximal invariance; Neyman-Pearson theory; Fisher, Kullback-Leibler information; asymptotic properties of maximum-likelihood methods.

STAT 731 03(3-0-0). Advanced Theory of Statistics II. S, SS. Prerequisite: STAT 730.

Decision-theory model; Bayes, e-Bayes, complete, and admissible classes; applications to sequential analysis and design of experiments.

STAT 740 03(3-0-0). Advanced Statistical Methods. F, S. Prerequisite: STAT 640; concurrent registration in STAT 730.

Generalized additive models; recursive partitioning regression and classification; graphical models and belief networks; spatial statistics.

STAT 750 03(3-0-0). Advanced Theory of Design. F, S. Prerequisite: STAT 650.

Information theory; design evaluation, factorial designs and optimal designs, orthogonal and balanced arrays, designs with discrete/continuous factors.

STAT 760 03(3-0-0). Theory of Multivariate Statistics. F, SS. Prerequisite: STAT 640; concurrent registration in STAT 730.

Theory of multivariate normal; maximum-likelihood inference, union-intersection testing for single sample; theory of a multivariate linear model.

STAT 770 03(3-0-0). Approximation Theory and Methods. F, S. Prerequisite: STAT 730.

Edgeworth expansions, saddlepoint methods; applications of weak convergence and other approximation methods in mathematical statistics.

STAT 792 01(0-0-1). Seminar.

STAT 793 03(3-0-0). Seminar on Advanced Statistical Methods. F, S. Prerequisite: STAT 640; concurrent registration in STAT 730. May be

taken up to two times for credit.

STAT 795 Var. Independent Study.

STAT 796 Var. Group Study.

Methodology, stochastic processes, experimental design, multidimensional statistics.

STAT 799 Var. Dissertation.

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THEATRE COURSES

Department of Music, Theatre, and Dance *College of Liberal Arts*

+TH 141 03(3-0-0). Introduction to Theatre. (GT-AH1, AUCC 3B). F, S, SS.

Theatre as an art and one of the humanities, its impact upon society, and its relationship to other art forms. (\$)

TH 150 03(1-0-2). Introduction to Performance. F, S.

Imagination as the actor's primary resource: acting exercises, compositions, improvisations to acquire the basic approach to text through action.

TH 151 03(2-2-0). Beginning Acting. F, S.

Beginning scene study with an emphasis on exploring action/objective and the given circumstances of a selected text.

TH 152 03(2-3-0). Theatrical Makeup. S. Prerequisite: TH 151.

Stage makeup. Individual skill in character analysis, application in pigment, plastic, hair, makeup, and selection and use of theatrical makeup.

TH 160 03(3-0-0). Introduction to Production Design. F, S.

Concepts and practices in the visual arts of the theatre; studio processes and technical production; elementary work in theatre design and production.

TH 161 03(2-2-0). Technical Theatre: Stagecraft. F, S. Prerequisite: TH 160.

Skills and craft of technical theatre. Knowledge of tools, materials, and techniques essential to production realization.

°TH 163 03(1-4-0). Costume Construction for the Theatre. S. Prerequisite: TH 160.

Technical side of costuming for live stage performances with an emphasis on all aspects of construction.

+TH 192 03(0-03). From Page to Stage: Freshman Theatre Seminar. F, S, SS.

Collaborative creative processes required to transfer literature to theatrical performances with faculty artists/scholars. (\$)

TH 241 03(3-0-0). Text Analysis for Performance. F, S.

Reading, researching and discussing representative play types to foster an understanding of concepts used in theatrical staging.

TH 251 03(2-2-0). Intermediate Acting. S. Prerequisite: TH 151.

Study in the application of the given circumstances to a text and development of characterization. Selection and preparation of audition material.

TH 261 03(1-4-0). Drawing and Drafting for the Theatre. F. Prerequisite: TH 160.

Fundamental drawing, drafting, and rendering techniques needed by theatrical designers to effectively communicate their visual ideas.

TH 262 03(3-0-0). Stage Management I. F. Prerequisite: TH 151; TH 161.

Duties and responsibilities of stage managers. Communication, rehearsal, performance techniques. Conceptual approaches to theatre.

TH 263 03(2-2-0). Costume Design I. F. Prerequisite: TH 160.

Basic theory and technique for visualization of theatrical characters through costume.

TH 264 03(2-2-0). Lighting Design: Fundamentals. F. Prerequisite: TH 160; TH 161.

Essential principles and theory for stage lighting including design process, control, equipment, and lighting aesthetics.

TH 265 03(3-0-0). Scenic Design: Fundamentals. F. Prerequisite: TH 160; TH 161.

Theory and techniques for designing scenery for the stage.

TH 266 03(2-2-0). Sound Design for the Theatre. S. Prerequisite: TH 160; TH 161.

Equipment, process, and recording techniques used in sound design for live performance.

TH 275 03(1-0-2). Playwrights' Workshop. F.

Understanding the craft of the playwright. Practical exercises in character, conflict, structure, setting, dialogue, and the process of rewriting.

TH 286 01(0-3-0). Practicum. Maximum of 4 credits allowed in course.

Practical experience in mounting theatrical productions.

+TH 324 03(1-6-0). Teaching Creative Drama for Children. F. Prerequisite: TH 251. Required field trips.

Theoretical and practical experience in teaching creative drama.

TH 341 03(3-0-0). History of Theatre in Performance. F. Prerequisite: TH 141; TH 241.

Theatre in performance from its origins through the modern era.

TH 342 03(3-0-0). Contemporary Plays in Performance. S. Prerequisite: TH 341.

History of theatre, Restoration to present.

***TH 350 03(2-2-0). Voice and Speech for the Stage.** F. Prerequisite: TH 251.

Linklater and Skinner approaches to voice and speech for the theatre actor.

TH 351 03(2-2-0). Advanced Acting. F. Prerequisite: TH 251.

Contemporary acting methods in a wide range of dramatic texts.

TH 352 02(1-0-1). Acting for Singers. F. Prerequisite: MU 401 or concurrent registration.

Acting class specifically for singers: improv, beginning scene work, harnessing given circumstance and augmenting physical character life onstage.

TH 353 03(2-2-0). Experimental Performance. SS.

Artistic exploration of experimental performance via radical innovations in dance, theatre, music, literature, film, art, and performance art.

°TH 361 03(1-4-0). Technical Theatre: Technical Direction. F. Prerequisite: TH 161.

Advanced training and techniques in construction management and technical production for the theatre.

°TH 362 03(3-0-0). Advanced Stage and Production Management. S. Prerequisite: TH 262.

Stage and production management practices and procedures of theatre in the U.S.

***TH 363 03(1-4-0). Advanced Costume Design.** S. Prerequisite: TH 263.

Theory and practice of advanced costume design techniques.

***TH 364 03(2-2-0). Advanced Lighting Design.** S. Prerequisite: TH 264.

Principles and theory for stage lighting including advanced programming, tour preparation, and presentation techniques.

***TH 365 03(2-2-0). Advanced Scenic Design.** S. Prerequisite: TH 265.

The practice of scenic design from text to idea to realized work. Advanced scenic design techniques in divergent and increasingly complex situations.

***TH 366 03(2-2-0). Digital Media Design for the Stage.** F. Prerequisite: TH 266.

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Training, content creation and presentation techniques for sound and projection design for live performance.

°**TH 367 03(1-6-0). Scenic Painting.** F. Prerequisite: Theatre majors only.

Basic techniques and practical applications in scenic painting for the theatre. (\$)

TH 400 03(1-4-0). Theatre Production Workshop. F, S. Prerequisite: One of the following: TH 266, TH 342, TH 351, TH 361, TH 362, TH 363, TH 364, TH 366. May be taken twice for credit in the major.

Explores both the practical and dramaturgical essences of the production of a play.

***TH 450 03(2-2-0). Professional Actor Preparation.** F. Prerequisite: TH 351.

Portfolios, casting, breakdowns, reels, agents, managers, interviews, cold reading techniques, on-camera work, marketing.

TH 451 03(2-2-0). Advanced Topics in Acting. S. Prerequisite: TH 351. May be taken three times for credit.

Author-specific actor challenges (e.g., Brecht, Beckett, Shakespeare, Chekhov, Moliere, and contemporary writers).

TH 455 04(2-0-2). Directing Process. S. Prerequisite: TH 262; TH 341; TH 342; TH 351; TH 363 or TH 365.

Intensive practical experience in direction of scenes focusing on specific directorial problems posed by various types of plays.

***TH 460 03(2-2-0). Design Portfolio and Professional Preparation.** F. Prerequisite: Theatre major; two of the following: TH 363, TH 364, TH 365, TH 366, TH 367.

Creating effective portfolio and design presentations, hard copy and digital, storyboarding, communicating design concept in collaboration, interviews.

***TH 467 03(1-4-0). Advanced Scenic Painting.** S. Prerequisite: TH 367.

Advanced linear perspective, sculpture, texture techniques, creating translucent effect, painting various materials.

TH 470A-I 02(0-6-0). Applied Theatre Production. F, S. Prerequisite: Written consent of instructor.

Advanced topics in applied theatre production. Challenges in developing and mounting a theatrical performance. Each may be taken once for credit.

A) Acting. **B)** Stage Management. **C)** Costume Design. **D)** Scenic Design and Production. **E)** Lighting Design. **F)** Digital Media Design. **G)** Property Design and Scenic Painting. **H)** Dramaturgy. **I)** Directing.

TH 475 03(2-0-1). Advanced Playwriting: Theatre. S. Prerequisite: TH 275.

Advanced techniques of writing for the stage.

TH 482 03(0-0-3). Theatre in London—Travel Abroad. SS. Prerequisite: Good academic and disciplinary standing.

Study abroad in and around London to foster research into theatre as an evolving art form with rich historical and artistic traditions.

TH 484 Var. [1-3]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

TH 486 01(0-3-0). Practicum. Prerequisite: TH 286. Maximum of 4 credits allowed in course.

Practical experience in the supervisory capacities involved in mounting theatrical productions.

TH 487 Var. [1-12]. Theatre Internship.

Adviser-approved position at a professional regional theatre, a professional training program, or professional summer theatre.

TH 491 Var. Repertory Theatre Workshop. Prerequisite: Audition only.

Principles and practice of repertory theatre operation; practical experience offered.

TH 495 Var. Independent Study.

TH 499 Var[3-6]. Thesis. Prerequisite: TH 341, TH 342; performing arts-theatre majors only.

Comprehensive project in performance, production, or scholarship directed by a faculty mentor.

TH 695 Var. Independent Study.

VETERINARY MEDICINE COURSES

Nondepartmental

College of Veterinary Medicine and Biomedical Sciences

VM 603 01(1-0-0). Veterinary Science: Research and Methods. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Conduct of responsible research, contributions of research to the practice of veterinary medicine, and career opportunities.

VM 606 03(3-0-0). Veterinary Immunology. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Infectious agents, immune-mediated diseases, immune deficiencies, and principles of vaccination.

VM 610 01(.5-1.5-0). Foundations of Veterinary Medicine I. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Development of professional skills (ethics, communication, physical exam, surgical skills) necessary for the practice of veterinary medicine.

VM 611 01(.5-1.5-0). Foundations of Veterinary Medicine II. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Development of professional skills (ethics, communication, physical exam, surgical skills) necessary for the practice of veterinary medicine.

VM 616 08(4-9-1). Functional Anatomy. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Embryonic development and organogenesis are incorporated to improve understanding of normal anatomy and common developmental pathologies.

VM 618 07(5-6-0). Veterinary Physiology and Histology. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Gross microscopic anatomy and physiology of gastrointestinal, cardiovascular, respiratory, hemopoietic, urinary systems in selected domestic animals.

VM 619 04(3-3-0). Veterinary Neurobiology. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Structural and functional foundations of nervous system activity; introduction to clinical neurology.

VM 621 02(1-2-0). Exotic Animal Anatomy and Husbandry. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Applied veterinary anatomy and husbandry of birds, reptiles, amphibians, and fish.

VM 623 02(2-0-0). Veterinary Nutrition and Metabolism. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Intermediary metabolism, nutrients, and animal nutrition.

VM 624 03(2-2-0). Veterinary Feeds and Feeding. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Description, advantages, and limitations of feedstuffs fed to domestic livestock; nutrient requirements and formulation of rations for various needs.

VM 625 02(2-0-0). Principles of Diagnostic Imaging. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses

must be taken in prescribed sequence in the PVM program.

Diagnostic film and digital radiography, computed tomography, ultrasound, magnetic resonance, nuclear medicine, and radiographic and sonographic anatomy.

VM 637 03(3-0-0). Veterinary Bacteriology and Mycology. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Biology of bacterial and fungal pathogens of animals with emphasis on common infectious diseases encountered in veterinary practice.

VM 638 02(2-0-0). Veterinary Parasitology. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Biology of helminths, arthropod, and protozoan pathogens of animals with emphasis on common infectious diseases encountered in veterinary practice.

VM 639 02(2-0-0). Veterinary Virology. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Biology of viral pathogens of animals with emphasis on common infectious diseases encountered in veterinary practice.

VM 640 05(4-0-1). Biology of Disease I. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Introduction to mechanisms of subcellular, cellular, tissue, and organ response to injury and associated pathological processes.

VM 648/VS 648 02(2-0-0). Food Animal Production and Food Safety. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program. Credit not allowed for both VM 648 and VS 648.

Basic orientation to food animal production units, herd health concepts, and issues of food safety from preharvest through processing and distribution.

VM 707 01(1-0-0). Emerging Issues in Infectious Disease. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Influence of microbial, host, and environmental changes on the emergence, control, and prevention of infectious disease of veterinary importance.

VM 710 01(.5-1.5-0). Foundations of Veterinary Medicine III. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Development of professional skills (ethics, communication, physical exam, surgical skills) necessary for the practice of veterinary medicine.

VM 711 01(.5-1.5-0). Foundations of Veterinary Medicine II. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Development of professional skills (ethics, communication, physical exam, surgical skills) necessary for the practice of veterinary medicine.

VM 712 04(4-0-0). Practice Management/Professional Development. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Veterinary practice management including marketing, finance, information systems, personnel issues, and client relations.

VM 714 04(4-0-0). Veterinary Preventive Medicine. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Principles of health promotion and disease prevention in populations.

VM 716 01(1-0-0). Principles of Shelter Veterinary Medicine. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Introduces the principles of veterinary shelter medicine. Emphasis on

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management of small animals with herd health concepts.

VM 720 01(1-0-0). Alternative and Complementary Therapeutics. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Mechanisms and efficacy of alternative and complementary therapeutics used in veterinary medicine.

VM 721 02(0-0-2). Non-Mammalian Vertebrate Medicine. F, S. Prerequisite: VM 621; admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Diagnosis and treatment of diseases of non-mammalian vertebrates.

VM 722 04(4-0-0). Veterinary Pharmacology. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Basic and clinical pharmacology, therapeutic practice, and pharmacy management.

VM 724 06(4-0-2). Bioanalytical Pathology. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Mechanisms, interpretation, and applications of laboratory analyses for solving diagnostic problems.

VM 726 02(1-0-1). Principles of Imaging Interpretation I. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Clinical indications and interpretation for imaging modalities in examination of body systems.

VM 728 02(2-0-0). Principles of Imaging Interpretation II. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Interpretation of clinical imaging techniques used in diagnosis of specific diseases of organ systems.

VM 730 02(2-0-0). Applied Animal Behavior. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Identification, characterization, and treatment of common disorders of animal behavior encountered by practicing veterinarians.

VM 731 02(2-0-0). Biology and Diseases of Small Mammals. F, S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Diagnosis and treatment of diseases of small mammals.

VM 733 02(2-0-0). Principles of Surgery. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Principles and concepts of general and orthopedic surgery.

VM 737 03(2-0-1). Principles of Anesthesia. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Integration of physiological and pharmacological principles in clinical anesthesia.

VM 741 04(3-0-1). Biology of Disease II. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Pathogenesis of organ system diseases and integrated systemic pathology.

VM 742 01(0-0-1). Biology of Disease III. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Pathogenesis of disease in organ systems, systemic pathology.

VM 744 03(2-2-0). Theriogenology. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Reproductive function and disease, including mammary gland and endocrine regulation of reproduction and lactation.

VM 745 05(5-0-0). Clinical Sciences I. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Diagnostic approaches to common medical problems of cardiovascular, urinary, and digestive-hepatic systems.

VM 747 05(5-0-0). Clinical Sciences II. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Diagnostic approaches to common medical problems of organ systems.

VM 749 05(5-0-0). Clinical Sciences III. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Diagnostic approaches to common medical problems of organ systems.

VM 751 02(2-0-0). Veterinary Clinical Toxicology. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Common toxicants and poisonous plants encountered by companion and farm animal species, their pathophysiological effects, and clinical treatments.

VM 753 05(5-0-0). Clinical Sciences IV. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Diagnostic approaches to common medical problems of organ systems.

VM 757 03(3-0-0). Bovine Herd Medicine. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Health management, and diagnosis and treatment of diseases of food animals.

VM 763 05(5-0-0). Equine Medicine and Surgery. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Health management, and diagnosis and treatment of diseases of horses.

VM 773 04(4-0-0). Small Animal Medicine and Surgery I. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Health management, and diagnosis and treatment of diseases of dogs and cats.

VM 774 04(4-0-0). Small Animal Medicine and Surgery II. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Health management, and diagnosis and treatment of diseases of dogs and cats.

VM 786A-B Var [1-22]. Practicum. Prerequisite: A-B) Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

A) Junior practicum Var [6-8]. B) Senior practicum.

VM 795 Var [1-18]. Independent Study. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

VM 796J-R. Group Study. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

J) Swine medicine 01(1-0-0). R) Food animal clinical problems 03(3-0-0).

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°Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-*subcode* = State Guarantee Transfer course and AUCC*subcode* = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

CLINICAL SCIENCES COURSES

Department of Clinical Sciences College of Veterinary Medicine and Biomedical Sciences

VS 300 03(3-0-0). Prevention and Control of Livestock Diseases. F.

Common ailments of livestock; sanitation and disease prevention and control.

VS 320 03(3-0-0). Birds of Prey-Health Care and Natural History. S, SS. Prerequisite: BZ 110 or LIFE 103.

Natural history of birds of prey; health care for field or clinic. Designed for wildlife, zoology, interpretation, and preveterinary medicine students.

VS 331 04(3-2-0). Histology. F, S, SS. Prerequisite: BMS 230 or BMS 300. Credit allowed for only one of the following: BMS 330, BMS 331, VS 331.

Analysis of animal cells, tissues and organs emphasizing light microscopy. (NT-O)

VS 333 04(3-3-0). Domestic Animal Anatomy. F, S, SS. Prerequisite: LIFE 102 or BZ 110. Credit not allowed for both VS 333 and BMS 305.

Comparative functional anatomy of the dog, horse, and cow. (NT-O)

VS 479/BZ 479 03(3-0-0). Biology and Behavior of Dogs. F, S. Prerequisite: BZ 110 or LIFE 103. Credit not allowed for both VS 479 and BZ 479.

Interactions of physiology, neurobiology, and genetics on behavior of domestic dogs, and how evolution and domestication influence behavioral traits. (NT-O)

VS 495 Var. Independent Study. F, S, SS.

VS 533/MIP 533 03(2-0-1). Epidemiology of Infectious Diseases/Zoonoses. S. Prerequisite: MIP 300. Credit not allowed for both VS 533 and MIP 533.

Epidemiologic features of infectious and parasitic diseases that have a major impact on community medicine.

VS 562 03(3-0-0). Applied Data Analysis. S. Prerequisite: STAT 301 or STAT 307.

Data management, application and interpretation of statistical analysis, and reporting of results for students in health science fields.

VS 570/AGRI 570 02(2-0-0). Issues in Animal Agriculture. F. Credit not allowed for both VS 570 and AGRI 570.

Issues that have a major impact on the direction of changes in animal agriculture.

VS 579/NSCI 579 03(3-0-0). Animal Behavior in Captive Populations. F, S. Prerequisite: Enrollment in the M.P.N.S., Zoo, Aquarium and Shelter Management specialization, or BZ 300. Credit not allowed for both VS 579 and NSCI 579.

How animals learn, perceive their world, and behave, and how all of those intersect to alter behavior in captive settings.

VS 602 02(1-0-1). Critical Evaluation of Scientific Literature. F.

Method of evaluating scientific literature. Students present critiques of papers they have chosen.

¹VS 605 02(2-0-0). Comparative Anesthesiology. S.

Techniques in anesthesia for large and small animals.

¹VS 606 01(0-3-0). Comparative Anesthesiology Laboratory. S. Prerequisite: Concurrent registration in VS 605.

Techniques in anesthesia for large and small animals.

VS 612 02(2-0-0). Plastic and Reconstructive Surgery. F. Prerequisite: DVM or equivalent.

Advances in surgical patient care, surgical instrumentation, and reconstruction.

VS 613 01(0-3-0). Plastic and Reconstructive Surgery Laboratory. F. Prerequisite: VM 786B.

Advances in surgical patient care, surgical instrumentation, and reconstruction.

¹VS 626 02(2-0-0). Infertility and Genital Disease. F.

Infectious and noninfectious causes of reproductive failure in food animals.

VS 628 03(3-0-0). Physiology and Pathophysiology. F. Prerequisite: DVM degree, or BMS 500 and BMS 501.

Overview of the normal physiology and pathophysiology of disease states of mammalian organ systems.

¹VS 630 03(3-0-0). Orthopedic Surgery. F.

Techniques, devices, and prosthetic materials in rehabilitating musculoskeletal problems.

¹VS 631 01(0-3-0). Orthopedic Surgery Laboratory. F. Prerequisite: VS 630 or concurrent registration; VM 786A or VM 786B.

Procedures applied to skeletal preparations and living animals.

VS 642 05(4-2-0). Ophthalmology. F.

Instrumentation, ocular therapeutics, and clinical ophthalmology.

¹VS 645 03(2-3-0). Surgery of the Eye. S.

Techniques, indications, and complications.

VS 648/VM 648 02(2-0-0). Food Animal Production and Food Safety. S. Prerequisite: Enrollment in Food Science/Safety Graduate Interdisciplinary Studies Program. Credit not allowed for both VS 648 and VM 648.

Basic orientation to food animal production units, herd health concepts, and issues of food safety from preharvest through processing and distribution.

¹VS 650 03(3-0-0). Comparative Abdominal Surgery. F.

New techniques in surgery of abdominal viscera.

¹VS 651 01(0-3-0). Comparative Abdominal Surgery Laboratory. F. Prerequisite: DVM or equivalent.

Reparative and reconstructive abdominal surgical procedures.

^oVS 655 03(2-3-0). Echocardiography in Veterinary Medicine. F. Prerequisite: Earned DVM degree or equivalent professional medicine degree.

Technical proficiency in obtaining echocardiographic images; fundamental understanding of diagnostic criteria for common cardiac disease in dogs and cats.

¹VS 660 03(3-0-0). Neurology and Neurosurgery. S.

Diagnostic and surgical techniques for the nervous system.

¹VS 661 01(0-3-0). Neurology and Neurosurgery Laboratory. S. Prerequisite: DVM or equivalent.

Production and correction of surgically amenable lesions in central and peripheral nervous system; electrodiagnosis.

¹VS 673 03(3-0-0). Thoracic and Cardiovascular Surgery. F. Prerequisite: DVM or equivalent.

Surgical approaches to the thorax and the central and peripheral cardiovascular system.

¹VS 674 01(0-3-0). Thoracic and Cardiovascular Surgery Laboratory. F. Prerequisite: VS 673 or concurrent registration; VM 786A or VM 786B.

Surgical procedures applied to the chest, heart, and vessels.

¹Offered every third year.

^oAlternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

VS 699 Var. Thesis.

¹VS 701 Var [1-3]. Postgraduate Medicine I. F.

Comprehensive review, update of immunology, emergency medicine, dermatology, and endocrinology.

¹VS 702 Var [1-3]. Postgraduate Medicine II. S.

Comprehensive review, update of neurology, gastroenterology, and ophthalmology.

¹VS 703 Var [1-3]. Postgraduate Medicine III. F.

Comprehensive review, update of oncology, cardiology, reproduction, ophthalmology, and radiology.

¹VS 704 Var [1-3]. Postgraduate Medicine IV. S.

Comprehensive review, update of hematology, nephrology, urology, respiratory, hepatic, and pancreatic.

VS 716 02(2-0-0). Advanced Studies in Reproduction. S.

Biochemical and physiological basis for problems in reproduction.

VS 718 02(0-0-4). Cancer Biology Clinical Practicum. SS.

Prerequisite: ERHS 510.

Exposes graduate students engaged in laboratory cancer research to cancer from a clinical perspective, through VTH clinical rotations.

^oVS 733 04(4-0-0). Advanced Veterinary Epidemiology. S.

Prerequisite: ERHS 532; ERHS 542 or ERHS 544 or STAT 511 or STAT 512 or VS 662.

Advanced epidemiological and statistical techniques for the design and analysis of research projects.

***VS 750 02(2-0-0). Clinical and Applied Pharmacology. S. Prerequisite:**

BMS 450 or DVM or equivalent degree.

Factors involved in drug dosing and variability of drug response. Applications in veterinary and human medicine.

VS 784 Var. Supervised College Teaching.

VS 792 Var. Seminar.

VS 795A-T Var [1-5]. Independent Study. Maximum of 5 credits allowed per subtopic.

A) Small animal medicine. **B)** Large animal medicine. **C)** Small animal surgery. **D)** Equine surgery. **G)** Equine orthopedics. **H)** Large animal reproduction. **I)** Anesthesiology. **J)** Cardiology. **K)** Neurology. **L)** Dermatology. **N)** Ophthalmology. **O)** Herd health management. **P)** Equine lameness. **S)** Epidemiology. **T)** Human-animal bond.

VS 796 Var. Group Study-Medicine.

VS 798 Var. Research.

VS 799 Var. Dissertation.

WATERSHED SCIENCE COURSES

Department of Ecosystem Science and

Sustainability

Warner College of Natural Resources

WR 304 03(3-0-0). Principles of Watershed Management. (AUCC 3A). F, S.

Effects of land use practices on watersheds: hydrology, soil loss, and water quality.

+*WR 406 03(2-3-0). **Seasonal Snow Environments.** S. Prerequisite: Junior or senior standing.

Evaluation of the physical environment; characteristics of snow; methods of studying snow; snow safety. (\$)

WR 416 03(3-0-0). Land Use Hydrology. F. Prerequisite: (GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or SOCR 240); (CIVE 202 or STAT 201 or STAT 301 or STAT 307 or STAT 315); PH 110 or PH 121 or PH 141).

Fundamental concepts in hydrology and effects of land use on hydrologic processes.

+WR 417 03(2-3-0). **Watershed Measurements.** F. Prerequisite: Concurrent registration in WR 416.

Instrument and field techniques in watershed science. Project design and data analysis. (\$)

WR 418 03(3-0-0). Land Use and Water Quality. S. Prerequisite: (CHEM 103; CHEM 104) or (CHEM 107; CHEM 108) or (CHEM 111; CHEM 112).

Physical, chemical, biological water quality parameters affecting land use; land management to maintain water quality; water quality standards, legislation.

WR 419 02(0-4-0). Water Quality Laboratory for Wildland Managers. S. Prerequisite: Concurrent registration in WR 418.

Sampling and determination of water quality parameters. (\$)

+WR 440 03(2-2-0). **Watershed Problem Analysis.** S. Prerequisite: CIVE 322/ENVE 322; WR 416.

Hydrologic analysis and problem solving in watershed management. (\$)

WR 465 04(3-3-0). Eolian and Fluvial Transport Processes. F. Prerequisite: PH 141.

Fundamental physical principles of eolian and fluvial transport processes.

WR 474 03(3-0-0). Snow Hydrology. F.

Snowfall, accumulation, distribution, physical processes in the snowpack, energy balance, ablation and runoff, measurement methods, runoff forecasting.

+WR 486 02(0-6-0). **Watershed Field Practicum.** F. Prerequisite: Junior year standing.

Field visits to watershed management projects and sites of significant field studies. (\$)

WR 492 Var. Seminar.

WR 495 Var. Independent Study in Watershed Resources.

WR 510 02(2-0-0). Watershed Management in Developing Countries. F. Prerequisite: CIVE 322/ENVE 322 or WR 304.

Watershed management problems, approaches, and solutions in developing countries.

°WR 516 03(2-0-1). **Cumulative Effects and Watershed Analysis.** S. Prerequisite: WR 416; WR 417.

Definition, casual processes, and modeling of cumulative watershed effects; comparison and evaluation of current watershed analysis procedures.

WR 520 02(2-0-0). Evapotranspiration. S. Prerequisite: PH 122.

Theory, estimation, measurement, simulation, and application of evapotranspiration processes in hydrology.

°WR 524/°CIVE 524 03(2-2-0). **Modeling Watershed Hydrology.** S. Prerequisite: CIVE 322/ENVE 322 or WR 416; CIVE 202 or STAT 301 or STAT 315. Credit not allowed for both WR 524 and CIVE 524.

Development and application of watershed models: structure, calibration, evaluation, sensitivity analysis, simulation.

*WR 574 04(3-0-1). **Advanced Snow Hydrology.** F. Prerequisite: CIVE 322/ENVE 322 or WR 416.

Snow processes in hydrologic cycle; physical and conceptual methods of modeling; techniques for measuring different states and change rates.

WR 575 01(0-2-0). Snow Hydrology Field Methods. S. Prerequisite: Enrollment in a graduate program.

Field course offering hands-on experience in snow hydrology. (\$)

*WR 616 03(1-0-2). **Hillslope Hydrology and Runoff Processes.** S. Prerequisite: CIVE 322/ENVE 322 or WR 416.

Hillslope hydrology and runoff processes in different environments; implications for management and modeling.

*WR 674 03(3-0-0). **Data Issues in Hydrology.** S. Prerequisite: WR 574.

Types of data, data sources, data quality, missing data, spatial data, data usage, sensitivity in models, error, presentation of data and results.

WR 692 Var. Seminar.

WR 695 Var. Independent Study.

WR 696 Var. Group Study.

WR 698 Var. Research.

WR 699 Var. Thesis.

*WR 712 03(2-2-0). **Watershed Systems.** F. Prerequisite: CIVE 322/ENVE 322 or WR 416; STAT 340.

Dynamic simulation of watershed behavior; application and evaluation of current hydrologic models.

*WR 714 03(3-0-0). **Water Quality for Wildland Managers.** F. Prerequisite: WR 418.

Sampling, statistics of sampling, concepts of ionic equilibrium, water quality modeling, instream flow requirements.

WR 798 Var. Research.

WR 799 Var. Dissertation.

WOMEN'S STUDIES COURSES

Department of Ethnic Studies

College of Liberal Arts

WS 200 03(3-0-0). Introduction to Women's Studies. F.

Examination of gender roles in work, education, spirituality, relationships, health, institutions, and organizations.

WS 397 03(3-0-0). Group Study.

WS 472 03(3-0-0). Seminar in Women's Studies-Social Sciences. F, S.

Prerequisite: Enrolled in Women's Interdisciplinary Studies Program.

WS 495 Var [1-3]. Independent Study. Prerequisite: Approval of Women's Studies Director and relevant department head(s).

WS 692 03(0-0-3). Seminar in Women's Studies. Prerequisite: One semester of enrollment in Women's Interdisciplinary Graduate Studies Program.

WS 695 Var [1-3]. Independent Study. Prerequisite: Approval of Women's Studies Director and relevant department head.

WS 699 Var [3-6]. Thesis. Prerequisite: Approval of Women's Studies Program Board.



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