

General Catalog

2007 - 2008



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Colorado
State
University

**Colorado State University
General Catalog
2007-2008**

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 126,000 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.

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

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PRESIDENT'S MESSAGE

Colorado State University is transforming the world through its teaching, research, and the outstanding contributions of its graduates. Your own CSU experience will prepare you with the skills, knowledge, and broad understanding to make a significant impact on our world.

Whenever I talk with Colorado State students, I am impressed by the stories they tell about their experiences inside and outside the classroom, whether exploring new technologies to support clean energy and sustainable development, running a real investment fund through our College of Business, or working side by side with legislators at the state Capitol through our Political Science internship program.

In doing so, they are learning how to ask questions, investigate options, synthesize information, test theories, and pinpoint results. The payoff from such experiences is clear: CSU students develop the confidence, character, and professional acumen they need both for a lifetime of learning—and to hit the ground running in the working world once they leave our campus.

This general catalog is designed as a resource to help you on your own educational journey. I encourage you to explore the options it describes, chart your path, and work closely with your academic advisor and major department to ensure you have full access to the many opportunities Colorado State has to offer.

Welcome to Colorado State University!

Sincerely,

*Larry Edward Penley
President*

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

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		Clinical Sciences, Department of www.cvmb.colostate.edu/clinsci	491-1274
		Colorado Cooperative Fish and Wildlife Research Unit www.colostate.edu/depts/coopunit	491-5396

Colorado Institute for Irrigation Management www.engr.colostate.edu/ce/centers/ciim/index.shtml	491-5247	Engineering, College of www.engr.colostate.edu	491-6603
Colorado State Forest Service http://csfs.colostate.edu/	491-6303	English, Department of www.colostate.edu/Depts/English	491-6428
Colorado State University Foundation http://www.giving.colostate.edu/index.asp?url=foundation	491-7135	Enrollment Services www.es.colostate.edu	491-2127
Colorado State University System http://csusystem.edu	491-7707	Environmental Affairs Interdisciplinary Studies Program www.colostate.edu/Programs/EAP/	491-6468
Colorado Water Resources Research Institute http://cwrrri.colostate.edu	491-6308	Environmental & Radiological Health Sciences, Department of www.cvmbs.colostate.edu/erhs	491-7038
Computer Information Systems, Department of http://www.biz.colostate.edu/depts/CIS/cis.htm	491-7929	Equal Opportunity and Diversity, Office of www.oed.colostate.edu	491-5836
Computer Science, Department of www.cs.colostate.edu	491-5792	Events and Calendars http://newsinfo.colostate.edu/index.asp?page=events_calendars	491-6432
Conference Services www.housing.colostate.edu/conference/index.htm	491-6222	Exercise Science & Nutrition Interdisciplinary Graduate Program www.caahs.colostate.edu/fshn/programs2.asp	491-3663
Conflict Resolution and Student Conduct Services www.conflictresolution.colostate.edu	491-7165	Facilities Management www.colostate.edu/Depts/Facilities	491-0099
Conservation Biology Interdisciplinary Studies Program www.warnercnr.colostate.edu/curriculum/conservationbiology	491-6714	Family and Consumer Sciences www.caahs.colostate.edu/cfs/program.htm	491-6331
Construction Management, Department of www.cm.caahs.colostate.edu/	491-7353	Finance & Real Estate, Department of www.biz.colostate.edu/depts/Finance/finance.htm	491-5062
Consumer and Family Studies (see Family and Consumer Sciences)	491-6331	Financial Aid (see Student Financial Services) www.sfs.colostate.edu	491-6321
Continuing Education, Division of www.learn.colostate.edu	491-5288	Fish, Wildlife, & Conservation Biology, Department of www.warnercnr.colostate.edu/FWB	491-5020
Cooperative Extension www.ext.colostate.edu	491-6281	Food Science & Human Nutrition, Department of www.caahs.colostate.edu/fshn	491-3663
Cooperative Institute for Research in the Atmosphere www.cira.colostate.edu/index.html	491-8448	Food Science/Safety Interdisciplinary Studies Programs www.caahs.colostate.edu/fshn/isp-foodsciencesafety/program.asp	491-3663
Counseling Center, University www.counseling.colostate.edu	491-6053	Foreign Languages & Literatures, Department of www.colostate.edu/Depts/FLL	491-6141
Degree Requirements/Certification www.registrar.colostate.edu	491-7159	Forest, Rangeland, and Watershed Stewardship, Department of www.warnercnr.colostate.edu/frws	491-6911
Design and Merchandising, Department of www.dm.caahs.colostate.edu	491-1629	Geosciences, Department of www.warnercnr.colostate.edu/geo	491-5661
Disabled Students, Resources for www.colostate.edu/Depts/RDS	491-6385	Geospatial Science Graduate Interdisciplinary Studies Program http://www.warnercnr.colostate.edu/frws/forestry/graduate/geospatial/index.html	491-6911
Diversity in Law Interdisciplinary Studies Program http://secure.casa.colostate.edu/applications/achoriz/majorDescription.cfm?major=IP07	491-5421	Gerontology Interdisciplinary Studies Program http://www.colostate.edu/Dept/HDFS/GISP.htm	491-6070
Ecology Graduate Degree Program www.colostate.edu/Depts/GDPE/Homepage.html	491-4373	Graduate School http://graduateschool.colostate.edu	491-6817
Economics, Department of www.colostate.edu/Depts/Econ	491-6324	Graduation Requirements (Degree Requirements) www.registrar.colostate.edu	491-7159
Education, School of http://soe.caahs.colostate.edu	491-6317	Health & Exercise Science, Department of www.caahs.colostate.edu/hes	491-5081
Educational Access and Outreach, Center for www.ceao.colostate.edu	491-6473	Health Service, Hartshorn http://hartshorn.colostate.edu/	491-7121
El Centro Students Services www.colostate.edu/depts/elcentro/	491-5722	History, Department of www.colostate.edu/Depts/Hist	491-6334
Electrical & Computer Engineering, Department of www.engr.colostate.edu/ece/	491-6600		
Employment Services, Student www.ses.colostate.edu	491-5714		

Directory

Honors Program www.honors.colostate.edu	491-5679	Molecular Biology Interdisciplinary Studies Program www.colostate.edu/Depts/CMB	491-0241
Horticulture & Landscape Architecture, Department of http://hla.colostate.edu	491-7019	Molecular, Cellular and Integrative Interdisciplinary Graduate Program www.cvmb.colostate.edu/mcin	491-0425
Housing and Dining Services www.housing.colostate.edu	491-6511	Music, Theatre, & Dance, Department of www.colostate.edu/Depts/Music	491-5529
Human Development & Family Studies, Department of www.hdfs.cahs.colostate.edu	491-5558	Native American Student Services www.nass.colostate.edu	491-1332
Immunization Information http://hartshorn.colostate.edu/	491-6548	Natural Resource Recreation and Tourism, Department of www.warnercnr.colostate.edu/NRRT	491-6591
Information/Campus Information Services www.whatsup.colostate.edu	491-6444	Natural Resources, Warner College of www.warnercnr.colostate.edu	491-6675
Information Science & Technology Interdisciplinary Studies Program http://istec.colostate.edu/education	491-2030	Natural Sciences, College of www.colostate.edu/Depts/NatSci	491-1300
Information Systems www.colostate.edu/Depts/IS	491-5491	Occupational Therapy, Department of www.ot.cahs.colostate.edu	491-6253
Insurance, Student Health http://hartshorn.colostate.edu/	491-5118	Orientation Services/PREVIEW www.orientation.colostate.edu	491-6011
Integrated Resource Management Interdisciplinary Studies Program (WCIRM) http://www.wcirm.colostate.edu/	491-1610	Parking Services Division www.parking.colostate.edu	491-7041
International Development Interdisciplinary Studies Programs http://www.international.colostate.edu/intled2/experimental2/areastudies/ids_studies.html	491-5917	Pathology (see Microbiology, Immunology, & Pathology) www.cvmb.colostate.edu/mip	491-6144
International Programs www.international.colostate.edu	491-5917	Philosophy, Department of www.colostate.edu/Depts/Philosophy	491-6315
Journalism & Technical Communication, Department of www.colostate.edu/Depts/TJ	491-6310	Physics, Department of www.physics.colostate.edu	491-6206
Latin American/Caribbean Studies Interdisciplinary Studies Program http://secure.casa.colostate.edu/applications/achoriz/majorDescription.cfm?major=IP20	491-5917	Physiology (see Biomedical Sciences) www.cvmb.colostate.edu/bms	491-6187
Legal Services, Student www.sls.colostate.edu	491-1482	Pingree Park www.housing.colostate.edu/pingree/index.htm	491-7377
Liberal Arts, College of www.colostate.edu/Colleges/LibArts	491-5421	Police Department http://police.colostate.edu	491-6425/911
Libraries, University http://lib.colostate.edu	491-1841	Political Science, Department of www.colostate.edu/Depts/PoliSci	491-5156
Lory Student Center www.sc.colostate.edu	491-6444	President's Office www.colostate.edu/Depts/President	491-6211
Management, Department of www.biz.colostate.edu/Depts/Management/Mgt.htm	491-5323	Provost/Senior Vice President's Office www.provost.colostate.edu	491-6614
Marketing, Department of www.marketing.colostate.edu	491-5063	Psychology, Department of www.colostate.edu/Depts/Psychology	491-6363
Mathematics, Department of www.math.colostate.edu	491-1303	Radiological Health Sciences (see Environmental & Radiological Health Sciences) www.cvmb.colostate.edu/erhs	491-7038
Mechanical Engineering, Department of www.engr.colostate.edu/me	491-6558	Rangeland Ecology (see Forest, Rangeland, & Watershed Stewardship) www.warnercnr.colostate.edu/frws	491-6911
Microbiology, Immunology, & Pathology, Department of www.cvmb.colostate.edu/mip	491-6144	Records, Student www.registrar.colostate.edu	491-7148
Military Science, Department of (Army ROTC) www.colostate.edu/Depts/ArmyROTC	491-6506	Recreation Center www.campusrec.colostate.edu	491-6359
		Registration www.registrar.colostate.edu	491-7148
		Religious Studies Interdisciplinary Studies Program Research, Vice President for http://vpri.colostate.edu	491-5421 491-7194

Russian, Eastern and Central European Interdisciplinary Studies Program www.international.colostate.edu/intled/area_studies/reces.htm	491-5917	Student Media http://campusmedia.colostate.edu	491-1683
		Summer Session www.summer.colostate.edu	491-1590
Scholastic Standards www.casa.colostate.edu/Advising/ScholasticStandards.cfm	491-7095	Teacher/Educator Licensure www.soe.caahs.colostate.edu	491-5292
Social Work, School of www.caahs.colostate.edu/sw	491-6612	Testing Service, University www.counseling.colostate.edu/UTS/index1.htm	491-6498
Sociology, Department of www.colostate.edu/Depts/sociology	491-6044	Transcripts www.registrar.colostate.edu	491-7148
Soil and Crop Sciences, Department of www.colostate.edu/Depts/SoilCrop	491-6517	Transfer Evaluation www.registrar.colostate.edu	491-7147
Speech Communication, Department of www.colostate.edu/Depts/Speech	491-6140	University Development & Advancement, www.advancement.colostate.edu	491-7530
Sports, Recreational www.campusrec.colostate.edu	491-6359	Veterans Certification www.registrar.colostate.edu	491-7148
State Board of Agriculture (see Board of http://csusystem.edu)	491-7707	Veterinary Medicine & Biomedical Sciences, College of www.cvmbbs.colostate.edu	491-7051
Statistics, Department of www.stat.colostate.edu	491-5269	Warner College of Natural Resources www.warnercnr.colostate.edu	491-6675
Student Accounts/Loans Receivable www.sfs.colostate.edu	491-6321	Water Resources Interdisciplinary Studies Program http://watercenter.colostate.edu/water_minor.PDF	491-6308
Student Activities and Involvement www.whatsup.colostate.edu	491-6444	Women's Programs and Interdisciplinary Studies Programs (Undergraduate & Graduate) www.wps.colostate.edu	491-6384
Student Affairs, Division of http://www.studentaffairs.colostate.edu/	491-5312		
Student Center, Charles A. Lory www.sc.colostate.edu	491-6444		
Student Financial Services www.sfs.colostate.edu	491-6321		

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 Calendar

Fall Semester – 2007

Aug. 16-17	Thursday, Friday. Orientation, advising, and registration for new students.
Aug. 20	Monday. Classes begin. Late registration fee assessed for adding first class.
Aug. 23	Thursday. End of Special B drop period.
Aug. 26	Sunday. End of Special A and Special B add period.
Sept. 3	Monday. Holiday – University offices closed.
Sept. 5	Wednesday. Registration closes. End of regular schedule change period. Last day for dropping courses without record entry, changes in grading options, and tuition and fee adjustments.
Oct. 15	Monday. End of course withdrawal period. Last day to exercise repeat/delete option.
Nov. 17	Saturday. Fall recess begins; no classes next week.
Nov. 22-23	Thursday, Friday. Holiday – University offices closed.
Nov. 26	Monday. Classes resume.
Dec. 7	Friday. Classes end.
Dec. 10-14	Monday through Friday. Final examinations.
Dec. 14-15	Friday, Saturday. Commencement ceremonies.
Dec. 24-26	Monday through Wednesday. Holiday – University offices closed.
Jan. 1	Tuesday. Holiday – University offices closed.

Spring Semester - 2008

Jan. 17-18	Thursday, Friday. Orientation, advising, and registration for new students.
Jan. 21	Monday. Holiday – University offices closed.
Jan. 22	Tuesday. Classes begin. Late registration fee assessed for adding first class.
Jan. 27	Sunday. End of Special B drop period.
Jan. 28	Monday. End of Special A and Special B add period.
Feb. 6	Wednesday. Registration closes. End of regular schedule change period. Last day for dropping courses without record entry, changes in grading options, and tuition and fee adjustments.
March 15	Saturday. Spring recess begins.
March 24	Monday. Classes resume.
March 24	Monday. End of course withdrawal period. Last day to exercise repeat/delete option.
May 9	Friday. Classes end.
May 12-16	Monday through Friday. Final examinations.
May 16-17	Friday, Saturday. Commencement ceremonies.

Summer Session - 2008

May 19	Monday. First 4- and 12-week terms begin.
May 26	Monday. Holiday – University offices closed; no classes.
June 13	Friday. First 4-week term ends.
June 16	Monday. 8-week term and second 4-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 begins.
August 8	Friday. Last day of classes for all terms.

Fall Semester – 2008

Aug. 21-22	Thursday, Friday. Orientation, advising, and registration for new students.
Aug. 25	Monday. Classes begin. Late registration fee assessed for adding first class.
Aug. 28	Thursday. End of Special B drop period.
Aug. 31	Sunday. End of Special A and Special B add period.
Sept. 1	Monday. Holiday – University offices closed.
Sept. 3	Wednesday. Registration closes. End of regular schedule change period. Last day for dropping courses without record entry, changes in grading options, and tuition and fee adjustments.
Oct. 20	Monday. End of course withdrawal period. Last day to exercise repeat/delete option.
Nov. 22	Saturday. Fall recess begins; no classes next week.
Nov. 27-28	Thursday, Friday. Holiday – University offices closed.
Dec. 1	Monday. Classes resume.
Dec. 12	Friday. Classes end.
Dec. 15-19	Monday through Friday. Final examinations.
Dec. 19-20	Friday, Saturday. Commencement ceremonies.
Dec. 24-26	Wednesday through Friday. Holiday – University offices closed.
Jan. 1	Thursday. Holiday – University offices closed.

Spring Semester - 2009

Jan. 15-16	Thursday, Friday. Orientation, advising, and registration for new students.
Jan. 19	Monday. Holiday – University offices closed.
Jan. 20	Tuesday. Classes begin. Late registration fee assessed for adding first class.
Jan. 25	Sunday. End of Special B drop period.
Jan. 26	Monday. End of Special A and Special B add period.
Feb. 4	Wednesday. Registration closes. End of regular schedule change period. Last day for dropping courses without record entry, changes in grading options, and tuition and fee adjustments.
March 14	Saturday. Spring recess begins.
March 23	Monday. Classes resume.
March 23	Monday. End of course withdrawal period. Last day to exercise repeat/delete option.
May 8	Friday. Classes end.
May 11-15	Monday through Friday. Final examinations.
May 15-16	Friday, Saturday. Commencement ceremonies.

Summer Session - 2009

May 18	Monday. First 4- and 12-week terms begin.
May 25	Monday. Holiday – University offices closed; no classes.
June 12	Friday. First 4-week term ends.
June 15	Monday. 8-week term and second 4-week term begin.
July 4	Saturday. Holiday - University offices closed; no classes.
July 10	Friday. Second 4-week term ends.
July 13	Monday. Third 4-week term begins.
August 7	Friday. Last day of classes for all terms.

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), while 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, and it 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 \$244M research expenditures in FY05, 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 25,000 regular, on-campus students. In 2005-2006, CSU granted 4,317 bachelor's degrees, 186 Ph.D. degrees in 36 fields, and 1,089 master's degrees in 62 fields. The Professional Veterinary Medicine (PVM) program awarded 135 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, and public service 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 the Colorado State University System.

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 the following academic year. This strategic plan has 15 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

Service and Outreach

- Engage citizens through community involvement
- Prepare and empower learners outside the campus environment

Resources and Support

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

¹For a copy of the full plan see
http://www.president.colostate.edu/strategicplanning/content/pdf/march06_fullplan.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 research and subsequent improvements are reported annually for undergraduate and graduate student learning, faculty research, scholarship, and artistry, and faculty outreach efforts. This process has academic programs regularly researching the learning of their students, while support programs routinely survey students for their satisfaction ratings of University services. The yearly process of collecting data, monitoring program participation in improvement research, 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.higherlearningcommision.org or
30 N. LaSalle Street, Suite 2400
Chicago, IL 60602-2504;
(800) 621-7440; (312) 263-0456

Accreditation Board for Engineering and Technology
Accrediting Council on Education in Journalism and Mass Communication

American Association of Marriage and Family Therapy
American Association of Veterinary Laboratory Diagnosticians, Inc.

American Council for Construction Education
American Dietetics Association

American Occupational Therapy Association-
Accreditation Council for Occupational Therapy Education

American Psychological Association
American Veterinary Medical Association
Association to Advance Collegiate Schools of Business International

Council for Accreditation of Counseling and Related Educational Programs

Council for Interior Design Accreditation

Council on Social Work Education

Institute of Food Technologists

Landscape Architectural Accreditation Board

National Association of Schools of Music

National Council for Accreditation of Teacher Education

National Environmental Health Science and Protection
Accreditation Council

Society for Range Management

Society of American Foresters

Colorado State is approved by the Colorado State Department of Education for training teachers.

President’s Cabinet

Leadership for the University is provided by:

Larry Edward Penley, President

Anthony A. Frank, Provost and Senior Vice President

Joyce Berry, Vice President for Advancement and Strategic Initiatives

Robin Brown, Vice President for Enrollment and Access

Peter Dorhout, Vice Provost for Graduate Studies and Assistant Vice President for Research

Bill Farland, Vice President for Research

Tom Gorell, Vice Provost for Faculty Affairs

Dana Hiatt, Director, Office of Equal Opportunity and Diversity

Blanche Hughes, Vice President for Student Affairs

Paul Kowalczyk, Director of Athletics

Alan Lamborn, Vice Provost for Undergraduate Affairs

Aaron Levi, President's Chief of Staff
John Lincoln, Senior Advisor to the President and Vice President for Public Affairs
Loretta Martinez, General Counsel
Lou Swanson, Vice Provost for Outreach and Strategic Partnerships
Rich Schweigert, Chief Financial Officer
Bob Rizzuto, Vice President for Finance and Administration
Pat Burns, Vice President for Information Technology
Cara Neth, Director of Administrative Communications
Katie Kalkstein, Executive Assistant to the President

COLORADO STATE UNIVERSITY SYSTEM

410 Seventeenth Street, Suite 1415
Denver, CO 80202
(303) 534-6290
<http://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 of the Colorado State University System is the governing body for Colorado State University and Colorado State University-Pueblo, including the

Agricultural Experiment Station, Cooperative Extension, Colorado State Forest Service, and the Colorado Water Resources Research Institute. The Board consists of nine members appointed by the Governor and confirmed by the Senate for four-year terms with the potential for reappointment to one second term. In addition, a student representative and a faculty representative from each institution also serve as nonvoting, advisory members of the Board. The student representatives must be full-time students, have junior or senior status, and be elected officers of the student body of the institution which they represent. The faculty representatives must have the rank of associate professor or higher and be an elected officer of the faculty council for their respective institutions. The administrative offices for the Board of Governors of the Colorado State University System are located in Denver.

Members of the Board of Governors as of April 2007 included:

Joseph Blake
Bonifacio Cosyleon
Phyllis "Diane" Evans
Patrick A. Grant
Donald A. Hamstra
Ed Haselden
Douglas L. Jones
Chad C. McWhinney
Jeff Shoemaker

Dr. F. C. "Ted" Weston, CSU Faculty Representative
Jason Green, CSU Student Representative
Dr. Jude DePalma, CSU-Pueblo Faculty Representative
Samantha Milyard, CSU-Pueblo Student Representative

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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 living and learning community in the Academic Village, early registration for classes (after the first semester), co-curricular activities, and assistance on applications for prestigious post-graduate awards. Approximately 1,000 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

1. *University Honors Core Curriculum.* Two curricular tracks provide enriched educational experiences for high ability students in all majors. The **University Honors Scholar** program of studies (Track 1) provides entering freshmen with the opportunity to fulfill Colorado State's All-University Core Curriculum (AUCC) by completing four Honors seminars, two Honors courses in the major, and a faculty-mentored senior year creative activity. The Honors requirements fulfill most of the AUCC 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, and college transfer courses. Track 2 focuses on upper division Honors experiences in the student's major

through small classes, enriched experiences, and opportunities for on-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.

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

2. *Graduation as an Honors Scholar.* Students who complete the Honors requirements and achieve at least a 3.500 cumulative grade point average earn the prestigious designation of Honors Scholar for Track 1 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.
3. *Admission to the Program.* The application and selection process, which targets high school seniors, 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, between 275 and 300 first-year students enroll in the Honors Program each year. Currently enrolled CSU and transfer students can also apply to the University Honors Program after their first year of college.
4. *The Honors Living Learning Community.* The optional Honors Living Learning Community (HLLC) 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 HLLC 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 across from the Program Office.

LIVING AND LEARNING COMMUNITIES

Housing and Dining Services offers Living Learning Community (academic and themed floors) in some 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 Living Learning Community 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 Living Learning Community: Located in the Academic Village on the south side of campus, the Engineering Living 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. College of Engineering faculty participate in events in the community to get to know their students better.

Equine and Agricultural Sciences 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 and Agricultural Sciences 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 and Agricultural Sciences 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, Hartshorn Health Services, and University Counseling Centers. First aid and CPR (among other courses sponsored by Hartshorn Health Services) will be offered in Corbett Hall. Conveniently located by the Recreation Center and Moby Athletic Arena, Corbett Hall is ideally located for HES students.

Honors 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 Ingersoll Hall 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 at least 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.

Key Service Community: The Key Service Community is a first-year living learning community developed around the theme of "student leadership and civic engagement." The Key Service Community is comprised of 150 students who live together in Parmelee 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 Corbett Hall provides students with the opportunity to continue the development of their leadership skills through a variety of involvement opportunities. Students often take a leadership class together, become involved in service projects, and learn about on-campus and community leadership opportunities.

Live Green Sustainability Floor: This new 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 Corbett 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. A variety of social opportunities are offered to make this a fun and involved community.

Network CSU: The Network CSU Living Learning Community in Parmelee Hall is an opportunity for first-year students to access tools to assist them in major and career exploration. For students who haven't decided or want to confirm which of the 66 majors or 128 concentrations and minors they want to pursue at CSU, this community is a good fit. Network CSU will offer students the chance to match their interests and strengths to majors and potential careers. Residents have a range of tools to help them succeed, including attending at least two classes with other students from the community, group study opportunities, feedback on academic progress, access to career and major interest inventories and self-assessments, leadership opportunities, connections with faculty and other campus resources.

Pre-Veterinary Medicine Community: Residents in this community in Edwards Hall live with other students who have similar academic demands, understand the necessity for studying, and share common interests. Often, students living on the Pre-Vet Floors have majors in microbiology, animal science, zoology, equine science, biological science, or environmental health. In addition to the academic focus, students also participate in a wide variety of social activities including the Pre-Vet Club, attending CSU sporting event, hiking Horsetooth Mountain, and hosting movie nights, just to name a few.

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 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.

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 four main branches: Senate, Cabinet, Supreme Court, and Association of Student Activities Programming (ASAP). Student senators and the ASCSU cabinet represent all CSU students. Programs and services provided by ASCSU include Ram Road Trips, RamRide, Bookswap, Ram Leadership Team and the ASCSU Handbook Planner.

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 can contact their Deans' Offices in order to find out more about the College's Student Council and the leadership opportunities it may afford. University Open Option students should contact the Center for Advising and Student Achievement to get information about the University Open Option Council.

HONORARY SOCIETIES

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/index.asp?url=honorcsu. A list is also available in the Graduation Requirements and Procedures chapter of this catalog.

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 searching departmental websites and 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. Phase I and Phase II 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, and production

support facilities. Phase III construction began in 2006 and will include 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. Please see the website at www.curc.colostate.edu.

SPECIAL FELLOWSHIP AND SCHOLARSHIP OPPORTUNITIES

Assistance is available to qualified undergraduate and graduate students who wish to apply for specific scholarships and fellowships sponsored by federal and private organizations. These include but are not limited to the Truman, Marshall, Udall, Rhodes, Cook, Goldwater, and Fulbright scholarships and fellowships. Generally, these scholarships and fellowships are highly competitive and have specific requirements for 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 are willing to support undergraduate and/or graduate work within the United States as well as in foreign countries. Students can identify and determine eligibility for these prestigious scholarships and fellowships by viewing the websites for these specific awards and contacting the appropriate faculty/campus representative listed on the website. See www.provost.colostate.edu. Students may also contact Heather Esterday (heather.esterday@colostate.edu) through the Office of the Provost/Senior Vice President for information, campus deadlines, and assistance in submitting applications to the appropriate organization.

BROADENING ACADEMIC HORIZONS

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.

International Programs

Office in Laurel Hall

Jim Cooney, Associate Provost/Director of International Programs

(970) 491-5917

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

Graduate schools and employers are looking for people with international experience who understand the world and appreciate other cultures. Study abroad, area studies programs, and international education courses are just a few of the many ways Colorado State can prepare students for work in the increasingly global economy.

Colorado State offers over thirty University-sponsored study abroad programs on six continents and study abroad opportunities exist for most majors. Area studies interdisciplinary programs exist for Asian, Latin American/Caribbean, Russian, Central and East European, and international development studies offer certification in an international specialty that complements a degree program in any area of the University. More detail can be found in the International Programs and Services chapter or University-Wide Instruction Programs chapter of this catalog.

Summer Session

Office in Administration Building

Barbara Gotshall, Director

(970) 491-1590

www.summer.colostate.edu

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 of classes 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. 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 a taste of 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 program offers 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

Paul Kowalczyk, Director of Athletics

(970) 491-3350

www.CSURAMS.com

The University is a member of Division I-A of the NCAA and competes in the Mountain West Conference. Other conference members include Brigham Young University, San Diego State University, Texas Christian University, the United States Air Force Academy, the University of Nevada-Las Vegas, The University of New Mexico, the University of Utah, and the University of Wyoming.

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 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
Admissions 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 80523-8020. Students interested in graduate admission should consult the Graduate and Professional Bulletin available online at <http://graduateschool.colostate.edu/index.asp?url=catalog>

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, high 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 printed. 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, though paper applications can be requested by e-mailing to 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. Colorado State University is a member of the Common Application and accepts applications submitted online at www.commonapp.org. Finally, paper applications may be available through high school guidance offices and community college transfer centers.

Completed Application Materials

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
- One official high school transcript reflecting GPA and class rank (if applicable)
- 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)
- Personal essay (minimum 250 words)
- Teacher of school-based counselor recommendation

Transfer Applicants:

- Application for admission (online preferred)
- \$50 non-refundable processing fee
- One official transcript from each college/university attended
- One official high school transcript and ACT or SAT results
- Personal essay (minimum 250 words)
- Teacher or school-based counselor recommendation

International Applicants:

- Application for admission (online preferred)
- \$50 non-refundable processing fee
- One official transcript from each university attended (if applicable)
- One official secondary school transcript
- Official TOEFL results
- Personal essay (minimum 250 words)
- Teacher or school-based counselor recommendation

Application Processing Fee

A \$50 (subject to change) nonrefundable processing fee is required. This fee is not refunded if admission is denied and is not 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.

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 beginning September 15 prior to the start of the term.

Freshman and Transfer Students:

The **priority application date** for completed **freshman** applications is **February 1** for fall semester admission.

The **priority application date** for completed **transfer** applications is **May 1** for fall semester admission.

Applications completed or received after the priority deadline will be considered on a space available basis and may be updated to the next consecutive academic term or withdrawn once enrollment limits have been met.

International Students:

Completed applications must be received by **May 1** for fall semester (August-December).

Spring Semester Consideration:

Freshman and Transfer Students:

The **completed application deadline** is **December 1**.

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

International Students:

Completed applications must be submitted by **October 1** for spring semester (January-May).

Enrollment Deposit and Admission Confirmation

As part of the admission confirmation process, all newly admitted freshman, transfer, international, and second bachelor 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 January 3.

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 no longer 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 hide and protect 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 immunity against measles (two doses), mumps (two doses),

and rubella (two doses) 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.

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

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.

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.

Priority Consideration

Priority consideration is given to applicants who have earned a minimum 3.250 cumulative grade point average on a 4.000 scale with successful completion of an academically rigorous high school curriculum (outlined in the **Academic Standards** below) and submission of ACT or SAT results, an essay, and at least one teacher or school-based counselor letter of recommendation. Some majors have more competitive admission requirements.

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. See HEAR outlined in the chart below.

Academic Standards for Priority Consideration

Priority consideration is given to applicants with a minimum 3.250 GPA who satisfactorily complete a minimum 18 high school units outlined in the chart below.

For high school graduates beginning Spring 2008:

	HEAR	Priority Consideration
English ¹	4	4
Mathematics ²	3	4
Natural Science ³	3	3
Social Studies ⁴	3	3
Foreign Language ⁵		2
Academic Elective ⁶	2	2
TOTAL	15	18

Notes:

Grade 9-12 are considered in the admission decision; a unit typically equals one year of course work.

1. English units should include reading, composition, grammar, literature, and speech.
2. Mathematics units must include algebra I, geometry, and algebra II (or a comparable three-year sequence). Admission preference is given to students who have participated in an accelerated mathematics program or who have maintained enrollment in mathematics courses during their senior year in high school. Admission to the College of Engineering requires at least one half-unit of trigonometry/pre-calculus.
3. Natural Science units must include two lab-based units. Admission to the College of Engineering requires at least one unit of chemistry or physics.
4. Social Studies units must include at least one U.S. or world history unit.
5. Foreign Language units must be in the same language.
6. Academic Elective units can come from the core areas listed here or from music, art, theatre, or computer science.

Course work may be deemed deficient if unsatisfactory grades (D, F, U) are earned.

Applicants who do not meet the 18 academic units and/or who have a cumulative GPA below 3.250 will receive a holistic file review. *Such candidates are strongly 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.

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

In special cases, students otherwise well-qualified, but not meeting all requirements receive holistic file review for admission consideration.

For Home-Schooled Applicants

Colorado State University encourages applications from homeschooled students who have completed a solid college-preparatory education. It is recognized that homeschooling

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 homeschool curricula, etc.)

The admission decision factors are the same as those for traditional high school graduates.

Additional information may be found at <http://admissions.colostate.edu/AdmWRBlk.aspx?PgID=40>.

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).

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 or the six regional associations or schools and colleges. Credit will be granted only for academic courses.
2. An official transcript must be provided by the college or university showing the courses completed.

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.

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, economics, French, German, history, Italian, Latin, mathematics, music, physics, psychology, Spanish, and statistics for scores of three or higher. Scores of one and two are not granted credit.

See the website, www.registrar.colostate.edu, use the drop-down list under "Transfer Section," 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. Information may be obtained and arrangements for taking the tests by contacting the University Testing Service, C81 Clark Building, 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.

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. The test material usually covered in the first two years of college is often referred to as the general or liberal education requirement. Therefore, if a student takes a college-level course in a particular area, credit will not be allowed for the CLEP General Examination covering that area. Students scoring 50 or higher on a computer-based examination are awarded a minimum of three semester credits for each examination or a maximum of 30 semester credits for all five examinations. Credit granted is based on the following test scores:

General Examinations

50-57 = 3 semester credits
58-65 = 4 semester credits
66-72 = 5 semester credits
73-80 = 6 semester credits

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 Basic Competencies Requirements (intermediate writing or mathematics).

Subject Examinations

The Subject Examinations measure achievement in specific college courses and are used to grant exemption from and credit for these courses. Students scoring 50 or higher on a computer-based specific Subject Examination will be granted credit in the amount allowed for the Colorado State equivalent course or courses. Students who are enrolled in or who have successfully completed a course at a higher level may not receive credit for a lower prerequisite. See the website, www.registrar.colostate.edu and use the drop-down list under “Transfer Section” for a list of the Subject Examinations for which Colorado State credit will be granted.

International Baccalaureate

Students who graduate from high school with an International Baccalaureate or have completed International Baccalaureate examinations may receive University credit for scores of four or higher. The website, www.registrar.colostate.edu and the drop-down list under “Transfer Section” lists the courses for which credit will be granted.

For Non-High School Graduates

1. Submit transcripts showing all completed high school and collegiate courses.
2. Submit scores from the General Educational Development (GED) Test.
3. Submit evidence of competence in mathematics comparable to that indicated by successful completion of high school courses customarily titled algebra I, geometry, and algebra II. Examples of acceptable evidence of the required competence in mathematics include satisfactory completion of high school courses, completion of a college course in intermediate algebra with a grade of B or above, or satisfactory performance on the Colorado State University Mathematics Placement Exam.
4. Submit scores from either the ACT or the SAT. ACT/SAT scores are not required of applicants who are 23 years of age or older or who have been out of high school five or more years.

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.

For Transfer Students

Undergraduate students who have graduated from high school and completed **more than twelve credits** at other regionally-accredited institutions must apply as transfer

students. Those who were enrolled in high school and took college-level course work concurrently (regardless of the number of credits attempted) or those who have completed twelve or fewer credits after high school must apply for admission as freshmen (see “For High School Graduates” above). However, a “transfer profile” consisting of the total number of attempted credits and cumulative college GPA will be noted in the admission decision.

Grade Point Average Requirements

Students who have completed an Associate of Arts or an Associate of Science degree from an accredited Colorado institution will be guaranteed University admission providing that it is the last institution attended and that a cumulative 2.000 GPA (on a 4.000 scale) has been achieved from ALL institutions attended. Entry into a specific major may be dependent on completion of appropriate prerequisite courses and enrollment limitations of the major.

Students who have not yet completed an Associate’s degree but who have earned more than twelve collegiate semester credit hours, may be considered for regular admission provided they have a minimum cumulative transfer grade point average of 2.500 and all other entrance requirements have been satisfied.

Application Process for Transfer Students

1. Submit 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 cancel admission or enrollment and result in loss of credit.* 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.
2. If currently registered at another institution submit a list of courses in progress and courses scheduled to be completed prior to entering Colorado State.
3. Meet the admission requirement in mathematics. This requirement may be met by completing a transferable mathematics course (e.g., College Algebra) with a grade of C or higher, OR completing intermediate algebra or its equivalent with a grade of B or higher, OR completing algebra I, geometry, algebra II (or a comparable math sequence) with grades of C or higher while in high school, OR achieving a satisfactory score on the Colorado State University Mathematics Placement Exam, OR by submitting other credible evidence of adequate preparation of university-level mathematics courses.
4. Submit high school transcripts and ACT/SAT results. Transcripts may be used to determine if course work requirements have been met while attending high school and ACT/SAT results may be used for

placement into college composition if the course has not been completed at another college/university.

5. 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. For example, students applying to the College of Engineering must have completed at least one term of calculus and one term of calculus-based physics or chemistry prior to enrolling. Preference will be given to those applicants with the strongest records in pre-engineering programs.

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 routine course equivalencies for all courses that meet the All-University Core Curriculum (AUCC) requirements. 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.

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. Transfer grades and credits are not computed within the cumulative GPA earned at Colorado State.

Course Applicability System (CAS)

Using the World Wide Web, CAS 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 user-selected 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 transfer articulation agreements and course equivalency tables. Course descriptions, details about academic programs, and course equivalencies can all be obtained from this one website.

For Colorado State University, CAS 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 CAS. If a particular institution is not listed, contact the Transfer Evaluation Section of the Registrar's Office for evaluation of specific courses.

Statewide Guaranteed Transfer Program

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 more than 300 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. These courses will apply toward the general education core or graduation requirements at Colorado State University. Extended detail may be found on the Colorado Department of Higher Education (CDHE) web site at <http://www.state.co.us/cche/academic/transfer/index.html>. Colorado State University's site may also be referenced at www.registrar.colostate.edu. Click on the State Guarantee drop down menu under the Transfer Office Section.

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 appeals should first be directed to the Transfer Evaluation Section of the Registrar's Office in 100 Administration Annex. The student is responsible for supplying any supporting documentation from the student's transferring college along with the appeal, such as a syllabus or more detailed course description. The Transfer Evaluation Section 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, a formal written appeal may be presented to the Transfer Evaluation Section in 100 Administration Annex for presentation to the Vice Provost for Undergraduate Affairs for final decision.

60-Credit Rule for Mathematics and Composition

Colorado State has a requirement that all students must complete their math and composition credits within 60 credits. More complete information on this policy may be found in the chapter on the All-University Core Curriculum (AUCC) 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

1. A maximum of 64 semester credits may be accepted in transfer from two-year colleges accredited by one of the six regional associations of schools and colleges.
2. Credit earned at a two-year college may not be used to meet the upper-division (300-400 level) graduation requirement. Departments may allow substitution of course work from two-year colleges towards specific major upper-division requirements.
3. Advising guides are available for students who complete 60 credits at a Colorado community college and want to complete a four-year degree at Colorado State in another 60 credits for *selected* degrees. See www.registrar.colostate.edu, use the drop-down list under "Transfer Section" "State Guarantee" and choose "Transfer Guides."

Service Schools and Courses of the Armed Services

Credit may be allowed for those service schools with baccalaureate credit recommendation in the latest *Guide to the Evaluation of Educational Experiences in the Armed Services* prepared by the American Council on Education. Individual departments determine whether those courses clear major curriculum requirements or may be used as elective credit. Evaluations of service school training are made only for currently enrolled students. Contact the Transfer Evaluation Section 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 department and college in which the subject matter is taught at Colorado State. Those wishing to request such transfers should contact the Transfer Evaluation Section of the Registrar's Office.

For Former Colorado State Students

Former Colorado State students who have not attended another institution since attending Colorado State must file an Intent to Return Form. Students who have withdrawn prior to the end of a semester must also file an Intent to Return Form. A \$50 (subject to change) nonrefundable processing fee must accompany the application for admission for students who were not regularly enrolled during the previous year. Students are readmitted if they are eligible to return to the University and if space is available.

Students who have attended other collegiate institutions after attending Colorado State must file an Intent to Return Form with the \$50 (subject to change) nonrefundable processing fee, transcript(s) of all courses attempted at the transfer institution(s), and a list of courses that will be completed prior to entering Colorado State. 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")
- Select a major that does not duplicate the first degree.

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 (high school graduate, non-high school graduate, transfer student).

The admission decision will include a review of the student’s personal background and educational circumstances to determine whether additional support information is required to assess the student’s potential for academic success at the University. For example, a student 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. The applicants are required to submit the Certificate for Issuance of Immigration Document and financial support statements for immigration processing.

Colorado State 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, 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.

Freshmen must:

1. Demonstrate a high level of English proficiency.
2. 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.

Transfer students must:

1. Submit official transcripts of all university or college courses taken in the United States or abroad.
2. 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.
3. Demonstrate a high level of English proficiency.

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 Administration Annex, Room 103
(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.

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 <https://cof.college-access.net/cofapp/> AND authorize CSU to receive the funds EACH semester via RAMweb (go to RamPoint and select RAMweb). Go to <http://cof.colostate.edu> 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 or they will be assessed a portion of tuition and fees.

Registration Changes

Tuition and fees will be adjusted 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, students dropping all courses and leaving the University must contact the Center for Advising and Student Achievement (CASA), Aylesworth Hall NE, Room 201. Adjustments of tuition and fees will be made on a pro-rated basis.

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

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, refunds to financial aid programs, and repayments resulting from their withdrawal.

A withdrawal may require an immediate refund of financial aid funds. Refunds are calculated according to Student Assistant General Provisions regulations. The date of a student's withdrawal, financial aid disbursements to the student's account, University charges, and payments by the student or a third party are used to calculate the refund amount.

The student may have to repay those funds which are in excess of an amount determined to be reasonable for their length of enrollment.

All calculated refunds and repayments 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), Aylesworth Hall NE, Room 201, 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 adjustments 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	\$ 50.00
Application fee for admission to professional program in occupational therapy	\$ 50.00
Application fee for admission to professional program in veterinary medicine	\$ 60.00
Enrollment deposit and admission Confirmation	\$300.00
Composition Placement Examination fee	\$ 40.00
Mathematics Placement Examination fee	\$ 15.00
(each time exam is taken)	\$ 15.00
Credit established by challenge examination per credit attempted	\$ 20.00
Dissertation microfilming fee	\$ 55.00
Language Placement Examination fee (one-time charge; no charge for retakes)	\$ 10.00

Charge for Technology, per term;¹ (college-wide)

Agricultural Sciences	\$ 74.41
Applied Human Sciences	\$ 72.50
Business	\$ 90.00
Engineering	\$170.00
Intra-University	\$ 36.00
Liberal Arts	\$ 51.98
Natural Resources	\$100.00
Natural Sciences	\$ 94.50
Veterinary Medicine and Biomedical Sciences	\$ 90.00
Transcript fee per copy	\$ 8.00
University Technology Fee	\$ 15.00

*Fees are subject to change.

Special Course Fees

Certain courses require enrolled students to pay fees for special services and/or materials. Since the costs are determined annually in June, courses with fees are indicated by (\$) in the Courses of Instruction section of this catalog. For the most current listing of special course fees, visit the Provost/Senior Vice President web page at http://www.provost.colostate.edu/index.asp?url=ug_studies

For some courses, enrolled students are assessed a uniform fee during registration to cover the costs incurred by the University to offer the courses. These costs include the rental of external facilities, the expenses of field placements, the provision of special facilities of a personal nature that the University would not otherwise maintain, and/or the costs of off-campus travel of students with supervising faculty members.

For some courses enrolled students are assessed variable fees 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. The assessed amount is based upon actual use of expendable materials supplied by the department because of the inability to make individual purchases economically.

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.

All special course fees will be assessed and collected through normal student accounts receivable procedures. *No*

¹ For full-time resident and nonresident undergraduates and graduates; undergraduates only in the Intra-University, Natural Sciences, and Veterinary Medicine and Biomedical Sciences. Students enrolled for nine or more credits are considered full time for tuition and fee purposes and required to pay the full amount according to their college affiliation. Part-time undergraduate and graduate students pay a prorated amount.

fees should be paid directly to academic departments or individuals.

Tuition for Continuing Education Courses

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

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 difficult to estimate the amount of money needed by individual students for such items as entertainment, laundry, and clothing. Expenses not directly related to educational costs are not included in the estimates.

Example of Estimated Yearly Expenses (based on 2006-2007 figures)

The following estimate of student costs is based on a minimum but adequate standard. Students' actual expenses may be lower or higher, since these are only estimates. Certain courses carry a special course fee in addition to the regular tuition and fees.

	Resident	Non-Resident
Total base tuition and fees	\$7,296	\$16,244
College Opportunity Fund stipend credit (Colorado residents) ¹	- 2,580	0
Student share of base tuition and fees	4,716	16,244
Living allowance ²	6,326	6,326
Books and supplies	900	900
Total costs for the year ³	\$11,942	\$23,470

¹ If you are a Colorado resident, be sure to apply for the College Opportunity Fund at www.collegeincolorado.org.

² Based on standard residence hall room with Meal Plan B.

³ Don't forget to budget for supplemental tuition and personal and miscellaneous expenses (transportation, entertainment, clothing, etc.)

In addition to base tuition, there is a supplemental tuition charge per credit hour for undergraduate students enrolled in high cost/high demand programs and/or upper division courses. For more information about tuition and fee charges, visit www.colostate.edu/Depts/Registrar.

Health Insurance

The University administers an optional health insurance plan for students at a reasonable rate. This insurance cost is in addition to the Hartshorn Health Service program funded by student fees. Insurance is not a prerequisite to the use of the Hartshorn Health Service, but is designed to supplement it and to help protect against the high medical costs of an accident or sickness requiring hospitalization. This insurance plan provides additional coverage for any family plan; it provides primary coverage when no other plan is involved. The plan is optional; however, students are encouraged to enroll unless they already have adequate health insurance. Information on student health insurance is contained in the Student Health Insurance brochure which is available to all new students.

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 in writing prior to the date the residence halls open for the semester. For specific information about the refund policy, refer to the "Contract/Refund Information" outlined in the Housing and Dining Services guide or on the housing web site at <http://www.housing.colostate.edu>.

University Apartments

A deposit is required for students applying for university apartments. This deposit serves as an application fee and a contractual guarantee. The deposit will be refunded, upon request, any time prior to signing an apartment contract. The refund procedure for current apartment residents is outlined in the Apartment Life Contract Agreement. For further information, refer to the Housing and Dining Services guide or on the housing web site at <http://www.housing.colostate.edu>.

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 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
Graduates	
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
Graduates	
Full-time	5 or more credits
Half-time	3-4 credits

For verification of enrollment status, term(s) of attendance, or degree awarded, go to www.ramweb.colostate.edu. For other verifications contact the Records and Registration Section in 100 Administration Annex.

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
Office in Administration Annex, Room 103
(970) 491-6321
FAX: (970) 491-5010
www.sfs.colostate.edu*

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 104, and 23-7-105 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.

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 a 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.”

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 and a copy of the Colorado Revised Statutes may be obtained from Student Financial Services. Petitions will be processed only for students who have been admitted to the University and currently enrolled for the semester 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 during the “Priority decision deadline” 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. 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. To obtain a copy of the deadline dates for any semester, contact Student Financial Services or look for information on the Student Financial Services Web site at www.sfs.colostate.edu.

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 by 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 compliance.

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 on permanent duty station in Colorado 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. To request the Military Tuition Adjustment Request Form, contact Student Financial Services.

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 (this eligibility expires as of the first term that begins after retirement or loss of dependent status, unless the student meets the requirements for domicile [see definition of domicile for tuition purpose] in Colorado for year).

2. 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.

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.

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.

ACCOUNTS RECEIVABLE (PAYING YOUR BILL)

*Business and Financial Services
Accounts Receivable Operations
555 S. Howes, 1st Floor
(970) 491-6466
<http://www.aroweb.colostate.edu>*

You can make a payment...

On the Web

www.ramweb.colostate.edu

By Mail

Colorado State University
Cashier's Office Box 3
6015 Campus Delivery
Fort Collins, CO 80523-6015

Via Drop Box

In Lory Student Center across from Sweet Sensations
In the northeast doorway of Johnson Hall by the Cashier's Office

In Person

Cashier's Office
Room 108 Johnson Hall
Office Hours: M, T, W, F – 8:00 a.m. to 4:00 p.m., MT
Thursday – 8:30 a.m. to 4:00 p.m., MT

Payment of Student Accounts

Any student who completes registration agrees to pay the University as follows:

CHARGES	FALL	SPRING
Approximately 1/3 tuition, fees, technology charges, housing	August	January
Approximately 1/3 tuition, fees, technology charges, housing*	September	February
Approximately 1/3 tuition, fees, technology charges, housing**	October	March

* 2/3 if not assessed on first statement.

**All due if not assessed on the first two statements.

All other charges for University Services should be paid in the month billed. Summer session tuition is 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. All payment 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 through the Web Cashier or CASHNet SmartPay must be made by 2:00 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. Credit card overpayments will be credited back to the originating card. All other 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 www.sponsorbill.colostate.edu. 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 returned checks, 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 do so 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 with the University. To create a billing address or update an existing address, go to www.ramweb.colostate.edu, log into RamPoint and select the RAMweb tab. Then click on Change My Address/Telephone.

FINANCIAL ASSISTANCE

Student Financial Services

*Office in Administration Annex, Room 103
(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 Web site 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 January 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 Web site.

Grants

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

- Academic Competitiveness Grant
- Colorado Leveraging Educational Assistance Partnership Program
- Colorado Student Grant (Colorado's College Responsibility Program)
- CSU Ram Grant
- Federal Pell Grant
- Federal Supplemental Educational Opportunity Grant
- National SMART Grant

Additionally, 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 Program is administered by Student Employment Services and provides 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. Interested students should contact Student Employment Services beginning in 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 or FAFSA on the Web, <http://www.fafsa.ed.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 Web site.

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. Students must complete 75% of the credits they attempt, be in good academic standing at the University, and must not exceed established credit limits for their degree program. Copies of the complete policy are available at Student Financial Services, in your Financial Aid Guide, or on the Web site.

Ceased Attendance

Students who receive all F, U, and/or W grades for a semester will be required to verify the last date of attendance and may be required to return up to 50% of the financial aid received.

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 a scholarships, veteran's 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. Interested students may call (970) 491-5714 for general information.

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 as of the term of census date are exempt from retirement withholdings.

Several thousand students work on campus each year through the work-study and student hourly programs, and an equal 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 Records and Registration Section of the Registrar's Office assists the Department of Veterans' Affairs (VA) in providing certification for the following education benefits:

- Title 38, U.S. Code
- Chapter 30 (New G.I. Bill)
- Chapter 31 (Vocational Rehabilitation)
- Chapter 32 (Post-Viet Nam Era)
- Chapter 35 (Dependents Educational Assistance)
- 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 Records and Registration office at least six weeks 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 www.colostate.edu/Depts/Registrar/records.htm#vebo.

Financial Support for Graduate Students

Graduate students seeking financial support should consult the appropriate section of the *Graduate and Professional Bulletin*, <http://graduateschool.colostate.edu/index.asp?url=catalog>. 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

*James A. Cooney, Associate Provost and
Director of International Programs*

(970) 491-5917

www.international.colostate.edu

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 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 instructional, student service, research and outreach programs, and to the experience of the University's students.

The office is organized into three functional units:

- International Education;
- International Student and Scholar Services.
- Study Abroad

International Education

Office in Laurel Hall

Martha A. Denney, Director

Colorado State University encourages students and faculty to gain knowledge for living and working in an increasingly internationalized and interdependent world. The Office of International Programs, through its International Education unit, offers relevant international experiences for students and faculty on campus or abroad. Experiences coordinated through International Education include on-campus courses for learning about other cultures and issues of world importance (IE prefix courses), interdisciplinary international area studies certificate programs, international field experiences and work, internship, and volunteer programs, and ongoing campus programs such as the Global Village Living 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 through the area studies interdisciplinary programs for Asia; Latin America and the Caribbean; and Russian, Eastern, and Central Europe; and the International Development Interdisciplinary Studies Program (IDS). All offer certification in a specialty that complements a degree program in any area of the university. The IDS program offers undergraduate and graduate certificate options to students who wish to focus on issues related to international development (e.g. economic or social development in developing countries) or to special populations. A capstone seminar is offered (IE 492/IE 692) to provide an opportunity for discussion and for a comprehensive view of development issues. For specific program descriptions, refer to the University Interdisciplinary Studies Programs section in the University-Wide Instruction Programs chapter.

International Education (IE) Courses and Internships

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

Graduate Programs

Graduate students may enroll in the International Development Graduate Interdisciplinary Studies Program to earn a certificate in the field. This program, like the undergraduate program, does not lead to a degree, but is a certificate program that enhances a student's degree in any field. Students may also enroll in one of several Peace Corps Masters International Programs. These are offered in any field within the Warner College of Natural Resources; in the College of Agricultural Sciences; in the Department of English; and in the Department of Food Science and Human Nutrition; please check with International Education for details.

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

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. Information on scholarships for overseas study is located in the International Resource Room located in the Office of International Programs, Laurel Hall. Opportunities are also listed on the international programs website at www.international.colostate.edu.

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
Kara Bingham, Director*

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, allows for the release of financial aid to cover program costs, and fulfills 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 <http://www.studyabroad.colostate.edu>.

Scholarships for Study Abroad

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
Mark Hallett, Director

International Student and Scholar Services (ISSS) provides immigration documentation and advising to international students, scholars, and their families. ISSS support services include pre-arrival information, orientation, various workshops, cross-cultural adjustment and advising services, and information. ISSS serves as liaison to academic departments, other campus offices, sponsoring agencies, and embassies. Additional services are provided to agency-sponsored students.

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 requirements, 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 International Fest, the Day in the Mountains (a unique one-day interactive cross-cultural seminar), 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 online at www.admissions.colostate.edu, though paper applications can be requested by e-mail to 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. Colorado State University is a member of the Common Application and accepts applications submitted online at www.commonapp.org. Finally, paper applications may be available through high school guidance offices and community college transfer centers.

Completed Application Materials

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)
- Teacher or school-based counselor recommendation

Application Processing Fee

A \$50 (subject to change) nonrefundable processing fee is required. This fee is not refunded if admission is denied and is not 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.

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, transfer, international, and second bachelor 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 January 3.

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 no longer 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 hide and protect 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 immunity against measles (two doses), mumps (two doses), and rubella (two doses) 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.

English Proficiency

Colorado State 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, 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 Administration Annex, Room 103
(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 or they will be assessed a portion of tuition and fees.

Registration Changes

Tuition and fees will be adjusted 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, students dropping all courses and leaving the University must contact the Center for Advising and Student Achievement (CASA), Aylesworth Hall NE,

Room 201. Adjustments of tuition and fees will be made on a prorated basis.

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

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, refunds to financial aid programs, and repayments resulting from their withdrawal.

A withdrawal may require an immediate refund of financial aid funds. Refunds are calculated according to Student Assistant General Provisions regulations. The date of a student's withdrawal, financial aid disbursements to the student's account, University charges, and payments by the student or a third party are used to calculate the refund amount.

The student may have to repay those funds which are in excess of an amount determined to be reasonable for their length of enrollment.

All calculated refunds and repayments 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), Aylesworth Hall NE, Room 201, 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 \$80 the first semester and \$35 for each subsequent semester. Fees are subject to change.

Nonrefundable Fees

Admission application fee	\$ 50.00
Application fee for admission to professional program in occupational therapy	\$ 50.00
Application fee for admission to professional program in veterinary medicine	\$ 60.00
Enrollment deposit and admission confirmation	\$300.00
Composition Placement Examination fee	\$ 40.00
Mathematics Placement Examination fee (each time exam is taken)	\$ 15.00
Credit established by challenge examination per credit attempted	\$ 20.00
Dissertation microfilming fee	\$ 55.00
Language Placement Examination fee (one-time charge; no charge for retakes)	\$ 10.00
Charge for Technology, per term ¹ ; (college-wide)	
Agricultural Sciences	\$ 74.41
Applied Human Sciences	\$ 72.50
Business	\$ 90.00
Engineering	\$170.00
Intra-University	\$ 36.00
Liberal Arts	\$ 51.98
Natural Resources	\$100.00
Natural Sciences	\$ 94.50
Veterinary Medicine and Biomedical Sciences	\$ 90.00
Transcript fee per copy	\$ 8.00
University Technology Fee	\$ 15.00

Fees are subject to change.

Special Course Fees

Certain courses require enrolled students to pay fees for special services and/or materials. Since the costs are determined annually in June, courses with fees are indicated by (\$) in the Courses of Instruction section of this catalog. For the most current listing of special course fees, visit the Provost/Senior Vice President Web page at www.provost.colostate.edu/index.asp?url=ug_studies.

For some courses, enrolled students are assessed a uniform fee during registration to cover the costs incurred by the University to offer the courses. These costs include the rental of external facilities, the expenses of field placements, the provision of special facilities of a personal nature that the University would not otherwise maintain, and/or the costs of off-campus travel of students with supervising faculty members.

For some courses enrolled students are assessed variable fees 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. The assessed amount is based upon actual use of expendable materials supplied by the department because of the inability to make individual purchases economically.

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.

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 for 2006-2007. The actual total may exceed this minimum, as it reflects a relatively modest standard of living.

In addition, expenses for graduate students 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 Family Estimate of Expenses below.

¹ For full-time resident and nonresident undergraduates and graduates; undergraduates only in the Intra-University, Natural Sciences, and Veterinary Medicine and Biomedical Sciences. Students enrolled for nine or more credits are considered full time for tuition and fee purposes and required to pay the full amount according to their college affiliation. Part-time undergraduate and graduate students pay a prorated amount.

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

Non-resident tuition and fees (fall and spring)	\$ 16,359
For full time enrollment per DHS regulations	
Mandatory health/accident insurance coverage (12-month coverage)	\$ 1,799
Books and supplies	\$ 900
Housing, food, miscellaneous personal	<u>\$ 9,747</u>
Total estimate	\$ 28,805

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 for 2006-2007. 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.

Graduate Student Estimate of Expenses for One Calendar Year (12 months)

Non-resident tuition and fees	\$ 16,834
For full-time enrollment per DHS regulations	
Mandatory health/accident insurance coverage (12-month coverage)	\$ 1,799
Books and supplies	\$ 900
Housing, food, miscellaneous personal	<u>\$ 12,996</u>
Total estimate	\$ 32,529

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:

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

	<u>Spouse</u>	<u>Children</u>
Health/accident insurance coverage	\$ 3,955	\$ 2,597 ¹
Housing, food, miscellaneous		
Personal	<u>\$ 3,000</u>	<u>\$ 2,400</u> ²
Total estimate	\$ 6,955	\$ 4,997 ³
For two children		\$ 7,397
For three children		\$ 9,797
For four children		\$ 12,197

¹ For any number of children.

² Per child.

³ For one child. Each additional child will add \$2,400 to the total estimate.

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. In 2006-2007 this is a minimum of \$28,805 for undergraduate students who are single or arriving without family members and a minimum of \$32,529 for graduate students who are single or arriving without family members.

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 http://www.international.colostate.edu/isss/new/estimated_expenses.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, are required to live their first two consecutive semesters in a residence hall. First year students are guaranteed a room in one of twelve residence halls on campus, www.housing.colostate.edu/halls. Students with families, graduate students, and upperclass undergraduate students can find information on university apartments at www.housing.colostate.edu/apartements. Off-campus housing information can be found at Off-Campus Student Services, www.sc.colostate.edu/ocss_ral/index.html.

Residence Halls

Students have twelve 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 six flexible meal plans and can eat at any one of eight dining centers. 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 villages for students with families, graduate students, upperclass undergraduate students, and CSU faculty and staff. For more information, visit www.housing.colostate.edu.

Third Party Billing

All agencies and other entities sponsoring international students, which utilize third party billing privileges, will be assessed a \$250 base service fee per student per semester. 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.

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).

Policies and Guiding Principles

Colorado State University fundamentally exists as a community of 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 in Lory Student Center, Room 200. 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 deplures, 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

Nondiscrimination Policy

*Office of Equal Opportunity and Diversity
of Colorado State University
Office in 101 Student Services Building
Dana Hiatt, Director*

*(970) 491-5836
<http://oeod.colostate.edu>*

Colorado State University does not discriminate on the basis of race, age, color, religion, national origin, gender, disability, sexual orientation, veteran status or disability. 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 Veteran's Readjustment Act of 1974, the Age Discrimination in Employment Act of 1967, as amended, Americans with Disabilities Act of 1990, the Civil Rights Act of 1991, and all civil rights laws of the state of Colorado. Accordingly, equal opportunity for employment and admission shall be extended to all persons and the University shall promote equal opportunity and treatment through a positive and continuing affirmative action program. In order to assist Colorado State University in meeting its affirmative action responsibilities, ethnic minorities, women, and other protected class members are encouraged to apply and to so identify themselves.

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 age, race, religion, color, gender, sexual orientation, national origin, veteran status, or disability either on or off campus is urged to report such incident to the Office of Equal Opportunity and Diversity of Colorado State University, located in 101 Student Services. Any person who wishes to discuss a possible discriminatory act without filling out a complaint form 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 and Diversity.

Sexual Harassment Policy

*Office of Equal Opportunity and Diversity
of Colorado State University
Office in 101 Student Services Building
Dana Hiatt, Director*

*(970) 491-5836
<http://oeod.colostate.edu>*

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 and in the education context by Title IX of the Educational Amendments of 1972.

Sexual harassment occurs when unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature appear in any of the following contexts: (1) submission by an individual is made either an explicit or implicit term or condition of academic standing or of employment; (2) submission to or rejection of such conduct is used as the basis for academic or employment decisions affecting the individual; or (3) such conduct has the purpose or effect of unreasonably interfering with a person's academic performance or work, or creating an intimidating, hostile, or offensive academic or work environment.

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 and Diversity to request advice and information about possible ways to proceed, including use of the University formal complaint procedures. Such discussion will be kept confidential to the full extent permitted by law. 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 and Diversity.

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 and Diversity or online at the Colorado State web site on the A-Z list under “Sexual Harassment Policy” or directly at <http://oeod.colostate.edu>.

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 handicap.
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), Aylesworth Hall. 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.

Rights Regarding Students’ Educational Records

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

Policies and Guiding Principles

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" unless the student has placed a written request that such information be withheld in the Registrar's Office by the end of the second week of classes. Colorado State

defines "directory information" as a student's name, current mailing and e-mail address, telephone listing, major field of study, class, dates of attendance, anticipated date/term of graduation and expected award(s), participation in officially recognized activities and sports, weight and height of members of athletic teams, honors and degrees awarded, and CSUID number.

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.

1. 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, class schedule, residency, and class rank. None of these items may be released without the student's permission.

Directory (Public) Information

Current address and phone, major, class level, dates of attendance, anticipated graduation date and expected award, degrees awarded, honors awarded, and CSUID number are all considered directory (public) information. This information may be released on request unless the student

has signed a FERPA Release Form restricting all or some of it.

A student is required to sign this form if they want public information withheld. It is available at the Records and Registration Section of the Registrar's Office in 100 Administration Annex. If a student later wants this information released when requested, he/she will need to go to the Records and Registration Section of the Registrar's Office in 100 Administration Annex to sign a release.

Deceased Student Information Disclosure

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

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.

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 instance which interferes with educational functions. Demonstrators refusing to vacate premises upon request are subject to immediate temporary suspension and arrest under applicable municipal and state laws.

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 handicap.

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 handicap.

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 and Diversity, 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 (http://welcome.colostate.edu/index.asp?url=features_templeton) by the Templeton Foundation. 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 dishonesty. 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 responsible for and affected by the cooperative commitment to academic integrity.

Academic dishonesty (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 instructors.

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

Students are encouraged to share responsibility for the academic integrity of the University by reporting incidents of academic dishonesty.

Examples of academic dishonesty 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 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 Dishonesty* – Facilitation of any act of academic dishonesty 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 Dishonesty

Faculty/instructors are expected to use reasonably practical means of preventing and detecting academic dishonesty. If a faculty member has evidence that a student has engaged in an act of academic dishonesty, the faculty member will notify the student of the concern and make an appointment to discuss the allegations with the student. The student will be given the opportunity to give his or her position on the matter. If the student admits to engaging in academic dishonesty or if the faculty member judges that the preponderance of evidence supports the allegation of academic dishonesty, the faculty member may then assign an academic penalty. Examples of academic penalties include assigning a reduced grade for the work, a failing grade in the course, or other lesser penalty as the faculty member deems appropriate.

Faculty/instructors have a responsibility to report to the Office of Conflict Resolution and Student Conduct Services all cases of academic dishonesty in which a penalty is imposed. Incidents which the faculty member 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 member regarding alleged academic dishonesty, he or she may request a hearing with the Office of Conflict Resolution and Student Conduct Services.

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

- a. Assign an interim grade of incomplete and notify the student and the Office of Conflict Resolution and Student Conduct Services of the reason such grade was given; or
- b. 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 dishonesty.

If a University Hearing Office finds insufficient evidence or clears the student of the charges, the faculty member will determine a grade based on academic performance and without reflection of the academic dishonesty charge and change any previously assigned grade accordingly. If a University Hearing Officer finds the student culpable, the Hearing Office may impose additional University disciplinary sanctions.

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

Grades marked on the student's transcript with the designation "AD" 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 dishonesty 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, 200 Lory Student Center
 - Vice President for Student Affairs, 201 Administration Building
 - Housing and Dining Services, Palmer Center
 - Residence hall front desks
 - Off-Campus Student Services, Lory Student Center Lower Level
 - 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

dishonesty, 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 dishonesty including but not limited to: cheating, plagiarism, unauthorized possession or disposition of academic materials, falsification, or facilitation of acts of dishonesty. Specific procedures for cases of academic dishonesty 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 intentionally initiating or causing to be initiated any false report, warning or threat of fire, explosion, or 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, 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 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 of any member of the University community, 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 and Diversity 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. 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. Public intoxication is not permitted on University property.
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. Use or possession of prescription drugs other than for the person prescribed, or for use other than the prescribed purpose. Possession or use of drug paraphernalia including but not limited to equipment, products, and materials used to cultivate, manufacture, distribute, or use illegal drugs.
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 belong 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

Policies and Guiding Principles

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.

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.

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

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

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 are characteristic of such a system:

- Accessibility to students;
- An adequate amount of time spent in advising students;
- Familiarity with the requirements of various University programs;
- Ability to relate successfully to a wide variety of students;
- Knowledge of resources available for the meeting of students' needs;
- Maintaining 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

The first step is knowing where to find your academic adviser. If you have declared a major, go to the academic department office of your major. If you are an Intra-University, Life Science, or Biomedical Sciences Open Option student, contact the Center for Advising and Student Achievement (CASA), northeast wing of Aylesworth Hall. If you are a college open option student, you can contact the appropriate college office.

In addition to your assigned adviser, you may work with another adviser if you are interested in a professional program such as medicine, law, or 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 the web. All majors, minors, and interdisciplinary studies requirements will be displayed.

The *General Catalog*, All-University Core Curriculum listing outlines the general education requirements for

graduation (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 <http://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 <http://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.

About Credits

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

Undergraduate Classification

Student level (class) is determined by the number of credits earned (passed) 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

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 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.

Credit Overload

Undergraduate students who wish to register for more than 18 credits per term must have an overload approved by their adviser and department head, by using an overload form at <http://www.colostate.edu/Depts/Registrar/Credit%20Overload.pdf>. Graduate students should consult the *Graduate and Professional Bulletin*, <http://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.

Earning Alternative Credits

College-Level Examination Program (CLEP)

See additional detail in Admissions Policies and Procedures chapter in this catalog.

Credit awarded for these examinations cannot be used in meeting the Colorado State residency requirement for the baccalaureate degree.

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.

Subject Examinations

See the website, www.registrar.colostate.edu, use the link "Transfer Office," for a list of the Subject Examinations for which Colorado State credit will be granted and the fees.

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:

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

Students wishing to establish credit by challenge may obtain the application form from the University Testing Service, C81 Clark Building.

International Baccalaureate Credit

Students who graduate from high school with an International Baccalaureate or have completed International Baccalaureate examinations may receive University credit for scores of four or higher. The website, www.registrar.colostate.edu/ and the "Transfer Section" link, lists the courses for which credit will be granted.

Changing a Major/Adding or Dropping a Minor, 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. Students wishing to transfer from one major to another can obtain information about any restrictions that may be in place, as well as the actual process involved, from either the department office or from the Center for Advising and Student Achievement. A change of major form is available from the Records and Registration Section of the Registrar's Office in 100 Administration Annex. All changes of major forms are processed through this office.

Adding or Dropping a Curricular Program

Students wishing to add or drop a second major or minor use a change of major form available from the Records and Registration Section of the Registrar's Office in 100 Administration Annex. After the student receives the appropriate approvals, the Records and Registration Section of the Registrar's Office will process the change.

A student seeking an interdisciplinary studies program needs to contact the department or office overseeing the interdisciplinary study program. Refer to the University-Wide Instructional Programs chapter for more detailed information.

Registration/Schedule Changes

Class Schedule

Class schedule information is available on-line to students prior to the beginning of the registration period and provides registration procedures and courses to be offered during a given term. Students may access electronic class schedules through RamPoint and select RAMweb or through www.registrar.colostate.edu. Enrollment must conform to the courses listed in the on-line class schedule.

Registration Process

Registration, including schedule changes (adds and drops), is accomplished on-line in RAMweb. Access RAMweb at www.ramweb.colostate.edu, log into RamPoint, and select the RAMweb tab. Before registering for classes, you will need to complete the items under Registration Ready. You will be asked to answer questions that are applicable to you. Once you have completed these items, the Registration Ready hold will automatically be lifted. Deadlines for registration changes can be found online at www.colostate.edu/Depts/Registrar/Imp.Dates.html. In order to fully benefit from the system, it is essential that students follow the required procedures and conform to the established deadlines as presented in the applicable on-line class schedule. Being prepared to register (by having a list of course reference numbers, CRNs, written down) will minimize mistakes and time on the system, thereby reducing the demand during peak registration periods.

It is 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. The University also requires that each enrolled student provide an email address. Students may use either the email of their choice or the free email service the University provides through Holly/Lamar/Simla and some colleges.

Course Overrides

Even when a course has reached the formal enrollment limit, the instructor, on occasion, may give special permission for a student to register in the course. Overrides will be processed electronically by the department offering the course. The student then registers 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.

Registration Changes in Full- or Part-Time Status

Tuition and fees will be adjusted for students that go above or below the nine-credit assessment cut-off during the schedule change 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 part of their schedules.

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 Change and Drop Periods

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. 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.

The course withdrawal period begins after the schedule change period and closes at the end of the eighth week of the term. 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). No drops may be made after the schedule change period. See also Class Attendance Regulations in this section of the catalog. Tuition and fees will not be adjusted for drops during this 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 proportionately shorter 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), Aylesworth Hall NE, 201. See also Withdrawal 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 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) in 201 Aylesworth Hall NE, 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:

Advising and Registration

1. Participant must be 62 years of age or older.
2. Participation is subject to the approval of the instructor and available space in the class.
3. Approval for visitation cannot be obtained prior to the first day of class, in order to serve tuition-paying students first.
4. 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.
5. Instructors are under no obligation to grade assignments or tests submitted by visitors.
6. Student services are not available to visitors such as: student health, counseling, athletic event tickets, ID cards, etc., without payment as appropriate.
7. 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 expect to take undergraduate courses at another institution for transfer to Colorado State University must obtain a Request for Permission to Take Off-Campus Course Work from the Registrar's Office. The appropriate academic department must determine if courses will fulfill Colorado State degree requirements before the students enroll for the transfer work.

Students are responsible for insuring an official transcript will be 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 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 in the Records and Registration Section of the Registrar's Office in 100 Administration Annex.

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.

About Grades

Traditional Grading – Plus/Minus

Term grades are reported using the scale below.

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

Grade		Grade points per credit
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
C-		1.667
D+		1.334
D	(Poor, but passing)	1.000
D-		0.667
I	(Incomplete)	*
F	(Failure)	0.000
W	(Withdrawal)	*
S	(Satisfactory)	**
H	(Honors)	**
U	(Unsatisfactory)	*
AU	(Audit)	*
NG	(No Grade Reported)	*

* 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 and WF are used to compute GPA, but they do not count toward graduation. (WF grades were not issued after Summer Session 1979.)

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” symbol 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.

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 Pass/Fail

Students may elect pass/fail grading in one course per term in courses offered for student option pass/fail 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 pass/fail 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 20-credit social science requirement, for example, would not be considered free electives.) Changes to pass/fail grading can only be made at the beginning of the semester.

Performance equivalent to a grade of D+/D/D- or better is recorded as S (pass). Performance equivalent to 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. Changes to or from pass/fail grading by students must be made during the schedule change period.

A grade for a course taken as pass/fail 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 pass/fail 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 pass/fail course, a traditional grade will be assigned. A correct pass/fail 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 schedule change period. Tuition and fees are assessed for audited credits.

Audits do not count for full-time status for loan deferments, financial aid, etc.

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. 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 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 four business days after the week of final exams of each term.

Transcripts

Transcripts of students' official academic records are maintained by and may be requested from the Registrar's Office. 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 Records and Registration Section of the Registrar's Office in 100 Administration Annex.

About Withdrawals

Withdrawal from a Course

The course withdrawal period begins after the schedule change period and closes at the end of the eighth week of the term for most courses. 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 chapter of this catalog). See Schedule Change and Drop 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 term *must* contact the Center for Advising and Student Achievement (CASA), 201 Aylesworth Hall NE, prior to their departure to complete the withdrawal process. Unless this procedure is followed, students are not eligible for an adjustment (if appropriate) of tuition and fees and will receive failing grades in all courses.

Called to Active Military Duty

Any student reservist called to active military duty may, upon presentation of a copy of her/his orders to the Center for Advising and Student Achievement (CASA), be given a grade of incomplete in courses for which she/he is registered. The student or her/his designate may make this

request in person, by letter, or by telephone. However, the request will not be processed by CASA until a copy of the orders is received. The CASA advisers will counsel with the student or her/his designate and the student's instructors to select the option (either withdrawal from the University, cancellation of courses, or taking incompletes) that is most appropriate to that student's situation. (Note: CASA cannot disclose personally identifiable educational information with a third party, even a spouse or other designee, without a signed Family Educational Rights and Privacy Act (FERPA) Release Form. The FERPA Release Form authorizes CASA to disclose the student's educational information to her/his designee).

If the student chooses to withdraw from the University as a result of an undetermined amount of time required away from his/her studies during military service, the tuition paid for the semester will be refunded. If the student opts for an incomplete for the course, tuition will not be refunded. The grade of incomplete shall remain on the student's record for a period not to exceed one year following the end of the semester in which the student re-enrolls at Colorado State University. By this date, the grade will be changed by the instructor or department head of record, or it will revert to a grade of F. It will be the responsibility of CASA personnel to track these students and keep the Office of the Registrar notified of the status of these students since the time period for which the incomplete grade may remain on the record may vary from the normal University time limits for resolution of incompletes.

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 202 Aylesworth Hall NE. 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

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.

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.

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, when 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.
8. 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 Aylesworth Hall NE, Room 201
Paul Thayer, Executive Director*

*(970) 491-7095
www.casa.colostate.edu*

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. The CUM GPA is based on grades of A, B, C, D, and F. A student is expected to maintain a CUM GPA of 2.000 or higher at all times. 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. 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 two options to seek readmission. First, they can take classes 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 have the privilege to appeal academic dismissal. A written 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 five years have elapsed since the student's last term of enrollment as a regular student, regardless of the number of credits taken. The time period during which courses were taken through the Division of Continuing Education or the Colorado State summer session after leaving the University will not count as part of the five-year interval.

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.

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).

Student Services

DIVISION OF STUDENT AFFAIRS

*Office in the Administration Building, Room 201
Blanche Hughes, Vice President for Student Affairs*

(970) 491-5312

www.studentaffairs.colostate.edu/

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.

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, peer mentoring, career planning, and other academic and social activities. Program eligibility criteria include: neither parent has a bachelor's degree, **and/or** student qualifies for a Pell Grant, **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.

Accounts Receivable Operations

*Office at 555 S. Howes, 1st Floor
(970) 491-6466*

www.aroweb.colostate.edu

The accounts receivable office manages consistent, accurate, and efficient billing; collects University receivables in a timely manner; serves all clients fairly and with respect; and applies appropriate resources to projects and activities.

Advising and Student Achievement, Center for (CASA)

Office in Aylesworth Hall NE, 201

(970) 491-7095 (appointment);

(970) 491-3658 (other matters)

www.casa.colostate.edu

CASA provides the following services for on-campus students:

- Academic advising for Open Option students (including Intra-University Open Option, Life Sciences Open Option, Open Option Biomedical Sciences and Applied Human Science Open Option), for students enrolled as Open Option Seeking certain controlled majors, and for GUEST and Continuing Education students.
- Pre-professional advising in the human and animal health careers, including veterinary medicine, medicine, nursing, pharmacy, physical therapy, dentistry, and others.
- Withdrawal from the University.
- Scholastic Standards, including appeals for academic dismissal.
- Orientation programs for new students, including Preview Freshman Summer Orientation, Next Step Transfer Orientation, and Ram Welcome: Explore CSU.
- Student achievement programs, including Key Living Learning Communities, Taking Stock at First Semester, and support for students in the First Generation Award Program.

Advocacy Offices

Asian/Pacific American Student Services

Office in Lory Student Center, Room 212

(970) 491-6154

www.apass.colostate.edu

Asian/Pacific American Student Services (A/PASS) exists to support the matriculation, retention, and graduation of Asian/Pacific American students at Colorado State

University, through direct service to students as well as through educational and cultural campus-wide programs. Committed to a philosophy of multiculturalism, Asian/Pacific American Student Services creates and supports opportunities for interaction among university and community constituencies to enhance a campus environment that welcomes all students.

A/PASS achieves its mission through:

- Academic support programs
- Connections with community
- Educational and cultural programs/resources
- Student organization support
- Student leadership involvement and development.

Black Student Services

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

The Office of Black Student Services assists African American/Black students by providing support and encouragement for their academic, professional, cultural, and personal development. The office strives to provide a family-like support system of faculty, staff, and students to help students succeed. Programs and services are provided that foster cultural awareness to the campus and community about the history, heritage, and traditions unique to the African American/Black experience. Specific programs include:

- Black History Month programs during the month of February
- Mentoring program with community children
- Monthly “Knowledge for the Soul” chats
- Quarterly 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 program which includes leadership development and mentoring with a faculty or staff member.
- Junior/Senior Capstone Seminar – one semester non-credit seminar to prepare students for graduate/professional school or the work force.

El Centro Student Services

*Office in Lory Student Center, Room 178
(970) 491-5722
www.colostate.edu/depts/elcentro*

For more than 25 years, El Centro Student Services has provided a home away from home for Chicanos/as and Latinos/as at Colorado State University. The mission of El Centro is to increase the outreach, recruitment, retention, graduation, and cultural pride of our students. El Centro is

dedicated to providing services and programs that will assist students with the transition to Colorado State University by encouraging them to make connections with various departments and individuals. El Centro encourages and supports our students to volunteer and give back to the campus and community at large.

Specific programs include:

- Academic counseling, workshops, and tutoring
- Career advising and mentoring
- Scholarships
- Community and public school outreach
- Professional and leadership training
- Cultural enrichment programming
- Campus referrals
- Volunteer opportunities
- Job opportunities.

Gay, Lesbian, Bisexual, and Transgender Student Services

*Office in Lory Student Center, Room 174
(970) 491-4342
www.glbtss.colostate.edu*

The Gay, Lesbian, Bisexual, and Transgender Student Services office provides support services, programs, and a safe gathering place for GLBT people, other sexual minorities, and allies of the Colorado State University community. Reflecting a commitment to diversity through positive community building, these services include:

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

Native American Student Services

*Office in Lory Student Center, Room 218
(970) 491-1332
www.nass.colostate.edu*

The mission of Native American Student Services is to ensure a successful educational experience for Native American students by providing advocacy and support services. The four primary advocacy and service areas include recruitment, retention, graduation, and community outreach. The office embraces and encourages a support environment based on the traditions and cultures of Native American peoples. We are here to

- Assist in personal, social, and academic growth by empowering students with the skills and strategies that

Student Services

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 Native American 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; the North Star Mentoring Program; and a resource library and computer lab.

Native American Student Services also has information on the American Indian Science and Engineering Society (AISES), a private, non-profit organization which 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.

The Native American Student Association (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

www.colostate.edu/Depts/RDS

Resources for Disabled Students coordinates efforts necessary for students with disabilities to benefit from, and participate in educational, cultural, and other programs sponsored by the University. These efforts encompass accommodation, awareness, and advocacy services, depending upon individual needs and without charge. Services include:

- Alternative testing
- Alternative text conversion
- Note taking support
- Accessible transportation
- Sign language/oral interpreting.

Women's Programs and Studies

Office in Student Services Building, Room 112

(970) 491-6384

www.wps.colostate.edu/

The Office of Women's Programs and Studies provides information, services, and programs with women and gender

as the focus. The office serves all students – undergraduate and graduate, women and men. Its programs concentrate on examining the intersections of oppression and creating conditions that allow for all people to share safely and equally in the opportunities and resources provided by CSU.

- Information, counseling, and referral
- Sexual Assault Victim Assistance Team (VAT)
- Women's Interdisciplinary Studies Program (undergraduate and graduate certification)
- Outreach programming – "Women at Noon," colloquia, workshops, etc.
- The Resource Center (lending library)
- The Men's Project
- SAGE (Student Alliance for Gender Education)
- GASA (Greeks Against Sexual Assault)

Associated Students at 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 is comprised of four main branches: Senate, Cabinet, Supreme Court, and Association of Student Activities Programming (ASAP). Student senators and the ASCSU cabinet represent all CSU students. Programs and services provided by ASCSU include Ram Road Trips, RamRide, Bookswap, Ram Leadership Team, and the ASCSU Handbook Planner and Forever Green

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

All 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, Main Level
(970) 491-6626
www.sc.colostate.edu/involvement.asp*

ASAP is a group of student staff and volunteers that create, plan, implement, and attend events on campus. Working with offices and student organizations across campus, ASAP makes entertainment at CSU a reality. Whether it is a comedian, speaker, film, concert, or artistic act, ASAP is always looking for new ideas and people who want to make a positive impact on the CSU community.

The Campus Box Office is the campus source for tickets to plays, concerts, and most non-athletic events at CSU. Tickets are available in person, over the phone, and on-line at www.csutix.com.

Campus Information is the source for all kinds of information, the Campus Lost & Found, a convenient mail drop, and your link to whatsup@colostate.edu.

The LSC Arts Program enhances the academic and multicultural experience of CSU students through its exhibitions and arts programming. Exhibits by student, local, and internationally-known artists are hosted by the Curfman Gallery and Student Art Lounge, while the Duhesa Lounge Gallery showcases the art and artifacts of Native American cultures.

Campus Recreation

*Office in the Student Recreation Center
(970) 491-6359
www.campusrec.colostate.edu*

The Campus Recreation department encourages the pursuit of a balanced, healthy lifestyle that incorporates sport, fitness, and leisure activities. A sense of community is developed for students participating in quality programs, facilities, and services that promote leadership development, personal growth, 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.
- Strength & Fitness Program offers a variety of health and fitness activities promoting a balance of the mind and body.
- Intramural Sports provides an opportunity to compete against other CSU students in league sports, individual sports, and tournaments in women, men, and coed divisions.
- Sport Clubs are student-run competitive sport organizations that compete with other colleges and play for national championship sport club titles.
- Noncredit instruction activity classes provide opportunities for students to learn new skills while having fun.

- Outdoor Adventure offers a variety of outdoor activities to enable students to experience the great Colorado outdoors.
- Challenge Ropes 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* on campus or check out the Campus Recreation web site at www.campusrec.colostate.edu.

Career Center

*Office in Ammons Hall, Room 105
(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
 - On-campus interviewing opportunities through CareerRAM
- Job vacancy information through CareerRAM
- The Career Center website with extensive information and links (www.career.colostate.edu), and The Career Resource Guide.

Conflict Resolution and Student Conduct Services

*Office in Lory Student Center, Room 200
(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
- Emergency consultation team
- Healing Action Response Team (HART) for bias incidents
- Advising of student peer conduct boards

Student Services

- 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 Clark Building, Room C36

(970) 491-6053

www.counseling.colostate.edu

Learning Assistance Center

Office in General Services Building, Room 100

(970) 491-5527

www.colostate.edu/Depts/Counseling/LAC/

Based on a mental health model stressing personal development and prevention as well as remediation of problems, the Counseling Center 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. 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 Service provides testing adjunct to counseling, assists faculty with automated test scoring, administers challenge exams, GED's, and national admissions tests (e.g., SAT, ACT, MCAT)
- Computer Based Testing administers GRE, GMAT, TOEFL in C82 Clark, 491-5060.

Educational Access and Outreach, Center for

Office in Student Services Building, Room 304

(970) 491-6473

http://www.ceao.colostate.edu

Federal TRIO Programs and the Bridge Scholars Program increase access to higher education for low-income, first generation college, and underrepresented youth and adults in surrounding communities by nurturing college-bound aspirations; increasing academic skills and motivation; facilitating the college application, enrollment, and student aid process; and assisting in the transition to college.

- 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.
- 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.
- Bridge Scholars Program facilitates students' high school to college transition through campus life and academic experiences in an eight-week, summer residential program.
- The Center also engages in outreach efforts and access initiatives on campus, in surrounding communities, and at the state and national level.

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, Latino Greek Council, National Pan-Hellenic Council, Up 'til Dawn, and the Order of Omega.

Hartshorn Health Service

Office in the Hartshorn Health Center

(970) 491-7121

www.colostate.edu/Dept/HHS

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
- 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 and Dining Services

Offices in the Palmer Center, 1005 W. Laurel
(970) 491-6511
www.housing.colostate.edu

The mission of Housing and Dining Services is to develop, sustain, and improve dynamic, student-centered, employee-supported, living learning communities that enhance personal growth and global citizenship.

Residence Halls

Office in the Palmer Center, Room 111
(970) 491-4719 or 491-4721
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 Living 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 GPA's 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, 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 towards 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 as part of the admissions acceptance packet. Inquiries from continuing students should be directed to Residence Life at (970) 491-4719 or assign@colostate.edu.

Living Learning Communities

Living 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 LLC have the chance to get the most from their college experience.

The following Living Learning Communities are available in the residence halls:

- Engineering Living Learning Community
- Equine and Agricultural Sciences
- Global Village
- Health and Exercise Science
- Honors Living Learning Community
- Ingersoll Residential College (College of Natural Sciences)
- Key Academic Community
- Key Service Community
- Leadership Development Community
- Live Green Sustainability Floor
- Living Substance Free
- Network CSU
- Pre-Veterinary Medicine

For more information on these communities, see Living Learning Communities in the Broadening Your Horizons chapter or visit the website at <http://www.housing.colostate.edu/halls>.

Residential Dining Services

Office in the Palmer Center, Room 108
(970) 491-4754
www.housing.colostate.edu/dining/index.htm

Residential Dining Services operates eight dining centers in seven residence halls and the Durrell Center. Each dining center is a unique combination of one or more of 12 different food concepts, offering choices such as pizza, pasta, sandwiches, stir-fry, vegan, deli, Tex-Mex, and grilled-to-order sandwiches. Extensive salad bars feature fresh fruits, fat-free dressings, and a wide range of fresh produce. The in-house bakery bakes a wide range of breads, cakes, pies, cookies, and mouth-watering pastries and donuts.

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 rooms.

University Apartment Housing Apartment Life

*Office in the Palmer Center, Room 208
(970) 491-4743
www.housing.colostate.edu/apartments*

The University Apartments offer nine hundred apartments in four villages that provide housing for undergraduate and graduate students as well as CSU faculty and staff members. Leases are month-to-month and individual leases are also available. All utilities including local phone, cable, and high-speed Internet are available as well as washer/dryer hook-ups in some apartments. A number of modified apartments for physically disabled students are also available.

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 at Pitkin and College, Southwest Corner
(970) 491-4636*

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

*Located at Pitkin and College, Southwest Corner
(970) 491-6222
www.conferences.colostate.edu*

The Office of Conference Services assists University and non-University program sponsors in organizing and conducting conferences, seminars, workshops, and other short-term educational activities. Support services are available all year for programs meeting on the campus, in Fort Collins hotels, and at other sites around the state. In addition, limited services are available for programs meeting 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 and especially during University breaks. The Conference Services staff works with about 100 programs per year, accommodating over 20,000 participants.

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.

University RamCard

*Office in Lory Student Center, Room 30D
(970) 491-2344
<http://www.housing.colostate.edu/id/index.htm>*

University identification (ID) cards for students, faculty, and staff are used by campus departments for a wide range of activities including meal plans, convenience accounts, building access, library materials checkout, sporting and cultural events, entrance to exams, and vending services. The ID card can be obtained during normal business hours at the RamCard Office in the Lory Student Center or Student Recreation Center. An existing government-issued picture ID such as a driver's license, passport, or military ID is required to obtain a University ID. The initial University ID cost is \$18 and replacement cards cost \$23 (subject to change).

Lory Student Center

(970) 491-5444

www.sc.colostate.edu

The Lory Student Center is the dynamic hub of campus, serving 15,000 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 Student Services/ Resources for Adult Learners

Office in Lory Student Center, Room 195

(970) 491-2248/491-6196

www.ocssral.colostate.edu

Off-Campus Student Services/Resources for Adult Learners is a leader in integrating the evolving, diverse needs of off-campus students, non-traditional students, the University, and surrounding community. They assess and offer an array of information, services, and educational programs that encompass students' rights, responsibilities, and success in transitioning to off-campus living; life skills; campus and community resources; and support a multi-generational student body. They assist in retaining adult learners at Colorado State University, facilitating the transition of adult learners to university life and contributing to the enrichment of the education and lives of students and community members through exposure to a diverse, multi-generational campus. Services include:

- Adult learner orientation, networking, family-friendly programming
- Community-building programs, ordinance information, city resources
- Rental housing information, roommate connection, off-campus living assistance
- Individual appointments.

Orientation

(See Advising and Student Achievement, Center for)

Registrar's Office

Office in Administration Annex, Room 100

(970) 491-7148

www.registrar.colostate.edu/

The Registrar's Office is responsible for student academic records and registration information. This includes overrides, final exams, grade appeals and changes, incompletes, repeat/deletes and university withdrawal, transfer credits, and registration changes.

Student Financial Services

Office in Administration Annex, Room 103

(970) 491-6321

www.sfs.colostate.edu

Student Employment Services

Office in Student Services Building, Room 133

(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 and Civic Engagement

Office in Lory Student Center, Room 176

(970)491-1682

This office prepares students for leadership roles as engaged and community-minded citizens in the emerging global society through service learning, volunteerism and civic based leadership opportunities.

The Student Organizations office staff 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 the wide range of student interests such as academic, political, religious, and special interests.

The wide range of curricular and co-curricular programs can be divided into four broad categories:

- Connecting Academics and Service, promoting and supporting courses and programs that integrate public and community service with academic instruction and research.
- Developing Student Leadership, preparing students to become leaders both as citizen participants in public service and in their career fields.

Student Services

- Engaging with Communities, including volunteer activities and other sustainable collaborations with community-based, philanthropic, and governmental organizations.
- Community Based Research, maintaining resources related to service learning and civic engagement and supporting research that contributes to community development.

Student Legal Services

Office in Lory Student Center, Room 182

(970) 491-1482

www.sls.colostate.edu

Student Legal Services provides legal advice, counsel, and representation to full fee-paying students on a variety of legal matters. Some of the more common cases involve housing issues, criminal law, consumer complaints, and debt problems. Most services provided by SLS are free. For others there is a nominal charge. The staff also educates clients (individually and in groups) about their legal rights and responsibilities and encourages them to learn about various methods of dispute resolution, including negotiation, mediation, and small claims court. Educational presentations by the SLS attorneys are available.

Student Media

Office in Lory Student Center, Room 28

(970) 491-1683

<http://campusmedia.colostate.edu/>

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, Hartshorn Health Service, and University Counseling Center)

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 Facilities, Libraries, Services, and Outreach

FACILITIES AT COLORADO STATE UNIVERSITY

*Office of Facilities Management
Facilities Services Center, North
Brian J. Chase, Director*

(970) 491-0005

The University spans five primary campuses on 4,952 acres plus numerous Agricultural Experiment Stations, Cooperative Extension offices, and Colorado State Forest Service sites across the state that cover an additional 4,666 acres. Altogether, the University has 749 buildings including 261 classrooms and 1,542 laboratories totaling 8,384,321 gross square feet. In addition to acres owned, the University manages an additional 98,473 acres throughout the state, most of which is the Colorado State Forest.

The main campus is a 579-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 10 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. Renovation of the Printing and Publications building was completed in summer 2001. The building was renamed Laurel Hall and now houses International Programs. Printing and Publications has relocated to the University Center for the Arts Annex.

Albert C. Yates Hall, between Anatomy/Zoology and Chemistry Buildings, consisting of ground-level construction with a bridge connecting the two buildings was completed February 2003. Phase I of the transit center was completed in summer 2003. Phase II of the transit center was completed July 2006.

The Old Fort Collins High School was purchased from the school district in 1997. Phase I and Phase II construction is

complete on the University Center for the Arts, housing the Edna Rizley Griffin Concert Hall, the University Theatre, the Studio Theatre, the Runyan Music Hall, and production support facilities. Phase III construction began in fall 2006 and will include recital and rehearsal halls, dance performance space and studios, classrooms, and faculty offices.

The south campus contains the Veterinary Teaching Hospital's research and teaching programs and the federal Natural Resources Research Center. The Equine Orthopaedic Research Laboratory, housing a multidisciplinary program addressing equine musculoskeletal disease, was completed in fall 2002.

Two miles west of main campus lies the 711-acre foothills campus, home to much of the University's research activities and the Colorado State Forest Service nursery. A new research/lab complex at Atmospheric Science/CIRA and a new Foothills Fishery Facility were completed in fall 2002. The Bioenvironmental Research Building Expansion Project is scheduled for completion May 2007.

The Environmental Learning Center (ELC), one mile east of Fort Collins, is a 181-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
Catherine Murray-Rust, Dean of Libraries*

<http://lib.colostate.edu>

The University Libraries support the teaching and research activities of Colorado State's faculty and students by providing a diverse collection of approximately two million items and offering a wide array of services. These services include library instruction, research, archives, electronic reserves, and interlibrary loan.

Enhancing the collection is a wide selection of electronic resources accessible from the library web page (<http://www.library.colostate.edu>). Electronic books, electronic databases, and more than 20,000 electronic serial titles are available from the desktop. Finding aids for collections and selected images are also accessible electronically for noted special collections in the Water Resources and Colorado Agricultural Archives.

William E. Morgan Library houses the major 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 equipment, and public terminals for accessing the full array of electronic databases and services. A variety of user seating, including group spaces, is

available. 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, resource sharing, and collection development programs on a national scale. Resource sharing is further enhanced by the Libraries' locally developed RAPID ILL system now linking research libraries around the world.

UNIVERSITY SERVICES

Academic Computing and Networking Services

*Office in University Services Center, Sixth Floor
Patrick J. Burns, Associate Vice President for Information and Instructional Technology*

(970) 491-5133

www.acns.colostate.edu

Academic Computing and Networking Services (ACNS) provides services to the University community to augment 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, support for personal computing and personal computer applications; end user training and support via workshops, seminars, consulting and publications; negotiation of software, hardware, and maintenance contracts for campus-wide use; computer repair services; and the sale of computer software and supplies. See www.acns.colostate.edu for specific information about the services offered by ACNS.

Computer Training and Support Services (CTSS), a division of ACNS, offers seminars and workshops on computer use and software applications. Students, faculty, and staff may access a wide variety of computing resources at the CTSS Laboratory located in Room 224 of the Weber Building. The lab provides access to Windows-based computers, laser printers, scanners, the University's network, and the internet. Hours are posted at the facility and on the CTSS web site, at www.ctss.colostate.edu. Please be prepared to show your University ID card when using the lab.

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 the University's computing systems is available from the Computing Help Desk, 224A Weber Building. Computer supplies, software, and manuals may be purchased at the Software Cellar in the Lory Student Center. A University identification card is required for cash purchases.

For more information about ACNS and updates on the general computing environment at CSU, view the latest issue of *VECTOR*, a publication of ACNS, at www.vector.colostate.edu.

Division of Continuing Education

*Offices in Spruce Hall and downtown Denver
Richard B. Simpson, Director*

(970) 491-5288
www.learn.colostate.edu

The Division of Continuing Education offers a wide range of credit and noncredit educational opportunities available on campus, off campus, and by various distance education formats. Programs include academic, degree-oriented courses and programs, as well as instructional packages to meet the specific needs of individuals, groups, and employers.

Credit Programs include sponsoring special sections of regular academic courses available during evening hours on the Fort Collins campus. Where a need exists, Continuing Education arranges contract credit courses conducted at off-campus locations.

Noncredit Programs include courses, workshops, and institutes for personal and professional development conducted both on and off campus. 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 programs in work-related areas.

Distance Education courses are offered by Continuing Education in a self-paced or semester-bound independent learning format. Through the use of a course syllabus, textbooks, video, online, and additional reference materials, students can complete courses without the limitations of time and place associated with classroom instruction. Learning assignments are submitted by mail or email and examinations are taken under the supervision of an

authorized proctor at a time and location convenient to the student.

The Online/Distance Degree Program offers credit courses toward graduate and undergraduate degrees via videotape, correspondence, online, or computer technology, with no residency requirement. Courses are available in several disciplines including adult education and training, agricultural sciences, computer science, engineering, fire service, human development and family studies, industrial/organizational psychology, organizational performance and change, liberal arts, rangeland ecosystem science, and statistics. Courses utilizing videotapes, DVDs, and VCDs are only delivered to students using U.S. and Canadian addresses. Thousands of students have earned degrees via the Distance Degree Program.

Advising Services for students continuing their studies is available through the Center for Advising and Student Achievement (CASA), Aylesworth Hall. Information is provided on financial aid and student services.

The *Denver Center* represents an extension of University resources to the people and businesses of metropolitan Denver. The Center is located at 410 17th Street (17th and Tremont). Designed for the convenience of the working professional, classes are offered evenings and weekends. Day classes have recently been added to further accommodate our students. Master's programs currently available include: executive M.B.A. and organizational performance and change. Facilities include a fully equipped microcomputer lab. The Denver Center provides numerous opportunities for professional development to metro Denver residents and businesses.

The *Alumni College* is a new and exciting educational partnership of the Alumni Association and Continuing Education. The Alumni College will look to provide access for alumni to Colorado State's variety of resources including courses, faculty, university events, and alumni networks.

In partnership with the Bernard Osher Foundation, the *Osher Lifelong Learning Institute (OLLI)* at Colorado State University is an innovative educational program. The program is designed to help people 50 years of age or better (or anyone with a curious mind) renew their enthusiasm for learning in a relaxed atmosphere.

Office of Equal Opportunity and Diversity

*Office in 101 Student Services
Dana S. Hiatt, Director*

*(970) 491-5836
<http://oeod.colostate.edu/>*

Colorado State University is a land-grant institution committed to offering access in its educational, scholarly, and outreach activities to all individuals representative of our multi-cultural society and 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 Office of Equal Opportunity and Diversity is charged with implementing, monitoring, and evaluating programs, activities, and procedures that support this commitment.

The following are key programs and activities of the Office of Equal Opportunity and Diversity:

- Provide leadership to diversity enhancement efforts and monitor the progress and implementation of the University Strategic Plan for Diversity.
- Develop and implement the University's Affirmative Action Program.
- Review and develop policies that support diversity goals.
- 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 Title IX of the Education Amendments of 1972.
- Provide education and training to students, staff, and external constituencies in diversity-related areas.

CSU Police Department

*Office in Green Hall
Chief D. Yarbrough, Chief of Police*

*(970) 491-6425
<http://police.colostate.edu>*

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 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 Division

*Office in Green Hall, Room 201
Assistant Chief Frank Johnson*

*(970) 491-7041
<http://parking.colostate.edu/>*

Parking at Colorado State University is provided for faculty, staff, students, and visitors. Parking permits are required and can be purchased at the Parking Services Division of the Colorado State University Police Department. Colorado State has over 13,000 parking spaces on campus allocated to promote the best interests of the entire University community. For specific information, contact the Parking Services Division.

OUTREACH UNITS OF THE UNIVERSITY

Agricultural Experiment Station

*Office in University Square, Room 102
Lee E. Sommers, Director*

(970) 491-5371

www.colostate.edu/Depts/AES

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 quality, and wildlife. The food production system involves use of human and monetary 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 8 off-campus research centers: Agricultural Research Development, and Education Center (ARDEC), Fort Collins; Arkansas Valley, Rocky Ford; Eastern Colorado, Akron; Plainsman, Walsh; San Juan Basin, Hesperus; 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. These results are also disseminated by Cooperative Extension in a variety of formats.

Colorado State Forest Service

*Office in Foothills Campus Building 1050
Jeff J. Jahnke, Director*

(970) 491-6303

The Colorado State Forest Service (CSFS) assists other state agencies, counties, and private landowners in forest stewardship, community forestry, fire protection, and conservation education. The CSFS is located on campus with 17 district and 12 field offices throughout Colorado.

The Colorado State Forest Service is part of the Warner College of Natural Resources and maintains cooperative relationships with Colorado State University Cooperative Extension and other federal, state, and local agencies. The State Forest Service, via media, publications, and personal contact, provides forestry-related information to Colorado citizens.

Cooperative Extension

*Offices in University Square, Room 102, and in Aylesworth Hall NW, First Floor
Marc A. Johnson, Interim Director*

(970) 491-6281

www.ext.colostate.edu

Cooperative Extension was established in 1914 by federal legislation, accepted by Colorado's General Assembly in 1915, and reaffirmed in 1979. It is funded by federal, state, and county appropriations. Colorado State University Cooperative Extension (CSUCE) provides information and encourages the application of research-based knowledge in response to local, state, and national issues affecting individuals, families, agricultural enterprises, and communities of Colorado. Cooperative Extension also functions as the educational arm of the U.S. Department of Agriculture, through each state's land grant university. CSUCE has off-campus offices and serves 59 of Colorado's 64 counties.

Cooperative Extension's educational objectives fall within the scope of their land-grant mission and currently 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 the following high-priority areas: strong families, healthy homes; nutrition, health, and food safety; 4-H and youth

University Facilities, Libraries, Services, and Outreach

development; community resource development; natural resources and the environment; and competitive and

sustainable agriculture systems.

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
Administration Annex, Room 100*

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), Aylesworth Hall. 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 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. Some majors require a minimum grade of C or C- in required courses. For further information, 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.

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 earned at Colorado State by the total credits attempted 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.

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.

“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 CSU 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.

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 curriculum requirements must be approved by the adviser and department head. Ultimate responsibility for ensuring that curriculum requirements are observed and that substitution of equivalent courses or waivers are for good and sufficient academic reasons rests with the Provost/Senior Vice President.

Degree Audit Reports (DARS)

DARS is the degree audit tool used for verification of university, program, minor, and interdisciplinary requirements. The report 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 certification. The degree audit report will provide students with current and accurate transfer and course information to enhance their degree and program planning. Students are able to see a What-If degree audit for display to see how their credits would be used to fulfill another major’s requirements.

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. 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.

EXCLUSION OF COURSES FROM THE BACHELOR’S DEGREE

Undergraduates who enroll in 500-level courses which are not applied toward the bachelor’s degree may request that an exclusion statement be placed on their academic records. This makes such courses potentially applicable to a Colorado State graduate degree. Students cannot exclude any courses below the 500-level under this policy. (See Course Restrictions in this section.) Courses at the 600-level are automatically excluded from use for an undergraduate degree.

A written request must be filed in the Degree Section of the Registrar’s Office, Room 100, Administration Annex, 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 to determine its appropriateness to the major requirements.

GRADUATION PROCEDURES AND INFORMATION

Checking *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. Requests for waivers or substitutions for curriculum 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 Section of the Registrar's Office, 100 Administration Annex.

Intent to Graduate

Students will file their Intent to Graduate every semester during registration via the Registration Ready Tool in RamWeb. Upon completion of 85 credits, the student will be prompted to verify their curriculum and give their desired name for their diploma.

Contract for Graduation

Candidates for degrees must complete and sign a contract for graduation for majors, second majors, and minors by the end of the fourth week of their graduation term in the department office(s) of their majors/minors. Students not completing degree requirements that term must sign another contract for graduation during the first week of the new graduation term.

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 from the contracts for graduation. 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 graduation on file in the Registrar's Office by the end of the fourth week of the graduation term. Official transcripts showing completion of work from another institution must be on file in this office by no later than the fourth week after the graduation term.

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 weeks following the close of the graduation term, 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.

<u>College</u>	<u>Summa Cum Laude</u>	<u>Magna Cum Laude</u>	<u>Cum Laude</u>
Agricultural Sciences	3.99	3.91	3.74
Applied Human Sciences	3.97	3.89	3.74
Business	3.96	3.85	3.72
Engineering	3.95	3.86	3.72
Liberal Arts	3.96	3.87	3.70
Natural Resources	3.98	3.89	3.72
Natural Sciences	3.98	3.93	3.83
Veterinary Medicine & Biomedical Sciences	3.97	3.92	3.77

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.

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 HONORS SCHOLAR

Students who complete the University Honors Program academic requirements and achieve at least a cumulative 3.500 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/index.asp?url=honorcsu

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 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).

Degree Programs

UNIVERSITY OPEN OPTION

*Center for Advising and Student Achievement
Offices in Aylesworth Hall, Northeast Wing, Room 201
(970) 491-3658
www.casa.colostate.edu*

Open Option Advising

The Open Option category is a special designation for students who are exploring which major they want to pursue. University Open Option is for students with a rich and diverse set of interests that span the University curriculum. Life Science Open Option is designed for students who are interested in the life sciences, but have not chosen a specific major. Additionally, students who want to explore a particular college but are not sure which major in the college they want to study, can start in College Open Option. Through the Open Option programs, 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 academic requirements to assist students in the process of selecting a major. Advisers help students plan their schedules, provide information on career options, and refer students to other resources. Students should declare a major by the time they earn 45 credits.

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 section 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.

Second Major Requirements

Students may elect to complete concurrently the requirements for two majors. Combinations are available in unrelated as well as related majors.

At least one full term before the graduation term, students selecting second majors must contact the Records and Registration Section of the Registrar's Office to make official declarations and gain departmental approval for the joint curricular plans. Common requirements for either major may count in meeting curriculum requirements for both majors.

Students must file sign a contract for graduation in the department offices for both majors. The single degree awarded is that degree appropriate for the first major. A single diploma is issued which displays both majors, and both are recorded on the student's academic record.

Students must complete degree requirements for the first major before they can graduate. Students completing degree requirements for the second major only cannot graduate until the first major's degree requirements have been met.

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, but not on the diploma.

Option

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.

Second Bachelor's Degrees

Requirements for a second bachelor's degree include the following:

1. A minimum of 30 semester credits in residence in addition to the minimum number of credits required for the first degree.

2. All curriculum requirements for the major including All-University Core Curriculum requirements (see that section of this catalog).

The first baccalaureate degree from an institution accredited by an accrediting agency recognized by the U.S. Department of Education, the Council for Higher Education Accrediting, or equivalent will fulfill the All-University Core Curriculum (AUCC) requirements with the exception of those AUCC courses (including category 4 courses) that are required in the major.

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.

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 Science (B.S.), Biomedical Sciences/Veterinary Medicine and Biomedical Sciences

Business Administration (B.S.), interdepartmental major/Business

Chemical Engineering (B.S.), Chemical and Biological Engineering/Engineering

Chemistry (B.S.), Chemistry/Natural Sciences

Civil Engineering (B.S.), Civil and Environmental Engineering/Engineering

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

Equine Science (B.S.), Animal Sciences/Agricultural Sciences

Family and Consumer Sciences (B.S.), interdepartmental major/Applied Human Sciences

*Fire and Emergency Services Administration*¹(B.S.), Construction Management/Applied Human Sciences

*Fishery Biology*² (B.S.), Fish, Wildlife, and Conservation Biology/Natural Resources

Forestry (B.S.), Forest, Rangeland, and Watershed Stewardship/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

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

Landscape Architecture (B.S.), Horticulture and Landscape Architecture/Agricultural Sciences

Landscape Horticulture (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/Natural Resources

Natural Resources Management (B.S.), Forest, Rangeland, and Watershed Stewardship/Natural Resources

Natural Sciences (B.S.), interdepartmental major/Natural Sciences

Nutrition and Food Science (B.S.), Food Science and Human Nutrition/Applied Human Sciences

¹ Offered only through the Division of Continuing Education as a distance degree program.

² The majors of Fishery Biology and Wildlife Biology are being consolidated by the Department of Fish, Wildlife, and Conservation Biology into a major in Fish, Wildlife, and Conservation Biology. The consolidated major is under review by the Board of Governors and the Colorado Commission on Higher Education at the time of publication of this catalog. For more information, see the department section in the chapter on the Warner College of Natural Resources.

Degree Programs

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, Rangeland, and
Watershed Stewardship/Natural Resources
Restaurant and Resort Management (B.S.), Food Science
and Human Nutrition/Applied Human Sciences
Social Work (B.A.), Social Work/Applied Human
Sciences
Sociology (B.A.), Sociology/Liberal Arts
Soil and Crop Sciences (B.S.), Soil and Crop Sciences/
Agricultural Sciences
Speech Communication (B.A.), Speech Communication/
Liberal Arts
Technical Journalism (B.A.), Journalism and Technical
Communication/Liberal Arts
Watershed Science (B.S.), Forest, Rangeland, and
Watershed Stewardship/Natural Resources
*Wildlife Biology*² (B.S.), Fish, Wildlife, and Conservation
Biology/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, but not on the diploma.

List of Minors

This list is subject to change.

Aerospace Studies – All-University
Agricultural and Resource Economics – Agricultural and
Resource Economics/Agricultural Sciences
Anthropology – Anthropology/Liberal Arts
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
Computer Science – Computer Science/Natural Sciences
Construction Management – Construction Management/
Applied Human Sciences

Criminology and Criminal Justice – Sociology/Liberal
Arts
Economics – Economics/Liberal Arts
English – English/Liberal Arts
Entomology – Bioagricultural Sciences and Pest
Management/Agricultural Sciences
Environmental Engineering – Civil and Environmental
Engineering/ Engineering
Ethnic Studies/interdepartmental/Liberal Arts
Fishery Biology – Fish, Wildlife, and Conservation
Biology/Natural Resources
Forestry – Forest, Rangeland, and Watershed
Stewardship/Natural Resources
French – Foreign Languages and Literatures/Liberal Arts
General Philosophy – Philosophy/Liberal Arts
General Sociology – Sociology/Liberal Arts
Geology – Geosciences/Natural Resources
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
Landscape Horticulture – Horticulture and Landscape
Architecture/Agricultural 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, Rangeland, and Watershed
Stewardship/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, Rangeland,
and Watershed Stewardship/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 – Forest, Rangeland, and Watershed
Stewardship/Natural Resources
Wilderness Management – Human Dimensions of Natural
Resources/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.

Completion of requirements for an interdisciplinary studies program is noted on the student's academic record (transcript) but not on the diploma. The minimum number of credits in an undergraduate interdisciplinary studies program is 20. The programs of study for the interdisciplinary studies programs are in the University-Wide Instructional Programs section of this catalog.

Asian Studies
 Biomedical Engineering (Undergraduate and Graduate)
 Biotechnology
 Community Youth Development (Graduate)
 Conservation Biology
 Diversity in Law
 Environmental Affairs
 Exercise Science and Nutrition (Graduate)
 Food Science and Safety (Undergraduate and Graduate)
 Geospatial Science (Graduate)
 Gerontology (Undergraduate and Graduate)
 Information Science and Technology
 Integrated Resource Management
 International Development (Undergraduate and Graduate)
 Latin American and Caribbean Studies
 Mathematics (Graduate)
 Merchandising (Graduate)
 Molecular Biology
 Molecular, Cellular and Integrative Neuroscience (Graduate)
 Organic Agriculture
 Political Economy (Graduate)
 Religious Studies
 Russian, Eastern, and Central European Studies
 Water Resources
 Women's (Undergraduate and Graduate)
 Youth Program Management and Evaluation (Graduate)

GRADUATE DEGREES

The following is a list of graduate degree programs offered by Colorado State. For information on requirements for graduate degrees, visit the Graduate School web pages at www.colostate.edu/Depts/Grad. An online version of the *Graduate and Professional Bulletin* is available at <http://graduateschool.colostate.edu/index.asp?url=catalog>.

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
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
Computer Science (M.S., Ph.D.), Computer Science/
 Natural Sciences
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, Rangeland, and Watershed Stewardship/Natural
 Resources
Ecology (M.S., Ph.D.), intra-University
Economics (M.A., Ph.D.), Economics/Liberal Arts
Education and Human Resource Studies (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
Fishery and Wildlife Biology (M.S., Ph.D.), Fish,
 Wildlife, and Conservation Biology/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, Rangeland, and
 Watershed Stewardship/Natural Resources
Geosciences (M.S.), Geosciences/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

Degree Programs

Human Dimensions of Natural Resources (M.S., Ph.D.),
Human Dimensions of Natural Resources/Natural
Resources

Human Development and Family Studies (M.S.), Human
Development and Family Studies/Applied Human
Sciences

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

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

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,
Rangeland, and Watershed Stewardship/Natural
Resources

Sociology (M.A., Ph.D.), Sociology/Liberal Arts

Soil and Crop Sciences (M.S., Ph.D.), Soil and Crop
Sciences/Agricultural Sciences

Speech Communication (M.A.), Speech Communication/
Liberal Arts

Statistics (M.S., Ph.D.), Statistics/Natural Sciences

Student Affairs in Higher Education (M.S.), School of
Education/Applied Human Sciences

Technical Communication (M.S.), Journalism and
Technical Communication/Liberal Arts

Watershed Science (M.S.), Forest, Rangeland, and
Watershed Stewardship/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 Business Administration (M.B.A.)
Business

Master of Computer Science (M.C.S.)
Computer Science/Natural Sciences

Master of Education (M.Ed.)
*Education and Human Resource Studies/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 Fishery and Wildlife Biology (M.F.W.B.)
*Fish, Wildlife, and Conservation Biology/Natural
Resources*

Master of Music (M.M.)
Music/Liberal Arts

Master of Natural Resources Stewardship (M.N.R.S.)
*Forest, Rangeland, and Watershed Stewardship/
Natural Resources*

Master of Social Work (M.S.W.)
Social Work/Applied Human Sciences

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
<http://core.colostate.edu>

ALL-UNIVERSITY CORE CURRICULUM (AUCC)

All Colorado State University students share a learning experience in common and 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. Written Communication ¹	3
B. Mathematics ¹	3
2. Additional Communication (3 credits)	
A. Oral Communication ²	
OR	
B. Advanced Writing ²	
3. Foundations and Perspectives (22 credits)	
A. Biological/Physical Sciences	7
(At least one course will have an associated lab)	
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 2B). Some programs of study have specific requirements for additional communication, 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. Written Communication.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	Seminar	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 web site at <http://www.state.co.us/cche/academic/transfer/index.html>.

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

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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
MATH	315	Mathematics for Economics	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.

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 web site at <http://www.state.co.us/cche/academic/transfer/index.html>.

Category 2. Additional Communication. (3 credits)

Building on and adapting basic skills and strategies already developed in the course in Written Communication, the objective of this requirement is structured according to two different options:

A. Oral Communication.¹ Development of effective rhetorical skills in oral communication.

SPCM	200	Public Speaking	3
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B. Advanced Writing.¹ Enhancement of skills in written communication.

CO	300	Writing Arguments	3
CO	301A	Writing in the Disciplines-Arts and Humanities	3
CO	301B	Writing in the Disciplines-Sciences	3
CO	301C	Writing in the Disciplines-Social Sciences	3
CO	301D	Writing in the Disciplines-Education	3
CO	302	Writing Online	3
JTC	300	Professional and Technical Communication	3

¹ First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (category 2B). Some programs of study have specific requirements for additional communication, 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	3
AA	101	Astronomy Laboratory	1
ANTH	120	Human Origins and Variation	3
ANTH	121	Human Origins and Variation Laboratory	1
BSPM	102	Insects, Science, and Society	3
BZ	101	Humans and Other Animals (GT-SC2) ²	3
BZ	104	Basic Concepts of Plant Life (GT-SC1)	3
BZ	105	Basic Concepts of Plant Life Laboratory (GT-SC1)	1
BZ	110	Principles of Animal Biology (GT-SC1)	3
BZ	111	Animal Biology Laboratory (GT-SC1)	1
BZ	120	Principles of Plant Biology (GT-SC2)	4
CHEM	103	Chemistry in Context (GT-SC1)	3
CHEM	104	Chemistry in Context Laboratory (GT-SC1)	1
CHEM	107	Fundamentals of Chemistry (GT-SC1)	4
CHEM	108	Fundamentals of Chemistry Laboratory (GT-SC1)	1
CHEM	111	General Chemistry I (GT-SC1)	4
CHEM	112	General Chemistry Laboratory I (GT-SC1)	1
FW	104	Wildlife Ecology and Conservation	3
GEOL	120	Exploring Earth: Physical Geology ³	3
GEOL	121	Introductory Geology Laboratory ⁴	1
GEOL	122	The Blue Planet: Geology of Our Environment ³	3
GEOL	124	Geology of Natural Resources ³	3
HORT	100	Horticultural Sciences	4
LAND	220	Fundamentals of Ecology	3
LIFE	102	Attributes of Living Systems	4
LIFE	201A	Introductory Genetics-Applied Genetics ⁵ (GT-SC2)	3
LIFE	201B	Introductory Genetics-Molecular ⁵ (GT-SC2)	3
MIP	101	Introduction to Human Disease	3
NR	120A	Environmental Conservation	3
NR	130	Global Environmental Systems ⁶	3
NR	150	Oceanography	3
PH	110	Descriptive Physics (GT-SC1)	3
PH	111	Descriptive Physics Laboratory (GT-SC1)	1
PH	121	General Physics I (GT-SC1)	5
PH	122	General Physics II	5
PH	141	Physics for Scientists and Engineers I	5
PH	142	Physics for Scientists and Engineers II (GT-SC2)	5
SOCR	220	Fundamentals of Ecology	3
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.

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 at <http://www.state.co.us/cche/academic/transfer/index.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	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	3
LARA	200	Second Year Arabic I ²	4
LARA	201	Second Year Arabic II ²	4
LCHI	200	Second Year Chinese I ²	5
LCHI	201	Second Year Chinese II ²	5
LFRE	200	Second Year French I ² (GT-AH4)	3
LFRE	201	Second Year French II ²	3
LGER	200	Second Year German I ²	3
LGER	201	Second Year German II ²	3
LITA	200	Second Year Italian I ²	3
LITA	201	Second Year Italian II ²	3
LJPN	200	Second Year Japanese I ²	5
LJPN	201	Second Year Japanese II ²	5
LRUS	200	Second Year Russian I ²	3
LRUS	201	Second Year Russian II ²	3
LSPA	200	Second Year Spanish I ²	3
LSPA	201	Second Year Spanish II ² (GT-AH4)	3
MU	100	Music Appreciation (GT-AH1)	3
MU	111	Music Theory Fundamentals (GT-AH1)	3
MU	131	Introduction to Music History and Literature	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	3

¹ 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 at <http://www.state.co.us/cche/academic/transfer/index.html>.

² Only three of the six credits required in arts and humanities may come from foreign language courses.

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	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	3
EDUC	275	Schooling in the U.S. (GT-SS3)	3
HDFS	101	Individual and Family Development (GT-SS3)	3
HONR	492	Senior Seminar	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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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	3
AMST	101	Self/Community in American Culture Since 1877	3
ANTH	140	Introduction to Prehistory	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	101	Western Civilization, Modern (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	171	World History, 1500-Present (GT-HI1)	3
HIST	250	African American History (GT-HI1)	3

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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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E. Global and Cultural Awareness.¹ (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	3
AGRI	270	World Interdependence-Population and Food (GT-SS3) ²	3
AM	250	Clothing, Adornment, and Human Behavior (GT-SS3)	3
ANTH	250	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	3
ETST	256	Border Crossings: People/Politics/Culture (GT-SS3)	3
HIST	100	Western Civilization, Pre Modern (GT-HI1)	3
HIST	115	Islamic World to 1800 (GT-HI1)	3
HIST	120	Asian Civilizations I (GT-HI1)	3
HIST	170	World History, Ancient-1500 (GT-HI1)	3
HORT	171	Environmental Issues in Agriculture (GT-SS3)	3
IE	116	Plants and Civilizations	3
IE	270	World Interdependence-Population and Food (GT-SS3)	3
IE	370	Model United Nations	3
LARA	250	Arabic Language, Literature, and Culture in Translation	3
LB	170	World Literatures to 1500 (GT-AH2)	3
LB	171	World Literatures-The Modern Period (GT-AH2)	3
LCHI	250	Chinese Language, Literature, and Culture in Translation	3
LFRE	250	French Language, Literature, and Culture in Translation	3
LGER	250	German Language, Literature, and Culture in Translation	3
LJPN	250	Japanese Language, Literature, and Culture in Translation	3
LRUS	250	Russian Language, Literature, and Culture in Translation	3
LSPA	250	Spanish Language, Literature, and Culture in Translation	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	Study Abroad	
SOC	205	Contemporary Race-Ethnic Relations (GT-SS3)	3

SOCR	171	Environmental Issues in Agriculture (GT-SS3)	3
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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.

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 at <http://www.state.co.us/cche/academic/transfer/index.html>.

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 three 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 Challenge Examination.
3. Transfer of equivalent credits from another college. Students who transfer with less than three semester credits in composition will be required to take the Composition Challenge Examination before enrolling in CO 150.
4. Satisfactory completion of 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 written communication.

Credit for CO 150 will not be given for high scores on the College-Level Examination Program (CLEP).

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 met this requirement 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” which will be calculated into 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 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 the 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 approval it must be presented through the Records and Registration Section of the Registrar’s Office, 100 Administration Annex, to the Director of the Composition program (or designee) for final approval or disapproval.

Placement Procedures

Students who score 500 or higher on the old SAT verbal/new SAT critical reading or 20 or higher on the ACT English section of the exam are eligible to register for CO 150. [NOTE: For students entering in Fall Semester 2008, the cut-off scores will be changing to 26 or higher on the ACT test or 600 or higher on the SAT test.]

Students who score below these cutoff scores must take the Composition Challenge Examination. For more information refer to <http://writing.colostate.edu/comp/placement.cfm>. All students taking this exam will be assessed a fee of \$40.00, which will be billed to their student account. The 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). Students should take this examination as soon as possible after admission and may take the test only once. Students can check their composition placement by logging onto RAMweb. On the Homepage, select the third option under “More Links—SAT/ACT Scores and Composition Challenge 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 program is only available during the academic year – not during the summer session. The Writing Center tutorial does not require

registration and does not carry University credit, but students must sign up for a tutor during the first or second week of the semester. For tutorial assignment, students should contact the Writing Center (Eddy 6), (970) 491-0222.

2. If placement scores indicate adequate preparation in basic 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 credit through CO 150-Section 550 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 precalculus 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, 100 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
Life Sciences Programs
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 Studies Program (see the program description later in this section of the catalog) and an Environmental Studies Open Option 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 open option). For further information about specific environmental studies-focused majors, please contact the respective college/department and see their program descriptions within this catalog.

LIFE SCIENCES

*Center for Advising and Student Achievement
Offices in Aylesworth Hall, Northeast Wing*

With more than 350 life science faculty members in 7 colleges and 25 departments, Colorado State University is committed to undergraduate academic programs and research in the basic and applied life sciences. Students can choose from among 34 life science-related majors, 48 different concentrations, and 6 interdisciplinary studies programs.

Open Option Advising Program

The Life Science Open Option category is a special designation for students who are interested in the life sciences but have not yet chosen a specific major. Professional advisers are knowledgeable about academic requirements in each of the life science disciplines and help guide students through the process of selecting a major that is appropriate for their interests and goals. Advisers help students plan their schedules, provide information on career options, internships, and scholarships, and refer them to other resources. The advisers are located in the northeast wing of Aylesworth Hall.

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 and dental hygiene, 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.

The pre-veterinary adviser also provides academic advising for the Open Option Biomedical Sciences students while they explore programs and majors offered at Colorado State. After an academic major has been chosen, 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 northeast wing of Aylesworth Hall. 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 providing a variety of disciplinary perspectives.

Although completion of courses in an interdisciplinary studies program does not lead to a degree, credits earned in these courses can be used in meeting the requirements for a degree.

An interdisciplinary studies program includes a core of required courses, with some selectivity, and also a wide choice from supporting courses.

Interdisciplinary studies are designated in the catalog to assist the student in identifying logically-related course work in a broad subject matter area.

Completion of the requirements for an interdisciplinary studies program is noted on the student’s academic record (transcript) but not on the diploma. The minimum number of credits in an undergraduate interdisciplinary studies program is 20. No minimum number of credits is specified at the graduate level.

Asian Studies Interdisciplinary Studies Program

Office in Laurel Hall

Coordinated by the Asian Studies Board and the Office of International Programs

The Asian Studies Interdisciplinary Studies Program 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 (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
A minimum of 21 credits is required including 9 credits outside the student's major. Courses must be taken in at least <i>three</i> disciplines.			
Core Courses (6 credits required)			
<i>Select one course from each section</i>			
Section I			
HIST 120	Asian Civilizations I	3	3E
HIST 121	Asian Civilizations II	3	3D
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	
E 356	Asian Literature	3	
HIST 115	Islamic World to 1800	3	3E
LCHI 105	First-Year Chinese I (no previous study in language)	5	
LJPN 105	First-Year Japanese I (no previous study in language)	5	
LKOR 105	First-Year Korean I (no previous study in language)	5	
Asian Studies Area Courses (9-15 credits required)			
ANTH 312	Modern Indian Culture and Society (ANTH 100 or ANTH 200)	3	
ANTH 314	Southeast Asian Cultures and Societies (ANTH 100 or ANTH 200)	3	
ART 112	History of Asian Art	3	
ART 316	Art of the Pacific (ART 212)	3	
E 356	Asian Literature	3	
HIST 430	Ancient Near East (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
HIST 431	Ancient Israel (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
HIST 433	Muhammad and the Origins of Islam (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
HIST 438	The Modern Middle East (HIST 101 or HIST 115 or HIST 171)	3	
HIST 450	Ancient China (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
HIST 451	Medieval China and Central Asia (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
HIST 452	China in the Modern World, 1600-Present (HIST 101 or HIST 120 or HIST 171)	3	
HIST 455	Tokugawa and Modern Japan, 1600-Present (HIST 101 or HIST 120 or HIST 121 or HIST 171)	3	
HIST 532	Reading Seminar-Middle East (HIST 501)	3	
HIST 533	Reading Seminar-East Asia (HIST 501)	3	
IE 271	India	3	
LCHI 107	First-Year Chinese II (LCHI 105)	5	
LCHI 200	Second-Year Chinese I (LCHI 107 or placement exam)	5	3B
LCHI 201	Second-Year Chinese II (LCHI 200 or LCHI 228A or placement exam)	5	3B

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LCHI 250	Chinese Language, Literature, Culture in Translation	3	3E
LCHI 304	Third-Year Chinese I (LCHI 201 or LCHI 228B or placement exam)	3	
LCHI 305	Third-Year Chinese II (LCHI 304 or LCHI 228A or placement exam)	3	
LCHI 309	Contemporary Chinese Literature and the Arts	3	
LGEN 465B	Studies in Foreign Film-Asia	3	
LJPN 107	First-Year Japanese II (LJPN 105)	5	
LJPN 200	Second-Year Japanese I (LJPN 107 or placement exam)	5	3B
LJPN 201	Second-Year Japanese II (LJPN 200 or LJPN 228A or placement exam)	5	3B
LJPN 250	Japanese Language, Literature, Culture in Translation	3	3E
LJPN 304	Third-Year Japanese I (LJPN 201 or LJPN 228B or placement exam)	3	
LJPN 305	Third-Year Japanese II (LJPN 304 or LJPN 228A or placement exam)	3	
LJPN 496	Group Study-Japanese (LJPN 305 or LJPN 328A)	Var	
PHIL 309	Ideas in Oriental Art and Literature	3	
PHIL 335	Islam: Cosmology and Practice	3	
PHIL 349	Philosophy of Tao and Zen (sophomore standing or higher)	3	
PHIL 360	Topics in Oriental Philosophy (sophomore standing or higher)	3	
PHIL 371	Contemporary Eastern Religious Thought	3	
PHIL 455	Islamic Philosophy (PHIL 206; PHIL 210)	3	
POLS 445	Comparative Asian Politics (POLS 241)	3	

Supporting Field Courses (0-6 credits)¹
PROGRAM TOTAL = 21 credits

¹ Students may use up to 6 credits of supporting field courses for certificate. Courses should be chosen in consultation with an Asian studies adviser. To be considered as a supporting course for Asian studies, 30 percent or more of the class content should focus on Asia. Students must submit a syllabus to the Advisory Board for each class proposed as a supporting course. These submissions should be made prior to or at the time of registration for such courses.

Biomedical Engineering Interdisciplinary Studies Programs

Office in Engineering Building, Room 102
(970) 491-6220

www.engr.colostate.edu/bep/

The Biomedical Engineering Interdisciplinary Studies Program offers students a multidisciplinary approach to biomedical engineering education, research, and service. This unique program combines veterinary medicine, engineering, and the life sciences to improve health and well-being, fight disease, and aid persons with disabilities.

The program offers certificates to bachelors, masters, and doctoral students enrolled in any degree program at Colorado State University. Core courses focus on the life sciences, engineering, and clinical experiences, while the electives allow students to choose a particular facet of biomedical engineering such as biomechanics, biomaterials, bioprocessing, or biosignal/image analysis. Additional electives focus on entrepreneurship, animal research, and bioethics.

University-Wide Instructional Programs

Program details are available at www.engr.colostate.edu/bep/, by calling (970) 491-6220, or from the Biomedical Engineering Program Office, College of Engineering.

Undergraduate

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).

Course	Title (Prerequisite)	Cr	AUCC
CORE COURSES			
BIOM 470	Biomedical Engineering (MATH 155 or MATH 160; PH 141)	3	
BMS 300	Principles of Human Physiology (BZ 101 or BZ 110 or LIFE 102; CHEM 103 or CHEM 107 or CHEM 111)	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/	Bioprocess Engineering (CHEM 107 or CHEM 111; PH 121 or PH 141)	4	
BTEC 306			
CBE 201	Material and Energy Balances (CHEM 111; MATH 160; PH 141; 1 course in computer programming)	3	
CBE 202	Thermodynamic Process Analysis (CBE 201)	3	
CBE 320	Chemical and Biological Reactor Design (CBE 201; LIFE 102; MATH 340)	3	
CBE 331	Momentum Transfer and Mechanical Separations (CBE 201; CBE 202 or MECH 237; MATH 340)	3	
CBE 406	Introduction to Transport Phenomena (CBE 332; CHEM 474)	3	
CBE 430	Process Control and Instrumentation (CBE 320; CBE 330; CBE 442/ENVE 442)	3	
CIVE 260	Engineering Mechanics-Statics (MATH 160; PH 141 or concurrent reg.)	3	
CIVE 261	Engineering Mechanics-Dynamics (CIVE 260)	3	
ECE 201	Circuit Theory (ECE 192 with a C- or better; concurrent reg. in MATH 161 and PH 142)	3	
ECE 204	Introduction to Electrical Engineering (MATH 161; PH 142)	3	
ECE 303/	Introduction to Communication	3	
STAT 303	Principles (ECE 311 or concurrent reg.; MATH 261)		
ECE 331	Electronic Principles I (ECE 202 with a C- or better; MATH 340 or MATH 345)	4	
ECE 341	Electromagnetic Fields and Devices I (MATH 340 with a C- or better or MATH 345 with a C- or better; PH 142 with a C- or better)	3	
MECH 237	Introduction to Thermal Sciences (MATH 160; PH 142)	3	
MECH 307	Mechatronics and Measurement Systems (CIVE 261 with a C- or better; ECE 204 with a C- or better; MATH 340 with a C- or better)	4	
MECH 331	Introduction to Engineering Materials (CHEM 111 with a C- or better; CHEM 112 with a C- or better; PH 142 with a C- or better)	4	
MECH 342	Mechanics and Thermodynamics of Flow Processes (MATH 340 with a C- or better; MECH 337 with a C- or better or concurrent reg.; PH 141 with a C- or better)	3	

Course	Title (Prerequisite)	Cr	AUCC
PH 245	Introduction to Electronics (MATH 161; PH 142)	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	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346)	4	
BIO 310	Cell Biology (BZ 110 or BZ 120 or LIFE 103; CHEM 245 with a C or better or CHEM 345 with a C or better)	4	
BIOM 486A-B	Biomedical Clinical Practicum (BMS 300; BIOM 470)	2-4	
BMS 301	Human Gross Anatomy (BZ 110 or LIFE 102)	5	
BMS 325	Cellular Neurobiology (BMS 300 or BMS 360)	3	
BMS 345	Functional Neuroanatomy (BMS 300 or BMS 360)	4	
BMS 365	Nerve and Muscle-Toxins, Trauma, and Disease (BIO 310 or BMS 300 or BMS 360)	3	
BMS 420	Cardiopulmonary Physiology (BMS 300 or BMS 360)	3	
BMS 430	Endocrinology (BMS 300 or BMS 360)	3	
BUS 205	Legal and Ethical Issues in Business ¹	3	
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
CHEM 246	Fundamentals of Organic Chemistry Laboratory (CHEM 108 or CHEM 112 or CHEM 114; CHEM 245 or concurrent reg.)	1	
CHEM 345	Organic Chemistry I (CHEM 113; CHEM 114)	4	
HES 207	Anatomical Kinesiology	3	
HES 307	Biomechanical Principles of Human Movement (BMS 301 or HES 207; PH 121 or PH 141)	3	
HES 403	Physiology of Exercise (BMS 300; LIFE 102)	4	
HES 405	Exercise Testing Instrumentation (HES 403)	2	
HES 420	Electrocardiography and Exercise Management (BMS 300)	3	
HES 476	Rehabilitation Exercise (HES 403)	3	
LIFE 103	Biology of Organisms-Animals and Plants (LIFE 102)	4	
MGT 420	New Venture Creation ¹ (MGT 340)	3	
MGT 440	New Venture Management ¹ (MGT 420)	3	
MIP 300	General Microbiology (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or concurrent reg. or CHEM 341 or concurrent reg. or CHEM 345 or concurrent reg.)	3	
PHIL 205	Introduction to Ethics ¹ (sophomore standing or higher)	3	
PHIL 305E	Philosophical Issues in the Professions-Animal Science ¹	3	
PSY 456	Sensation and Perception (PSY 250)	3	
PSY 457	Sensation and Perception Laboratory (PSY 250; PSY 456 or concurrent reg.)	2	
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	
	TOTAL	4-13	
PROGRAM TOTAL = 21 credits minimum			

¹ Only three credits of non-technical courses may count toward minimum requirements.

Graduate

Graduate students complete 21 credits, 11 credits of core courses and 10 credits of electives chosen according to the student's home department (engineering or non-engineering).

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>
BIOM 570/ MECH 570	Bioengineering (MECH 307; MECH 324)	3
BMS 500	Mammalian Physiology I (BMS 300 or BMS 360)	4
STAT 511	Design and Data Analysis for Researchers I (STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	4
	TOTAL	11

ELECTIVE COURSES (minimum of 10 credits)

Engineering students must select at least 10 credits from either of the elective course lists. Non-engineering students must select at least 3 credits from the engineering course list and may select the 7 remaining credits from either electives course list.

Engineering Courses

BIOM 306/ BTEC 306	Bioprocess Engineering (CHEM 107 or CHEM 111; PH 121 or PH 141)	4
BIOM 504/ CBE 504	Fundamentals of Biochemical Engineering (BIOM 306/BTEC 306 or concurrent reg. or CBE 320 or concurrent reg.; MATH 255 or MATH 340; MIP 300)	3
BIOM 522/ CBE 522	Bioseparation Processes (CBE 331)	3
BIOM 525/ CBE 525	Cell and Tissue Engineering (BMS 300 or BMS 500/NB 501 or BIO 310 or BC 351)	3
BIOM 571/ MECH 571	Biomechanics (BIOM 470 or BIOM 570/MECH 570)	3
BIOM 573/ MECH 573	Structure and Function of Biomaterials (MECH 331)	3
	TOTAL	3-6

Science, Engineering, Animal Research, Bioethics and Entrepreneurship Courses

ANEQ 565	Interpreting Animal Science Research ¹ (ANEQ 101 or ANEQ 102; 3 credits of statistics)	3
BC 565	Molecular Regulation of Cell Function (BC 351 or BC 403 or concurrent reg. in BC 403; LIFE 210)	4
BC 663	Gene Expression (BC 563)	3
BC 701	Grant Proposal Writing and Reviewing ¹ (BC 403; BC 511 or concurrent reg.; BC 563 or concurrent reg.)	1
BIOM 586A-B	Biomedical Clinical Practicum (BIOM 570/MECH 570; BMS 300 or BMS 500)	2-4
BMS 501	Mammalian Physiology II (BMS 300 or BMS 360)	5
BMS 550	Electron Microscopy-TEM, SEM, and X-ray	3
BMS 560	Theory and Practice of Animal Biotechnology	3
BMS 575	Human Anatomy Dissection	4
BMS 610A-B	Managing a Career in Science (written consent of instructor) ¹	1
BMS 620	Cardiovascular Physiology (BMS 420 or BMS 500)	3
BMS 631	Mechanisms of Hormone Action (BMS 430 or BMS 501)	2
CM 501	Advanced Cell Biology (BIO 310)	4
CM 520	Proteolytic Regulation of Cellular Processes (CM 501)	3
MIP 576/ BSPM 576	Bioinformatics (BC 451 or BZ 463 or BIO 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/ERHS 307)	3
MIP 651	Immunobiology (MIP 342)	3
NB 505	Neuronal Circuits, Systems and Behavior (BMS 325 or BMS 500 or NB 501)	3
PHIL 547	Seminar in Ethical Theory ¹ (PHIL 447)	3
PHIL 564	Seminar in Animal Rights ¹ (written consent of instructor)	3
STAT 512	Design and Data Analysis for Researchers II (STAT 511)	4
	TOTAL	7-10

¹ Only three credits of non-technical electives may count towards minimum requirement.

Biotechnology Interdisciplinary Studies Program

*Office in Anatomy/Zoology Building, Room W102
Coordinated by a Faculty Advisory Board and the
Associate Dean for Undergraduate Education,
College of Veterinary Medicine and Biomedical Sciences*

The Biotechnology Interdisciplinary Studies Program is a cooperative effort of faculty from departments in several colleges of the University who share a common interest in the commercial application of biological systems and processes. The purpose of the program is to provide students with the interdisciplinary background necessary for understanding the roles of various majors in the emerging field of biotechnology.

Program details are available from the office of the Associate Dean for Undergraduate Education, College of Veterinary Medicine and Biomedical Sciences.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Students must select a minimum of 21 credits from a combination of core and elective courses.			
Biochemistry Core		4-6	
BC 351	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346)	4	
BC 352	Principles of Biochemistry Laboratory (BC 351 or concurrent reg. or BC 401 or concurrent reg.; CHEM 112; CHEM 114)	1	
BC 401	Comprehensive Biochemistry I (CHEM 245 or CHEM 345 or concurrent reg. in CHEM 345; MATH 155 or MATH 160)	3	
BC 403	Comprehensive Biochemistry II (BC 401)	3	
BC 404	Comprehensive Biochemistry Laboratory (BC 401 or concurrent reg.; CHEM 246 or CHEM 344; LIFE 212)	2	
Microbiology Core		7	
MIP 300	General Microbiology (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or concurrent reg. or CHEM 341 or concurrent reg. or CHEM 345 or concurrent reg.)	3	
MIP 301	Fundamental Microbiology Laboratory Techniques (MIP 300 or concurrent reg.)	1	
MIP 302	General Microbiology Laboratory (MIP 300 or concurrent reg.)	2	
MIP 432	Microbial Ecology (MIP 300)	3	
MIP 436	Industrial Microbiology (LIFE 206 or MIP 301 or MIP 302)	4	
Process Engineering Core		4-6	
BTEC 306/ BIOM 306	Bioprocess Engineering (CHEM 107 or CHEM 111; PH 121 or PH 141)	4	
CBE 331	Momentum Transfer and Mechanical Separations (CBE 201; CBE 202 or MECH 237; MATH 340)	3	
CBE 333	Momentum and Heat Transfer Laboratory (CBE 332 or concurrent reg.)	2	
CBE 442/ ENVE 442	Separation Processes (CBE 332; one course in physical chemistry)	4	
CBE 443	Mass Transfer and Separation Laboratory (CBE 442/ENVE 442 or concurrent reg.)	2	
Biotechnology			
MIP 400B	Capstone in Microbiology-Biotechnology (BC 351 or BC 401; MIP 300)	2	

Electives (chosen from courses not required for graduation in the major and approved by the Advisory Board.)

Community Youth Development Graduate Interdisciplinary Studies Program

Office in L. L. Gibbons Building, Room 204
College of Applied Human Sciences
www.gpidea.org

Through a multi-university collaboration, Great Plains IDEA (Great Plains Interactive Distance Education Alliance), students can pursue a youth development on-line master's degree or interdisciplinary studies program leading to a certificate. This program provides youth workers and youth development specialists in public and private agencies and programs with a strengths-based, positive youth development curriculum. It emphasizes multiple knowledge bases and the complex concerns for children, youth, and families with the intent to support youth socially, emotionally, and cognitively.

In addition to Colorado State University, faculty from three other land-grant universities – Kansas State, Michigan State, and the University of Nebraska – share their knowledge and expertise in youth development. Students have the option to pursue a master's degree or one of two certificates: Youth Program Development Specialist or Youth Program Management and Evaluation. Colorado State University offers the certificate programs. Students apply for the program through one of the four universities (which becomes the home institution). At the present time, Colorado State University is not accepting applications. Interested students should seek information from www.gpidea.org.

There is a critical need for trained youth development professionals. An estimated 17,000 organizations currently serve more than 30 million young people. With a move away from focusing on problems and behavior correction, professionals who understand the strengths-based positive model will be in great demand and competent to work cross-culturally to improve outcomes for youth and youth programs.

All of the courses below are offered in a distance (online) format, in cooperation with the Great Plains Interactive Distance Education Alliance (Great Plains IDEA).

Course	Title (Prerequisite)	Cr
AHS 559	Foundations of Youth Development	1

<i>Select four courses from the following:</i>		
AHS 660	Community Youth Development	3
AHS 661	Adolescents and Families: Implications	3
AHS 662	Contemporary Youth Issues and Life Skills	3
AHS 663	Youth Policy	3
AHS 665	Youth Development	3
AHS 666	Youth in Cultural Contexts	3

PROGRAM TOTAL = 13 credits		

Conservation Biology

Office in Natural Resources Building, Room 101
Coordinated by a Faculty Advisory Board and the Office of the Dean, Warner College of Natural Resources

The Conservation Biology Interdisciplinary Studies Program 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 (Prerequisite)	Cr	AUCC
Core Curriculum			
<i>Select at least three credits from the following:</i>			
ERHS 446	Environmental Toxicology (CHEM 245 or CHEM 343 or CHEM 346)	3	
F 311	Forest Ecology (BIO 320 or LAND 220/SOCR 220)	3	
FW 474	Wildlife Ecology (LAND 220/SOCR 220; STAT 301 or STAT 307/ERHS 307)	3	
NR 440	Land Use Planning	3	
NR 460	Wilderness Management (LAND 220/SOCR 220; NR 300; RR 231)	3	
PHIL 345	Environmental Ethics (sophomore standing or higher)	3	
POLS 361	U.S. Environmental Politics and Policy (POLS 101)	3	
RS 331	Rangeland Ecogeography (BZ 223 or F 210 or NR 220; RS 300)	3	
LAND 220/ SOCR 220	Fundamentals of Ecology (3 credits 100-level biology or HORT 100; 3 credits 100-level mathematics)	3	
NR 120A	Environmental Conservation	3	3A
NR 300	Biological Diversity (NR 120A or B or one course in biology)	3	
NR 495	Independent Study	1-2 ¹	
SOC 320	Population-Natural Resources and Environment (SOC 100 or SOC 105)	3	
SOCR 330	Principles of Genetics ² (BZ 110 or BZ 120 or LIFE 102)	3	
PROGRAM TOTAL = 20 credits			

¹ The number of credits taken must assure a minimum of 20 total credits in the program. ² BZ 350 may be substituted.

Diversity in Law Interdisciplinary Studies Program

Office in Clark Building, Room C138
Dean Ann M. Gill, Coordinator

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 Studies Program 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 as well as students who plan careers in law or criminal justice.

Program details are available from the College of Liberal Arts Dean's Office.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
<i>Select 6 credits from the following:</i>			
POLS 101	American Government and Politics	3	3C
SOC 100	General Sociology	3	3C
SOC 253	Introduction to Criminal Justice (SOC 100 or SOC 105)	3	
TOTAL		6	
SOPHOMORE			
<i>Select 3 credits from the following:</i>			
ETST 100	Introduction to Ethnic Studies	3	3E
HIST 250/	African American History	3	3D
ETST 250			
HIST 252/	Asian American History	3	3D
ETST 252			
HIST 255/	Native American History	3	3D
ETST 255			
TOTAL		3	
JUNIOR			
<i>Select 6 credits from the following:</i>			
ANTH 422/	Comparative Legal Systems (ANTH 100 or SOC 100)	3	
SOC 422			
HDFS 403	Families in the Legal Environment	3	
JTC 415	Communications Law ¹	3	
POLS 410	American Constitutional Law (POLS 101)	3	
POLS 413	U.S. Civil Rights and Liberties (POLS 101)	3	
POLS 431	International Law (POLS 232)	3	
SOC 355	Sociology of Law (SOC 253)	3	
SPCM 349	Freedom of Speech ¹	3	
TOTAL		6	
SENIOR			
<i>Select 6 credits from the following:</i>			
ANTH 318/	Peoples and Cultures of the Southwest (ANTH 100)	3	
ETST 318			
ETST 312	African American Situation	3	
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 414/	Development in Indian Country	3	
ANTH 414			
ETST 444/	Federal Indian Law and Policy	3	
SOC 444			
HIST 360	United States Immigration History (HIST 101 or HIST 150 or HIST 151 or HIST 171)	3	
JTC 316/	Multiculturalism and the Media	3	
ETST 316			
SOC 332	Comparative Majority/Minority Relations (SOC 100 or SOC 105)	3	
SPCM 334	Co-Cultural Communication	3	
SPCM 434	Intercultural Communication	3	
TOTAL		6	
PROGRAM TOTAL = 21 credits			

¹ Credit is not allowed for both JTC 415 and SPCM 349 in this program.

Environmental Affairs Interdisciplinary Studies Program

*Office in Clark Building, Room B258
Coordinated by a Faculty Advisory Board*

The Environmental Affairs Interdisciplinary Studies Program 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 Sociology, College of Liberal Arts.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Environmental Affairs Core			
<i>Select three courses from the following:</i>			
ANTH 330	Human Ecology (ANTH 100; ANTH 120 or BZ 101 or LAND 220/SOCR 220)	3	
ANTH 414/	Development in Indian Country ¹	3	
ETST 414			
ANTH 415	Indigenous Ecologies and the Modern World ¹	3	
E 403	Nature Writing (one course in literature or CO 301A-D or E 311A-C)	3	
ECON 340/	Introduction to Economics of Natural Resources (AREC 202 or ECON 202)	3	
AREC 340			
HIST 355	American Environmental History (HIST 101 or HIST 150 or HIST 151 or HIST 171)	3	
JTC 461	Writing about Science, Health, and Environment (JTC 210)	3	
PHIL 345	Environmental Ethics (sophomore standing or higher)	3	
POLS 361	U.S. Environmental Politics and Policy (POLS 101)	3	
OR			
POLS 362	Global Environmental Politics (POLS 232 or POLS 241)	3	
SOC 460	Society, and Environment (SOC 100 or SOC 105)	3	
TOTAL		9	
Environmental Science			
<i>A. Select one course from the following:</i>			
BIO 320	Ecology (BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 102; MATH 141 or MATH 155 or MATH 160)	3	
ERHS 220	Environmental Health (BZ 101 or concurrent reg. or BZ 104 or concurrent reg. or BZ 110 or concurrent reg. or BZ 120 or concurrent reg. or LIFE 102 or concurrent reg.)	3	
F 210	Forest Ecogeography (BZ 120)	3	
GEOL 122	The Blue Planet: Geology of Our Environment ²	3	3A
GEOL 124	Geology of Natural Resources ²	3	3A
GR 210	Physical Geography	3	
NR 120	Environmental Conservation	3	3A
A NR 120	Environmental Conservation (participation in University Honors Program)	4	
B NR 130	Global Environmental Systems	3	3A

University-Wide Instructional Programs

Course	Title (Prerequisite)	Cr	AUCC
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	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/IE 116	Plants and Civilization	3	3E
ATS 350	Introduction to Weather and Climate	2	
AND			
ATS 351	Introduction to Weather and Climate Laboratory (ATS 350 or concurrent reg.)	1	
BSPM 102	Insects, Science, and Society	3	3A
CIVE 322/ENVE 322	Basic Hydrology (CBE 331 or CIVE 300 or WR 416; CIVE 202 or STAT 301 or STAT 315)	3	
CIVE 413	Environmental River Mechanics (CIVE 300 or WR 416)	3	
CIVE 425	Soil and Water Engineering (CBE 331 or CIVE 300 or SOCR 240)	3	
ERHS 320	Environmental Health Water Quality (MIP 300 or concurrent reg.)	3	
F 324	Fire Effects and Adaptation (BIO 320 or LAND 220/SOCR 220)	3	
FW 100	Wildlife Fundamentals (concurrent reg. in FW 192 for freshmen)	2	
FW 200	Wildlife Conservation (MATH 118)	3	
GR 100	Introduction to Geography	3	
NR 150	Oceanography	3	3A
NR 300	Biological Diversity (NR 120A or B or one course in biology)	3	
NR 326	Forest Vegetation Management (NR 220)	3	
NRRT 452	Management of the Wilderness Resource (NRRT 451) ³	4	
RS 300	Principles of Range Management (BZ 120 or LIFE 103)	3	
RS 478	Restoration Ecology (BZ 450 or F 311 or LAND 220/SOCR 220; SOCR 240)	3	
SOCR 421	Crop and Soil Management Systems II (HORT 100 or SOCR 100; SOCR 240)	4	
WR 304	Principles of Watershed Management	3	3A
		6	
Liberal Arts Electives			
<i>Select one course from the list below OR a different course with strong environmental focus may be used with approval of adviser.</i>			
ANTH 330	Human Ecology ⁴ (ANTH 100; ANTH 120 or BZ 101 or LAND 220/SOCR 220)	3	
E 403	Nature Writing ⁴ (1 course in literature or CO 301A-D or E 311A-C)	3	
ECON 240/AREC 240	Issues in Environmental Economics	3	3C
ECON 340/AREC 340	Introduction to the Economics of Natural Resources ⁴ (AREC 202 or ECON 202)	3	
ECON 344	Economics of Energy Resources (AREC 202 or ECON 202)	3	
ECON 346/AREC 346	Economics of Outdoor Recreation (AREC 202 or ECON 202)	3	
ETST 344	Native American Religious History and Issues	3	
ETST 414/ANTH 414	Development in Indian Country ⁴	3	
6HIST 351	American West to 1900 (HIST 101 or HIST 150 or HIST 171)	3	
HIST 352	American West Since 1900 (HIST 101 or HIST 151 or HIST 171)	3	
HIST 355	American Environmental History ⁴ (HIST 101 or HIST 150 or HIST 151 or HIST 171)	3	
HONR 492	Senior Seminar (HONR 392; participation in University Honors Program)	3	
JTC 461	Writing About Science, Health, and Environment ¹ (JTC 210)	3	
PHIL 330/AGRI 330	Agricultural Ethics	3	
PHIL 345	Environmental Ethics ⁴ (sophomore standing or higher)	3	
POLS 361	U.S. Environmental Politics and Policy ^{4,5} (POLS 101)	3	
POLS 362	Global Environmental Politics ^{4,5} (POLS 232 or POLS 241)	3	
SOC 320	Population-Natural Resources and Environment (SOC 100 or SOC 105)	3	

Course	Title (Prerequisite)	Cr	AUCC
SOC 364	Agriculture and Global Society (SOC 100 or SOC 105)	3	
SOC 460	Society and Environment ⁴ (SOC 100 or SOC 105)	3	
SOC 461	Sociology of Water Resources (SOC 100 or SOC 105)	3	
		TOTAL	3
Select from Other Colleges			
<i>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.</i>			
AGRI 330/PHIL 330	Agricultural Ethics	3	
AREC 202	Agricultural and Resource Economics	3	3C
AREC 240/ECON 240	Issues in Environmental Economics	3	
AREC 340/ECON 340	Introduction to Economics of Natural Resources (AREC 202 or ECON 202)	3	
AREC 342	Economic Analysis-Water Resource Development (AREC 202 or ECON 202)	3	
AREC 346/ECON 346	Economics of Outdoor Recreation (AREC 202 or ECON 202)	3	
AREC 375	Agricultural Law (junior standing)	3	
AREC 460	Economics of World Agriculture (AREC 202 or ECON 202)	3	
AREC 478	Agricultural Policy (AREC 202 or ECON 202 or AREC 240/ECON 240)	3	
CIVE 438/ENVE 438	Pollution Control Engineering (CBE 331 or CIVE 300 or MECH 342; CHEM 113)	4	
CIVE 439/CBE 439	Environmental Engineering Chemical Concepts (CHEM 113; MATH 340)	3	
CIVE 440	Nonpoint Source Pollution (CIVE 300 or CIVE 322/ENVE 322 or SOCR 240 or WR 416)	3	
CON 450/INTD 450	Travel Abroad-Sustainable Building	3	
ENVE 441	Water and Wastewater Characterization (CIVE 438/ENVE 438 or concurrent reg. or CIVE 440 or concurrent reg.)	1	
ERHS 410	Environmental Health Waste Management (CHEM 245 or concurrent reg. or CHEM 343 or concurrent reg. or CHEM 346 or concurrent reg.; ERHS 230)	3	
ERHS 446	Environmental Toxicology (CHEM 245 or CHEM 343 or CHEM 346)	3	
F 322	Economics of the Forest Environment (AREC 202 or ECON 202 or ECON 240/AREC 240)	3	
F 330	Timber Harvesting and the Environment (F 230 or F 321)	3	
FW 356	Leopold's Ethic for Wildlife and Land ³	3	
GR 320	Cultural Geography (GR 100)	3	
GR 342	Geography of Water Resources	3	
GR 345	Geography of Hazards (GR 210)	3	
HORT 466	Community Forestry (F 210 or HORT 221)	3	
LAND 110	Introduction to Landscape Architecture	3	
LAND 120	History of the Designed Landscape	3	
NR 320	Natural Resources History and Policy	3	3D
NR 355	Contemporary Environmental Issues ³ (one course in biology)	3	
NR 365	Environmental Education	3	
NRRT 330	Social Aspects of Natural Resource Management	3	
NRRT 462	Environmental Communication-Natural Resources (NRRT 262)	3	
PSY 316	Environmental Psychology (PSY 100)	3	
RS 320/SOCR 320	Forage and Range Management	3	
SOCR 370	Irrigation Principles and Management (HORT 100 or SOCR 100; SOCR 240)	3	
SOCR 377/CIVE 377	Geographic Information Systems in Agriculture (3 credits in SOCR or CS)	3	
		TOTAL	3
PROGRAM TOTAL = 21 credits			

¹ Only one ANTH course can be used for the environmental affairs core.

² GEOL 121 is also recommended.

³ Offered as a correspondence or telecourse course only.

⁴ May be taken if not selected in the Environmental Affairs Core.

⁵ Students may not get credit for both POLS 361 and POLS 362 in this program.

Exercise Science and Nutrition Interdisciplinary Graduate Program

*Graduate Faculty of Health and Exercise Science and
Food Science and Human Nutrition Departments*

This interdisciplinary graduate program is a cooperative effort offered by the Department of Health and Exercise Science and the Department of Food Science and Human Nutrition. It provides a unique opportunity for students to pursue combined educational interests to better understanding the interactions of diet and exercise to health and to chronic disease prevention. This is not a graduate program in sports nutrition. Students admitted in this program will receive their M.S. degree in either health and exercise science or food science and nutrition. Faculty members from both departments co-chair graduate thesis committees, and students are encouraged to explore research topics which bridge the respective disciplines of the departments. Students apply for this program after their first semester at Colorado State. Six students per year are accepted into the program.

Program details are available from the Departments of Health and Exercise Science and Food Science and Human Nutrition.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>
Core Curriculum		
BMS 500	Mammalian Physiology I (BMS 300 or BMS 360)	4
OR		
BMS 501	Mammalian Physiology II (BMS 300 or BMS 360)	5
FSHN 550	Advanced Nutritional Science I (BC 351 or BC 403; FSHN 350)	3
FSHN 551	Advanced Nutritional Science II (BC 351 or BC 403; FSHN 350)	3
HES 560/ FSHN 560	Exercise and Nutrition (FSHN 350; HES 403; 3 credits of biochemistry)	3
HES 600	Data Analysis for Research Design (one course in statistics)	3
HES 603	Advanced Topics in Exercise Physiology (HES 403)	3
HES 692	Seminar	1
OR		
FSHN 692	Seminar	1
HES 696C	Group Study-Exercise and Nutrition	1
OR		
FSHN 696D	Group Study-Exercise and Nutrition	1
HES 699	Thesis	10
OR		
FSHN 699B	Thesis-Nutrition	10
STAT 301	Introduction to Statistical Methods ¹ (MATH 117) Electives ²	3 5-6
PROGRAM TOTAL = 40 credits		

¹ STAT 301 or higher with consent of student's graduate committee.

² The elective credits will be used to meet the student's requirements for the M.S. degree in either food science and human nutrition or health and exercise science.

Food Science/Safety Interdisciplinary Studies Programs

Coordinated by a Faculty Advisory Board

The Food Science/Safety Interdisciplinary Studies Programs are designed to provide students interested in the safety and quality of food from "farm to fork" with the interdisciplinary background necessary for understanding the roles and responsibilities of various members (growers, producers, processors, retailers, consumers, etc.) within the food system in ensuring that food is safe and healthful. The programs are a cooperative effort of faculty in several departments/colleges in the University who share a common interest in food quality, safety, and integrated production/processing. Students enrolling in this program will receive their degree from their home department and completion of requirements for the interdisciplinary studies program will be noted on their transcript.

The program is available at both the undergraduate and graduate level. 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.

Undergraduate Program

The undergraduate interdisciplinary studies program in food science/safety is designed to be an additional component to the student's major and 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Required Courses			
FTEC 400	Food Safety ¹ (CHEM 107 or CHEM 111)	3	
OR			
MIP 334	Food Microbiology ¹ (LIFE 205 or MIP 300)	3	
LIFE 205	Survey of Microbial Biology	3	
OR			
MIP 300	General Microbiology (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or concurrent reg. or CHEM 341 or concurrent reg. or CHEM 345 or concurrent reg.)	3	
			6
TOTAL			
Foundation Courses (minimum of six credits chosen from the following)			
<i>Select one of the following courses:²</i>			
BC 351	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346)	4	
BC 401	Comprehensive Biochemistry I (CHEM 245 or CHEM 345 or concurrent reg. in CHEM 345; MATH 155 or MATH 160)	3	

University-Wide Instructional Programs

Course	Title (Prerequisite)	Cr	AUCC
FSHN 150	Survey of Human Nutrition	3	
CHEM 245	Fundamentals of Organic Chemistry ³ (CHEM 107 or CHEM 113)	4	
FTEC 110	Food-From Farm to Table	3	
FTEC 447	Food Chemistry (CHEM 245 or CHEM 345)	2	
HORT 100	Horticultural Science	4	3A
LIFE 206	Microbial Biology Laboratory (LIFE 205 or concurrent reg.)	2	
OR			
MIP 302	General Microbiology Laboratory (MIP 300 or concurrent reg.)	2	
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	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	Topics in Animal Sciences-Health Programs/Quality Assurance (ANEQ 101 or ANEQ 102)	2	
ANEQ 350B	Animal and Product Judging-Meats	1-3	
ANEQ 360	Principles of Meat Science (one course in chemistry)	3	
ANEQ 460	Meat Safety (3 credits 100-level chemistry)	3	
ANEQ 470	Issues in the Meat Industry (senior standing)	3	
BTEC 306/ BIOM 306	Bioprocess Engineering (CHEM 107 or CHEM 111; PH 121 or PH 141)	4	
ERHS 220	Environmental Health (BZ 101 or concurrent reg. or BZ 104 or concurrent reg. or BZ 110 or concurrent reg. or BZ 120 or concurrent reg. or LIFE 102 or concurrent reg.)	3	
ERHS 332	Principles of Epidemiology (ERHS 307/STAT 307; MIP 149 or MIP 300)	3	
ERHS 430	Human Disease and the Environment	3	
FSHN 300	Food Principles and Applications (CHEM 103 or CHEM 107 or CHEM 111; FSHN 150)	3	
FSHN 350	Human Nutrition (BMS 300 or concurrent reg.; CHEM 245 or CHEM 345)	3	
FTEC 400	Food Safety ¹ (CHEM 107 or CHEM 111)	3	
FTEC 420	Quality Assessment of Food Products (FTEC 110; LIFE 205)	3	
FTEC 460	Brewing Science and Technology (CHEM 245; MATH 118; 21 years of age; completed 60 credits)	2	
HORT 401	Medicinal and Value-Added Uses of Plants (BZ 120 or HORT 100 or LIFE 103)	3	
HORT 450A	Cool Season Vegetable Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
HORT 450B	Warm Season Vegetable Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
HORT 450C	Small Fruit Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
HORT 450D	Tree Fruit Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
HORT 454	Horticulture Crop Production and Management (HORT 310 or HORT 450A-B)	2	
HORT 475	Environmental Requirements of Horticultural Plants (BZ 120 or HORT 100 or LIFE 103)	3	
MIP 302	General Microbiology Laboratory ⁴ (MIP 300 or concurrent reg.)	2	
MIP 334	Food Microbiology ¹ (LIFE 205 or MIP 300)	3	
MIP 335	Food Microbiology Laboratory (LIFE 206 or MIP 301 or MIP 302; MIP 334 or concurrent reg.)	2	
SOCR 330	Principles of Genetics (BZ 110 or BZ 120 or LIFE 102)	3	
SOCR 430	Applications of Plant Biotechnology (SOCR 330)	3	
Special problems/internships ⁵		3	

Course	Title (Prerequisite)	Cr	AUCC
TOTAL		12	
500-level courses that may be selected as electives by high achieving undergraduates:			
ANEQ 565	Interpreting Animal Science Research (ANEQ 101 or ANEQ 102; 3 credits of statistics)	3	
ANEQ 567	HACCP Meat Safety (ANEQ 460)	3	
FTEC 570	Food Product Development (FTEC 447)	2	
FTEC 572	Food Biotechnology (MIP 334)	2	
FTEC 576	Cereal Science (FTEC 447)	2	
FTEC 578	Neutraceuticals (CHEM 245 or CHEM 345 or FTEC 447)	3	
MIP 540	Biosafety in Research Laboratories (MIP 300)	2	
VS 570/ AGRI 570	Issues in Animal Agriculture	2	
PROGRAM TOTAL = 24 credits			

- ¹ If both FTEC 400 and MIP 334 are taken, credit for one class may be used for Advanced Courses credit.
² ANEQ 522 may be selected here.
³ Or higher level organic chemistry course.
⁴ Cannot double count as a Foundation course.
⁵ Maximum of three credits allowed.

Graduate Program

The graduate interdisciplinary research and education program is a cooperative effort offered 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. 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 this interdisciplinary program. Faculty research interests are focused in food microbiology, food safety education, food processing, and integrated production/processing. Students interested in the safety and further processing of foods and commodities are encouraged to apply.

Students can apply and be admitted into one of the participating departments and take part in program activities. Student interactions with faculty from more than one department are strongly encouraged. Graduate programs are customized to fit a student's interests and long-term objectives. Basic training in the food science comes from an integrated first-year 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 that includes papers given by students, post docs, participating faculty, and distinguished visiting scientists, along with 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 and may be offered by the participating departments on a rotational basis.

The students receives a degree from their home department and a transcript endorsement indicating the student has successfully completed the requirements of the

interdisciplinary studies program, which will become part of the student's official record.

Students who wish to pursue the Food Science/Safety Graduate Interdisciplinary Studies Program must declare their intent with the chair of the Faculty Advisory Board.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>
Prerequisite Course		
MIP 334	Food Microbiology (LIFE 205 or MIP 300)	3
Core Courses		
FSHN 696A	Group Study-Food Science	2
FTEC 400	Food Safety (CHEM 107 or CHEM 111)	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	Meat Systems (senior standing)	3
ANEQ 567	HACCP Meat Safety (ANEQ 460)	3
ANEQ 660	Topics in Meat Safety (ANEQ 567)	3
ERHS 532	Epidemiologic Methods (ERHS 307/STAT 307)	3
ERHS 533/	Epidemiology of Infectious Diseases/Zoonoses (MIP	3
MIP 533	300)	
FTEC 570	Food Product Development (FTEC 447)	2
FTEC 572	Food Biotechnology (MIP 334)	2
FTEC 576	Cereal Science (FTEC 447)	2
FTEC 578	Neutraceuticals (CHEM 245 or CHEM 345 or FTEC 447)	3
HORT 401	Medicinal and Value-Added Uses of Plants (BZ 120 or HORT 100 or LIFE 103)	3
HORT 675	Plant Stress Physiology (BZ 440)	3
MIP 335	Food Microbiology Laboratory (LIFE 206 or MIP 301 or MIP 302; MIP 334 or concurrent reg.)	2
MIP 443	Microbiology Physiology (BC 351 or BC 401; MIP 300)	4
MIP 450	Microbial Genetics (BC 351 or concurrent reg. or BC 401 or concurrent reg.; MIP 300)	3
MIP 540	Biosafety in Research Laboratories (MIP 300)	2
MIP 550	Microbial and Molecular Genetics Laboratory (MIP 301 or MIP 302; MIP 450; written consent of department)	4
MIP 624	Microbial Ecology (MIP 300; MIP 432)	2
SOCR 755	Advanced Soil Microbiology (MIP 624 or SOCR 455)	3
VS 570/	Issues in Animal Agriculture	2
AGRI 570		
VS 648/	Food Animal Production and Food Safety (enrollment	2
VM 648	in food science/safety interdisciplinary graduate studies program)	

¹ Six or more credits, approved by Faculty Advisory Board for the Graduate Interdisciplinary Studies Program in Food Science/Safety.

Geospatial Science Graduate Interdisciplinary Studies Program

Department of Forest, Rangeland, and Watershed Stewardship and the Graduate School

Colorado State University offers a graduate-level certificate in geospatial science. The certificate is designed to meet the education needs of two groups of people: 1) those who want to redirect their career with new skills in geospatial science, but who are not interested in pursuing a full graduate degree program at the present time, and 2) those who want a geospatial science focus as part of a traditional graduate degree program in some other discipline. To meet the requirements for the certificate, graduate students take one or more courses in each of four groups or subject matter areas, rather than a defined set of specific courses. These

groups and course requirements include: two courses in GIS, one in remote sensing, one in GPS, and two courses in an "other" category. Upon completion of the minimum number of credits in each of the four categories and with an average GPA of 3.000 in the courses taken, the student is eligible to receive the certificate. A total of 15 to 21 credits is usually needed to meet these requirements. The certificate program involves faculty from various departments throughout the University serving as advisers for the students, but it is officially housed in the Graduate School and administered through the Department of Forest, Rangeland, and Watershed Stewardship. It is important to note that students applying for the certificate must meet all of the normal graduate admission requirements of the academic department to which they are applying.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>
GIS Skills (Two courses, minimum of 5 credits)		
CIVE 576	Engineering Applications of GIS and GPS ¹	3
CIVE 577	GIS in Civil and Environmental Engineering (CIVE 300; CIVE 322/ENVE 322)	3
LAND 520	Geographic Information Systems (LAND 241)	3
NR 422	GIS Applications in Natural Resource Management (NR 322)	4
NR 505	Concepts in GIS (STAT 301 or STAT 511)	4
NR 621	Design of Geographic Information Systems (CS 110; LAND 520 or NR 322)	3
GPS Skills (One course; minimum of 1 credit)		
CIVE 576	Engineering Applications of GIS and GPS ¹	3
NR 423	Applications of Global Positioning Systems (NR 322 or NR 505)	1
SOCR 577	Principles/Components: Precision Agriculture ² (3 credits in SOCR or CS)	3
Remote Sensing Skills (Two courses; minimum of 6 credits)		
CS 612	Topics in Computer Graphics (CS 510)	4
ECE 513	Digital Image Processing (ECE 303/STAT 303 with a C- or better; ECE 312)	3
NR 503	Remote Sensing of Natural Resources	4
NR 504	Computer Analysis of Remote Sensing Data (NR 323 or NR 503)	4
Other Courses (Two courses, one of which must be NR 793; minimum of 3 credits) ²		
NR 512	Spatial Statistical Modeling-Natural Resources (NR 322; NR 323; STAT 301)	3
NR 523/	Quantitative Spatial Analysis (STAT 301 or STAT	3
STAT 523	307/ERHS 307)	
NR 793	Seminar on Remote Sensing and GIS (NR 322 or NR 323 or NR 503 or NR 505)	1
SOCR 577	Principles/Components: Precision Agriculture ² (3 credits in CS or SOCR)	3
STAT 372	Data Analysis and Database Management Tools (STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3

PROGRAM TOTAL = 15 credits

¹ CIVE 576 can be used to satisfy both the two credits of GIS and one credit of the GPS requirement.

² SOCR 577 can be used to satisfy both the one credit of GPS and two credits of the other courses.

³ Any of the courses listed in the first three skill groups that were not used to meet the requirements for that skill group could also be used for the other courses requirements.

Gerontology Interdisciplinary Studies Programs

Office in Gifford Building
College of Applied Human Sciences

Undergraduate Program

The Gerontology Interdisciplinary Studies Program 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 College of Applied Human Sciences website at <http://www.cahs.colostate.edu/fyi>.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Core Requirements			
AHS 201	Perspectives in Gerontology (HDFS 101 or PSY 100 or SOC 100)	3	
FSHN 444	Nutrition and Aging (FSHN 150 or admission to Gerontology Interdisciplinary Studies Program)	1	
HDFS 312	Adult Development-Middle Age and Aging (HDFS 101)	3	
HES 444	Successful Aging: Role of Physical Activity (BZ 110 or LIFE 102)	2	
SOWK 371F	Social Work with Selected Populations-Social Gerontology	3	
	TOTAL	<u>12</u>	
Elective Courses			
HDFS 332	Death, Dying, and Grief (HDFS 101)	3	
HDFS 403	Families in the Legal Environment	3	
OT 355	Handicapped Individual in Society (PSY 100 or SOC 100)	2	
PHIL 366	Philosophy of Aging	3	
PSY 296	Group Study	1-3	
PSY 496	Group Study	1-3	
	TOTAL	<u>5-8</u>	

Minimum of three credits practicum or internship directly related to aging.

PROGRAM TOTAL = 20-23 credits

Graduate Program

Gerontology is one of the inter-institutional graduate programs offered through the Great Plains Distance Education Alliance (Great Plains IDEA), a consortium of universities who have come together to offer post-baccalaureate programs through distance education to students. The 36-credit web-based master's program and the 21-credit graduate certificate are designed to prepare professionals who are working directly with older people or are involved in related education and research. Professionals offering direct services often are involved in health promotion programs; directing intergenerational activities; managing senior centers or retirement communities;

counseling older individuals and their families; and helping people plan for retirement. Professionals involved in education and research may evaluate community-based services; teach about the aging process; develop policies and programs to serve the needs of the elderly; work with business and industry on issues related to an aging work force; and educate and inform consumers.

Universities collaborating on the gerontology program are Colorado State University (currently only offering the 21-credit certificate program), Iowa State University, Kansas State University, North Dakota State University, Oklahoma State University, and Texas Tech University.

Students apply for admission directly to one or more of these universities, selecting one "home" institution from which the degree will be granted. At the present time, Colorado State University is not accepting applications. Interested students should seek information from www.gpidea.org for opportunities at other cooperating universities.

Information Science and Technology Interdisciplinary Studies Program

Office in Clark Building, Room C242
Associate Professor Peter B. Seel, Coordinator

This interdisciplinary studies program is sponsored by four departments in different colleges across the University: Computer Information Systems, Computer Science, Electrical and Computer Engineering, and Journalism and Technical Communication. 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. Similar to a minor, the program requires 21 credits and is open to students majoring in any field other than computer science, computer information systems, electrical engineering, or computer engineering.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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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 CIS 150 or CS 110

Required Courses

CIS 210	Information Technology in Business	3	
CS 115	Computer Science Concepts and Practices (placement into MATH 117 or MATH 130)	3	
JTC 413	New Communication Technologies and Society	3	
	TOTAL	<u>9</u>	

Elective Courses – Select four of the following courses:

CIS 240	Application Design and Development (CIS 210)	3	
CIS 301	End User Computing	3	
CIS 340	Advanced Application Design and Development (CIS 240)	3	
CIS 355	Business Database Systems (CIS 120 or CIS 210)	3	
CS 150	Interactive Programming with Java (placement into MATH 117 or MATH 130)	4	
CT 310	Web Development (CS 150 or CS 160)	4	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
CT 320	Network and System Administration (CS 155 and CS 156 or CS 253)	4	
ECE 325	Telecommunication Networks (MATH 141 or MATH 155 or MATH 160)	3	
ECE 421	Telecommunications I (ECE 303/STAT 303 with a grade of C- or better; ECE 312 with a C- or better)	3	
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
JTC 372	Web Design and Management (JTC 210; JTC 211)	3	
TOTAL		12-16	

PROGRAM TOTAL = 21-22 credits

Integrated Resource Management Interdisciplinary Studies Program

*Office in Animal Reproduction and Biotechnology Laboratory, Room E102
Kraig Peel, Coordinator*

The Integrated Resource Management Interdisciplinary Studies Program 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 three courses focused on integration of the information provided in the disciplinary courses and developing skills in systems analysis. This interdisciplinary studies program is aimed at providing training for students interested in careers involving the businesses associated with land and animal management.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
SOPHOMORE			
AGRI 224/ NR 224	Integrated Resource Management I (AGRI 192)	3	
LAND 220/ SOCR 220	Fundamentals of Ecology (3 credits 100-level biology or HORT 100; 3 credits 100-level mathematics)	3	
RS 300	Principles of Range Management (BZ 120 or LIFE 103)	3	
RS 320/ SOCR 320	Forest and Range Management	3	
OR			
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
TOTAL		12-13	
JUNIOR			
AGRI 424/ NR 424	Integrated Resource Management II (AGRI 224/NR 224)	3	
ANEQ 300E	Topics in Animal Science-Family Ranching (ANEQ 101 or ANEQ 102)	1	
AREC 305	Agricultural and Resource Enterprise Analysis (AGRI 140 or CS 110; AREC 202 or ECON 202)	3	
AREC 310	Agricultural Marketing (AREC 202 or ECON 202)	3	
SOC 341	Sociology of Rural Life (SOC 100 or SOC 105)	3	
TOTAL		13	
SENIOR			
AGRI 383/ NR 383	U.S. Travel-Integrated Resource Management	2	
ANEQ 472	Sheep Systems (senior standing)	3	
OR			
ANEQ 478	Beef Systems (senior standing)	3	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
AREC 478	Agricultural Policy (AREC 202 or ECON 202 or AREC 240/ECON 240)	3	
TOTAL		8	

PROGRAM TOTAL = 33-34 credits without prerequisites

International Development Interdisciplinary Studies Programs

*Office in Laurel Hall
Coordinated by the International Development Board and the Office of International Programs/International Education*

The International Development Interdisciplinary Studies Program 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.

Undergraduate Program

The undergraduate program requires 21 credits of work in international development studies. These credits consist of a 3-credit seminar (IE 492), selection of 6 credits from a core group of courses, and participation in a non-credit colloquium. In addition, 12 elective credits are selected from a list of supporting courses approved by the International Development Board. Up to 6 credits of foreign language may count toward the elective credits.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Core Courses			
<i>Select six credits from the following:</i>			
ANTH 200	Cultures and the Global System	3	3E
ECON 460	Economic Development (ECON 304)	3	
GR 100	Introduction to Geography	3	
IE 270/ AGRI 270	World Interdependence-Population and Food	3	3E
IE 470	Women and Development	3	
IE 471	Children and Youth in Global Context	3	
POLS 232	International Relations	3	3E
IE 492	International Development Seminar	3	
TOTAL		9	
Supporting Courses			
Students will take at least 12 credits from the following courses or additional courses approved by the International Development Board. Core courses not taken to meet the 6-credit core requirement can be used as supportive coursework.			
ANTH 310	Peoples and Cultures of Africa (ANTH 100)	3	
ANTH 312	Modern Indian Culture and Society (ANTH 100 or ANTH 200)	3	
ANTH 314	Southeast Asian Cultures and Societies (ANTH 100 or ANTH 200)	3	
ANTH 319	Latin American Peasantries (ANTH 100)	3	
ANTH 329	Cultural Change (ANTH 100)	3	
ANTH 332	Peoples of the Caribbean (ANTH 100 or ANTH 200)	3	
ANTH 340	Medical Anthropology (ANTH 100)	3	
ANTH 413	Indigenous Peoples Today (ANTH 200 or ANTH 412 or ANTH 414/ETST 414)	3	

University-Wide Instructional Programs

Course	Title (Prerequisite)	Cr	AUCC
ANTH 414/ ETST 414	Development in Indian Country	3	
ANTH 415	Indigenous Ecologies and the Modern World	3	
ANTH 441	Method in Cultural Anthropology (ANTH 100)	3	
AREC 415	International Agricultural Trade (AREC 310; ECON 204)	3	
AREC 460	Economics of World Agriculture (AREC 202 or ECON 202)	3	
ECON 332/ POLS 332	International Political Economy (AREC 202 or ECON 202; POLS 232)	3	
ECON 370	Comparative Economic Systems (AREC 202 or ECON 101 or ECON 202)	3	
ECON 440	International Economics I (ECON 306)	3	
ECON 442	International Economics II (ECON 304)	3	
FIN 475	International Business Finance (FIN 300 or FIN 305)	3	
GR 320	Cultural Geography (GR 100)	3	
IE 116/ AGRI 116	Plants and Civilizations	3	3E
INST 300	Approaches to International Studies (GR 100; junior or senior standing)	3	
INST 492A	Seminar-Asia (INST 300)	3	
INST 492B	Seminar-Latin America (INST 300)	3	
JTC 412	International Mass Communication	3	
L*	Foreign languages ¹	3-6	
MGT 475	International Business Management (FIN 300 or FIN 305; MGT 305 or MGT 320; MKT 300 or MKT 305)	3	
MKT 365	International Marketing (MKT 300 or MKT 305)	3	
NRRT 320	International Issues-Recreation and Tourism	3	
PHIL 345	Environmental Ethics (sophomore standing or higher)	3	
POLS 131	Current World Problems	3	3E
POLS 241	Comparative Government and Politics	3	3E
POLS 331	Politics and Society Along Mexican Border	3	
POLS 431	International Law (POLS 232)	3	
POLS 433	International Organization (POLS 232)	3	
POLS 444	Comparative African Politics (POLS 241)	3	
POLS 445	Comparative Asian Politics (POLS 241)	3	
POLS 446	Politics of South America (POLS 241)	3	
POLS 447	Politics in Mexico, Central America, Caribbean (POLS 241)	3	
SOC 320	Population-Natural Resources and Environment (SOC 100 or SOC 105)	3	
SOC 341	Sociology of Rural Life (SOC 100 or SOC 105)	3	
SOC 364	Agriculture and Global Society (SOC 100 or SOC 105)	3	
SOC 366	Peoples and Institutions of Latin America (SOC 100 or SOC 105)	3	
SOC 429	Comparative Urban Studies (SOC 100 or SOC 105)	3	
SOC 460	Society and Environment (SOC 100 or SOC 105)	3	
SOC 461	Sociology of Water Resources (SOC 100 or SOC 105)	3	
SOCR 475	Tropical Soils, Crops, and Farming Systems	3	
SOWK 450/ IE 450	International Social Welfare and Development	3	
SPCM 434	Intercultural Communication Internship	3	
	TOTAL	1-3	
		12	

Program Total = 21 credits

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.).

Graduate Program

For admission to the International Development Graduate Interdisciplinary Studies Program, candidates may write a

letter to the Board requesting admission and outlining their academic and professional goals for participating in the program. Alternatively, candidates may have completed a relevant international experience, e.g., study abroad, Peace Corps, residence in a foreign culture, or have completed at least nine credits (or demonstration of equivalent competence) or internationally-related undergraduate or graduate courses, e.g., foreign language, history and culture, international studies, cross-cultural communication.

The graduate program requires 12 credits of work in international development studies, consisting of a 3-credit seminar (IE 692), selection of 3 credits from a core group of courses, and participation in a non-credit colloquium. In addition, electives include at least 6 credits from a list of supporting courses approved by the International Development Studies Board. The Board, in cooperation with International Education, oversees the program, keeping students informed of curricular changes, and providing advisers as needed.

Course	Title (Prerequisite)	Cr
Core Courses		
<i>Select one course from the following:</i>		
AREC 566/ SOC 566	Contemporary Issues of Developing Countries (2 or more courses in AREC or ECON or SOC)	3
AREC 660	Economics of Agricultural Development (AREC 460)	3
IE 470	Women and Development	3
IE 471	Children and Youth in Global Context	3
IE 517/ PSY 517	Perspectives in Global Health	3
IE 550/ PHIL 550	Ethics and International Development (written consent of instructor)	3
NR 525	World Natural Resources (written consent of instructor)	3
POLS 541	Political Economy of Change and Development (3 upper-division credits in comparative politics with a B or better)	3
IE 692	International Development Seminar	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.		
ANTH 414/ ETST 414	Development in Indian Country	3
ANTH 515	Culture and Environment (6 credits in anthropology)	3
ANTH 520	Women, Health, and Culture (graduate standing)	3
ANTH 529	Anthropology and Development (9 credits in anthropology)	3
ANTH 535	Globalization and Culture Change (9 credits in anthropology)	3
AREC 415	International Agricultural Trade (AREC 310; ECON 204)	3
AREC 460	Economics of World Agriculture (AREC 202 or ECON 202)	3
AREC 660	Economics of Agricultural Development (AREC 460)	3
AREC 792B	Seminar-International	Var
BUS 662	International Business (BUS 625; BUS 635; BUS 641; BUS 650)	2
CIVE 516	Water Control and Measurement	3
CIVE 524/ WR 524	Modeling Watershed Hydrology (CIVE 322/ENVE 322 or WR 416; STAT 315 or STAT 340)	4
CIVE 544	Water Resources Planning and Management (CIVE 322/ENVE 322)	3
CIVE 578	Infrastructure Engineering and Management (10 credits of engineering, economics, public administration, or planning courses)	3
CIVE 639/ SOC 639	Technology Assessment and Social Forecasting (CIVE 544 or SOC 500)	3
DM 518	Consumer Issues-Global Perspectives	3
E 526	Teaching English as Foreign/Second Language	3

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>
E 527	Theories of Foreign/Second Language Learning (E 526)	3
ECON 440	International Economics I (ECON 306)	3
ECON 442	International Economics II (ECON 304)	3
ECON 460	Economic Development (ECON 304)	3
ECON 640	International Trade Theory (ECON 306 or ECON 506)	3
ECON 742	International Production and Monetary Theory (ECON 304 or ECON 504)	3
ECON 760	Theories of Economic Development (ECON 460)	3
EDOD 767	Cross-Culture and International Training (admission to OPC specialization)	3
FIN 675	International Finance	3
FSHN 661	International Nutrition (FSHN 350)	2
FW 573	Travel Abroad-Wildlife Ecology/Conservation (written consent of instructor)	3
IE 471	Children and Youth in Global Context	3
JTC 412	International Mass Communication	3
MGT 475	International Business Management (FIN 300 or FIN 305; MGT 305 or MGT 320; MKT 300 or MKT 305)	3
MKT 365	International Marketing (MKT 300 or MKT 305)	3
NRRT 550	Ecotourism (NRRT 470)	3
POLS 433	International Organization (POLS 232)	3
POLS 444	Comparative African Politics (POLS 241)	3
POLS 445	Comparative Asian Politics (POLS 241)	3
POLS 446	Politics of South America (POLS 241)	3
POLS 447	Politics in Mexico, Central America, Caribbean (POLS 241)	3
POLS 531	Policy Making, Diplomacy, and World Politics (3 upper-division credits in international relations with a B or better)	3
POLS 540	Comparative Politics (3 upper-division credits in comparative politics with a B or better)	3
POLS 670	Politics of Environment and Sustainability (written consent of instructor)	3
POLS 739	International Environmental Politics (POLS 530; POLS 670)	3
POLS 749	Comparative Environmental Politics (POLS 540 or POLS 541; POLS 670)	3
RS 531	World Grassland Ecogeography (BZ 223)	3
SOC 631	Sociology of Rural Development (SOC 500)	3
SOC 660	Development Theories and Issues (SOC 500)	3
SOC 661	Gender and Global Society (SOC 500)	3
SOC 663	Sociology of Sustainable Development (SOC 500)	3
SOC 666	Globalization and Socioeconomic Restructuring (SOC 500)	3
SOC 667	Theories of State, Economy, and Society (SOC 500)	3
SOC 669	Global Inequality and Change (SOC 500)	3
SOCR 475	Tropical Soils, Crops, and Farming Systems	3
WR 510	Watershed Management in Developing Countries (CIVE 322/ENVE 322 or WR 304)	2
	Internship	1-3
	Independent Study	1-3
	TOTAL	6

Latin American and Caribbean Studies Interdisciplinary Studies Program

Office in Laurel Hall

Coordinated by a Faculty Advisory Board and the Office of International Programs/International Education

The Latin American and Caribbean Studies Interdisciplinary Studies Program, open to all students, seeks to broaden understanding of the languages, cultures, institutions, political and economic systems, and the processes of change in Latin America. By comparing development processes of Latin America with those of the United States, students may better understand the problem of change in their own society.

To qualify for a certificate in Latin American and Caribbean studies, students should complete, with a grade point average of 2.000 or better, a minimum of 15 credits in Latin American and Caribbean area courses, and at least 10 credits in either Spanish or Portuguese language. The latter requirements may be waived if the Department of Foreign Languages and Literatures certifies that the student has at least this equivalence in language proficiency. If language is waived, the student must complete 20 credits in Latin American and Caribbean area courses. Except for language, a student may not have more than 7 credits in any one discipline.

Program details are available from the Office of International Programs.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Area Courses¹			
<i>Select 15-20 credits from the following:³</i>			
ANTH 319	Latin American Peasantries (ANTH 100)	3	
ANTH 332	Peoples of the Caribbean (ANTH 100 or ANTH 200)	3	
ANTH 451	Andean Archaeology and Ethnohistory (ANTH 100 or ANTH 140)	3	
ART 312	History of Pre-Columbian Art (ART 212)	3	
HIST 353	U.S.-Mexico Borderlands (HIST 101 or HIST 150 or HIST 151 or HIST 171)	3	
HIST 410	Colonial Latin America (HIST 101 or HIST 171)	3	
HIST 411	Latin America Since Independence (HIST 101 or HIST 151 or HIST 171)	3	
HIST 412	Mexico (HIST 101 or HIST 151 or HIST 171)	3	
HIST 413	Caribbean Civilization (HIST 101 or HIST 151 or HIST 171)	3	
HIST 414	Revolutions in Latin America (HIST 101 or HIST 151 or HIST 171)	3	
INST 492B	Seminar-Latin America (INST 300)	3	
JTC 412	International Mass Communication	3	
LGEN 465A	Studies in Foreign Film-The Americas	3	
LSPA 335	Issues in Hispanic Culture (LSPA 300 or LSPA 328A)	3	
LSPA 435	Caribbean Culture in Hispanic Literature (LSPA 335 or LSPA 328C)	3	
LSPA 436	Advanced Latin American Culture (LSPA 335 or LSPA 328C)	3	
LSPA 445	Women Writers in the Hispanic Worlds (LSPA 300 or LSPA 328A; LSPA 310 or LSPA 328B)	3	
LSPA 449	Spanish-American Literary Movements and Periods (LSPA 300 or LSPA 328A; LSPA 310 or LSPA 328B)	3	
LSPA 452	Genre Studies in Spanish (LSPA 300 or LSPA 328A; LSPA 310 or LSPA 328B)	3	
LSPA 492	Seminar-Spanish Language, Literature, and Society (LSPA 310 or LSPA 328B; two 400-level courses; senior status)	3	
POLS 331	Politics and Society Along Mexican Border	3	
POLS 446	Politics of South America (POLS 241)	3	
POLS 447	Politics in Mexico, Central America, Caribbean (POLS 241)	3	
SOC 366	Peoples and Institutions of Latin America (SOC 100 or SOC 105)	3	
SA 482	Study Abroad (Mexico/Latin America)		3E

¹ Senior capstone courses (492 suffix) based on one of the 300-400 level courses on the list below may also be used to fulfill certificate requirements.

² ANTH 510 and LSPA 549 may be used as area courses.

³ Students should complete, with a grade point average of 2.000 or better, a minimum of 15 credits in area courses and at least 10 credits in either Spanish or Portuguese language. The language requirement may be waived if the Department of Foreign Languages and Literatures certifies the student has at least this equivalence in language proficiency. If language is waived, the student must complete 20 credits in area courses. Except for language, a student may not have more than 7 credits in any one discipline.

Mathematics Graduate Interdisciplinary Studies Program

Office in Weber Building, Room 101
Coordinated by the Department of Mathematics

The graduate-level certification 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, complete the Graduate Certificate in Mathematics application, available on the Department of Mathematics website: www.math.colostate.edu/grad/grad/index.html. Each individual program of study must be submitted to and approved by the Mathematics Graduate Committee.

<u>Course</u>	<u>Title (Prerequisite)</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
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 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 to 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, 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 (Prerequisite)</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 Studies Program

Office in Molecular and Radiological Biosciences Building, Room 316
(970) 491-5602
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 certificate in the Molecular Biology Interdisciplinary Studies Program 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).

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Mathematics Core			
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
OR			
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
OR			
STAT 307/ ERHS 307	Introduction to Biostatistics (MATH 117)	3	
TOTAL		7	
Physics Core			
<i>Select one of the following pairs of courses:</i>			
PH 121	General Physics I (MATH 125 or concurrent reg.)	5	3A
PH 122	General Physics II (PH 121)	5	3A
OR			
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
TOTAL		10	
Chemistry Core			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117 or concurrent reg.; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
CHEM 345	Organic Chemistry I (CHEM 113; CHEM 114)	4	
CHEM 346	Organic Chemistry II (CHEM 345)	4	
TOTAL		17	
Biology Core			
<i>Select one of the following sets of courses:</i>			
BIO 310	Cell Biology (BZ 110 or BZ 120 or LIFE 103; CHEM 245 with a C or better or CHEM 345 with a C or better)	4	
OR			
LIFE 210	Introductory Eukaryotic Cell Biology (CHEM 111; CHEM 112 or concurrent reg.; LIFE 102)	3	
LIFE 211	Eukaryotic Cell Biology Recitation (LIFE 210 or concurrent reg.)	1	
LIFE 212	Introductory Cell Biology Laboratory (CHEM 112; LIFE 210 or concurrent reg.)	1	
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
TOTAL		8-9	
Biochemistry Core			
BC 401	Comprehensive Biochemistry I (CHEM 245 or CHEM 345 or concurrent reg. in CHEM 345; MATH 155 or MATH 160)	3	
BC 403	Comprehensive Biochemistry II (BC 401)	3	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
BC 404	Comprehensive Biochemistry Laboratory (BC 401 or concurrent reg.; CHEM 246 or CHEM 344; LIFE 212)	2	
TOTAL		8	
Microbiology Core			
MIP 300	General Microbiology (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or concurrent reg. or CHEM 341 or concurrent reg. or CHEM 345 or concurrent reg.)	3	
MIP 342	Immunology (MIP 300; CHEM 245 or CHEM 345; LIFE 201B or LIFE 210 or MIP 300)	4	
TOTAL		7	
Molecular Genetics Core			
BC 463	Molecular Genetics (CHEM 245 or concurrent reg. or CHEM 341 or concurrent reg. or CHEM 345 or concurrent reg.; LIFE 201B or LIFE 210 or MIP 300)	3	
OR			
MIP 450	Microbial Genetics (BC 351 or concurrent reg. or BC 401 or concurrent reg.; MIP 300)	3	
<i>Select one of the following sets of courses (4-5 credits):</i>			
BZ 350	Molecular and General Genetics (BZ 110 or BZ 120 or LIFE 102; STAT 201 or concurrent reg. or STAT 301 or concurrent reg. or STAT 307/ERHS 307 or concurrent reg.)	4	
OR			
LIFE 201B	Introductory Genetics-Molecular/Immunological/ Developmental (LIFE 102)	3	3A
LIFE 202B	Introductory Genetics Recitation-Molecular Genetics (LIFE 201B or concurrent reg.)	1	
LIFE 203	Introductory Genetics Laboratory (LIFE 201A or concurrent reg. or LIFE 201B or concurrent reg.)	1	
OR			
SOCR 330	Principles of Genetics (BZ 110 or BZ 120 or LIFE 102)	3	
SOCR 331	Genetics Laboratory (SOCR 330 or concurrent reg.)	1	
TOTAL		7-8	
Seminar			
BC 493	Senior Seminar (BC 401 or concurrent reg.)	1	
Elective			
<i>Select one course from the following:</i>			
BC 465	Molecular Regulation of Cell Function (BC 351 or BC 403 or concurrent reg. in BC 403; LIFE 210)	3	
BZ 402	Molecular Cytogenetics (BIO 310 or concurrent reg. or LIFE 210 or concurrent reg.; BZ 350 or concurrent reg. or LIFE 201A or concurrent reg.; or LIFE 201B or concurrent reg. or SOCR 330 or concurrent reg.)	4	
BZ 403	Comparative Endocrinology (BIO 310)	3	
BZ 433	Behavioral Genetics (BZ 350 or LIFE 201A or LIFE 201B or SOCR 330)	3	
MIP 420	Medical and Molecular Virology (BC 351 or concurrent reg. or BC 401 or concurrent reg.; MIP 342)	4	
MIP 443	Microbial Physiology (BC 351 or BC 401; MIP 300)	4	
TOTAL		3-4	
Advanced Laboratory			
<i>Select four credits from the following:</i>			
BC 475	Mentored Research (BC 404)	3	
BC 495	Independent Study (minimum GPA of 3.000)	Var.	
BC 499A	Thesis-Laboratory Research Based	Var.	
BC 499B	Thesis-Literature Based	Var.	
BZ 495	Independent Study	Var.	
MIP 302	General Microbiology Laboratory (MIP 300 or concurrent reg.)	2	
MIP 343	Immunology Laboratory (MIP 301 or MIP 302; MIP 342 or concurrent reg.)	2	

University-Wide Instructional Programs

Course	Title (Prerequisite)	Cr	AUCC
MIP 425	Virology and Cell Culture Laboratory (MIP 301 or MIP 302; MIP 420 or concurrent reg.)	2	
MIP 495	Independent Study (MIP 300; written consent of instructor)	Var.	
TOTAL		4	

PROGRAM TOTAL = 72-75 credits

Molecular, Cellular and Integrative Neurosciences Interdisciplinary Graduate Program

Office in Anatomy-Zoology Building, Room W334
James R. Bamburg, Director

This interdisciplinary graduate research and education program has 29 faculty participants from 9 departments in 4 colleges. The degree-granting departments are Biochemistry and Molecular Biology; Biology; Biomedical Sciences; Computer Science; 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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>. Details are available from the program office.

Course	Title (Prerequisite)	Cr
NB 500	Readings in Cellular Neurobiology (1 college-level course in each: biology, biochemistry, physics, calculus)	1
NB 501	Cellular and Molecular Neurophysiology (1 college-level course in each: biology, biochemistry, physics, calculus)	2
NB 502/ CM 502	Techniques in Molecular and Cellular Biology (1 college-level course with laboratory in each: biology, biochemistry, physics, and written consent of instructor)	2
NB 503	Developmental Neurobiology (1 college-level course in each: biology, biochemistry, physics, calculus)	3
NB 505	Neuronal Circuits, Systems and Behavior (BMS 325 or BMS 500 or NB 501)	3
NB 586	Practicum-Techniques in Neuroscience II (NB 501; NB 502/CM 502)	1
NB 793	Neuroscience Seminar ¹	2
NB 795	Independent Study	Var.
NB 796A-E	Group Study ¹	2

¹ Two semesters.

Organic Agriculture Interdisciplinary Studies Program

Coordinated by a Faculty Advisory Board

The Organic Agriculture Interdisciplinary Studies Program 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 studies program will be noted on their transcript.

Program details are available from Jessica Davis (Department of Soil and Crop Sciences) and Harrison Hughes (Department of Horticulture and Landscape Architecture).

Course	Title (Prerequisite)	Cr	AUCC
CORE COURSES			
AREC 202	Agricultural and Resource Economics	3	3C
AREC 328	Small Agribusiness Management (AREC 202 or ECON 202)	3	
----- <i>Select one course from the following:</i>			
BIO 320	Ecology (BZ 110 or BZ 120 or LIFE 103; CHEM 245 with a C or better or CHEM 345 with a C or better)	3	
LAND 220/ SOCR 220	Fundamentals of Ecology (3 credits in 100-level biology or HORT 100; 3 credits 100-level mathematics)	3	
NR 120A	Environmental Conservation	3	3A
----- <i>Select two of the following three groups:</i>			
BSPM 302	Applied and General Entomology	2	
BSPM 303A-C	Entomology Laboratory (BSPM 302 or concurrent reg.)	1	
OR			
BSPM 308	Ecology and Management of Weeds (BZ 120 or LIFE 103; CHEM 107 or CHEM 111)	4	
OR			
BSPM 361	Elements of Plant Pathology (BZ 104 or BZ 120 or HORT 100 or LIFE 102)	3	
FSHN 150	Survey of Human Nutrition	3	
HORT 100	Horticultural Science	4	3A
OR			
SOCR 100	General Crops	4	
----- <i>Select two courses from the following:</i>			
HORT 450A	Horticulture Food Crops-Cool Season Vegetable Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
HORT 450B	Horticulture Food Crops-Warm Season Vegetable Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
HORT 450C	Horticulture Food Crops-Small Fruit Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	

Course	Title (Prerequisite)	Cr	AUCC
HORT 450D	Horticulture Food Crops-Tree Fruit Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
HORT 452	Viticulture I-Grape Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
SOCR 350	Soil Fertility Management (SOCR 240)	3	
SPECIFIC COURSES			
HORT 171/ SOCR 171	Environmental Issues in Agriculture	3	3E
<i>Select four courses from the following:</i>			
HORT 344	Organic Greenhouse Production (HORT 310)	1	
SOCR 341	Soil Ecology (SOCR 240)	1	
SOCR 342	Organic Soil Fertility (SOCR 240; SOCR 341; SOCR 350)	1	
SOCR 343	Composting Principles and Practices (SOCR 240; SOCR 341; SOCR 342; SOCR 350)	1	
SOCR 344	Crop Development Techniques (BZ 120 or LIFE 102 or LIFE 103)	1	
SOCR 345/ HORT 345	Diagnosis and Treatment in Organic Fields ¹ (BSPM 302 or BSPM 308 or BSPM 361; HORT 100 or SOCR 100; SOCR 240)	2	
SOCR 424/ HORT 424	Topics in Organic Agriculture (AREC 202 or ECON 202; AREC 328; HORT 100 or SOCR 100; SOCR 171/HORT 171; SOCR 240)	3	
SOCR 487	Internship	3	
OR			
HORT 487	Internship	3	
PROGRAM TOTAL = 46-47 credits			

The following courses are recommended for additional study, but are not required.

Course	Title (Prerequisite)	Cr	AUCC
AGRI 116/ IE 116	Plants and Civilizations	3	3E
AGRI 270/ IE 270	World Interdependence-Population and Food	3	3E
AREC 305	Agricultural and Resource Enterprise Analysis (AGRI 140 or CS 110; AREC 202 or ECON 202)	3	
AREC 310	Agricultural Marketing (AREC 202 or ECON 202)	3	
AREC 478	Agricultural Policy (AREC 202 or ECON 202 or AREC 240/ECON 240)	3	
BSPM 451	Integrated Pest Management (BSPM 302 or BSPM 308 or BSPM 361)	3	
HORT 310	Greenhouse Management	4	
HORT 401	Medicinal and Value-Added Uses of Plants (BZ 120 or HORT 100 or LIFE 103)	3	
HORT 450A-D	Horticulture Food Crops ² (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	3	
HORT 452	Viticulture I-Grape Production ² (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
HORT 454	Horticulture Crop Production and Management (HORT 310 or HORT 450A-B)	2	
HORT 475	Environmental Requirements of Horticultural Plants (BZ 120 or HORT 100 or LIFE 103)	3	
PHIL 330/ AGRI 330	Agricultural Ethics	3	
PHIL 345	Environmental Ethics (sophomore standing or higher)	3	
RRM 400	Food and Society (SOC 100; must have completed category 3D and 3E AUCC requirements)	3	
SOC 341	Sociology of Rural Life (SOC 100 or SOC 105)	3	
SOC 364	Agriculture and Global Society (SOC 100 or SOC 105)	3	
SOC 461	Sociology of Water Resources (SOC 100 or SOC 105)	3	

Course	Title (Prerequisite)	Cr	AUCC
SOCR 351	Soil Fertility Laboratory (SOCR 350 or concurrent reg.)	1	
SOCR 370	Irrigation Principles and Management (HORT 100 or SOCR 100; SOCR 240)	3	
SOCR 420	Crop and Soil Management Systems I (HORT 100 or SOCR 100; SOCR 240)	3	
SOCR 421	Crop and Soil Management Systems II (HORT 100 or SOCR 100; SOCR 240)	4	

¹ Offered only during the eight-week summer session in alternate odd-numbered years.
² The other three modules not taken above.

Political Economy Graduate Interdisciplinary Studies Program

Office in Clark Building, Room C346
 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.

Course	Title (Prerequisite)	Cr
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	Economic Anthropology (9 credits in anthropology)	3
ANTH 535	Globalization and Culture Change (9 credits in anthropology)	3
ECON 505	Political Economy I (ECON 372 or ECON 376 or ECON 474)	3
ECON 760	Theories of Economic Development (ECON 460)	3
POLS 532	Governance of the World Political Economy (9 upper-division credits in international relations with a B or better)	3
POLS 541	Political Economy of Change and Development (3 upper-division credits in comparative politics with a B or better)	3
SOC 666	Globalization and Socioeconomic Restructuring (SOC 500)	3
SOC 667	Theories of State, Economy, and Society (SOC 500)	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/ ETST 318	Peoples and Cultures of the Southwest (ANTH 100)	3
ANTH 319	Latin American Peasantries (ANTH 100)	3
ANTH 413	Indigenous Peoples Today (ANTH 200 or ANTH 412 or ANTH 414/ETST 414)	3
ANTH 414/ ETST 414	Development in Indian Country	3
ANTH 529	Anthropology and Development (9 credits in anthropology)	3
ANTH 530	Humans in Ecosystems (ANTH 100)	3
ECON 332/ POLS 332	International Political Economy (AREC 202 or ECON 202; POLS 232)	3
ECON 370	Comparative Economic Systems (AREC 202 or ECON 101 or ECON 202)	3
ECON 376	Marxist Economic Thought (AREC 202 or ECON 101 or ECON 202)	3

University-Wide Instructional Programs

Course	Title (Prerequisite)	Cr	Course	Title (Prerequisite)	Cr	AUCC
ECON 379/ HIST 379	Economic History of the United States (AREC 202 or ECON 101 or ECON 202 or any two courses in American history)	3	3.	Two required courses designed to survey the religions of the world, and to introduce students to		
ECON 474	Recent Economic Thought (ECON 304; ECON 306)	3	PHIL 171	Religions of the West	3	
ECON 570	Evolution of Economic Thought (ECON 304; ECON 306)	3	PHIL 172	Religions of the East	3	
ECON 705	Political Economy II (ECON 505)	3	4.	In consultation with a Religious Studies adviser, select fifteen credits with at least three different		
ECON 742	International Production and Monetary Theory (ECON 304 or ECON 504)	3	ANTH 312	Modern Indian Culture and Society (ANTH 100 or ANTH 200)	3	
ECON 770	Economic Thought and Systems (ECON 570)	3	ANTH 322	Religion and Society (ANTH 100 or ANTH 200)	3	
HIST 321	Industrial Society in Europe, 1600-1871 (HIST 101 or HIST 171)	3	ANTH 324	Folk Religion	3	
HIST 322	Industrial Society in Europe, 1871-1989 (HIST 101 or HIST 171)	3	ANTH 340	Medical Anthropology (ANTH 100)	3	
HIST 333	Contemporary Europe (HIST 101 or HIST 171)	3	ART 411	History of Medieval Art (ART 212)	3	
HIST 346	Reconstruction and the New South (HIST 101 or HIST 150 or HIST 171)	3	ART 496H	Group Study-Art History ²	3	
HIST 348	United States, 1917-1945 (HIST 101 or HIST 151 or HIST 171)	3	E 160	Mythical and Biblical Backgrounds	3	
HIST 350	United States Foreign Relations Since 1914 (HIST 101 or HIST 151 or HIST 171)	3	E 336	Goddess Religions	3	
HIST 414	Revolutions in Latin America (HIST 101 or HIST 151 or HIST 171)	3	E 337	Western Mythology	3	
HIST 422	Modern Africa (HIST 101 or HIST 115 or HIST 171)	3	E 460	Chaucer (E 341; one other upper-division E prefix course)	3	
JTC 412	International Mass Communication	3	E 463	Milton (E 341; one other upper-division E prefix course)	3	
POLS 431	International Law (POLS 232)	3	ETST 344	Native American Religious History and Issues	3	
POLS 433	International Organization (POLS 232)	3	HIST 115	Islamic World to 1800	3	3E
POLS 670	Politics of Environment and Sustainability (written consent of instructor)	3	HIST 120	Asian Civilizations I	3	3D
POLS 739	International Environmental Politics (POLS 530; POLS 670)	3	HIST 308	Ancient Christianity to 500 A.D. (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
SOC 366	Peoples and Institutions of Latin America (SOC 100 or SOC 105)	3	HIST 309	Medieval Christianity, 500-1500 (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
SOC 502	Foundations of Theoretical Sociology (SOC 500 or concurrent reg.)	3	HIST 310	Medieval Europe (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
SOC 660	Development Theories and Issues (SOC 500)	3	HIST 317	Renaissance and Reformation Europe (HIST 100 or HIST 101 or HIST 171)	3	
SOC 669	Global Inequality and Change (SOC 500)	3	HIST 323	Russia Before 1700 (HIST 100 or HIST 101 or HIST 171)	3	

Religious Studies Interdisciplinary Studies Program

*Office in Clark Building, Room C138
Coordinated by a Faculty Advisory Board and the
Associate Dean, College of Liberal Arts*

The Religious Studies Interdisciplinary Program 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.

Course	Title (Prerequisite)	Cr	AUCC
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1. Twenty-one credits, ordinarily seven courses in at least three disciplines.
2. A grade point average of 2.000 in courses selected for the program

PHIL 171	Religions of the West	3	
PHIL 172	Religions of the East	3	
ANTH 312	Modern Indian Culture and Society (ANTH 100 or ANTH 200)	3	
ANTH 322	Religion and Society (ANTH 100 or ANTH 200)	3	
ANTH 324	Folk Religion	3	
ANTH 340	Medical Anthropology (ANTH 100)	3	
ART 411	History of Medieval Art (ART 212)	3	
ART 496H	Group Study-Art History ²	3	
E 160	Mythical and Biblical Backgrounds	3	
E 336	Goddess Religions	3	
E 337	Western Mythology	3	
E 460	Chaucer (E 341; one other upper-division E prefix course)	3	
E 463	Milton (E 341; one other upper-division E prefix course)	3	
ETST 344	Native American Religious History and Issues	3	
HIST 115	Islamic World to 1800	3	3E
HIST 120	Asian Civilizations I	3	3D
HIST 308	Ancient Christianity to 500 A.D. (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
HIST 309	Medieval Christianity, 500-1500 (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
HIST 310	Medieval Europe (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
HIST 317	Renaissance and Reformation Europe (HIST 100 or HIST 101 or HIST 171)	3	
HIST 323	Russia Before 1700 (HIST 100 or HIST 101 or HIST 171)	3	
HIST 430	Ancient Near East (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
HIST 431	Ancient Israel (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
HIST 432	Sacred History in the Bible and the Qur'an (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
HIST 433	Muhammad and the Origins of Islam (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
HIST 434	Crusades in the Near East (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
HIST 438	The Modern Middle East (HIST 101 or HIST 115 or HIST 171)	3	
HIST 450	Ancient China (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
HIST 451	Medieval China and Central Asia (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
HIST 452	China in the Modern World, 1600-Present (HIST 101 or HIST 120 or HIST 171)	3	
HIST 455	Tokugawa and Modern Japan, 1600-Present (HIST 101 or HIST 120 or HIST 121 or HIST 171)	3	
LB 170	World Literatures to 1500	3	3E
PHIL 106	Wisdom of the East-Oriental Philosophy	3	
PHIL 170	World Philosophies	3	3E
PHIL 270	Issues in the Study of Religion (sophomore standing or higher)	3	
PHIL 309	Ideas in Oriental Art and Literature	3	
PHIL 335	Islam: Cosmology and Practice	3	
PHIL 349	Philosophy of Tao and Zen (sophomore standing or higher)	3	
PHIL 351	Interpreting the New Testament	3	
PHIL 355	Philosophy of Religion (PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270)	3	
PHIL 359	Philosophy of Humans (PHIL 105 or PHIL 205 or PHIL 206 or any upper-division course in philosophy)	3	
PHIL 360	Topics in Oriental Philosophy (sophomore standing or higher)	3	
PHIL 370	Contemporary Western Religious Thought (PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270)	3	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>	<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
PHIL 371	Contemporary Eastern Religious Thought	3		LGEN 465C	Studies in Foreign Film-Europe	3	
PHIL 372	Meaning and Truth in Religion (PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270)	3		LGER	Any 200-level or above German course	3	
PHIL 375	Science and Religion (PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270)	3		LGER 450	Selected German Literary Movements and Periods (LGER 300 or LGER 328A; LGER 310 or LGER 328B)	3	
PHIL 379	Mysticism East and West (PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270)	3		LGER 454	Topic Studies in German (LGER 300 or LGER 328A; LGER 310 or LGER 328B)	3	
PHIL 455	Islamic Philosophy (PHIL 206; PHIL 210)	3		LRUS	Any 200-level or above Russian course	3	
PHIL 463	Seminar in Religious Studies	3		LRUS 250	Russian Language, Literature, Culture in Translation	3	3E
PHIL 497	Group Study ³	1-9		PHIL 409	20th Century Philosophy (PHIL 301)	3	
PSY 305	Psychology of Religion (PSY 100)	3		POLS 241	Comparative Government and Politics	3	3E
SOC 375	Sociology of Religion and Medicine (SOC 100 or SOC 105)	3		POLS 421	Contemporary Political Theories	3	
				POLS 437	American Security Policy	3	
				Colloquia, seminars, independent study, group study, and study abroad courses as appropriate.			

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.

Russian, Eastern, and Central European Studies Interdisciplinary Studies Program

Office in Laurel Hall

Coordinated by a Faculty Advisory Board and the Office of International Programs, International Education

The Russian, Eastern, and Central European Studies Interdisciplinary Studies Program, which requires a minimum of 21 credits, is designed to give students comprehensive coverage of Russia, Central, and Eastern Europe (CEE). The basic purposes of the program are to broaden understanding of the peoples and cultures of Russia and the CEE region; to promote the study of this region within an integrated interdisciplinary framework; and to enhance student awareness of increasing East-West interdependence.

Program details are available from the Office of International Programs.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Core Courses (9 credits)			
E 353	Russian and Soviet Literature in Translation (one course in literature or HIST 235)	3	
HIST 235	Slavic and East Central European Civilizations	3	
POLS 345	Russian, Central, and East European Politics (POLS 241)	3	
Elective Courses (12 credits minimum)			
No more than 9 credits can be taken from one department.			
ECON 370	Comparative Economic Systems (AREC 202 or ECON 101 or ECON 202)	3	
ECON 376	Marxist Economic Thought (AREC 202 or ECON 101 or ECON 202)	3	
HIST 323	Russia Before 1700 (HIST 100 or HIST 101 or HIST 171)	3	
HIST 324	Imperial Russia (HIST 100 or HIST 101 or HIST 171)	3	
HIST 327	Habsburg Empire (HIST 101 or HIST 171)	3	
HIST 330	Eastern Europe Since 1918 (HIST 101 or HIST 171)	3	
HIST 331	The Soviet Union (HIST 101 or HIST 171)	3	
HIST 332	Germany Since World War I (HIST 101 or HIST 171)	3	
HIST 333	Contemporary Europe (HIST 101 or HIST 171)	3	

Water Resources Interdisciplinary Studies Program

Office in Engineering Building, Room E102

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 Studies Program, 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 (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
CORE COURSES			
AREC 342	Economic Analysis-Water Resource Development (AREC 202 or ECON 202)	3	
AREC 475	Water Law (AREC 375)	3	
GR 342	Geography of Water Resources	3	
LAND 220/	Fundamentals of Ecology ¹ (3 credits 100-	3	
SOCR 220	level biology; 3 credits 100-level mathematics)		
SOC 461	Sociology of Water Resources (SOC 100 or SOC 105)	3	
WR 304	Principles of Watershed Management ²	3	3A
	Elective	3	
	TOTAL	21	
ELECTIVE COURSES			
AREC 340/	Introduction to Economics of Natural	3	
ECON 340	Resources (AREC 202 or ECON 202)		
AREC 346/	Economics of Outdoor Recreation (AREC	3	
ECON 346	202 or ECON 202)		
AREC 375	Agricultural Law (junior standing)	3	
ATS 350	Introduction to Weather and Climate	2	
BZ 315	Marine Ecology (BZ 110 and BZ 111 and BZ 120 or LIFE 103; CHEM 245 or CHEM 345)	3	
BZ 321	Aquatic Vascular Plants (BZ 223 or BZ 325)	3	
CIVE 322/	Basic Hydrology (CBE 331 or CIVE 300 or	3	
ENVE 322	WR 416; CIVE 202 or STAT 301 or STAT 315)		
CIVE 413	Environmental River Mechanics (CIVE 300 or WR 416)	3	

University-Wide Instructional Programs

Course	Title (Prerequisite)	Cr	AUCC
CIVE 423	Groundwater Engineering (CBE 331 or CIVE 300 or WR 416)	3	
CIVE 440	Nonpoint Source Pollution (CIVE 300 or CIVE 322/ENVE 322 or SOCR 240 or WR 304)	3	
GR 210	Physical Geography	3	
POLS 361	U.S. Environmental Politics and Policy (POLS 101)	3	
PSY 316	Environmental Psychology (PSY 100)	3	
SOC 320	Population-Natural Resources and Environment (SOC 100 or SOC 105)	3	
SOCCR 370	Irrigation Principles and Management (HORT 100 or SOCR 100; SOCR 240)	3	
WR 416	Land Use Hydrology (SOCCR 240; STAT 201)	3	
WR 417	Watershed Measurements (concurrent reg. in WR 416)	2	
WR 418	Land Use and Water Quality (CHEM 107; WR 416)	3	

¹ BZ 440 or ERHS 446 or MIP 300 may be substituted for LAND 220/SOCR 220.

² CIVE 322/ENVE 322 or WR 416 may be substituted for WR 304.

Women's Interdisciplinary Studies Programs

Office in Student Services Building, Room 112

*Coordinated by the Women's Studies Executive Board
and the Director of the Office of Women's Programs
and Studies*

The Women's Interdisciplinary Studies Program prepares individuals for the needs and opportunities of a changing 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 interpersonal, intercultural, and international understanding.

Contemporary career opportunities can be directly enhanced by students who have a women's studies background. In several areas such as journalism, communications, business, law, education, and human services, it is now common to choose a career that has a direct focus on women.

In areas that have not traditionally focused on women, an awareness of the history and culture of women and an understanding of 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 a feminist perspective; to help develop an appreciation of the historic and contemporary contributions of women of all cultures; to explore the ideological assumptions regarding women 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 certificate program. Students interested in pursuing undergraduate or graduate certification in the 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 and the student will also receive a certificate.

Undergraduate Program

Students enrolled in the undergraduate Women's Interdisciplinary Studies Program are required to earn a grade of C (2.000) or better in each course completed for undergraduate certification credit.

Course	Title (Prerequisite)	Cr	AUCC
Core Courses (minimum of 15 credits required)			
E 330	Images of Women in Literature	3	
E 332	Modern Women Writers	3	
ECON 211	Gender in the Economy	3	3E
HIST 359	American Women's History Since 1800 (HIST 101 or HIST 150 or HIST 151 or HIST 171)	3	
IE 470	Women and Development	3	
MU 231	Women in Music	3	
PHIL 251	Feminist Philosophies	3	
PSY 296	Group Study ¹	3	
PSY 496	Group Study ¹	3	
PSY 327	Psychological Perspectives on Female Experience (PSY 100)	3	
SOC 333	Gender Roles in Society (SOC 100 or SOC 105)	3	
SPCM 335	Women and Communication	3	
WS 200	Introduction to Women's Studies	3	
WS 397	Group Study	3	
WS 472	Seminar in Women's Studies-Social Sciences ² (enrolled in Women's Interdisciplinary Studies Program)	3	
WS 495	Independent Study (approval of Women's Studies Director and relevant department head(s))	1-3	

Supporting courses (minimum of 6 credits required); may be taken from core courses or courses approved by Advisory Board.

¹ PSY 296 or PSY 496 may be selected.

² Required.

Graduate Program

The graduate-level certification 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 (Prerequisite)</u>	<u>Cr</u>
WS 692	Seminar in Women's Studies ¹ (1 semester of enrollment in Women's Interdisciplinary Graduate Studies Program)	3
WS 695	Independent Study (approval of Women's Studies Director and relevant department head)	3-6
OR		
WS 699	Thesis ² (approval of Women's Studies Program Board)	3-6
	Colloquium ³	0
	TOTAL	6-9
<ul style="list-style-type: none"> 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 Office of Women's Programs and Studies. Students may select no more than one course from the upper-division Women's Studies undergraduate offerings as a supporting course. 		3-6
PROGRAM TOTAL = 12 credits		

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.

Youth Program Management and Evaluation Graduate Interdisciplinary Studies Program

*Office in L. L. Gibbons Building, Room 204
College of Applied Human Sciences*

Through a multi-university collaboration, GP-IDEA (Great Plains—Interactive Distance Education Alliance), students can pursue a youth program management and evaluation on-line master's degree or interdisciplinary studies program leading to a certificate. This program provides youth workers and youth development specialists in public and private agencies and programs with a strengths-based, positive youth development curriculum. It emphasizes multiple knowledge bases and the complex concerns for children, youth, and families with the intent to support youth socially, emotionally, and cognitively.

In addition to Colorado State University, faculty from three other land-grant universities – Kansas State, Michigan State, and the University of Nebraska – share their knowledge and expertise in youth development. Students have the option to pursue a master's degree or one of two certificates: Youth Program Development Specialist or Youth Program Management and Evaluation. Colorado State University offers the certificate programs. At the present time, Colorado State University is not accepting applications. Interested students should seek information from www.gpidea.org. Students apply for the program through one of the four universities (which becomes the home institution).

There is a critical need for trained youth development professionals. An estimated 17,000 organizations currently serve more than 30 million young people. With a move away from focusing on problems and behavior correction, professionals who understand the strengths-based positive

model will be in great demand and competent to work cross-culturally to improve outcomes for youth and youth programs.

All of the courses below are offered in a distance (online) format, in cooperation with the Great Plains-Interactive Distance Education Alliance (GP-IDEA).

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>
AHS 559	Foundations of Youth Development	1
<i>Select four courses from the following:</i>		
AHS 662	Contemporary Youth Issues and Life Skills	3
AHS 663	Youth Policy	3
AHS 664	Youth Program Administration and Management	3
AHS 667	Youth Professionals as Consumers of Research	3
AHS 668	Program Design, Implementation and Evaluation	3
PROGRAM TOTAL = 13 credits		

INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

Cell and Molecular Biology

Office in Molecular and Radiological Biosciences, Room 260

Norm Curthoys, Director

(970) 491-0241

www.ecology.colostate.edu

The graduate program in cell and molecular biology is an interdisciplinary degree granting program that involves nearly 70 faculty members from 10 departments and 4 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, elective courses in laboratory research techniques, ethical conduct of science, and grant writing; a graduate seminar series in which students present their research; and a weekly seminar series that annually includes presentations by CSU faculty and approximately 20 nationally prominent scientists. Core courses are completed during the first year. The M.S. degree usually 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. Macromolecular Resources, a

university core facility, conducts DNA and protein sequencing, produces polyclonal antibodies, and houses instrumentation for proteomic, genomic, metabolomic, and bioinformatics analyses.

Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, or at <http://www.cmb.colostate.edu>.

Ecology

*Office in Natural Resources Building, Room 206
William K. Lauenroth and Ingrid C. Burke, Directors*

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 100 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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, 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 provide payment of full tuition (resident and non-resident), laboratory expenses, mandatory fees, a textbook allowance of \$900 per year, and a tax free stipend of \$300-\$500 per month, depending on academic year.

Details of the scholarship program may be obtained 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
www.colostate.edu/Depts/AFROTC*

*Colonel Thomas A. McCarthy, 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

Both two- and four-year Air Force ROTC programs are offered. The four-year program consists of the General Military Course (GMC) during the freshman and sophomore years and the Professional Officer Course (POC) the remaining two years of college. Those students who elect not to participate in the GMC may substitute a six-week

summer field training period for this requirement. Four-year cadets participate in a four-week field training period during the summer between their sophomore and junior years.

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 (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LOWER DIVISION			
AS 101*	Foundations of the Air Force I (concurrent reg. in AS 196)	1	
AS 102	Foundations of the Air Force II	1	
AS 201*	Evolution of Air and Space Power I (concurrent reg. in AS 296)	1	
AS 202*	Evolution of Air and Space Power II (concurrent reg. in AS 296)	1	
----- <i>Select one course from the following:</i>			
AS 250	Introduction to Aeronautics and Aviation	3	
MLSC 110*	Military Skills I (concurrent reg. in MLSC 196)	2	
MLSC 121*	Military Skills II (concurrent reg. in MLSC 196)	2	
MLSC 210*	Contemporary Management Principles (concurrent reg. in MLSC 296)	2	
MLSC 221*	Dynamics of Military Operations (concurrent reg. in MLSC 296)	2	
----- TOTAL			6-7
UPPER DIVISION			
AS 301*	Air Force Leadership Studies I (concurrent reg. in AS 396)	3	
AS 302*	Air Force Leadership Studies II (concurrent reg. in AS 396)	3	
AS 401*	National Security Affairs/Active Duty I (concurrent reg. in AS 496)	3	
AS 402*	National Security Affairs/Active Duty II (concurrent reg. in AS 496)	3	
MLSC 357/ HIST 357*	The American Military Experience (HIST 101 or HIST 150 or HIST 151 or HIST 171)	3	
----- TOTAL			15
PROGRAM TOTAL = 21-22 credits without corequisites or prerequisites			

*Additional coursework may be required because of prerequisites/corequisites.

Introductory Flight Training

Qualified cadets, selected for pilot or navigator training, participate in an introductory flight training program either during their senior year or 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 four-year, active duty commitment.

University-Wide Instructional Programs

Pilots and navigators serve additional commitments from the time they complete their pilot training.

Department of Military Science

Office in Military Science Building, Room 102
(970) 491-6506
www.colostate.edu/Depts/ArmyROTC

Lieutenant Colonel (P) Andrew L. Groeger, Professor of Military Sciences

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 all the military science courses, a military history course, and summer training. This minor allows ROTC students to compete in the University Honors Program.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
<i>Select 8 credits from the following:</i>			
MLSC 110*	Military Skills I (concurrent reg. in MLSC 196)	2	
MLSC 121*	Military Skills II (concurrent reg. in MLSC 196)	2	
MLSC 210*	Contemporary Management Principles (concurrent reg. in MLSC 296)	2	
MLSC 221*	Dynamics of Military Operations (concurrent reg. in MLSC 296)	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	
TOTAL		8	
UPPER DIVISION			
<i>Select 14 credits from the following:</i>			
MLSC 310*	Leadership Assessment (concurrent reg. in MLSC 396)	3	
MLSC 320*	Applied Leadership (MLSC 310; concurrent reg. in MLSC 396)	3	
MLSC 357/ HIST 357*	The American Military Experience (HIST 101 or HIST 150 or HIST 151 or HIST 171)	3	
MLSC 386	Advanced Camp Practicum ⁴ (MLSC 320)	8	
MLSC 395	Independent Study	1-3	
MLSC 420*	Role and Ethics of the Officer (MLSC 320; MLSC 357/HIST 357; concurrent reg. in MLSC 496)	3	

Course	Title (Prerequisite)	Cr	AUCC
MLSC 492*	Seminar-Leadership and Management (MLSC 310; MLSC 320; concurrent reg. in MLSC 496)	2	
TOTAL		14	

PROGRAM TOTAL = 22 credits without corequisites and prerequisites

*Additional course work may be required because of prerequisites/corequisites.
¹Taken between the student's sophomore and junior years, the five-week Basic Camp (MLSC 250) will meet commissioning requirements for MLSC 110, MLSC 121, MLSC 210, MLSC 221. The number of 100- and 200-level MLSC courses taken will determine the number of credits awarded for MLSC 250.
²Students who have taken all of the Basic Course (MLSC 110, MLSC 121, MLSC 210, MLSC 221) or have completed Basic Training as a prior service member are not eligible to take MLSC 250.
³Students may be given transfer credit for prior military service that can be applied to lower division credits.
⁴Attendance at the five-week Army ROTC Advanced Camp (MLSC 386) is normally the summer between the junior and senior years.

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 include fixed wing or rotary wing (helicopter) training.

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, paralleling the junior and senior years, covers leadership assessment, military history, and 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 successfully complete the necessary prerequisites.

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 camp at Fort Knox, Kentucky, between the sophomore and junior years. This four-week course consists of basic military training and allows the student to enter the advanced course upon return to campus.

Another option toward an officer's commission is the Simultaneous Membership Program (SMP). This program allows a cadet who is a member of a reserve 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 a reserve or active duty commission.

Students can also receive the Reserve GI Bill and tuition assistance 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.

Scholarships

Colorado State Army ROTC scholarship students are awarded full tuition (in-state and out-of-state), fees, and an additional \$900 per year for books. In addition to the above, Congress has increased the monthly stipend to \$300 per month. The stipend increases each year the student remains in the program, up to a maximum of \$500 per month. Applications for the four-year scholarship can be requested by calling 1-800-USA-ROTC (or online at www.ROTC.monroe.army.mil). Two- and three-year scholarship interviews for sophomores and freshmen, respectively, are done January to February annually.

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 funds, 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 a majority 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 15 and 25 students and are taught by the University's finest teachers.

Honors Track 1

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
HONR 192	First Year Seminar (participation in University Honors Program)	4	
HONR 193	Seminar (HONR 192; participation in University Honors Program)	3	1A
TOTAL		7	
SOPHOMORE			
	Honors course ¹	3	
JUNIOR			
HONR 392	Seminar (HONR 193; participation in University Honors Program)	3	3B
HONR 399	Pre-thesis (participation in University Honors Program)	1	
TOTAL		3	
TOTAL		7	
SENIOR			
HONR 492	Senior Seminar (HONR 392; participation in University Honors Program)	3	3C
HONR 499	Senior Honors Thesis (HONR 399)	3	
TOTAL		3	
TOTAL		6	
PROGRAM TOTAL = 23 credits³			

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 – Written Communication; 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 (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
IU 193	Honors Seminar ²	1	
SOPHOMORE³			
JUNIOR			
HONR 399	Pre-Thesis (participation in University Honors Program)	1	
TOTAL		6	
TOTAL		7	
SENIOR			
HONR 499	Senior Honors Thesis (HONR 399)	3	
TOTAL		6	
TOTAL		9	
PROGRAM TOTAL = 16-17 credits			

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 Two courses (upper-division, graduate level, etc.) in the major or discipline.

College of Agricultural Sciences

Office in Shepardson Building, Room 121
(970) 491-6274
www.agsci.colostate.edu

Professor Marc A. Johnson, Dean
Professor Nancy A. Irlbeck, Associate Dean of Academic Affairs
Professor Lee E. Sommers, Associate Dean of Research
Professor James C. Heird, Associate Dean

UNDERGRADUATE MAJORS

Agricultural Business
Agricultural Economics
Agricultural Education
Animal Science
Equine Science
Horticulture
Landscape Architecture
Landscape Horticulture
Soil and Crop Sciences

UNDERGRADUATE MINORS

Agricultural and Resource Economics
Entomology
Horticulture
Landscape 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 CSU are encouraged to access the Course Applicability System (CAS) through the Registrar’s web site (www.registrar.colostate.edu) and clicking on CAS for more information. (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.

INTERDEPARTMENTAL MAJOR

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(970) 491-6274
www.agsci.colostate.edu*

*Nancy A. Irlbeck, Associate Dean of Academic Affairs
Kellie Enns, Instructor of Agricultural Education*

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 Education and is ranked in the top 20 in the nation. 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.

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 Education 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 Education 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 (<http://soe.cahs.colostate.edu/Licensure>) or in room 100 of the Education Building.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
OR			
AGRI 193	Transfer Seminar	1	
ANEQ 101	Food Animal Science	3	
OR			
ANEQ 102	Introduction to Equine Science	4	
<i>Select four credits from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
OR			
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A

College of Agricultural Sciences

Course	Title (Prerequisite)	Cr	AUCC
----- <i>Select a minimum of three credits from the following:</i>			
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
MATH 133	Financial Mathematics (math placement exam)	3	1B
MATH 141	Calculus in Management Sciences (MATH 118)	3	1B
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
MATH 160	Calculus for Physical Scientists I (MATH 126; MATH 124 or concurrent reg.)	4	1B

SOCR 100	General Crops	4	
	Arts/humanities ¹	3	3B
	Technical agricultural electives ²	3	
	TOTAL	<u>28-29</u>	
SOPHOMORE			
AGRI 300	Issues in Agriculture	2	
AREC 202	Agricultural and Resource Economics	3	3C
FSHN 125	Food and Nutrition in Health	2	

OR			
FSHN 150	Survey of Human Nutrition	3	
HORT 100	Horticultural Science	4	3A
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	

SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	3	3B
	Global and cultural awareness ³	3	3E
	Historical perspectives ⁴	3	3D
	Technical agricultural electives ²	4	
	TOTAL	<u>31-32</u>	
JUNIOR			
ANEQ 250	Live Animal and Carcass Evaluation (ANEQ 101 or ANEQ 102)	3	
AREC 305	Agricultural and Resource Enterprise Analysis (AGRI 140 or CIS 150; AREC 202 or ECON 202)	3	
CON 151	Construction Materials and Methods	3	
EDCT 420	Agricultural Experience and Adult Education	3	
EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3C
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
EDUC 350	Instruction I- Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3	
EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent reg. in EDUC 350; admission to teacher licensure)	1	
	Technical agricultural electives ²	8	
	TOTAL	<u>32</u>	

SENIOR			
AREC 310	Agricultural Marketing (AREC 202 or ECON 202)	3	

OR			
AREC 408	Agricultural Finance (AREC 305)	3	
EDCT 425	Methods/Materials in Agricultural Education (EDUC 350 or concurrent reg. or EDUC 450 or concurrent reg.)	4	
EDCT 485	Student Teaching (EDUC 450; EDCT 425)	11	4A,4B, 4C
EDCT 492	Seminar-Professional Relations (EDUC 450; EDCT 425; concurrent reg. in EDCT 485)	2	4C
EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4	
EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
	Technical agricultural electives ²	3	
	TOTAL	<u>28</u>	
PROGRAM TOTAL = 120 credits			

¹ Select from list of courses in category 3B in the All-University Core Curriculum (AUCC).

² See advisor for suggested technical agriculture electives.

³ Select from list of courses in category 3E in the AUCC.

⁴ Select from list of courses in category 3D in the AUCC.

DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS

*Office in Clark Building, Room B320
(970) 491-6325
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*Professor Stephen P. Davies, Chair
Associate Professor W. Marshall Frasier, Undergraduate Coordinator
Professor Dana L. Hoag, 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.

Course	Title (Prerequisite)	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 (high school chemistry)	3	
HORT 100	Horticultural Science (high school biology)	4	3A
SOCR 100	General Crops	4	
AREC 202	Agricultural and Resource Economics	3	3C
<i>Select four credits from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
OR			
BZ 120	Principles of Plant Biology	4	3A
CHEM 103	Chemistry in Context	3	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECON 204	Principles of Macroeconomics (ECON 202 or AREC 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
	Arts/humanities ¹	3	3B
	TOTAL	29-30	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	

Course	Title (Prerequisite)	Cr	AUCC
MATH 141	Calculus in Management Sciences (MATH 118)	3	1B
SPCM 200	Public Speaking	3	2A
	Advanced writing ²	3	2B
	Agricultural science electives ³	6	
	Foundations and perspectives ⁴	9	3B, 3D, 3E
	Elective	3	
	TOTAL	30	

JUNIOR			
AREC 305	Agricultural and Resource Enterprise Analysis (AGRI 140 or CIS 150; AREC 202 or ECON 202)	3	
AREC 310	Agricultural Marketing (AREC 202 or ECON 202)	3	
AREC 335/ ECON 335	Introduction to Econometrics (ECON 204; STAT 201 or STAT 204 or STAT 301 or STAT 307/ERHS 307)	3	
ECON 306	Intermediate Microeconomics (ECON 204; MATH 141 or MATH 155 or MATH 160)	3	
FIN 305	Fundamentals of Finance (ACT 205 or ACT 210; ECON 204)	3	
MKT 305	Fundamentals of Marketing (ECON 101 or ECON 202 or AREC 202)	3	
STAT 301	Introduction to Statistical Methods (MATH 118)	3	
	Agricultural science electives ³	3	
	Electives	6	
	TOTAL	30	

SENIOR			
<i>Select three courses from the following:</i>			
AREC 375	Agricultural Law (junior standing)	3	
AREC 405	Agricultural Production Management (AREC 305)	3	
AREC 408	Agricultural Finance (AREC 305)	3	
AREC 412	Agricultural Commodities Marketing (AREC 310)	3	
AREC 415	International Agricultural Trade (AREC 310; ECON 204)	3	
AREC 428	Agricultural Business Management (AREC 305; AREC 310; and senior standing)	3	4A, 4C
AREC 460	Economics of World Agriculture (AREC 202 or ECON 202)	3	4B
OR			
AREC 478	Agricultural Policy (AREC 202 or ECON 202 or AREC 240/ECON 240)	3	4A, 4B, 4C
MKT 362	Professional Selling (MKT 300 or MKT 305)	3	
	Agricultural science electives ³	3	
	AREC/ECON electives ⁵	6	
	Electives ⁶	3-4	
	TOTAL	30-31	

PROGRAM TOTAL = 120 credits

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 2B 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
AGRI 140	Technology in Agriculture	3	
AGRI 192	Orientation to Agricultural Systems	1	

Select one of the following courses:			
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

Select four credits from the following courses:			
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
OR			
BZ 120	Principles of Plant Biology	4	3A
CHEM 103	Chemistry in Context ¹	3	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECON 204	Principles of Macroeconomics (AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
	Arts/humanities ²	3	3B
	TOTAL	29-30	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
MATH 141	Calculus in Management Sciences (MATH 118)	3	1B
SPCM 200	Public Speaking	3	2A
	Advanced writing ³	3	2B
	Foundations and perspectives ⁴	9	3B, 3D, 3E
	Agricultural sciences electives ⁵	3	
	Electives	6	
	TOTAL	30	
JUNIOR			
AREC 305	Agricultural and Resource Enterprise Analysis (AGRI 140 or CIS 150; AREC 202 or ECON 202)	3	

Select two courses from the following:			
AREC 310	Agricultural Marketing (AREC 202 or ECON 202)	3	
AREC 408	Agricultural Finance (AREC 305)	3	
AREC 412	Agricultural Commodities Marketing (AREC 310)	3	
AREC 428	Agricultural Business Management (AREC 305; AREC 310; senior standing)	3	
AREC 335/ ECON 335	Introduction to Econometrics (ECON 204; STAT 201 or STAT 204 or STAT 301 or STAT 307/ERHS 307)	3	
AREC 340/ ECON 340	Introduction to Economics of Natural Resources (AREC 202 or ECON 202)	3	
OR			

Course	Title (Prerequisite)	Cr	AUCC
AREC 342	Economic Analysis-Water Resource Development (AREC 202 or ECON 202)	3	
ECON 306	Intermediate Microeconomics (ECON 204; MATH 141 or MATH 155 or MATH 160)	3	
FIN 305	Fundamentals of Finance (ACT 205 or ACT 210; ECON 204)	3	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	2B
	Agricultural sciences electives ⁵	3	
	Electives	3	
	TOTAL	30	
SENIOR			
AREC 405	Agricultural Production Management (AREC 305)	3	4A, 4C
AREC 415	International Agricultural Trade (AREC 310; ECON 204)	3	
AREC 478	Agricultural Policy (AREC 202 or ECON 202 or AREC 240/ECON 240)	3	4A, 4B, 4C
ECON 304	Intermediate Macroeconomics (ECON 204; MATH 141 or MATH 155 or MATH 160)	3	
	Agricultural sciences electives ⁵	6	
	AREC, ECON electives ⁶	9	
	Electives ⁷	2-4	
	TOTAL	30-31	

PROGRAM TOTAL = 120 credits

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 2B 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 (Prerequisite)	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	Horticulture 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	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
OR			
BZ 120	Principles of Plant Biology	4	3A
CHEM 103	Chemistry in Context	3	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECON 204	Principles of Macroeconomics (AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	

Course	Title (Prerequisite)	Cr	AUCC
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
	Arts/humanities ¹	3	3B
	TOTAL	29-30	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
AREC 305	Agricultural and Resource Enterprise Analysis (AGRI 140 or CIS 150; AREC 202 or ECON 202)	3	
MATH 141	Calculus in Management Sciences (MATH 118)	3	1B
SPCM 200	Public Speaking	3	2A
	Advanced writing ²	3	2B
	Foundations and perspectives ³	9	3B, 3D, 3E
	Agricultural science electives ⁴	3	
	Elective	3	
	TOTAL	30	

JUNIOR

AREC 335/	Introduction to Econometrics (ECON 204; STAT 201 or STAT 204 or STAT 301 or STAT 307/ERHS 307)	3	
ECON 335			
AREC 408	Agricultural Finance (AREC 305)	3	
ECON 306	Intermediate Microeconomics (ECON 204; MATH 141 or MATH 155 or MATH 160)	3	
MKT 305	Fundamentals of Marketing (ECON 101 or AREC 202 or ECON 202)	3	
MKT 362	Professional Selling (MKT 300 or MKT 305)	3	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
	Agricultural science electives ⁴	6	
	Electives	6	
	TOTAL	30	

SENIOR

<i>Select two courses from the following:</i>			
AREC 310	Agricultural Marketing (AREC 202 or ECON 202)	3	
AREC 412	Agricultural Commodities Marketing (AREC 310)	3	
AREC 415	International Agricultural Trade (AREC 310; ECON 204)	3	
AREC 428	Agricultural Business Management (AREC 305; AREC 310; senior standing)	3	
AREC 375	Agricultural Law (junior standing)	3	
AREC 405	Agricultural Production Management (AREC 305)	3	4A, 4C
AREC 460	Economics of World Agriculture (AREC 202 or ECON 202)	3	4B
OR			
AREC 478	Agricultural Policy (AREC 202 or ECON 202 or AREC 240/ECON 240)	3	4A, 4B, 4C
	Agricultural science electives ⁷	6	
	AREC/ECON electives ⁵	6	
	Electives ⁶	3-4	
	TOTAL	30-31	

PROGRAM TOTAL = 120 credits

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 2B 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
AGRI 140	Technology in Agriculture	3	
AGRI 192	Orientation to Agricultural Systems	1	
AREC 202	Agricultural and Resource Economics	3	3C
<i>Select four credits from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
OR			
BZ 120	Principles of Plant Biology	4	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECON 204	Principles of Macroeconomics (ECON 202 or AREC 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
	Arts/humanities ¹	3	3B
	Biological/physical science ²	3	3A
	Agriculture, forestry, or natural science elective ³	3	
	TOTAL	29	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
MATH 141	Calculus in Management Sciences (MATH 118)	3	1B
SPCM 200	Public Speaking	3	2A
	Advanced writing ⁴	3	2B
	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/ ECON 335	Introduction to Econometrics (ECON 204; STAT 201 or STAT 204 or STAT 301 or STAT 307/ERHS 307)	3	
AREC 340/ ECON 340	Introduction to Economics of Natural Resources (AREC 202 or ECON 202)	3	
AREC 375/ ECON 306	Agricultural Law (junior standing)	3	
	Intermediate Microeconomics (ECON 204; MATH 141 or MATH 155 or MATH 160)	3	
FIN 305	Fundamentals of Finance (ACT 205 or ACT 210; ECON 204)	3	
STAT 301	Introduction to Statistical Methods (MATH 117)	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	Economic Analysis-Water Resource Development (AREC 202 or ECON 202)	3	
AREC 346/ ECON 346	Economics of Outdoor Recreation (AREC 202 or ECON 202)	3	

Course	Title (Prerequisite)	Cr	AUCC
ECON 344	Economics of Energy Resources (AREC 202 or ECON 202)	3	
AREC 460	Economics of World Agriculture (AREC 202 or ECON 202)	3	4B
AREC 478	Agricultural Policy (AREC 202 or ECON 202 or AREC 240/ECON 240)	3	4A, 4B, 4C
ECON 304	Intermediate Macroeconomics (ECON 204; MATH 141 or MATH 155 or MATH 160)	3	
	Agriculture, forestry, natural science elective ³	3	
	AREC or ECON electives ⁶	6	
	Electives ⁷	6	
	TOTAL	31	

PROGRAM TOTAL = 120 credits

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 3A in the AUCC.

³ See departmental list.

⁴ Select from the list of courses in category 2B 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.

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 (Prerequisite)	Cr	AUCC
LOWER DIVISION			
AREC 202	Agricultural and Resource Economics	3	3C
UPPER DIVISION			
AREC*	Agricultural economics	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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, or on the department's website, <http://dare.colostate.edu>.

DEPARTMENT OF ANIMAL SCIENCES

Office in Animal Sciences Building, Room 106C
(970) 491-6672
www.ansci.colostate.edu

Professor W. R. Wailes, Acting 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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
ANEQ 101	Food Animal Science	3	
<i>Select four credits from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
OR			
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
<i>Select one pair of courses from the following:</i>			
CHEM 103	Chemistry in Context	3	3A

Course	Title (Prerequisite)	Cr	AUCC
CHEM 104	Chemistry in Context Laboratory (CHEM 103 or concurrent reg.)	1	3A
OR			
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A
OR			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
<i>Select one course from the following:</i>			
L** 105 ¹	First Year Language I (no previous study in the language)	5	
L** 107 ¹	First Year Language II (L** 105 or L** 106)	5	
L** 200 ¹	Second Year Language I (L** 107 or L** 108 or placement)	3	
L** 201 ¹	Second Year Language II (L** 200 or L** 228A or placement)	3	
SPCM 200	Public Speaking ²	3	2A
<i>Select at least three credits from the following:</i>			
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
MATH 125	Numerical Trigonometry (MATH 118 or placement)	1	1B
MATH 126	Analytic Trigonometry (MATH 125 or placement)	1	1B
MATH 133	Financial Mathematics (math placement exam)	1	1B
MATH 141	Calculus in Management Sciences (MATH 118)	3	1B
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
		3	3B
		3	3D
TOTAL		27-31	
SOPHOMORE			
ANEQ 230	Farm Animal Anatomy and Physiology (3 credits 100-level LIFE)	3	
OR			
BMS 300	Human Gross Anatomy (BZ 101 or BZ 110 or LIFE 102; CHEM 103 or CHEM 107 or CHEM 111)	4	
ANEQ 250	Live Animal and Carcass Evaluation (ANEQ 101 or ANEQ 102)	3	
ANEQ 286	Livestock Practicum (ANEQ 101 or concurrent reg. or ANEQ 120 or concurrent reg.)	2	
<i>Select three courses from the following:</i>			
ANEQ 310	Animal Reproduction (ANEQ 230 or BMS 300)	3	4B
ANEQ 320	Principles of Animal Nutrition (ANEQ 230 or BMS 300; 3 credits 100-level chemistry)	3	4B
ANEQ 330	Principles of Animal Breeding (BZ 350 or LIFE 201 or SOCR 330; three credits of statistics)	3	4B
ANEQ 360	Principles of Meat Science (3 credits 100-level chemistry)	3	4B
AREC 202	Agricultural and Resource Economics	3	3C
OR			
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 160)	3	3C
<i>Select one course from the following:</i>			
STAT 101	Activity Based Statistics	3	
STAT 110	Statistical Thinking: Concepts and Applications	3	

College of Agricultural Sciences

Course	Title (Prerequisite)	Cr	AUCC
STAT 201	General Statistics (placement in MATH 130 or better)	3	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
STAT 307/ ERHS 307	Introduction to Biostatistics (MATH 117)	3	
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	

	Applied animal science elective ⁷	2	
	Arts/humanities ³	3	3B
	Business elective ⁶	3	
	TOTAL	31-32	
JUNIOR			

<i>Select one course from the following:</i>			
ANEQ 346	Equine Disease Management (ANEQ 230 or BMS 230 or BMS 300 or BMS 305 or VS 333)	3	
MIP 315A	Human and Animal Disease	3	
VS 300	Prevention and Control of Livestock Diseases	3	

SOCR 330	Principles of Genetics (BZ 110 or BZ 120 or LIFE 102)	3	

RS 300	Principles of Range Management (BZ 120 or LIFE 103)	3	
OR			
RS 320/ SOCR 320	Forage and Range Management	3	

	Advanced writing ⁷	0-3	2B
	Advanced animal science elective ⁸	3	
	Applied animal science elective ⁵	3	
	Foundation animal science elective ⁹	3	4B
	Business electives ⁶	6	
	Electives ¹⁰	3-6	
	TOTAL	30-31	
SENIOR			

<i>Select two courses from the following:</i> ¹¹			
ANEQ 470	Meat Systems (senior status)	3	4A, 4C
ANEQ 472	Sheep Systems (senior status)	3	4A, 4C
ANEQ 473	Dairy Systems (senior status)	3	4A, 4C
ANEQ 474	Swine Systems (senior status)	3	4A, 4C
ANEQ 476	Feedlot Systems (senior status)	3	4A, 4C
ANEQ 478	Beef Systems (senior status)	3	4A, 4C

	Advanced animal science elective ⁸	3	
	Applied animal science elective ⁵	2	
	Business electives ⁶	6	
	Global and cultural awareness ¹²	3	3E
	Electives ¹⁰	6-12	
	TOTAL	26-32	

PROGRAM TOTAL = 120 credits

¹ Effective Fall Semester 2007, foreign language courses have been moved into separate subject codes (LFRF for French, LGER for German, LSPA for Spanish, etc.), depending on the language.

² Students enrolled in a college or university prior to July 1, 2008, **must select SPCM 200** here in order to fulfill category 2 of the All-University Core Curriculum (AUCC). Students whose first enrollment in a college or university is after July 1, 2008, may select any of the courses in this choice.

³ Select from the list of courses in category 3B in the AUCC.

⁴ Select from the list of courses in category 3D in the AUCC.

⁵ Select from department approved applied course list for animal science majors.

⁶ 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.

⁷ Select from the list of courses in category 2B in the AUCC. This requirement is in place **only** for students whose first enrollment in a college or university is after July 1, 2008. All other students must select SPCM 200 in the choice in the freshman year and take 3 additional credits of electives in the junior year.

⁸ Select a total of two courses from the department approved advanced course list for animal science majors.

⁹ Select an additional course from the list of category 4B courses listed in the sophomore year.

¹⁰ 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.

¹¹ Two courses from the list meet departmental requirements; and one of the courses meets AUCC category 4A and 4C requirements.

¹² 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
- Publications and advertising including photographers, journalists, and related fields

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
ANEQ 102	Introduction to Equine Science	4	

<i>Select four credits from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
OR			
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A

<i>Select one pair of courses from the following:</i>			
CHEM 103	Chemistry in Context	3	3A
CHEM 104	Chemistry in Context Laboratory (CHEM 103 or concurrent reg.)	1	3A
OR			
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A
OR			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A

Course	Title (Prerequisite)	Cr	AUCC
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
<i>Select a minimum of 3 credits from the following:</i>			
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
MATH 125	Numerical Trigonometry (MATH 118 or placement)	1	1B
MATH 126	Analytic Trigonometry (MATH 125 or placement)	1	1B
MATH 133	Financial Mathematics (math placement exam)	3	1B
MATH 141	Calculus in Management Sciences (MATH 118)	3	1B
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
Additional communications ¹		3	2A or 2B
Arts/humanities ²		3	3B
Historical perspectives ³		3	3D
TOTAL		28-30	
SOPHOMORE			
<i>Select one course from the following:</i>			
ANEQ 230	Farm Animal Anatomy and Physiology (3 credits of 100-level LIFE)	3	
BMS 300	Principles of Human Physiology (BZ 101 or BZ 110 or LIFE 102; CHEM 103 or CHEM 107 or CHEM 111)	4	
BMS 305	Domestic Animal Gross Anatomy (BZ 110 or LIFE 102)	4	
VS 333	Domestic Animal Anatomy (BZ 110 or LIFE 102)	4	
ANEQ 292	Equine Industry Seminar (ANEQ 102)	1	
AREC 202	Agricultural and Resource Economics	3	3C
OR			
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
<i>Select one course from the following:</i>			
STAT 101	Activity Based Statistics (math placement exam)	3	
STAT 110	Statistical Thinking: Concepts and Applications (math placement exam)	3	
STAT 201	General Statistics (placement in MATH 130 or better)	3	
STAT 204	Statistics for Business Students (MATH 117)	3	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
STAT 307/ERHS 307	Introduction to Biostatistics (MATH 117)	3	
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	
Arts/humanities ²		3	3B
Global and cultural awareness ⁴		3	3E
Business electives ⁵		3	
Electives		8-11	
TOTAL		28-30	
JUNIOR			
ANEQ 344	Principles of Equine Reproduction (ANEQ 102; ANEQ 230 or ANEQ 310 or BMS 300 or BMS 305 or VS 333)	4	4B
ANEQ 345	Principles of Nutrition: Equine Applications (ANEQ 102; ANEQ 230 or ANEQ 320 or BMS 300 or BMS 305 or VS 333; 3 credits 100-level chemistry; 3 credits of math)	3	4B
ANEQ 346	Equine Disease Management (ANEQ 230 or BMS 230 or BMS 300 or BMS 305 or VS 333)	3	
SOCR 330	Principles of Genetics (BZ 110 or BZ 120 or LIFE 102)	3	

Course	Title (Prerequisite)	Cr	AUCC
Applied equine science electives ⁶		4	
Business electives ⁵		6	
Electives		10	
TOTAL		33-34	
SENIOR			
ANEQ 440	Equine Production and Industry (ANEQ 344; ANEQ 345; ANEQ 346)	3	4A, 4C
Applied equine science electives ⁶		4	
Business electives ⁵		6	
Experience equine science electives ⁷		3	
Electives ⁸		10-15	
TOTAL		26-31	
PROGRAM TOTAL = 120 credits			

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 category 3B 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 3E in the AUCC.

⁵ 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.

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 be 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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, 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 while utilizing a limited number of requirements. 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 (Prerequisite)	Cr	AUCC
LOWER DIVISION			
Select one pair of the following:			
BZ 110	Principles of Animal Biology	3	3A
BZ 120	Principles of Plant Biology	4	3A
OR			
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
LIFE 103	Biology of Organisms-Animals and Plants (LIFE 102)	4	
TOTAL		7-8	
UPPER DIVISION			
BSPM 302	Applied and General Entomology	2	
BSPM 303A-C	Entomology Laboratory (BSPM 302 or concurrent reg.)	3	
Select 12-13 credits from the following:			
BSPM 423	Evolution and Classification of Insects	4	
BSPM 445	Aquatic Insects (BZ 111 or LIFE 103)	4	
BSPM 451	Integrated Pest Management (BSPM 302 or BSPM 308 or BSPM 361)	4	
BSPM 462/ MIP 462/ BZ 462*	Parasitology and Vector Biology (BZ 110 or LIFE 103; BZ 212 or LIFE 206 or MIP 301 or MIP 302)	5	
BSPM 487	Internship	3	
OR			
BSPM 495	Independent Study	3	
TOTAL		17-18	
PROGRAM TOTAL = 24-26 credits			

*Additional course work may be required because of prerequisites.

Minor in Plant Health

Course	Title (Prerequisite)	Cr	AUCC
BSPM 302	Applied and General Entomology	2	
Select one of the following:			
BSPM 303A	General Entomology Laboratory (BSPM 302 or concurrent reg.)	2	
BSPM 303B	Horticultural Entomology Laboratory (BSPM 302 or concurrent reg.)	1	
BSPM 303C	Agricultural Entomology Laboratory (BSPM 302 or concurrent reg.)	1	
BSPM 308*	Ecology and Management of Weeds (BZ 120 or LIFE 103; CHEM 107 or CHEM 111)	4	
BSPM 310*	Fundamentals of Pesticides (3 credits 100-level BZ or CHEM)	2	
BSPM 361*	Elements of Plant Pathology (BZ 104 or BZ 120 or HORT 100 or LIFE 102)	3	
Select a minimum of 9-10 credits from the following (including the selections of BSPM 487 or BSPM 495 or BZ/LIFE courses below):			
BSPM 365*	Integrated Tree Health Management (BZ 120 or LIFE 102)	4	
BSPM 423	Evolution and Classification of Insects	3	
BSPM 445*	Aquatic Insects (BZ 111 or LIFE 103)	4	
BSPM 450*	Molecular Plant-Microbe Interactions (3 credits BZ; BZ 346 or SOCR 330)	3	
BSPM 451	Integrated Pest Management (BSPM 302 or BSPM 308 or BSPM 361)	3	
BSPM 462/ MIP 462/ BZ 462*	Parasitology and Vector Biology (BZ 110 or LIFE 103; BZ 212 or LIFE 206 or MIP 301 or MIP 302)	5	
BSPM 487	Internship	3	
OR			
BSPM 495	Independent Study	3	
BZ 120	Principles of Plant Biology ¹	4	3A
OR			
LIFE 102	Attributes of Living Systems ¹ (high school chemistry)	4	3A
AND			
LIFE 103	Biology of Organisms-Animal and Plants ¹ (LIFE 102)	4	
PROGRAM TOTAL = 22 credits without 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 master of science and doctor of philosophy degrees in bioagricultural sciences with specializations in entomology, plant, pathology, and 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. A specialization in crop protection is available in the master of science program. 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, www.colostate.edu/Depts/bspm/.

DEPARTMENT OF HORTICULTURE AND LANDSCAPE ARCHITECTURE

Office in Shepardson Building, Room 111
(970) 491-7019
<http://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, horticulture, and business. There are four concentrations in the horticulture major – floriculture, horticultural business management, horticultural food crops, and horticultural science.

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

A major challenge facing the horticulture industry today is keeping up with demand for its services. There is a growing need for well-educated professional horticulturists. 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; commercial fruit and produce buyer; extension specialist; floriculturist; fruit and vegetable grower; greenhouse supplies/seed and plant material sales representative; greenhouse production manager; interior plant maintenance technician; irrigation designer; marketing representative; plant breeder; produce buyer.

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 pot 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
BZ 120	Principles of Plant Biology	4	3A
<i>Select one of the following sets of courses:</i>			
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A
OR			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
HORT 100	Horticultural Science	4	3A
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
	Arts/humanities ¹	3	3B
	Global and cultural awareness ²	3	3E
	Electives	2-4	
	TOTAL	29-31	
SOPHOMORE			
AREC 202	Agricultural and Resource Economics	3	3C
BZ 223	Plant Identification (BZ 120 or LIFE 103)	3	
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
HORT 260	Plant Propagation (BZ 120 or concurrent reg. or HORT 100 or concurrent reg. or LIFE 103 or concurrent reg.)	4	
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	

College of Agricultural Sciences

Course	Title (Prerequisite)	Cr	AUCC
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	3	3B
	Historical perspectives ³	3	3D
	Electives	3	
	TOTAL	30	
JUNIOR			
AGRI 320B	Computer Applications in Agriculture-Data Base ⁴ (AGRI 140 or CIS 150 or CS 110)	1	
AGRI 320D	Computer Applications in Agriculture-Project Management ⁴ (AGRI 140 or CIS 150 or CS 110)	1	
AGRI 320E	Computer Applications in Agriculture-Spreadsheets ⁴ (AGRI 140 or CIS 150 or CS 110)	1	
BSPM 302	Applied and General Entomology	2	
BSPM 303B	Horticultural Entomology Laboratory (BSPM 302 or concurrent reg.)	1	
BSPM 361	Elements of Plant Pathology (BZ 104 or BZ 120 or HORT 100 or LIFE 102)	3	
HORT 310	Greenhouse Management	4	4B
<i>Select 3-4 credits from the following:</i> ⁵			
HORT 321	Nursery Production and Management (BZ 120 or HORT 100 or LIFE 103)	4	
HORT 331	Landscape Design	2	
HORT 341	Turfgrass Management (HORT 100 or concurrent reg.)	3	
HORT 401	Medicinal and Value-Added Uses of Plants (BZ 120 or HORT 100 or LIFE 103)	3	
HORT 441	Turfgrass Science (BZ 120 or HORT 100 or SOCR 240)	3	
HORT 450A	Cool Season Vegetable Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
HORT 450B	Warm Season Vegetable Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
HORT 450C	Small Fruit Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
HORT 450D	Tree Fruit Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
HORT 452	Viticulture I-Grape Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
HORT 460/ SOCR 460	Plant Breeding (BZ 350 or concurrent reg. or LIFE 201A or concurrent reg. or SOCR 350 or concurrent reg.)	3	
HORT 464	Arboriculture (HORT 100; SOCR 240)	3	
HORT 475	Environmental Requirements of Horticultural Plants (BZ 120 or HORT 100 or LIFE 103)	3	
HORT 322	Herbaceous Plants	3	
HORT 486	Practicum ⁶	2	
HORT 487	Internship ⁷	3	
	Advanced writing ⁸	3	2B
	Electives	2-3	
	TOTAL	30	
SENIOR			
BZ 440	Plant Physiology (BZ 120 or LIFE 103)	3	
HORT 412	Floriculture Crops	4	
HORT 454	Horticulture Crop Production and Management (HORT 310 or HORT 450A-B)	2	4A, 4C
HORT 486	Practicum ⁹	2	
MGT 305	Fundamentals of Management	3	
SOCR 330	Principles of Genetics (BZ 110 or BZ 120 or LIFE 102)	3	
	Agricultural economics ¹⁰	3	
	Horticulture electives ¹¹	3-4	
	Electives ¹²	5-8	
	TOTAL	29-31	
PROGRAM TOTAL = 120 credits			

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 3E in the AUCC.

³ Select from the list of courses in category 3D in the AUCC.

⁴ AGRI 140 and CIS 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 486 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 486 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 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
AREC 202	Agricultural and Resource Economics	3	3C
BZ 120	Principles of Plant Biology	4	3A
CHEM 107	Fundamentals of Chemistry I (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECON 204	Principles of Macroeconomics (ECON 202 or AREC 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3F
HORT 100	Horticultural Science	4	3A
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
	Elective	4	
	TOTAL	29	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
AGRI 140	Technology in Agriculture	3	
OR			
CIS 150	Business Computing Concepts and Applications	3	
AREC 375	Agricultural Law (junior standing)	3	
OR			
BUS 205	Legal and Ethical Issues in Business	3	
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
HORT 260	Plant Propagation (BZ 120 or concurrent reg. or HORT 100 or concurrent reg. or LIFE 103 or concurrent reg.)	4	
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
SPCM 200	Public Speaking	3	2A
	Electives	6	
	TOTAL	30	
JUNIOR			
AREC 408	Agricultural Finance (AREC 305)	3	

Course	Title (Prerequisite)	Cr	AUCC
OR			
FIN 305	Fundamentals of Finance (ACT 205 or ACT 210; ECON 204)	3	
BSPM 302	Applied and General Entomology	2	
BSPM 361	Elements of Plant Pathology (BZ 104 or BZ 120 or HORT 100 or LIFE 102)	3	
BZ 440	Plant Physiology (BZ 120 or LIFE 103)	3	
MGT 305	Fundamentals of Management	3	
MKT 305	Fundamentals of Marketing (AREC 202 or ECON 101 or ECON 202)	3	
SOCR 330	Principles of Genetics (BZ 110 or BZ 120 or LIFE 102)	3	
STAT 204	Statistics for Business Students (MATH 117)	3	
	Horticulture, upper division	6	
	TOTAL	29	
SENIOR			
HORT 310	Greenhouse Management	4	4B
OR			
HORT 460/	Plant Breeding (BZ 350 or concurrent reg. or LIFE 201A or concurrent reg. or SOCR 350 or concurrent reg.)	3	4B
SOCR 460			
HORT 454	Horticulture Crop Production and Management (HORT 310 or HORT 450A-B)	2	4A, 4C
HORT 475	Environmental Requirements of Horticultural Plants (BZ 120 or HORT 100 or LIFE 103)	3	
	Arts/humanities ¹	6	3B
	Global and cultural awareness ²	3	3E
	Historical perspectives ³	3	3D
	Horticulture, upper division	5	
	Upper division agricultural economics, business, or economics	3	
	Electives	3-4	
	TOTAL	32	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 3B in the AUCC.

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.

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 Studies Program described in the chapter on 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
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	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A

OR

Course	Title (Prerequisite)	Cr	AUCC
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
HORT 100	Horticultural Science	4	3A
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
	Elective	4	
	TOTAL	26-30	
SOPHOMORE			
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
HORT 260	Plant Propagation (BZ 120 or concurrent reg. or HORT 100 or concurrent reg. or LIFE 103 or concurrent reg.)	4	
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
SPCM 200	Public Speaking	3	2A
STAT 201	General Statistics (placement in MATH 130 or higher)	3	
OR			
STAT 301	Introduction to Statistical Methods (MATH 117)	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 303B	Horticultural Entomology Laboratory (BSPM 302 or concurrent reg.)	1	
BSPM 361	Elements of Plant Pathology (BZ 104 or BZ 120 or HORT 100 or LIFE 102)	3	
BZ 440	Plant Physiology (BZ 120 or LIFE 103)	3	
HORT 486	Practicum	3	
OR			
HORT 487	Internship	3	
SOCR 330	Principles of Genetics (BZ 110 or BZ 120 or LIFE 102)	3	
	TOTAL	18-19	
SENIOR			
BSPM 308	Ecology and Management of Weeds (BZ 120 or LIFE 103; CHEM 107 or CHEM 111)	4	
HORT 450A	Cool Season Vegetable Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
HORT 450B	Warm Season Vegetable Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
HORT 454	Horticulture Crop Production and Management (HORT 310 or HORT 450A-B)	2	4A, 4C
HORT 475	Environmental Requirements of Horticultural Plants (BZ 120 or HORT 100 or LIFE 103)	3	
	TOTAL	11	

PROGRAM TOTAL = 85-90 credits⁴

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 from the list of courses in category 3E in the AUCC.

⁴ 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
	Electives	0-4	
JUNIOR			
HORT 310	Greenhouse Management	4	4B
SOCR 350	Soil Fertility Management (SOCR 240)	3	
	Electives	4-5	
	TOTAL	11-12	
SENIOR			
HORT 450C	Small Fruit Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
HORT 450D	Tree Fruit Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
SOCR 370	Irrigation Principles and Management (HORT 100 or SOCR 100; SOCR 240)	3	
	Electives ¹	14	
	TOTAL	19	

PROGRAM TOTAL = 120 credits

¹Select enough elective credits to bring total to minimum of 120.

Seed Science Option

In addition to the horticultural food crop concentration courses, students in the seed science option must take the following courses:

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
BZ 223	Plant Identification (BZ 120 or LIFE 103)	3	
JUNIOR			
<i>Select 5 credits from the following:</i>			
HORT 310	Greenhouse Management	4	4B
HORT 321	Nursery Production and Management (BZ 120 or HORT 100 or LIFE 103)	4	
HORT 341	Turfgrass Management (HORT 100 or concurrent reg.)	3	
HORT 412	Floriculture Crops (HORT 310)	4	
HORT 450C	Small Fruit Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
HORT 450D	Tree Fruit Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
SOCR 304	Seed Production, Conditioning and Marketing (SOCR 100)	3	
SOCR 446	Physiology of Seeds (BZ 440)	2	
	Electives	1-3	
	TOTAL	11-13	
SENIOR			
HORT 460/ SOCR 460	Plant Breeding (BZ 350 or concurrent reg. or LIFE 201A or concurrent reg. or SOCR 350 or concurrent reg.)	3	4B
HORT 461/ SOCR 461	Plant Breeding Laboratory (HORT 460/SOCR 460 or concurrent reg.)	1	
	Electives ¹	12-15	
	TOTAL	16-19	

PROGRAM TOTAL = 120 credits

¹Select 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 and 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
BZ 120	Principles of Plant Biology	4	3A
CHEM 111	General Chemistry I (MATH 118 or MATH 121 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
HORT 100	Horticultural Science	4	3A
MATH 126	Analytic Trigonometry ¹ (MATH 125 or placement)	1	1B
	Arts/humanities ²	6	3B
	Historical perspectives ³	3	3D
	Social/behavioral sciences ⁴	3	3C
	TOTAL	33	
SOPHOMORE			
AGRI 140	Technology in Agriculture	3	
OR			
CS 110	Personal Computing	4	
HORT 260	Plant Propagation (BZ 120 or concurrent reg. or HORT 100 or concurrent reg. or LIFE 102 or concurrent reg.)	4	
PH 121	General Physics I (MATH 125 or concurrent reg.)	5	3A
PH 122	General Physics II (PH 121)	5	3A
SPCM 200	Public Speaking	3	2A
	Global and cultural awareness ⁵	3	3E
	Electives	4	
	TOTAL	27-28	
JUNIOR			
<i>Select one of the following pairs of courses:</i>			
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
CHEM 246	Fundamentals of Organic Chemistry Laboratory (CHEM 108 or CHEM 112 or CHEM 114; CHEM 245 or concurrent reg.)	1	
OR			
CHEM 345	Organic Chemistry I (CHEM 113; CHEM 114)	4	
CHEM 346	Organic Chemistry II (CHEM 345)	4	
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
SOCR 330	Principles of Genetics (BZ 110 or BZ 120 or LIFE 102)	3	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
	Horticulture electives	8	
	Electives	0-3	
	TOTAL	30	
SENIOR			
BC 351	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346)	4	
<i>Select two credits from the following courses:</i>			
BC 352	Principles of Biochemistry Laboratory (BC 351 or concurrent reg. or BC 401 or concurrent reg.; CHEM 112; CHEM 114)	1	
BZ 441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	

Course	Title (Prerequisite)	Cr	AUCC
SOCR 331	Genetics Laboratory (SOCR 330 or concurrent reg.)	1	
BSPM 302	Applied and General Entomology	2	
BSPM 303B	Horticultural Entomology Laboratory (BSPM 302 or concurrent reg.)	1	
BSPM 361	Elements of Plant Pathology (BZ 104 or BZ 120 or HORT 100 or LIFE 102)	3	
BZ 440	Plant Physiology (BZ 120 or LIFE 103)	3	
HORT 310	Greenhouse Management	4	4B
OR			
HORT 460/ SOCR 460	Plant Breeding (BZ 350 or concurrent reg. or LIFE 201A or concurrent reg. or SOCR 350 or concurrent reg.)	3	4B
HORT 454	Horticulture Crop Production and Management (HORT 310 or HORT 450A-B)	2	4A, 4C
HORT 475	Environmental Requirements of Horticultural Plants (BZ 120 or HORT 100 or LIFE 103)	3	
	Horticulture electives	3	
	Electives ⁶	3-4	
	TOTAL	29-30	
PROGRAM TOTAL = 120 credits			

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).

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 the number of credits to bring the program total to 120 credits.

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 47 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
BZ 120	Principles of Plant Biology	4	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition placement exam or CO 130)	3	1A

<i>Select one pair of courses from the following:</i>			
GEOL 120	Exploring Earth-Physical Geology	3	3A
GEOL 121	Introductory Geology Laboratory (GEOL 120 or concurrent reg. or GEOL 122 or concurrent reg. or GEOL 124 or concurrent registration)	1	3A
OR			
GEOL 121	Introductory Geology Laboratory (GEOL 120 or concurrent reg. or GEOL 122 or concurrent reg. or GEOL 124 or concurrent registration)	1	3A
GEOL 122	The Blue Planet: Geology of Our Environment	3	3A

LAND 110	Introduction to Landscape Architecture	3	
LAND 120	History of the Designed Landscape	3	
MATH 126	Analytic Trigonometry (MATH 125 or placement)	1	1B
PH 110	Descriptive Physics	3	3A
	Global and cultural awareness ¹	3	3E
	Mathematics ²	2	1B
	TOTAL	26	
SOPHOMORE			
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
LAND 220/	Fundamentals of Ecology (3 credits 100-level biology; 3 credits 100-level MATH)	3	
SOCR 220			
LAND 230	Drawing the Landscape	4	
LAND 240	Fundamentals of Landscape Design Process (LAND 230)	4	
LAND 241	Environmental Analysis (LAND 230; concurrent reg. in LAND 240)	3	
PSY 100	General Psychology	3	3C
SPCM 200	Public Speaking	3	2A
	Arts/humanities ³	6	3B
	TOTAL	30	
JUNIOR			
AREC 202	Agricultural and Resource Economics	3	3C
OR			
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C

LAND 360	Basic Landscape Design and Construction (LAND 240)	3	4A
LAND 361	Digital Methods (LAND 360 or concurrent reg.)	3	
LAND 362	Form and Expression in Garden Design (LAND 361)	3	4B
LAND 363	Advanced Landscape Site Engineering (LAND 360)	4	
LAND 444	Ecology of Landscapes (LAND 360; 1 course in biology)	3	
<i>Select one of the following courses:</i>			
LAND 454	Landscape Field Studies (LAND 366)	5	
LAND 455	Travel Abroad-European Landscape Architecture (LAND 362)	5	
NR 220	Natural Resources Ecology and Measurements (BZ 110 and BZ 111 or BZ 120 or LIFE 103; MATH 118)	5	

SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	

Course	Title (Prerequisite)	Cr	AUCC
	Advanced writing ⁴	0-3	2B
	Elective ⁵	0-3	
	TOTAL	31	
SENIOR			
HORT 368/	Landscape Irrigation and Water	3	
LAND 368	Conservation (HORT 100 or LAND 110)		
LAND 364	Design and Nature (LAND 361)	4	
LAND 365	Landscape Contract Drawing and Specifications (LAND 363)	3	
LAND 366	Landscape Design Expression (LAND 365)	4	
PHIL 345	Environmental Ethics (sophomore standing or higher)	3	
	Historical perspectives ⁶	3	3D
	Elective	3	
	TOTAL	23	
FIFTH YEAR			
BZ 223	Plant Identification (BZ 120 or LIFE 103)	3	
OR			
HORT 221	Landscape Plants	4	
LAND 392	Seminar-Designed Landscapes-Theory and Criticism (LAND 365)	2	
LAND 446	Urban Design (LAND 366)	4	
LAND 447	Comprehensive Landscape Design (LAND 446)	4	4C
LAND 449	Professional Practice (LAND 447 or concurrent reg.)	1	4C

NR 319	Geospatial Applications in Natural Resources (junior standing)	4	
OR			
NR 323	Remote Sensing of Natural Resources	3	
	Electives	6	
	TOTAL	23-25	

PROGRAM TOTAL = 133-135 credits

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 1B in the AUCC.

³ Select from the list of courses in category 3B in the AUCC.

⁴ Select from the list of courses in category 2B in the AUCC. This requirement is in place **only** for students whose first enrollment in a college or university is after July 1, 2008. All other students must take 3 credits of electives in the junior year.

⁵ Students enrolled in a college or university prior to July 1, 2008, should take 3 credits of electives instead of advanced writing.

⁶ Select from the list of courses in category 3D in the AUCC.

Major in Landscape Horticulture

Landscape horticulturists are responsible for many tasks necessary to achieve a pleasant and functional outdoor environment. They also design and care for private landscapes and plantings in public facilities, such as golf courses, botanical gardens, and parks. Three concentrations are offered in the landscape horticulture major – landscape design and contracting, nursery and landscape management, and turf management.

Learning Outcomes

Successful students will demonstrate:

- Technical competencies in their understanding of growth and development of horticultural crops and landscapes, including an understanding of plant growth and development as influenced by manipulation of horticulture technologies, such as fertility and water management, integrated pest management, etc., for all aspects of landscape horticulture.

- Management and leadership skills necessary for an entry-level manager or supervisor in the horticulture landscape industry.
- 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

Professional management of landscapes is in high demand due to modern lifestyles. Growth in construction contributes to the growth of design and contracting companies. Nursery and garden center businesses are also strong, and should remain so in the future. The design-build, landscape management, arboriculture, public gardens, and professional turf management industries provide many different career options. Graduates typically receive positions as project managers, growers, propagators, superintendents, salespersons, or start their own business. Participation in internships and cooperative education opportunities is required to enhance practical training and development. Some graduates choose to pursue advanced degrees to open other doors such as positions in research, education, or landscape planning.

Some career examples include: arborist; sports turf manager; botanic garden or arboretum specialist; community forester; custom lawn care specialist; golf course superintendent; landscape designer and contractor; landscape estimator; interior plant maintenance; irrigation designer; landscape maintenance manager; plant diagnostician; retail garden center manager; sod producer; wholesale and retail nursery manager.

Landscape Design and Contracting Concentration

Landscape design and contracting prepares students to be contributing members of the “design-build” profession for residential, commercial, and small-scale public properties. Landscape designers and contractors are often project managers who coordinate with clients and other construction professionals. They also oversee the implementation of landscape projects which may involve grading the property; installing plants, lights, and irrigation systems; building walkways, walls, patios, decks, water features, and other structures. Landscape designers and contractors prepare cost estimates and track costs of labor, equipment, and materials needed to complete a project. Courses in this concentration include design principles, construction methods, the creative use of plant material, and business management. An internship is required to ensure graduates have practical experience. The concentration is accredited through the Professional Landscape Network (Planet).

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
AGRI 140	Technology in Agriculture	3	
OR			
CIS 150	Business Computing Concepts and Applications	3	
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
HORT 100	Horticultural Science (high school biology)	4	3A
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 125	Numerical Trigonometry (MATH 118 or placement)	1	1B
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	6	3B
	Historical perspectives ²	3	3D
	Electives	3	
	TOTAL	32	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
CON 131	Graphic Communications/CAD	2	
CON 261	Construction Surveying (CON 131 or INTD 166; MATH 125 or MATH 160)	3	
HORT 221	Landscape Plants	4	
HORT 231	Landscape Graphics Studio	4	
HORT 232	Principles of Landscape Design (HORT 231)	4	
HORT 487	Internship	3-6	
LAND 120	History of the Designed Landscape	3	
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
	Electives	3	
	TOTAL	33-36	
JUNIOR			
AREC 202	Agricultural and Resource Economics	3	3C
OR			
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
HORT 322	Herbaceous Plants (one course in botany, biological science, or horticulture)	3	
HORT 335	Landscape Structures (CON 131; HORT 232)	4	
HORT 336	Landscape Grading and Drainage Studio (HORT 232; MATH 118)	4	
HORT 368/	Landscape Irrigation and Water	3	
LAND 368	Conservation (HORT 100 or LAND 110)	3	
HORT 465	Landscape Estimating (MATH 117; MATH 118; MATH 124 or MATH 125 or MATH 141 or MATH 155)	3	
	Writing elective ³	3	
OR			
	Spanish ¹	5	
	Electives	6	
	TOTAL	29-31	
SENIOR			
BSPM 302	Applied and General Entomology	2	
BSPM 303B	Horticultural Entomology Laboratory (BSPM 302 or concurrent reg.)	1	
HORT 341	Turfgrass Management (HORT 100 or concurrent reg.)	3	
HORT 431	Planting Design Studio (HORT 221; HORT 231; HORT 232; HORT 322)	4	4A
HORT 432	Intensive Landscape Design Studio (HORT 336; HORT 431)	5	4B, 4C
HORT 464	Arboriculture and Urban Plant Management (HORT 100; SOCR 240)	3	
	Global and cultural awareness ⁵	3	3E
	Business electives	3	
	Electives	6	
	TOTAL	30	
PROGRAM TOTAL = 124-129 credits			

¹Select 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 one course with CO or JTC prefix or another writing course.

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. Nursery and landscape managers 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
AREC 202	Agricultural and Resource Economics	3	3C
BZ 120	Principles of Plant Biology	4	3A
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
HORT 100	Horticultural Science (high school biology)	4	3A
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
	Electives	6	
	TOTAL	28	
SOPHOMORE			
BZ 223	Plant Identification (BZ 120 or LIFE 103)	3	
HORT 221	Landscape Plants	4	
HORT 260	Plant Propagation (BZ 120 or concurrent reg. or HORT 100 or concurrent reg. or LIFE 103 or concurrent reg.)	4	
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	6	3B
	Global and cultural awareness ²	3	3E
	Historical perspectives ³	3	3D
	TOTAL	30	

JUNIOR

Course	Title (Prerequisite)	Cr	AUCC
<i>Select three credits from the following:</i>			
AGRI 140	Technology in Agriculture	3	
AGRI 320A	Computer Applications in Agriculture-Optimization (AGRI 140 or CIS 150 or CS 110)	1	
AGRI 320B	Computer Applications in Agriculture-Data Base (AGRI 140 or CIS 150 or CS 110)	1	
AGRI 320C	Computer Applications in Agriculture-Communications (AGRI 140 or CIS 150 or CS 110)	1	
AGRI 320D	Computer Applications in Agriculture-Project Management (AGRI 140 or CIS 150 or CS 110)	1	

Course	Title (Prerequisite)	Cr	AUCC
AGRI 320E	Computer Applications in Agriculture-Spreadsheets (AGRI 140 or CIS 150 or CS 110)	1	
AGRI 320F	Computer Applications in Agriculture-Presentation Technology (AGRI 140 or CIS 150 or CS 110)	1	
BSPM 302	Applied and General Entomology	2	
BSPM 303B	Horticultural Entomology Laboratory (BSPM 302 or concurrent reg.)	1	
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
HORT 310	Greenhouse Management	4	4B
HORT 321	Nursery Production and Management (BZ 120 or HORT 100 or LIFE 103)	4	4A
HORT 322	Herbaceous Plants (one course in botany, biological science, or horticulture)	3	
HORT 331	Landscape Design	2	
HORT 341	Turfgrass Management (HORT 100 or concurrent reg.)	3	
HORT 487	Internship ⁴	3	
	TOTAL	29	
SENIOR			
AREC 328	Small Agribusiness Management (AREC 202 or ECON 202)	3	
BSPM 308	Ecology and Management of Weeds (BZ 120 or LIFE 103; CHEM 107 or CHEM 111)	4	
BSPM 361	Elements of Plant Pathology (BZ 104 or BZ 120 or HORT 100 or LIFE 102)	3	
BZ 440	Plant Physiology (BZ 120 or LIFE 103)	3	
HORT 464	Arboriculture (HORT 100; SOCR 240)	3	4C
HORT 465	Landscape Estimating (MATH 117; MATH 118; MATH 124 or MATH 125 or MATH 141 or MATH 155)	3	
	Electives	14	
	TOTAL	33	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 3B in the AUCC.

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.

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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
AREC 202	Agricultural and Resource Economics	3	3C
BZ 120	Principles of Plant Biology	4	3A
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
HORT 100	Horticultural Science	4	3A
MATH 117	College Algebra in Context I (math placement exam)	1	1B

Course	Title (Prerequisite)	Cr	AUCC
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 125	Numerical Trigonometry (MATH 118 or placement)	1	1B
	Global and cultural awareness ¹	3	3E
	Elective	4	
	TOTAL	29	
SOPHOMORE			
<i>Select one of the following courses:</i>			
AGRI 140	Technology in Agriculture	3	
CIS 150	Business Computing Concepts and Applications	3	
CS 110	Personal Computing	4	
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
HORT 221	Landscape Plants	4	
HORT 487	Internship	3	
SOCR 240	Introductory Soil Sciences (CHEM 107 or CHEM 111)	4	
SPCM 200	Public Speaking	3	2A
	Arts/humanities ²	6	3B
	TOTAL	27-28	
JUNIOR			
BSPM 361	Elements of Plant Pathology (BZ 104 or BZ 120 or HORT 100 or LIFE 102)	3	
BZ 440	Plant Physiology (BZ 120 or LIFE 103)	3	
HORT 321	Nursery Production and Management (BZ 120 or HORT 100 or LIFE 103)	4	4A
HORT 341	Turfgrass Management (HORT 100 or concurrent reg.)	3	
HORT 464	Arboriculture (HORT 100; SOCR 240)	3	
SOCR 350	Soil Fertility Management (SOCR 240)	3	
	Historical perspectives ³	3	3D
	Electives	11	
	TOTAL	33	
SENIOR			
BSPM 302	Applied and General Entomology	2	
BSPM 303B	Horticultural Entomology Laboratory (BSPM 302 or concurrent reg.)	1	
BSPM 308	Ecology and Management of Weeds (BZ 120 or LIFE 103; CHEM 107 or CHEM 111)	4	4B
HORT 368/	Landscape Irrigation and Water	3	
LAND 368	Conservation (HORT 100 or LAND 110)	3	
HORT 441	Turfgrass Science (BZ 120 or HORT 100 or SOCR 240)	3	4C
HORT 465	Landscape Estimating (MATH 117; MATH 118; MATH 124 or MATH 125 or MATH 141 or MATH 155)	3	
MGT 305	Fundamentals of Management	3	
	Electives ⁴	11-12	
	TOTAL	30-31	
PROGRAM TOTAL = 120 credits			

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.

³ Select from list of courses in category 3D in the AUCC.

⁴ Select enough elective credits to bring the total to 120.

Minor Programs

A horticulture or landscape 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 landscape 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 (Prerequisite)	Cr	AUCC
LOWER DIVISION			
HORT 100	Horticultural Science	4	3A
HORT 260	Plant Propagation (BZ 120 or concurrent reg. or HORT 100 or concurrent reg. or LIFE 103 or concurrent reg.)	4	
	TOTAL	8	
UPPER DIVISION			
HORT 310	Greenhouse Management	4	
<i>Select two courses from the following for a minimum of seven credits:</i>			
HORT 322	Herbaceous Plants	3	
HORT 401	Medicinal and Value-Added Uses of Plants (BZ 120 or HORT 100 or LIFE 130)	3	
HORT 412	Floriculture Crops	4	
HORT 450A-D	Horticulture Food Crops (BZ 120 or HORT 100 or LIFE 103 or SOCR 240)	1-4	
HORT 460/	Plant Breeding (BZ 350 or concurrent reg. or LIFE 201A or concurrent reg. or SOCR 350 or concurrent reg.)	3	
SOCR 460*			
HORT 475	Environmental Requirements of Horticultural Plants (BZ 120 or HORT 100 or LIFE 103)	3	
HORT 454	Horticulture Crop Production and Management (HORT 310 or HORT 450A-B)	2	
	TOTAL	13	
PROGRAM TOTAL = 21 credits without prerequisites			

*Additional course work may be required because of prerequisites.

Minor in Landscape Horticulture

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
HORT 100	Horticultural Science	4	3A
HORT 221	Landscape Plants	4	
	TOTAL	8	
UPPER DIVISION			
HORT 341	Turfgrass Management (HORT 100 or concurrent reg.)	3	
HORT 464*	Arboriculture (HORT 100; SOCR 240)	3	
<i>Select a minimum of seven credits (six must be upper division) from the following:</i>			
HORT 260	Plant Propagation (BZ 120 or concurrent reg. or HORT 100 or concurrent reg. or LIFE 103 or concurrent reg.)	4	
HORT 321	Nursery Production and Management (BZ 120 or HORT 100 or LIFE 103)	4	
HORT 322	Herbaceous Plants	3	
HORT 331	Landscape Design	2	
HORT 441	Turfgrass Science (BZ 120 or HORT 100 or SOCR 240)	3	
LAND 120	History of the Designed Landscape	3	
	TOTAL	13	
PROGRAM TOTAL = 21 credits without 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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, and the department's web site, <http://hla.colostate.edu>.

DEPARTMENT OF SOIL AND CROP SCIENCES

Office in Plant Science Building, C127
(970) 491-6517
<http://www.soilcrop.colostate.edu>

Professor Gary A. Peterson, 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. Six concentrations allow for specialization in the major – agronomic production management; applied information technology; environmental soil science; international soil and crops; plant biotechnology, genetics, and breeding; 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
AREC 202	Agricultural and Resource Economics	3	3C
OR			
AREC or ECON elective ¹		3	3C
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
PH 110	Descriptive Physics	3	3A
SOCR 100	General Crops	4	
	Arts/humanities ²	3	3B
	Biology electives ³	4	
	TOTAL	27	
SOPHOMORE			
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
CHEM 246	Fundamentals of Organic Chemistry Laboratory (CHEM 108 or CHEM 112 or CHEM 114; CHEM 245 or concurrent reg.)	1	
FSHN 125	Food and Nutrition in Health	2	
OR			
FSHN 150	Survey of Human Nutrition	3	
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
SPCM 200	Public Speaking	3	2A
	Arts/humanities ²	3	3B
	Global and cultural awareness ⁴	3	3E
	Biology elective ³	3	
	Electives	7-8	
	TOTAL	31	
JUNIOR			
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
SOCR 330	Principles of Genetics (BZ 110 or BZ 120 or LIFE 102)	3	
	Historical perspectives ⁵	3	3D
	Soil and crop science electives ⁶	6	
	Statistics ⁷	3	

Course	Title (Prerequisite)	Cr	AUCC	Course	Title (Prerequisite)	Cr	AUCC
	Technical electives ⁸	6		CHEM 113	General Chemistry II (CHEM 107 or CHEM 111; MATH 124)	3	
	Electives	6		CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
	TOTAL	30		CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
SENIOR				-----			
	<i>Select one of the following pairs of courses:</i>						
BZ 440	Plant Physiology (BZ 120 or LIFE 103)	3		FSHN 125	Food and Nutrition in Health	2	
BZ 441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2			OR		
	OR			FSHN 150	Survey of Human Nutrition	3	
GEOL 120	Exploring Earth-Physical Geology	3	3A	MATH 117	College Algebra in Context I (math placement exam)	1	1B
GEOL 121	Introductory Geology Laboratory (GEOL 120 or concurrent reg. or GEOL 122 or concurrent reg. or GEOL 124 or concurrent reg.)	1	3A	MATH 118	College Algebra in Context II (MATH 117)	1	1B
	<i>Select four credits from the following:</i>			MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
SOCR 421	Crop and Soil Management Systems II (HORT 100 or SOCR 100; SOCR 240)	4	4A, 4B, 4C	SOCR 100	General Crops	4	
	OR				Historical perspectives ¹	3	3D
SOCR 478	Environmental Soil Sciences (SOCR 467 or concurrent reg.; SOCR 470)	3	4A, 4B, 4C		TOTAL	28-33	
SOCR 479	Environmental Soil Science Laboratory (SOCR 478 or concurrent reg.)	1	4A, 4B, 4C	SOPHOMORE			
SOCR 492	Seminar	1	4A	ACT 205	Fundamentals of Accounting	3	
	Soil and crop science electives ⁶	5			OR		
	Technical electives ⁸	12		AREC 205	Farm and Ranch Management (AREC 202 or ECON 202)	3	
	Electives	3-4		LAND 220/ SOCR 220	Fundamentals of Ecology (3 credits 100-level biology or HORT 100; 3 credits 100-level MATH)	3	
	TOTAL	30		PH 110	Descriptive Physics	3	3A
PROGRAM TOTAL = 120 credits				SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	

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 3B in the AUCC.

³ Select from the list of courses in category 3A after consultation with adviser.

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 course(s) with the SOCR subject code.

⁷ Select a course with the STAT subject code.

⁸ Select from the Colleges of Agricultural Sciences, Business, Engineering, Natural Resources, Natural Sciences, and/or Veterinary Medicine and Biomedical Sciences.

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 (Prerequisite)	Cr	AUCC	Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN							
AGRI 192	Orientation to Agricultural Systems	1			Electives	1-2	
AREC 202	Agricultural and Resource Economics	3	3C		TOTAL	30-31	
BZ 120	Principles of Plant Biology	4	3A	-----			
	<i>Select one of the following sets of courses:</i>			SENIOR			
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A		<i>Select three courses from the following:</i>		
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A		AND		
	OR			BSPM 302	Applied and General Entomology	2	
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A	BSPM 303C	Agricultural Entomology Laboratory (BSPM 302 or concurrent reg.)	1	
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A	BSPM 308	Ecology and Management of Weeds (BZ 120 or LIFE 103; CHEM 107 or CHEM 111)	4	
				BSPM 361	Elements of Plant Pathology (BZ 104 or BZ 120 or HORT 100 or LIFE 102)	3	
				BZ 223	Plant Identification ⁵ (BZ 120 or LIFE 103)	3	

College of Agricultural Sciences

Course	Title (Prerequisite)	Cr	AUCC
<i>Select three credits from the following:</i>			
SOCR 200	Seed Anatomy and Identification ⁵ (BZ 104 or BZ 110 or BZ 120 or HORT 100 or LIFE 102 or SOCR 100)	1	
SOCR 201	Seed Development and Metabolism (BZ 104 or BZ 110 or BZ 120 or HORT 100 or LIFE 102 or SOCR 100)	1	
SOCR 310	Agronomic Plant and Seed Identification (BZ 104 or BZ 110 or BZ 120 or HORT 100 or LIFE 102 or SOCR 100)	2	
SOCR 446	Physiology of Seeds ⁵ (BZ 440)	2	
<i>Select three courses from the following:</i>			
SOCR 304	Seed Production, Conditioning and Marketing ⁵ (SOCR 100)	3	
SOCR 320/RS 320	Forage and Range Management	3	
SOCR 322	Principles of Microclimatology (3 credits of PH)	3	
SOCR 377/CIVE 377	Geographic Information Systems in Agriculture (3 credits in CS or SOCR)	3	
SOCR 414	Agricultural Experimental Design (STAT 201 or STAT 301)	3	
SOCR 440	Pedology	4	
SOCR 460/HORT 460	Plant Breeding ⁵ (BZ 350 or concurrent reg. or LIFE 201A or concurrent reg. or SOCR 350 or concurrent reg.)	3	
SOCR 421	Crop and Soil Management Systems II (HORT 100 or SOCR 100; SOCR 240)	4	4A,4B, 4C
SOCR 492	Seminar	1	4A
	Electives	2-4	
	TOTAL	30	

PROGRAM TOTAL = 120-124 credits

¹ Select from the list of courses in category 3D in the All-University Core Curriculum (AUCC).
² Select from courses in agricultural economics, business, or economics.
³ Select from the list of courses in category 3B in the AUCC.
⁴ Select from the list of courses in category 3E in the AUCC.
⁵ Required for students in the seed science option.

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
BZ 120	Principles of Plant Biology	4	
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A
CIS 120	Business Programming Fundamentals	3	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 117	College Algebra in Context I (math placement exam)	1	1B

Course	Title (Prerequisite)	Cr	AUCC
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
PH 110	Descriptive Physics	3	3A
SOCR 100	General Crops	4	
SOCR 177	Applied Information Technology in Agriculture	1	
	Arts/humanities ¹	3	3B
	TOTAL	30	
SOPHOMORE			
AREC 202	Agricultural and Resource Economics	3	3C
CIS 240	Application Design and Development (CIS 210)	3	
MATH 141	Calculus in Management Sciences (MATH 118)	3	
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	3	3B
	Global and cultural awareness ²	3	3E
	Historical perspectives ³	3	3D
	Electives	4	
	TOTAL	29	
JUNIOR			
BIO 320	Ecology (BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 103; MATH 141 or MATH 155 or MATH 160)	3	
OR			
LAND 220/SOCR 220	Fundamentals of Ecology (3 credits 100-level biology or HORT 100; 3 credits 100-level MATH)	3	
CIS 320	Project Management for Information Systems (CIS 120 or CIS 210)	3	
CIS 355	Business Database Systems (CIS 120 and CIS 210)	3	
OR			
STAT 372	Data Analysis and Database Management Tools (STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	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	Remote Sensing of Natural Resources	3	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
OR			
STAT 307/ERHS 307	Introduction to Biostatistics (MATH 117)	3	
	SOCR electives ⁴	3	
	Electives ⁴	5-6	
	TOTAL	30	
SENIOR			
AREC 478	Agricultural Policy (AREC 202 or ECON 202 or AREC 240/ECON 240)	3	
NR 423	Applications of Global Positioning Systems (NR 322 or NR 505)	1	
SOCR 377/CIVE 377	Geographic Information Systems in Agriculture (3 credits CS or SOCR)	3	4A, 4B, 4C
SOCR 487	Internship	6	4A
SOCR 492	Seminar	1	4A, 4C
	SOCR electives ⁴	9	
	Electives ⁴	8	
	TOTAL	31	

PROGRAM TOTAL = 120 credits

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 3E in the AUCC.
³ Select from the list of courses in category 3D in the AUCC.
⁴ Of the 12 SOCR elective credits and 13-14 general elective credits, 12 must be upper division (300- and 400-level).

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.

MATH 117, MATH 118, M CC 120A-B, and M CC 121 are considered review courses; credits in these courses may not be used toward a degree in the environmental soil science concentration in the major in soil and crop sciences.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	1	
AREC 240/ ECON 240	Issues in Environmental Economics	3	
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
FSHN 125	Food and Nutrition in Health	2	
OR			
FSHN 150	Survey of Human Nutrition	3	
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
MATH 141	Calculus in Management Sciences (MATH 118)	3	1B
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
	Arts/humanities ¹	3	3B
	TOTAL	32-33	
SOPHOMORE			
GEOL 120	Exploring Earth-Physical Geology	3	3A
GEOL 121	Introductory Geology Laboratory (GEOL 120 or concurrent reg. or GEOL 122 or concurrent reg. or GEOL 124 or concurrent reg.)	1	3A
LAND 220/ SOCR 220	Fundamentals of Ecology (3 credits 100-level biology or HORT 100; 3 credits 100-level MATH)	3	
MATH 125	Numerical Trigonometry (MATH 118 or placement)	1	1B
PH 121	General Physics I (MATH 125 or concurrent reg.)	5	3A
PH 122	General Physics II (PH 121)	5	3A
SOCR 350	Soil Fertility Management (SOCR 240)	3	
SOCR 351	Soil Fertility Laboratory (SOCR 350 or concurrent reg.)	1	
SPCM 200	Public Speaking	3	2A
<i>Select one course from the following:</i>			
STAT 201	General Statistics (placement in MATH 130 or higher)	3	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
STAT 307/ ERHS 307	Introduction to Biostatistics (MATH 117)	3	
	Global and cultural awareness ²	3	3E
	TOTAL	31	
JUNIOR			
<i>Select one of the following sets of courses:</i>			

Course	Title (Prerequisite)	Cr	AUCC
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
CHEM 246	Fundamentals of Organic Chemistry Laboratory (CHEM 108 or CHEM 112 or CHEM 114; CHEM 245 or concurrent reg.)	1	
OR			
CHEM 345	Organic Chemistry I (CHEM 113; CHEM 114)	4	
CHEM 346	Organic Chemistry II (CHEM 345)	4	
CHEM 331	Quantitative Analysis-Biological Sciences (CHEM 113)	3	
CHEM 334	Quantitative Analysis Laboratory-Biological (CHEM 114; CHEM 331 or concurrent reg.)	1	
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
MIP 300	General Microbiology (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or concurrent reg. or CHEM 341 or concurrent reg. or CHEM 345 or concurrent reg.)	3	
SOCR 440	Pedology	4	
SOCR 467	Soil Chemistry (CHEM 331)	3	
	Historical perspectives ³	3	3D
	Social/behavioral sciences ⁴	3	3C
	Technical electives ⁵	4	
	TOTAL	32-35	
SENIOR			
BC 351	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346)	4	
OR			
BZ 440	Plant Physiology (BZ 120 or LIFE 103)	3	
SOCR 455	Soil Microbiology (MIP 300 or SOCR 240)	3	
SOCR 456	Soil Microbiology Laboratory (SOCR 455 or concurrent reg.)	1	
SOCR 470	Soil Physics (SOCR 240)	3	
SOCR 471	Soil Physics Laboratory (SOCR 470 or concurrent reg.)	1	
SOCR 478	Environmental Soil Sciences (SOCR 467 or concurrent reg.; SOCR 470)	3	4A,4B,4C
SOCR 479	Environmental Soil Science Laboratory (SOCR 478 or concurrent reg.)	1	4A,4B,4C
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

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 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.

College of Agricultural Sciences

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	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	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A
OR			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
FSHN 125	Food and Nutrition in Health	2	
OR			
FSHN 150	Survey of Human Nutrition	3	
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
SOCR 100	General Crops Arts/humanities ¹	4	
	TOTAL	3	3B
		28-33	
SOPHOMORE			
AGRI 270/IE 270	World Interdependence-Population and Food	3	3E
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
CHEM 246	Fundamentals of Organic Chemistry Laboratory (CHEM 108 or CHEM 112 or CHEM 114; CHEM 245 or concurrent reg.)	1	
LAND 220/SOCR 220	Fundamentals of Ecology (3 credits 100-level biology; 3 credits 100-level MATH)	3	
PH 110	Descriptive Physics	3	3A
POLS 131	Current World Problems	3	3E
SOC 100	General Sociology	3	3C
OR			
SOC 105	Social Problems	3	3C
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
SPCM 200	Public Speaking Arts/humanities ¹	3	2A
	Historical perspectives ²	3	3B
	TOTAL	3	3D
		33	
JUNIOR			
BZ 440	Plant Physiology (BZ 120 or LIFE 103)	3	
BZ 441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
POLS 332/ECON 332	International Political Economy (AREC 202 or ECON 202; POLS 232)	3	
<i>Select one of the following courses:</i>			
SOC 341	Sociology of Rural Life (SOC 100 or SOC 105)	3	
SOC 364	Agriculture and Global Society (SOC 100 or SOC 105)	3	
SOC 366	Peoples and Institutions of Latin America (SOC 100 or SOC 105)	3	
SOCR 330	Principles of Genetics (BZ 110 or BZ 120 or LIFE 102)	3	
SOCR 350	Soil Fertility Management (SOCR 240)	3	
SOCR 351	Soil Fertility Laboratory (SOCR 350 or concurrent reg.)	1	
SOCR 420	Crop and Soil Management Systems I (HORT 100 or SOCR 100; SOCR 240)	3	
<i>Select one course from the following:</i>			

Course	Title (Prerequisite)	Cr	AUCC
STAT 201	General Statistics (placement in MATH 130 or higher)	3	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
STAT 307/ERHS 307	Introduction to Biostatistics (MATH 117)	3	
TOTAL		27	
SENIOR			
AREC 460	Economics of World Agriculture (AREC 202 or ECON 202)	3	
<i>Select two courses from the following:</i>			
BSPM 302	Applied and General Entomology	2	
AND			
BSPM 303C	Agricultural Entomology Laboratory (BSPM 302 or concurrent reg.)	1	
BSPM 308	Ecology and Management of Weeds (BZ 120 or LIFE 103; CHEM 107 or CHEM 111)	4	
BSPM 361	Elements of Plant Pathology (BZ 104 or BZ 120 or HORT 100 or LIFE 102)	3	
<i>Select two courses from the following:</i>			
SOCR 304	Seed Production, Conditioning and Marketing (SOCR 100)	3	
SOCR 320/RS 320	Forage and Range Management	3	
SOCR 322	Principles of Microclimatology (3 credits PH)	3	
SOCR 377/CIVE 377	Geographic Information Systems in Agriculture (3 credits CS or SOCR)	3	
SOCR 440	Pedology	4	
SOCR 460/HORT 460	Plant Breeding (BZ 350 or concurrent reg. or LIFE 201A or concurrent reg. or SOCR 350 or concurrent reg.)	3	
SOCR 370	Irrigation Principles and Management (HORT 100 or SOCR 100; SOCR 240)	3	
SOCR 421	Crop and Soil Management Systems II (HORT 100 or SOCR 100; SOCR 240)	4	4A, 4B, 4C
SOCR 475	Tropical Soils, Crops, and Farming Systems	3	
SOCR 492	Seminar Electives	1	4A
TOTAL		1-6	
TOTAL		29-32	
PROGRAM TOTAL = 120-122 credits			

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.

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.

This concentration requires an extensive understanding of science and math.

MATH 117, MATH 118, M CC 120A-B, and M CC 121 are considered review courses; credits in these courses may not be used toward a degree in the plant biotechnology, genetics, and breeding concentration in the major in soil and crop sciences. An introductory computer course, such as AGRI 140, is considered a review course; previous background in computers is expected. If a computer course is needed, AGRI 140 must be taken as a free elective.

Course	Title (Prerequisite)	Cr	AUCC	Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN				HORT 450A	Horticulture Food Crops-Cool Season Vegetable Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
AGRI 192	Orientation to Agricultural Systems	1		HORT 450B	Horticulture Food Crops-Warm Season Vegetable Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or higher)	4	3A	HORT 450C	Horticulture Food Crops-Small Fruit Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A	HORT 450D	Horticulture Food Crops-Tree Fruit Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3		HORT 452	Viticulture I-Grape Production (BZ 120 or HORT 100 or LIFE 103 or SOCR 100)	1	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1		HORT 454	Horticulture Crop Production and Management (HORT 310 or HORT 450A-B)	2	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A	MIP 300	General Microbiology (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or concurrent reg. or CHEM 341 or concurrent reg. or CHEM 345 or concurrent reg.)	3	
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A	MIP 450	Microbial Genetics (BC 351 or concurrent reg. or BC 401 or concurrent reg.; MIP 300)	3	
LIFE 103	Biology of Organisms-Animals and Plants (LIFE 102)	4		SOCR 414	Agricultural Experimental Design (STAT 201 or STAT 301)	3	
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B	----- <i>Select two courses from the following:</i>			
MATH 125	Numerical Trigonometry (MATH 118 or placement)	1	1B	BSPM 302	Applied and General Entomology	2	
MATH 126	Analytic Trigonometry (MATH 125 or placement)	1	1B	AND			
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B	BSPM 303C	Agricultural Entomology Laboratory (BSPM 302 or concurrent reg.)	1	
SOCR 100	General Crops	4		BSPM 308	Ecology and Management of Weeds (BZ 120 or LIFE 103; CHEM 107 or CHEM 111)	4	
	TOTAL	32		BSPM 361	Elements of Plant Pathology (BZ 104 or BZ 120 or HORT 100 or LIFE 102)	3	
SOPHOMORE				BZ 440	Plant Physiology (BZ 120 or LIFE 103)	3	
AGRI 116/IE 116	Plants and Civilization	3	3E	BZ 441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
OR				JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
AGRI 270/IE 270	World Interdependence-Population and Food	3	3E	SOCR 330	Principles of Genetics (BZ 110 or BZ 120 or LIFE 102)	3	
AREC 202	Agricultural and Resource Economics	3	3C	STAT 301	Introduction to Statistical Methods (MATH 117)	3	
BIO 310	Cell Biology (BZ 110 or BZ 120 or LIFE 103; CHEM 245 with a C or better or CHEM 345 with a C or better)	4		OR			
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4		STAT 307/ERHS 307	Introduction to Biostatistics (MATH 117)	3	
CHEM 246	Fundamentals of Organic Chemistry Laboratory (CHEM 108 or CHEM 112 or CHEM 114; CHEM 245 or concurrent reg.)	1		-----			
FSHN 125	Food and Nutrition in Health	2		SENIOR			
OR				SOCR 430	Applications of Plant Biotechnology (SOCR 330)	3	4A, 4B, 4C
FSHN 150	Survey of Human Nutrition	3		OR			
PH 110	Descriptive Physics	3	3A	SOCR 460/HORT 460	Plant Breeding (BZ 350 or concurrent reg. or LIFE 201A or concurrent reg. or SOCR 350 or concurrent reg.)	3	4A, 4B, 4C
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4		SOCR 486	Practicum (written consent of instructor)	1	4C
SPCM 200	Public Speaking	3	2A	SOCR 492	Seminar	1	4A
	Arts/humanities ¹	3	3B		Arts/humanities ¹	3	3B
	Historical perspectives ²	3	3D		Soil and crop electives	8	
	TOTAL	33-34			Electives	7-9	
JUNIOR					TOTAL	23-25	
BC 351	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346)	4		PROGRAM TOTAL = 120 credits			
----- <i>Select six credits from the following courses:</i>				¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC)			
BC 352	Principles of Biochemistry Laboratory (BC 351 or concurrent reg. or BC 401 or concurrent reg.; CHEM 112; CHEM 113)	1		² Select from the list of courses in category 3D in the AUCC.			
BC 463	Molecular Genetics (BC 401 or concurrent reg. or BC 351; LIFE 201B)	3		Soil Resources and Conservation Concentration			
BZ 331	Developmental Plant Anatomy (BZ 120 or LIFE 103; BZ 350 or concurrent reg.; CHEM 245 or CHEM 346)	4		Soil resources 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			
BZ 346	Population and Evolutionary Genetics (BZ 220; MATH 155; STAT 301 or STAT 307/ERHS 307)	3					
BZ 402	Molecular Cytogenetics (BIO 310 or concurrent reg. or LIFE 210 or concurrent reg.; BZ 350 or concurrent reg. or LIFE 201A or concurrent reg. or LIFE 201B or concurrent reg. or SOCR 330 or concurrent reg.)	4					
BZ 476	Topics in Advanced Genetics (BZ 350 or LIFE 201A or LIFE 201B or SOCR 330)	3					

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
AGRI 192	Orientation to Agricultural Systems	2	
AREC 202	Agricultural and Resource Economics	3	3C
BZ 120	Principles of Plant Biology	4	3A
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECON 204	Principles of Macroeconomics (AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
MIP 149	The Microbial World	3	
OR			
MIP 300	General Microbiology (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or concurrent reg. or CHEM 341 or concurrent reg. or CHEM 345 or concurrent reg.)	3	
SOCR 100	General Crops	4	
	TOTAL	33	
SOPHOMORE			
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
GEOL 120	Exploring Earth: Physical Geology	3	3A
GEOL 121	Introductory Geology Laboratory (GEOL 120 or concurrent reg. or GEOL 122 or concurrent reg. or GEOL 124 or concurrent reg.)	1	3A
PH 110	Descriptive Physics	3	3A
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	6	3B
	Global and cultural awareness ²	3	3E
	Historical perspectives ³	3	3D
	TOTAL	30	
JUNIOR			
FSHN 125	Food and Nutrition in Health	2	
OR			
FSHN 150	Survey of Human Nutrition	3	
SOCR 320/RS 320	Forage and Range Management	3	
SOCR 330	Principles of Genetics (BZ 110 or BZ 120 or LIFE 102)	3	
SOCR 350	Soil Fertility Management (SOCR 240)	3	
SOCR 351	Soil Fertility Laboratory (SOCR 350 or concurrent reg.)	1	
SOCR 370	Irrigation Principles and Management (HORT 100 or SOCR 100; SOCR 240)	3	
SOCR 420	Crop and Soil Management Systems I (HORT 100 or SOCR 100; SOCR 240)	3	
SOCR 440	Pedology	4	
<i>Select one of the following courses:</i>			

Course	Title (Prerequisite)	Cr	AUCC
STAT 201	General Statistics (placement in MATH 130 or higher)	3	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
STAT 307/ERHS 307	Introduction to Biostatistics (MATH 117)	3	
TOTAL		25-26	
SENIOR			
BZ 440	Plant Physiology (BZ 120 or LIFE 103)	3	
BZ 441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
GEOL 454	Geomorphology (GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or GR 210; MATH 155 or MATH 160)	4	
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
SOCR 421	Crop and Soil Management Systems II (HORT 100 or SOCR 100; SOCR 240)	4	4A, 4B, 4C
SOCR 470	Soil Physics (SOCR 240)	3	
SOCR 492	Seminar Electives	1	4A
	TOTAL	11-12	
	TOTAL	31-32	
PROGRAM TOTAL = 120 credits			

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 3E in the AUCC.

³ Select from the list of courses in category 3D in the AUCC.

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 (Prerequisite)	Cr	AUCC
LOWER DIVISION			
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
UPPER DIVISION			
BZ 440*	Plant Physiology (BZCC 120 or LIFE 103)	3	
GEOL 454*	Geomorphology (GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or GR 210; MATH 155 or MATH 160)	4	
<i>Select one course from the following:</i>			
SOCR 320/RS 320	Forage and Range Management	3	
SOCR 370*	Irrigation Principles and Management (HORT 100 or SOCR 100; SOCR 240)	3	
SOCR 420*	Crop and Soil Management Systems I (HORT 100 or SOCR 100; SOCR 240)	3	
SOCR 455	Soil Microbiology (MIP 300 or SOCR 240)	3	
SOCR 350	Soil Fertility Management (SOCR 240)	3	
SOCR 351	Soil Fertility Laboratory (SOCR 350 or concurrent reg.)	1	
SOCR 421*	Crop and Soil Management Systems II (HORT 100 or SOCR 100; SOCR 240)	4	
SOCR 440	Pedology	4	
SOCR 442	Forest and Range Soils (SOCR 240)	3	
SOCR 467*	Soil Chemistry (CHEM 331)	3	
OR			
SOCR 470	Soil Physics (SOCR 240)	3	
AND			
SOCR 471	Soil Physics Laboratory (SOCR 470 or concurrent reg.)	1	
	TOTAL	28-29	
PROGRAM TOTAL = 32-33 credits without prerequisites			

*Additional course work may be required because of prerequisites.

Graduate Programs in Soil and Crop Sciences

Graduate and Professional Bulletin, <http://graduateschool.colostate.edu/index.asp?url=catalog>, and the department's website, <http://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

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College of Applied Human Sciences

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Professor April Mason, Dean
Professor Dale DeVoe, Associate Dean for Academic Programs
Professor Jean Lehman, Associate Dean for Research

TEACHER LICENSURE

UNDERGRADUATE MAJORS

Apparel and Merchandising
Construction Management
Family and Consumer Sciences
Health and Exercise Science
Human Development and Family Studies
Interior Design
Nutrition and Food Science
Restaurant and Resort Management
Social Work

UNDERGRADUATE MINORS

Construction Management
Merchandising
Nutrition

UNDERGRADUATE PROGRAMS

The College of Applied Human Sciences is comprised of 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 School of Education offers undergraduate and post-bachelor teacher education preparation programs in 20 areas of endorsement. The School also coordinates an

interdepartmental major in family and consumer sciences. 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 <http://www.cahs.colostate.edu>.

The College of Applied Human Sciences is the only unit of higher education in Colorado offering a degree and teacher licensure in family and consumer sciences. Undergraduate students may complete either the family and consumer sciences concentration or the family and consumer sciences education concentration. Both programs take course work from the Departments of Design and Merchandising, Food Science and Human Nutrition, and Human Development and Family Studies. Those students seeking licensure will also take courses from the School of Education.

A student who wishes to pursue a career in a *design-related* field may choose either the concentration in apparel design and production or the major in interior design.

For students wishing to pursue a degree in a *human services* field, the college has majors, concentrations, or options in dietetics, human development and family studies, nutritional sciences, nutrition and fitness, social work, sports medicine, and health promotion.

Students who wish to incorporate a strong background in *natural sciences and/or technology* with professional preparation should consider programs in dietetics, food science, nutritional sciences, or sports medicine.

For students interested in *management-related* careers, the College offers programs in apparel design and production, construction management, merchandising, restaurant and resort management, and health promotion.

Open Option Program

Students who wish to explore the wide variety of choices available to them may enroll in the Applied Human Sciences Open Option program. Students will be encouraged to take electives that will help them explore the disciplines they are most interested in as possible career choices. At the same time, they will take courses common to one of the themes described earlier: design, family and consumer sciences, human services, management, or natural sciences and technology. Consult with the Center for Advising and Student Achievement (CASA) in Aylesworth Hall and visit their web site at <http://www.CASA.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 <http://www.international.colostate.edu>.

INTERDEPARTMENTAL MAJOR

Major in Family and Consumer Sciences

*Office in Education Building, Room 203 or Room 227
(970) 491-5319 or 491-5141
<http://www.caahs.colostate.edu/cfs/>*

Dawn Mallette and Carole Makela

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 consumer and family studies.
- And value professional involvement
- Problem solving and communication skills
- 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 placement rate for graduates is very high, especially in the education concentration. Students are often recruited to fill positions before they finish student teaching. The Colorado and national demand for family and consumer sciences teachers exceeds the supply.

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
AM 130	Design Appreciation-Apparel and Merchandising	3	
OR			
ART 101	Visual Form	3	
<i>Select one pair of courses from the following:</i>			
CHEM 103	Chemistry in Context	3	3A
CHEM 104	Chemistry in Context Laboratory (CHEM 103 or concurrent reg.)	1	3A
OR			
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	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	Attributes of Living Systems (high school chemistry)	4	3A
CIS 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	2A
	Arts/humanities ²	6	3B
	Economics ³	3	
	Elective	3	
	TOTAL	30-32	

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
AHS 300	Research in Applied Professions	3	
DM 320	Finance-Personal and Family	3	
FSHN 300	Food Principles and Applications (CHEM 103 or CHEM 107 or CHEM 111; FSHN 150)	3	
FSHN 301	Food Principles and Applications Laboratory (FSHN 300 or concurrent reg.)	2	
<i>Select one course from the following:</i>			
HDFS 310	Infant and Child Development in Context (HDFS 101)	3	
HDFS 311	Adolescent/Early Adult Development in Context (HDFS 101)	3	
HDFS 312	Adult Development-Middle Age and Aging (HDFS 101)	3	
INTD 200	Housing Values in America	3	
	FSHN, FTEC, RRM elective	3	
	Family and consumer sciences electives ⁴	3	
	Historical perspectives ⁵	3	3D
	Support career objective-elective ⁶	3	
	TOTAL	29	
SENIOR			
FACS 479	Colloquium-Family and Consumer Sciences (FACS 179)	2	4A, 4C
HDFS 302	Marriage and Family Relationships (HDFS 101 or SOC 100)	3	
HDFS 334	Parenting Across the Lifespan (HDFS 310 or PSY 260)	3	4B
HDFS 402	Family Studies (HDFS 101 or SOC 100)	3	
HDFS 403	Families in the Legal Environment	3	
	Global and cultural awareness ⁷	3	3E
	Family and consumer sciences electives ⁴	12	
	Support career objective-electives ⁶	2-3	
	TOTAL	31-32	
PROGRAM TOTAL = 120-122 credits			

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.
³ Select one course from the ECON prefix.
⁴ 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.
⁵ Select from the list of courses in category 3D in the AUCC.
⁶ Select courses to enhance knowledge and skill in chosen career area.
⁷ Select from the list of courses in category 3E in the AUCC. AM 250 is suggested but not required.

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 master 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 Vocational Credential.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
<i>Select one pair of courses from the following:</i>			
CHEM 103	Chemistry in Context	3	3A
CHEM 104	Chemistry in Context Laboratory (CHEM 103 or concurrent reg.)	1	3A
OR			
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	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	Infant and Child Development in Context (HDFS 101)	3	
INTD 129	Introduction to Interior Design	3	
SPCM 200	Public Speaking	3	2A
	Biological/physical sciences ³	3	3A
	Family and consumer sciences electives ⁴	2-3	
	Historical perspectives ⁵	3	3D
	TOTAL	29-30	
JUNIOR			
AHS 300	Research in Applied Professions	3	
DM 320	Finance-Personal and Family	3	
EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3C
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
EDUC 350	Instruction I-Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3	
EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent reg. in EDUC 350; admission to teacher licensure)	1	
FSHN 300	Food Principles and Applications (CHEM 103 or CHEM 107 or CHEM 111; FSHN 150)	3	
FSHN 301	Food Principles and Applications Laboratory (FSHN 300 or concurrent reg.)	2	
HDFS 302	Marriage and Family Relationships (HDFS 101 or SOC 100)	3	
HDFS 311	Adolescent/Early Adult Development in Context (HDFS 101)	3	
	Family and consumer sciences electives ⁴	2-3	
	TOTAL	31-32	
SENIOR			
EDCT 451	Methods-Family and Consumer Sciences Education (EDUC 350 or concurrent reg. or EDUC 450 or concurrent reg.)	4	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
EDCT 485	Student Teaching (EDUC 450; EDCT 451)	11	4C
EDCT 492	Seminar-Professional Relations (EDUC 450; EDCT 451; concurrent reg. in EDCT 485)	1	4C
EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4	
EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
FACS 479	Colloquium-Family and Consumer Sciences (FACS 179)	2	4A
HDFS 334	Parenting Across the Lifespan (HDFS 101 or PSY 260)	3	4B
HDFS 403	Families in the Legal Environment	3	
	TOTAL	29	

PROGRAM TOTAL = 120-121 credits

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.

³ Select from list of courses in category 3A in the AUCC.

⁴ Select courses with subject codes AHS, AM, DM, FACS, FSHN, FTEC, HDFS, INTD, or RRM.

⁵ Select from family and consumer sciences' list of recommended courses in category 3D in the AUCC.

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 National Council for the Accreditation of Teacher Education (NCATE).

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 Educator Licensing Program and licensure requirements are available on the program's web site (<http://soe.cahs.colostate.edu/Licensure>) or in room 100 of the Education Building.

DEPARTMENT OF CONSTRUCTION MANAGEMENT

*Office in Guggenheim Hall, Room 102
(970) 491-7353*

www.cm.cahs.colostate.edu/

Professor Mostafa Khattab, Interim Head

Major in Construction Management

The construction management program at Colorado State University is one of the top-ranked programs in the nation. Since its inception in 1946, more than 4,500 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 major in construction management is a controlled major that requires a 2.300 cumulative GPA for admission and graduation. The academic program is interdisciplinary,

with course requirements in business, engineering, and the humanities as well as the applied courses in construction science and construction management. The focus 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 much broader range of career options for graduates.

Named after 1951 graduate, Joseph Phelps (Hensel Phelps Construction Co.), the Phelps Placement Office (PPO) assists students with career services and job placement. During their academic career, construction management students have the requirement and opportunity of obtaining an internship (full-time structured work experience), and co-op (part-time or full-time) positions with a variety of construction companies and organizations. The PPO also assists graduating students and alumni with in-house interviews, an annual career fair, and the publication of a graduate resume book. Additionally, CareerRAM is always a good resource for any sort of position announcement.

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, material and methods, estimating, scheduling, safety, surveying, and project administration.

Potential Occupations

The construction industry has become a \$500 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 construction management graduates in the industry is at 100 percent, with average starting salaries ranging from \$39,000 to \$46,000.

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; assistant superintendent.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
CON 101	Introduction to Construction Management	3	
CON 131	Graphic Communications/CAD	2	
CON 151	Construction Materials and Methods	3	
CON 251	Materials Testing and Processing (CON 151)	2	
<i>Select one of the following courses:</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	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 125	Numerical Trigonometry (MATH 118 or placement)	1	1B
	Arts/humanities ¹	3	3B
	Global and cultural awareness ²	3	3E
	Historical perspectives ³	3	3D
	TOTAL	28	
SOPHOMORE			
CON 260	Mechanical and Plumbing Systems (CON 101 or INTD 276 or concurrent reg. in INTD 276)	3	
CON 261	Construction Surveying (CON 131 or INTD 166; MATH 125 or MATH 160)	3	
CON 265	Construction Estimating I (CON 151)	3	
CON 317	Safety Management	2	
CON 351	Construction Field Management (CON 251 or concurrent reg.; CON 317 or concurrent reg.)	2	
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
MATH 141	Calculus in Management Sciences (MATH 118)	3	1B
PH 121	General Physics I (concurrent registration in MATH 125)	5	3A
SPCM 200	Public Speaking	3	2A
	Technical electives ⁴	3	
	TOTAL	30	
JUNIOR			
ACT 205	Fundamentals of Accounting	3	
CON 267	Construction Management Pre-Internship	1	
CON 359	Structures I (MATH 125; junior or senior standing)	4	
CON 360	Electrical and Control Systems (CON 260 or concurrent reg.)	3	
CON 365	Construction Estimating II ⁵ (CON 265)	3	4A
CON 366	Construction Equipment and Methods (CON 261)	3	
CON 367	Construction Contracts/Project Administration (CON 265; CON 357 or concurrent reg.)	3	4B
MGT 305	Fundamentals of Management	3	
STAT 204	Statistics for Business Students (MATH 117)	3	
	Technical elective ⁴	3	
	TOTAL	29	
SENIOR			
BUS 205	Legal and Ethical Issues in Business	3	
CIVE 350	Soil Engineering for Nonengineers (CIVE 359)	3	
CON 459	Structures II (CON 359 or CIVE 359; CIVE 370)	4	
CON 461	Construction Project Scheduling and Cost Control ⁵ (CON 365 or concurrent reg.)	3	4A
CON 462	Financial Management for Construction (ACT 205 or ACT 210; MGT 305 or MGT 320)	3	
CON 465	Construction Management Professional Practice (CON 461 or concurrent reg.; CON 487A or CON 487E)	3	4C
CON 487E	Internship-Construction Management II (CON 267; CON 367; 500 hours documented work experience)	3	
MGT 473	Employment Relations: Labor and Management	3	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
	Arts/humanities ¹	3	3B
	CON elective ⁶	2	
	Technical elective ⁴	3	
	TOTAL	33	

PROGRAM TOTAL = 120 credits

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 3E in the AUCC.

³ Select from the list of courses in category 3D in the AUCC.

⁴ Select from department list of approved courses.

⁵ To fulfill the AUCC 4A requirement, students must take either CON 365 or CON 461.

⁶ May include IU 193.

Minor in Construction Management

The construction management minor is linked to the controlled major in construction management, requiring an admission and graduation requirement of a cumulative GPA of 2.300.

This program is designed to provide students an opportunity to study the basic concepts of construction materials and methods, techniques, design, and management necessary to function in the construction industry.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LOWER DIVISION			
CON 101	Introduction to Construction Management	3	
CON 131	Graphic Communications/CAD	2	
CON 151	Construction Materials and Methods	3	
CON 265	Construction Estimating I (CON 151)	3	
	TOTAL	11	
UPPER DIVISION			
CON 317	Safety Management	2	
CON 359*	Structures I (junior or senior standing; MATH 125)	4	
CON 365*	Construction Estimating II (CON 365)	3	
CON 367*	Construction Contracts/Project Administration (CON 265; CON 351 or concurrent reg.)	3	
CON 461	Construction Project Scheduling and Cost Control (CON 365 or concurrent reg.)	3	
	TOTAL	15	

PROGRAM TOTAL = 26 credits without prerequisites

*Additional course work may be required because of prerequisites.

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, sustainable construction, and historical preservation. 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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, and the department's website, www.cm.cahs.colostate.edu/.

DEPARTMENT OF DESIGN AND MERCHANDISING

Office in Aylesworth Hall SE, Room 150

(970) 491-1629

<http://www.dm.cahs.colostate.edu>

Professor Mary A. Littrell, 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, apparel 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; and
- 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 setting 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 for 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; 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 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 spring 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 200-level and above apparel design and production courses.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
AM 101	Fashion Industries	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	Chemistry in Context Laboratory (CHEM 103 or concurrent reg.)	1	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
DM 120	Textiles	3	

Course	Title (Prerequisite)	Cr	AUCC
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B

PSY 100	General Psychology	3	3C
OR			
SOC 100	General Sociology	3	3C

	Elective	5	
	TOTAL	31	
SOPHOMORE			
AM 240	Computer-Aided Apparel Design (AM 143; portfolio review)	3	
AM 241	Apparel Production (AM 143; portfolio review)	3	
AM 250	Clothing, Adornment and Human Behavior	3	3E
AM 270	Merchandising Processes (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)	3	
DM 272	Consumers in the Marketplace	3	
PHIL 110	Logic and Critical Thinking	3	

OR			
STAT 201	General Statistics (placement in MATH 130 or higher)	3	

SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	3	3B
	Electives	7	
	TOTAL	31	
JUNIOR			
AM 341	Computer-Aided Apparel Production (AM 240; AM 241)	3	
AM 342	Computer-Aided Textile Design (AM 240)	3	4B
AM 343	Fashion Illustration (AM 143; AM 270; DM 272; portfolio review)	3	
AM 345	Draping Design (AM 241)	3	
AM 363	Historic Costume	3	4A
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	3	3A
	Historical perspectives ³	3	3D
	Electives	6	
	TOTAL	30	
SENIOR			
AM 421	Textile Analysis (DM 120)	3	
AM 446	Apparel Design and Production (AM 240; AM 341)	3	4C
AM 460	Historic Textiles	3	
DM 487B	Internship-Apparel Design and Production ⁴ (GPA 2.5; AM 343; AM 446; DM 492)	12	
DM 492	Preinternship Seminar (minimum GPA of 2.500; minimum of 75 credits completed)	1	
	Upper division electives	6	
	TOTAL	28	
PROGRAM TOTAL = 120 credits			

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC).

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 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, 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
AM 101	Fashion Industries	3	
AM 130	Design Appreciation-Apparel and Merchandising	3	
CHEM 103	Chemistry in Context	3	3A
CHEM 104	Chemistry in Context Laboratory (CHEM 103 or concurrent reg.)	1	3A
CIS 150	Business Computing Concepts and Applications	3	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
DM 120	Textiles	3	
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
PSY 100	General Psychology	3	3C
OR			
SOC 100	General Sociology	3	3C
	Arts/humanities ¹	3	3B
	Elective	4	
	TOTAL	32	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
AM 250	Clothing, Adornment and Human Behavior	3	3E
AM 270	Merchandising Processes (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)	3	
DM 272	Consumers in the Marketplace	3	
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
SPCM 200	Public Speaking	3	2A
STAT 201	General Statistics (MATH 117)	3	
OR			
STAT 204	Statistics for Business Students (placement in MATH 130 or higher)	3	
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	3	3A
	Historical perspectives ³	3	3D
	TOTAL	30	
JUNIOR			
AM 321	Advanced Textiles (DM 120)	3	
AM 330	Textile and Apparel Economics (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)	3	4B
AM 366	Merchandising Promotion (AM 270 or MKT 300 or MKT 305)	3	
AM 371	Merchandising Systems (AM 270; ACT 205 or ACT 210)	4	
DM 360/	Retailing (MKT 300 or MKT 305)	3	
MKT 360			
MGT 305	Fundamentals of Management	3	
MKT 305	Fundamentals of Marketing (AREC 202 or ECON 101 or ECON 202)	3	
	AM electives	3	
	Upper division AM electives ⁴	3	
	Electives	3	
	TOTAL	31	
SENIOR			
AM 479	Merchandising Policies and Strategies (AM 270; AM 330; AM 366; AM 371; DM 360/MKT 360)	3	4A, 4C
DM 487A	Internship-Merchandising ⁵ (GPA 2.500; AM 371; DM 360/MKT 360; DM 492)	12	
DM 492	Preinternship Seminar (minimum GPA of 2.500; minimum of 75 credits completed)	1	
	AM, DM, INTD elective ⁶	3	
	Upper division AM elective ⁴	3	
	Electives	5	
	TOTAL	27	
PROGRAM TOTAL = 120 credits			

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC).

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 Choose upper-division AM courses which end in 00-81.

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.

Minor in Merchandising

A minor in merchandising provides students in other majors an opportunity to expand knowledge about 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 (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LOWER DIVISION			
AM 101	Fashion Industries	3	
AM 270*	Merchandising Processes (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)	3	
DM 120	Textiles	3	
	TOTAL	9	
UPPER DIVISION			
AM 330*	Textile and Apparel Economics (AM 370 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)	3	
OR			
AM 366	Merchandising Promotion (AM 270 or MKT 300 or MKT 305)	3	
AM 371*	Merchandising Systems (ACT 205 or ACT 210; AM 270)	4	
AM*	Elective ¹	3	
DM 360/	Retailing (MKT 300 or MKT 305)	3	
MKT 360*			
	TOTAL	13	
PROGRAM TOTAL = 22 credits without 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 (formerly FIDER). A cohort of 40 students is selected upon completion of the selective advancement component, Design Scenario, towards the end of the first year of the program. By limiting enrollment through the Design Scenario, students receive individual attention in advanced course work; the Design Scenario occurs annually.

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. A practice internship 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 measures 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.

Job placement reflects market demands, with over 90% of graduates placed in recent years.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
ART 101	Visual Form	3	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
CON 151	Construction Materials and Methods	3	
INTD 129	Introduction to Interior Design	3	
INTD 166	Visual Communication/Sketching	3	
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
PSY 100	General Psychology	3	3C
	Arts/humanities ¹	3	3B
	Biological/physical science ²	4	3A
	Historical perspectives ³	3	3D
	TOTAL	31	
SOPHOMORE			
ART 100	Introduction to the Visual Arts	3	3B
CON 235	Construction Graphics (CON 151; INTD 166)	3	
DM 120	Textiles	3	
INTD 210	Interior Design Anatomy (INTD 129; INTD 166; design scenario advancement)	3	
INTD 236	Three-Dimensional Thinking (INTD 129; INTD 166; design scenario advancement)	3	
INTD 256	Computer Aided Design for Interior Designers (INTD 129; INTD 166; design scenario advancement)	3	
INTD 266	Visual Communication-Multi-Media (INTD 210; INTD 236)	3	
INTD 276	Interior Design I (CON 235; INTD 210; INTD 236; INTD 256)	3	
INTD 350	Codes-Health and Safety (INTD 210; INTD 276 or concurrent reg. or INTD 376 or concurrent reg.)	3	
	Additional communication ⁴	3	2A or 2B
	TOTAL	30	
JUNIOR			
CON 260	Mechanical and Plumbing Systems (CON 101 or INTD 276 or concurrent reg. in INTD 276)	3	
DM 492	Preinternship Seminar (minimum GPA of 2.500; minimum of 75 credits completed)	1	
INTD 330	Lighting Design (CON 260; INTD 276 with a C- or better)	3	
INTD 340	Interior Materials and Finishes (DM 120; INTD 276 with a C- or better)	3	
INTD 356	Professional Communications-Interior Design (CO 150 or HONR 193; INTD 276 with a C- or better)	3	4A
INTD 357	History of International Interiors (INTD 276 with a C- or better)	3	
INTD 358	History of American and 20th Century Interiors (INTD 357)	3	
INTD 376	Interior Design II (CON 260; INTD 330; INTD 340)	3	
PSY 316	Environmental Psychology (PSY 100)	3	
	Elective	6	
	TOTAL	31	
SENIOR			
INTD 400	Interior Design Research Proposal (INTD 376 with a C or better)	4	4B
INTD 476	Interior Design Project (INTD 400 with a C or better)	4	4C
INTD 487	Internship-Interior Design (INTD 356; INTD 376 with a C or better) ⁵	3	
	Biological/physical science ²	3	3A

Course	Title (Prerequisite)	Cr	AUCC
	Global and cultural awareness ⁶	3	3E
	Upper division electives ⁷	3	
	Electives	9	
	TOTAL	29	

PROGRAM TOTAL = 120 credits

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 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 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 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 A minimum of 3 elective credits must be upper-division.

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*, <http://graduate.school.colostate.edu/index.asp?url=catalog>, and the department's website, <http://www.dm.caahs.colostate.edu>.

SCHOOL OF EDUCATION

*Office in Education Building, Room 209
(970) 491-6316
<http://soe.caahs.colostate.edu/>*

*Professor Timothy G. Davis, Interim Director
Associate Professor Donna Cooner, Director, Educator Licensing Programs
Associate Professor Sharon Anderson, Director, Graduate Programs*

Educator Licensing Program

*Office in Education Building, Room 100
(970) 491-5292
<http://teachered.colostate.edu/>*

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 or 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	
Art	K-12	X	X	
Business Education	Secondary	X	X	
Business and Marketing Education	Secondary	X	X	
Early Childhood Education	Ages 0-8	X	X	
English/Language Arts	Secondary	X	X	
Family and Consumer Sciences	Secondary	X	X	
Foreign Language (French, German, Spanish)	K-12	X	X	
Linguistically Diverse	K-12			X
Mathematics	Secondary	X	X	
Marketing Education	Secondary	X	X	
Music	K-12	X	X	
Occupational Therapist	Ages 0-21			X
School Counselor	Ages 0-21			X
School Principal	K-12			X
School Social Worker	Ages 0-21			X
Science	Secondary	X	X	
Social Studies	Secondary	X	X	
Speech	Secondary	X	X	
Technology Education	Secondary	X	X	
Trade and Industrial Education	Secondary	X	X	

U = Undergraduate; P = Post-Baccalaureate; G = Graduate

The Colorado State University Educator Licensing Program is nationally accredited by the National Council for Accreditation of Teacher Education 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 (<http://teachered.colostate.edu/>).

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
Business Education	Business Administration (B.S.)	Business
Business and Marketing Education	Business Administration (B.S.)	Business
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
Foreign Language (French, German, Spanish)	Languages, Literatures, and Cultures (B.A.)	Liberal Arts
Marketing Education	Business Administration (B.S.)	Business
Mathematics	Mathematics (B.S.)	Natural Sciences
Music Science	Music (B.M.) Natural Sciences (B.S.)	Liberal Arts Natural Sciences
Social Studies	History (B.A.)	Liberal Arts
Speech	Speech Communication (B.A.)	Liberal Arts
Technology Education	Engineering Science (B.S.) Applied Computing Technology (B.S.)	Engineering Natural Sciences

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 Education. 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);
- 2.750 cumulative GPA; 3.000 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 Educator Licensing Office, Education Building, Room 100, and through the program’s web site, <http://soe.cahs.colostate.edu/Licensure>.

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 Education 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 Education 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 2.750 computed for all course work, except for social studies where a 3.000 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 486J. Additional courses may be required by specific endorsement areas. For clarification, refer to individual coursework check sheets which can be obtained in Room 100, Education Building.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3F
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
EDUC 350	Instruction I-Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3	
EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent reg. in EDUC 350; admission to teacher licensure)	1	
EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4	
EDUC 485A-C	Student Teaching ¹ (A-B EDUC 450; appropriate special methods courses; C) EDUC 426)	Var.	
OR			
EDCT 485	Student Teaching ¹ (EDUC 450; appropriate special (content) methods courses)	Var.	
EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
EDUC 493A-B	Seminar (EDUC 426 or EDUC 450; appropriate special methods course(s); EDUC 485A or concurrent reg. or EDUC 485B or concurrent reg. or EDUC 485C or concurrent reg. or EDCT 485 or concurrent reg.)	1	
OR			
EDCT 492	Seminar-Professional Relations (EDUC 450; appropriate special (content) methods course; concurrent reg. in EDCT 485)	1	
EDUC/EDCT	Special methods course ²	2-4	
EDUC/EDCT	Additional endorsement area courses ³		

¹ Student teachers in art and music must complete a semester of student teaching which includes an elementary and a secondary experience. Students in all other endorsement areas complete a student teaching experience at the secondary level only.

² Student must take the appropriate special methods courses based upon their endorsement areas from the following list:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
EDCT 425	Methods/Materials in Agricultural Education (EDUC 350 or concurrent reg. or EDUC 450 or concurrent reg.)	4	
EDCT 431	Methods/Materials in Business Education (EDUC 350 or concurrent reg. or EDUC 450 or concurrent reg.; concurrent reg. in EDCT 492)	4	
EDCT 441	Methods/Materials-Vocational Marketing Education (EDCT 431; EDUC 350 or concurrent reg. or EDUC 450 or concurrent reg.)	1	
EDCT 451	Methods-Family and Consumer Sciences Education (EDUC 350 or concurrent reg. or EDUC 450 or concurrent reg.)	4	
EDCT 465	Methods and Materials in Technology Education (EDUC 350 or concurrent reg. or EDUC 450 or concurrent reg.)	3	
EDUC 460	Methods and Materials in Teaching Science (admission to teacher licensure)	4	
EDUC 462	Methods and Assessment in Teaching Languages (admission to teacher licensure; oral and written competency in the language endorsement area)	4	
EDUC 463	Methods in Teaching Language Arts (admission to teacher licensure)	4	
EDUC 464	Methods and Materials in Teaching Mathematics (18 credits in mathematics; admission to teacher licensure)	4	
EDUC 465	Methods and Materials in Social Studies (admission to teacher licensure)	4	
EDUC 466	Methods and Assessment in K-12 Art Education (EDUC 275; admission to teacher licensure)	4	
EDUC 474	Elementary School Music Methods I (admission to teacher licensure)	2	
EDUC 475	Elementary School Music Methods II (EDUC 474)	2	
EDUC 476	Choral Methods for Secondary Schools (MU 217; admission to teacher licensure)	2	
EDUC 477	Instrumental Methods for Secondary Schools (MU 217; admission to teacher licensure)	2	

³ Students may also need to complete additional professional education courses depending upon their endorsement area.

Candidates must complete approved field experiences after admission to the Teacher Licensure Program and before student teaching. Information concerning field experiences is available in the Education Building, Room 100.

Candidates in all endorsement areas must complete appropriate methods courses the semester prior to enrolling in student teaching.

Career and Technical (Vocational) Education

Individuals desiring to teach in or administer career and technical (vocational) 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 Career and Technical Credentialing Office, 9101 E. Lowry Boulevard, Building 959, Denver, CO 80230; phone (303) 595-1650.

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 (vocational) education.

Agricultural Education

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 years of occupational experience (4,000 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, interdepartmental major in agricultural education, or contact the Licensure Office in room 100 Education Building.

Business Education

Individuals majoring in business with a concentration in accounting, organization and innovation management, or related business area, and desiring to teach business subjects at the secondary and postsecondary levels need to qualify for business education teacher licensure and credentialing. In addition to majoring in business administration, students must meet the licensure and credentialing requirements. Contact the School of Education for specific licensure and credentialing requirements for each area.

For the detailed curriculum requirements in business administration with a concentration in accounting, organization and innovation management, or a related business area, refer to the College of Business.

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.

Marketing Education

Individuals majoring in business administration with a concentration in marketing or a related business area, and desiring to teach marketing education at the secondary or community and junior college levels need to qualify for marketing education licensure and credentialing. In addition to majoring in business administration, students must meet the licensure and credentialing requirements in marketing education.

For the detailed curriculum requirements in business administration with a concentration in marketing or a related business area, refer to the College of Business.

Graduate Programs

*Office in Education Building, Room 111
(970) 491-1963
<http://soe.cahs.colostate.edu>*

The School of Education offers graduate programs leading to master of education and doctor of philosophy degrees in education and human resource studies, and a master of science degree in student affairs in higher education.

Master of education emphases are available in adult education and training, counseling and career development (approved by the Council for Accreditation of Counseling and Related Educational Programs), educational leadership, and organization performance and change (OPC).

Doctoral degree emphases are available in community college leadership, educational leadership, organizational performance and change, 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*, <http://graduate.school.colostate.edu/index.asp?url=catalog>, and the department's website, <http://soe.cahs.colostate.edu>.

DEPARTMENT OF FOOD SCIENCE AND HUMAN NUTRITION

Office in Gifford Building, Room 234
(970) 491-FOOD (3663)
<http://www.caahs.colostate.edu/fshn/>

Professor Christopher L. Melby, Head

Major in Nutrition and Food Science

Public interest in relations among nutrition, 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 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, integrate 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; 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.

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 management; caterer; quality assurance specialist; food scientist; food inspector; food technologist, food plant manager; food service manager. The median salary for R.D.'s 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 \$27,000-\$32,000 range for a nine-month teaching position.

Nutrition and Food Science Core

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
SOC 100	General Sociology	3	3C
	Option courses ¹	18-24	
	TOTAL	27-33	
SOPHOMORE			
BMS 300	Principles of Human Anatomy and Physiology (BZ 101 or BZ 110 or LIFE 102; CHEM 103 or CHEM 107 or CHEM 111)	4	
	Foundations and perspectives ²	6	3B, 3D, 3E
	Options courses ¹	16-27	
	TOTAL	26-37	

College of Applied Human Sciences

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
FSHN 350	Human Nutrition (BMS 300 or concurrent reg.; CHEM 245 or CHEM 345) Option courses ¹	3	
	TOTAL	23-31	
		26-34	
SENIOR			
FSHN 492	Seminar in Dietetics and Nutrition (senior standing) Option courses ¹	2	4C
	TOTAL	24-33	
		26-35	

PROGRAM TOTAL =120-123 credits

¹ Select one of the following career options: dietetics, food safety and nutrition, nutrition and fitness, or nutritional sciences.

² 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.

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 program meets American Dietetic Association (ADA) didactic course (DPD) requirements.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
	<i>Select four credits from the following courses:</i>		
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
	OR		
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
	<i>Select one of the following sets of courses:</i>		
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A
	OR		
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CIS 150	Business Computing Concepts and Applications	3	
	OR		
CS 110	Personal Computing	4	
FSHN 150	Survey of Human Nutrition	3	
PSY 100	General Psychology	3	3C
	TOTAL	17-22	

SOPHOMORE

BMS 302	Laboratory in Principles of Physiology (BMS 300 or concurrent reg. or BMS 360 or concurrent reg.)	2	
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
CHEM 246	Fundamentals of Organic Chemistry Laboratory (CHEM 108 or CHEM 112 or CHEM 114; CHEM 245 or concurrent reg.)	1	
FSHN 300	Food Principles and Applications (CHEM 103 or CHEM 107 or CHEM 111; FSHN 150)	3	

Course	Title (Prerequisite)	Cr	AUCC
FSHN 301	Food Principles and Applications Laboratory (FSHN 300 or concurrent reg.)	2	
LIFE 205	Survey of Microbial Biology	3	
LIFE 206	Microbial Biology Laboratory (LIFE 205 or concurrent reg.)	2	
OT 215	Medical Terminology	1	
RRM 310	Food Service Systems-Operations Foundations and perspectives ¹	3	
		6	3B, 3D, 3E
	TOTAL	27	

JUNIOR

BC 351	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346)	4	
	<i>Select one of the following courses:²</i>		
CO 300	Writing Arguments (CO 150 or HONR 193)	3	2B
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
SPCM 200	Public Speaking	3	2A
FSHN 360	Nutrition Assessment (CHEM 246; FSHN 350)	2	
FSHN 386	Practicum in Food Service Management	2	
FSHN 496A-I	Group Study in Dietetics and Nutrition (FSHN 350)	1	
MGT 305	Fundamentals of Management	3	
RRM 311	Food Service Systems-Production and Purchasing (RRM 310)	3	
STAT 201	General Statistics (placement in MATH 130 or higher)	3	
	OR		
STAT 204	Statistics for Business Students (MATH 117)	3	
	Electives ³	2-7	
	TOTAL	23-28	

SENIOR

FSHN 428	Nutrition Teaching and Counseling Techniques (FSHN 350; nine credits in food science and human nutrition)	3	
FSHN 450	Medical Nutrition Therapy (BMS 300; FSHN 350)	5	4B
FSHN 451	Community Nutrition (FSHN 350 or concurrent reg.)	3	4A
FSHN 459	Nutrition in the Life Cycle (FSHN 350)	3	
FSHN 470	Integrative Nutrition and Metabolism (BC 351; FSHN 350)	3	
FSHN 496A-I	Group Study in Dietetics and Nutrition (FSHN 350)	1	
RRM 414	Food Service Systems-Operations Analysis (RRM 311)	3	
	Electives	3	
	TOTAL	24	

OPTION TOTAL = 96 credits

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.

² First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (CO 300 or JTC 300).

³ 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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select four credits from the following courses:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
OR			
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
<i>Select one of the following sets of courses:</i>			
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent registration)	1	3A
OR			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
FSHN 125	Food and Nutrition in Health	2	
OR			
FSHN 150	Survey of Human Nutrition	3	
FTEC 110	Food-From Farm to Table Foundations and perspectives ¹	3	
		6	3B, 3D, 3E
TOTAL		20-24	
SOPHOMORE			
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
CHEM 246	Fundamentals of Organic Chemistry Laboratory (CHEM 108 or CHEM 112 or CHEM 114; CHEM 245 or concurrent registration)	1	
CIS 150	Business Computing Concepts and Applications	3	
OR			
CS 110	Personal Computing	4	
<i>Select one of the following courses:</i> ²			
CO 300	Writing Arguments (CO 150 or HONR 193)	3	2B
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
SPCM 200	Public Speaking	3	2A
FSHN 300	Food Principles and Applications (CHEM 103 or CHEM 107 or CHEM 111; FSHN 150)	3	
FSHN 301	Food Principles and Applications Laboratory (FSHN 300 or concurrent reg.)	2	
TOTAL		16-17	
JUNIOR			
FTEC 447	Food Chemistry (CHEM 245 or CHEM 345)	2	4B
LIFE 205	Survey of Microbial Biology	3	
LIFE 206	Microbial Biology Laboratory (LIFE 206 or concurrent reg.)	2	
<i>Upper division FSHN/RRM courses</i>			
<i>Advanced courses³</i>			
<i>Electives⁴</i>			
TOTAL		27	
SENIOR			
FTEC 400	Food Safety (CHEM 107 or CHEM 111)	3	
FTEC 420	Quality Assessment of Food Products (FTEC 110; LIFE 205)	3	4A
MIP 334	Food Microbiology (LIFE 205 or MIP 300)	3	
MIP 335	Food Microbiology Laboratory (LIFE 206 or MIP 301 or MIP 302; MIP 334 or concurrent reg.)	2	
STAT 201	General Statistics (placement in MATH 130 or higher)	3	
OR			
STAT 204	Statistics for Business Students (MATH 117)	3	

Course	Title (Prerequisite)	Cr	AUCC
Upper division FSHN/RRM courses		6	
Advanced courses ³		4	
Electives ⁴		4-9	
TOTAL		28-33	

PROGRAM TOTAL = 96 credits

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.

² First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (CO 300 or JTC 300).

³ 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.

⁴ 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 physical activity, nutrition, teaching, and counseling. The option also provides an excellent background for a graduate program. By addition of several elective courses, students can meet ADA didactic course requirements.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select four credits from the following courses:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
OR			
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
<i>Select one of the following sets of courses:</i>			
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A
OR			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CIS 150	Business Computing Concepts and Applications	3	
OR			
CS 110	Personal Computing	4	
FSHN 150	Survey of Human Nutrition	3	
PSY 100	General Psychology	3	3C
TOTAL		18-22	
SOPHOMORE			
BMS 302	Laboratory in Principles of Physiology (BMS 300 or concurrent reg. or BMS 360 or concurrent reg.)	2	
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
CHEM 246	Fundamentals of Organic Chemistry Laboratory (CHEM 108 or CHEM 112 or CHEM 114; CHEM 245 or concurrent reg.)	1	
<i>Select one of the following courses:</i> ¹			

College of Applied Human Sciences

Course	Title (Prerequisite)	Cr	AUCC
CO 300	Writing Arguments (CO 150 or HONR 193)	3	2B
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
SPCM 200	Public Speaking	3	2A
FSHN 300	Food Principles and Applications (CHEM 103 or CHEM 107 or CHEM 117; FSHN 150)	3	
FSHN 301	Food Principles and Applications Laboratory (FSHN 300 or concurrent reg.)	2	
HES 332F	Techniques of Teaching Weight Training (corresponding laboratory or competency in area)	1	
OT 215	Medical Terminology	1	
RRM 310	Food Service Systems-Operations Foundations and perspectives ²	3	
		6	3B, 3D, 3E
	TOTAL	26	
JUNIOR			
BC 351	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent registration in CHEM 346)	4	
FSHN 496A-I	Group Study in Dietetics and Nutrition (FSHN 350)	1	
HES 240	First Aid and Emergency Care	2	
HES 332H	Techniques of Teaching Aerobics (corresponding laboratory or competency in area)	1	
HES 403	Physiology of Exercise (BMS 300; LIFE 102)	4	
LIFE 205	Survey of Microbial Biology	3	
LIFE 206	Microbial Biology Laboratory (LIFE 205 or concurrent reg.)	2	
STAT 201	General Statistics (placement in MATH 130 or higher)	3	
	OR		
STAT 204	Statistics for Business Students (MATH 117)	3	
	Electives	3	
	TOTAL	23	
SENIOR			
FSHN 360	Nutrition Assessment (FSHN 350)	2	
FSHN 428	Nutrition Teaching and Counseling Techniques (FSHN 350)	3	
FSHN 450	Medical Nutrition Therapy (BMS 300; FSHN 350)	5	4B
FSHN 451	Community Nutrition (FSHN 350 or concurrent reg.)	3	4A
FSHN 459	Nutrition in the Life Cycle (FSHN 350)	3	
FSHN 470	Integrative Nutrition and Metabolism (BC 351; FSHN 350)	3	
FSHN 496A-I	Group Study in Dietetics and Nutrition (FSHN 350)	1	
HES 405	Exercise Testing Instrumentation (HES 403)	2	
	Electives ³	3-7	
	TOTAL	25-29	

OPTION TOTAL = 96 credits

¹ First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (CO 300 or JTC 300).
² 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.
³ 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 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
	<i>Select four credits from the following courses:</i>		
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
	OR		
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
BZ 120	Principles of Plant Biology	4	3A
	OR		
LIFE 103	Biology of Organisms-Animal and Plants (LIFE 102)	4	
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
MATH 125	Numerical Trigonometry (MATH 118 or placement)	1	1B
PSY 100	General Psychology	3	3C
	TOTAL	21	
SOPHOMORE			
BMS 302	Laboratory in Principles of Physiology (BMS 300 or concurrent reg. or BMS 360 or concurrent reg.)	2	
CHEM 341	Modern Organic Chemistry I (CHEM 113; CHEM 114)	3	
CHEM 343	Modern Organic Chemistry II (CHEM 245 or CHEM 341 or CHEM 345)	3	
CHEM 344	Modern Organic Chemistry Laboratory (CHEM 343 or concurrent reg. or CHEM 346 or concurrent reg.)	2	
FSHN 150	Survey of Human Nutrition	3	
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
MIP 300	General Microbiology (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or concurrent reg. or CHEM 345 or concurrent reg.)	3	
MIP 302	General Microbiology Laboratory (MIP 300 or concurrent reg.)	2	
OT 215	Medical Terminology	1	
	TOTAL	23	
JUNIOR			
BC 351	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346)	4	
	<i>Select 4 credits from the following:</i>		
BIO 310	Cell Biology (BZ 110 or BZ 120 or LIFE 130; CHEM 245 with a C or better or CHEM 345 with a C or better)	4	
	OR		
LIFE 210	Introductory Eukaryotic Cell Biology (LIFE 102; CHEM 111; CHEM 112 or concurrent reg.)	3	
LIFE 211	Eukaryotic Cell Biology Recitation (LIFE 210 or concurrent reg.)	1	
CIS 150	Business Computing Concepts and Applications	3	
	OR		
CS 110	Personal Computing	4	
	<i>Select one of the following courses:</i> ¹		
CO 300	Writing Arguments (CO 150 or HONR 193)	3	2B
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
SPCM 200	Public Speaking	3	2A
PH 121	General Physics I (MATH 125 or concurrent reg.)	5	3A
PH 122	General Physics II (PH 121) Foundations and perspectives ²	5	3A
		6	3B, 3D, 3E

Course	Title (Prerequisite)	Cr	AUCC
TOTAL		30-31	
SENIOR			
FSHN 360	Nutrition Assessment (FSHN 350)	2	
FSHN 428	Nutrition Teaching and Counseling Techniques (FSHN 350)	3	
FSHN 450	Medical Nutrition Therapy (BMS 300; FSHN 350)	5	4B
FSHN 451	Community Nutrition (FSHN 350 or concurrent reg.)	3	4A
FSHN 459	Nutrition in the Life Cycle (FSHN 350)	3	
FSHN 470	Integrative Nutrition and Metabolism (BC 351; FSHN 350)	3	
FSHN 496A-1	Group Study in Dietetics and Nutrition (FSHN 350)	2	
STAT 201	General Statistics (placement in MATH 130 or higher)	3	2B
TOTAL		24	
OPTION TOTAL = 98-99 credits			

¹ First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (CO 300 or JTC 300).

² 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.

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 (Prerequisite)	Cr	AUCC
UPPER DIVISION			
BC 351*	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346)	4	
BMS 300*	Principles of Human Anatomy and Physiology (BZ 101 or BZ 110 or LIFE 102; CHEM 103 or CHEM 107 or CHEM 111)	4	
FSHN 350*	Human Nutrition (BMS 300; CHEM 245 or CHEM 345)	3	
FSHN 360*	Nutrition Assessment (CHEM 246; FSHN 350)	2	
FSHN 451	Community Nutrition (FSHN 350)	3	
FSHN 459	Nutrition in the Life Cycle (FSHN 350)	3	
FSHN 470	Integrative Nutrition and Metabolism (FSHN 350; BC 351)	3	
PROGRAM TOTAL = 22 credits without prerequisites			

* Additional course work may be required because of prerequisites.

Major in Restaurant and Resort Management

Restaurant and resort 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 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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select four credits from the following courses:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
OR			
BZ 120	Principles of Plant Biology	4	3A
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
FSHN 150	Survey of Human Nutrition	3	
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
NRRT 270	Principles of Natural Resource Tourism	3	
RRM 101	Hospitality Industry	3	

Course	Title (Prerequisite)	Cr	AUCC
	Electives	2	
	TOTAL	28	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
BUS 205	Legal and Ethical Issues in Business	3	
CS 110	Personal Computing	4	
ECON 204	Principles of Macroeconomics (AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	
OR			
JTC 301	Business Communication (CO 150 or HONR 193)	3	
MIP 149	The Microbial World	3	
RRM 200	Resort Operations (RRM 101)	3	
RRM 310	Food Service Systems-Operations	3	
SPCM 200	Public Speaking	3	2A
STAT 204	Statistics for Business Students (MATH 117)	3	2B
	Electives	3	
	TOTAL	34	
JUNIOR			
FIN 305	Fundamentals of Finance (ACT 205 or ACT 210; ECON 204)	3	
FSHN 300	Food Principles and Applications (CHEM 103 or CHEM 107 or CHEM 111; FSHN 150)	3	
FSHN 301	Food Principles and Applications Laboratory (FSHN 300 or concurrent reg.)	2	4A
RRM 311	Food Service Systems-Production and Purchasing (RRM 310)	3	
RRM 330	Alcoholic Beverage Control and Management (CHEM 103 or CHEM 107)	2	
RRM 414	Food Service Systems-Operations Analysis (RRM 311)	3	
RRM 400	Food and Society (SOC 100; completion of AUCC categories 3D and 3E)	3	4B
SOC 100	General Sociology Foundations and perspectives ¹	3	3C, 3B, 3D, 3E
	Electives	3	
	TOTAL	28	
SENIOR			
FTEC 400	Food Safety (CHEM 107 or CHEM 111)	3	
MGT 305	Fundamentals of Management	3	
MGT 310	Human Resource Management	3	
RRM 350	Restaurant and Resort Marketing (RRM 101)	3	
RRM 415	Catering Techniques and Culinary Arts (RRM 311)	3	
RRM 492	Seminar on Restaurant and Resort Management (RRM 350) Foundations and perspectives ¹	3	4C
		9	3B, 3D, 3E
	Electives, upper division	3	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

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.

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*, <http://graduateschool.colostate.edu/index.asp?url=catalog> and the department's website, <http://www.caahs.colostate.edu/fshn/>.

DEPARTMENT OF HEALTH AND EXERCISE SCIENCE

Office in Health and Exercise Science Complex, B220
 Moby
 (970) 491-5081
<http://www.caahs.colostate.edu/hes/>

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
HES 145	Health and Wellness	3	
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
PSY 100	General Psychology	3	3C
	Chemistry ¹	4-5	3A
	Historical perspectives ²	3	3D
	Mathematics ³	3	1B
	TOTAL	23-24	
SOPHOMORE			
BMS 300	Principles of Human Anatomy and Physiology (BZ 101 or BZ 110 or LIFE 102; CHEM 103 or CHEM 107 or CHEM 111)	4	
HES 207	Anatomical Kinesiology	3	
HES 240	First Aid and Emergency Care	2	
SPCM 200	Public Speaking	3	2A
	TOTAL	12	
JUNIOR			
HES 403	Physiology of Exercise (BMS 300; LIFE 102)	4	4B
	Arts/humanities ⁴	6	3B
	Global and cultural awareness ⁵	3	3E
	TOTAL	13	
SENIOR			
<i>Select one of the following:</i>			
STAT 201	General Statistics (placement in MATH 130 or higher)	3	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
STAT 307/ERHS 307	Introduction to Biostatistics (MATH 117)	3	
HES 492	Health and Exercise Science Seminar	2	4A, 4C
	TOTAL	5	

CORE TOTAL = 53-54 credits⁶

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 departmental list of courses in category 1B of the AUCC.
⁴ Select from the list of courses in category 3B in the AUCC.
⁵ Select from the list of courses in category 3E in the AUCC.
⁶ 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 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
BMS 122	Drugs and the Human Body	2	
FSHN 150	Survey of Human Nutrition	3	
HES 332F	Techniques of Teaching Weight Training (corresponding lab or competency in area)	1	
	TOTAL	6	
SOPHOMORE			
CIS 150	Business Computing Concepts and Applications	3	
OR			
CS 110	Personal Computing	4	
CO 300	Writing Arguments (CO 150 or HONR 193)	3	
OR			
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
HES 332H	Techniques of Teaching Aerobics (corresponding lab or competency in area)	1	
HES 345	Population Health and Disease Prevention (HES 145)	3	
	Electives	4-5	
	TOTAL	18	
JUNIOR			
ACT 205	Fundamentals of Accounting	3	
HES 340	Exercise Prescription (concurrent reg. in HES 386A)	1	
HES 356	Wellness Programming (HES 145; HES 386A)	3	
HES 386A	Practicum in Adult Fitness (FSHN 150; HES 145; HES 207; HES 240; HES 332F; HES 332H; concurrent reg. in HES 340)	2	
HES 386B	Practicum in Wellness Program Management (BMS 300 with a C or better; FSHN with a C or better; HES 145 with a C or better; HES 207 with a C or better; HES 386A)	3	
MKT 305	Fundamentals of Marketing (AREC 202 or ECON 101 or ECON 202)	3	
MKT 320	Integrated Marketing Communications (MKT 300 or MKT 305)	3	
	TOTAL	18	
SENIOR			
HES 456	Advanced Wellness Programming (HES 356 or concurrent reg.; HES 386B or concurrent reg.)	3	
HES 486B	Practicum in Wellness Program Management (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; 2.50 GPA)	3	
HES 487	Internship (BMS 300 with a C or better; FSHN 150 with a C or better; HES 486B; 2.50 GPA)	15	
	Electives	4	
	TOTAL	25	

PROGRAM TOTAL = 120-121 credits

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 pre-professional preparation in medical 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
	HES 100 or HES 101 ¹	1	
	Electives	3	
	TOTAL	4	
SOPHOMORE			
BMS 301	Human Gross Anatomy (BZ 110 or LIFE 102)	5	
BMS 302	Laboratory in Principles of Physiology (BMS 300 or concurrent reg. or BMS 360 or concurrent reg.)	2	
HES 332F	Techniques of Teaching Weight Training (corresponding lab or competency in area)	1	
PH 121	General Physics I (MATH 125 or concurrent reg.)	5	
PH 122	General Physics II (PH 121)	5	
	TOTAL	18	
JUNIOR			
BC 351	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346)	4	
----- <i>Select four credits from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent registration)	1	3A
OR			
LIFE 103	Biology of Organisms-Animals and Plants (LIFE 102)	4	

CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
CHEM 246	Fundamentals of Organic Chemistry Laboratory (CHEM 108 or CHEM 112 or CHEM 114; CHEM 245 or concurrent registration)	1	
HES 307	Biomechanical Principles of Human Movement (HES 207 or BMS 301; PH 121 or PH 141)	3	
HES 319	Neuromuscular Aspects of Human Movement (BMS 300; BMS 301)	3	
	TOTAL	19	
SENIOR			
FSHN 350	Human Nutrition (BMS 300 or concurrent reg.; CHEM 245 or CHEM 345)	3	
HDFS 101	Individual and Family Development	3	
OR			
PSY 320	Abnormal Psychology (PSY 100)	3	

HES 405	Exercise Testing Instrumentation (HES 403)	2	
HES 476	Exercise and Chronic Disease (HES 403)	3	
HES 479	Psychology and Sport (PSY 100)	3	

Course	Title (Prerequisite)	Cr	AUCC
	HES, upper division ²	2-3	
	Electives	8-10	
	TOTAL	25-26	
PROGRAM TOTAL = 120 credits			

¹ Select any HES 100 or 101 courses.

² Select any upper division HES course.

Graduate Programs in Health and Exercise Science

The department offers graduate programs leading to the master of science. The department also offers a Ph.D. program in human bioenergetics. 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, <http://www.caahs.colostate.edu/hes/>.

DEPARTMENT OF HUMAN DEVELOPMENT AND FAMILY STUDIES

Office in Gifford Building, Room 102
(970) 491-5558

<http://www.caahs.colostate.edu/hdfs/>

Professor Lise Youngblade, Head
Anne Van Arsdale, Undergraduate Program Coordinator
Professor Karen C. Barrett, Graduate Program Coordinator

Major in Human Development and Family Studies

Human development and family studies is a major focusing on the interdisciplinary study of the development of individuals and families across the lifespan. In the contexts of culture and family, students learn to identify factors influencing cognitive, emotional, social, and physical development in infancy, childhood, adolescence, adulthood, and later adulthood. Students complete foundational course work in life span human development (infancy and childhood, adolescence and young adulthood, middle and later adulthood/aging) and in the area of family studies. Students also complete a prescribed series of experiential learning courses 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 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. The family and consumer sciences education concentration allows students to combine their interests in human/child development, marriage and family relationships, and/or parenting with teaching. Family and consumer sciences students take course work in the Departments of Human Development and Family Studies, Food Science and Human Nutrition, and Design and Merchandising 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 \$24,000-\$32,000 range for a nine-month teaching position.

Learning Outcomes

Students will demonstrate:

- Ability to complete courses and experiences that support their career goals.
- Development of effective intervention/educational programs based on their knowledge of theory, normative behavior, family functioning, and ecological factors.
- Ability to critically evaluate research and use of research to design simple program evaluations, and use of the computer skills required to support this objective; 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. 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; 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. The minimum scholastic average acceptable for graduation is 2.000 computed only for courses attempted at Colorado State.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BZ 101	Humans and Other Animals	3	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
HDFS 101	Individual and Family Development	3	3C
PSY 100	General Psychology	3	3C
SOC 100	General Sociology	3	3C
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	4	3A
	Historical perspectives ³	3	3D
	Mathematics ⁴	3	1B
	Elective	2	
	TOTAL	30	
SOPHOMORE			
<i>Select one course from the following:</i>			
CO 300	Writing Arguments (CO 150 or HONR 193)	3	2B
CO 301C	Writing in the Disciplines-Social Sciences (CO 150 or HONR 193)	3	2B
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
HDFS 286	Practicum-Professional Skills ⁵ (CO 150 or HONR 193; HDFS 101)	3	
HDFS 310	Infant and Child Development in Context (HDFS 101)	3	
<i>Select one course from the following:</i>			
SOC 210	Quantitative Sociological Analysis (MATH 118)	3	
STAT 201	General Statistics (placement in MATH 130 or higher)	3	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	3	3B
	Global and cultural awareness ⁶	3	3E
	Career interest elective ⁷	3	
	Elective	6	
	TOTAL	30	
JUNIOR			
HDFS 311	Adolescent/Early Adult Development in Context (HDFS 101)	3	
HDFS 312	Adult Development-Middle Age and Aging (HDFS 101)	3	
HDFS 334	Parenting Across the Lifespan (HDFS 310 or PSY 260)	3	4A, 4B
	Career interest electives ⁷	8-10	
	Electives	11-13	
	TOTAL	30	
SENIOR			
<i>Select two of the following courses:</i>			
HDFS 302	Marriage and Family Relationships (HDFS 101 or SOC 100)	3	
HDFS 402	Family Studies (HDFS 101 or SOC 100)	3	
HDFS 403	Families in the Legal Environment	3	
HDFS 492	Seminar-Program Proposal Development (HDFS 477 or concurrent reg.; HDFS 488A or B or C or D or concurrent reg.)	3	
	Career interest electives ⁷	3-6	
	Experiential learning ⁸	9	
	Electives	6-9	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

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 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 Students must register for lecture and laboratory.

⁶ Select from the list of courses in category 3E in the AUCC.

⁷ Choose from department list.

⁸ 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 25-35, each year. The admission process takes place once a year in the spring with the admitted candidates starting in the fall.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BZ 101	Humans and Other Animals	3	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
HDFS 101	Individual and Family Development	3	3C
PSY 100	General Psychology	3	3C
SOC 100	General Sociology	3	3C
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	4	3A
	Historical perspectives ³	3	3D
	Mathematics ⁴	3	1B
	Elective	2	
	TOTAL	30	
SOPHOMORE			
HDFS 217	Creative Experiences for Children (HDFS 101 or concurrent reg. in HDFS 286)	3	
HDFS 286	Practicum-Professional Skills (CO 150 or HPCC 193; HDFS 101)	3	
HDFS 310	Infant and Child Development in Context (HDFS 101)	3	
HDFS 311	Adolescent/Early Adult Development in Context (HDFS 101)	3	
HDFS 312	Adult Development-Middle Age and Aging (HDFS 101)	3	
HDFS 375	Programming for Children and Families (HDFS 286 or concurrent reg.; HDFS 310 or PSY 260)	3	
<i>Select one course from the following:</i>			
SOC 210	Quantitative Sociological Analysis (MATH 118)	3	
STAT 201	General Statistics (placement in MATH 130 or higher)	3	
STAT 301	Introduction to Statistical Methods (MATH 118)	3	
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	3	3B

Course	Title (Prerequisite)	Cr	AUCC
	Global and cultural awareness ⁵	3	3E
	TOTAL	30	
JUNIOR			
BMS 300	Principles of Human Anatomy and Physiology (BZ 101 or BZ 110 or LIFE 102; CHEM 103 or CHEM 107 or CHEM 111)	4	
<i>Select one course from the following:</i>			
CO 300	Writing Arguments (CO 150 or HONR 193)	3	2B
CO 301C	Writing in the Disciplines-Social Sciences (CO 150 or HONR 193)	3	2B
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3C
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
EDUC 400	Diagnostic Teaching of Reading (EDUC 275; EDUC 340; HDFS 217; HDFS 310; HDFS 320)	3	
EDUC 425	Early Childhood Education I (EDUC 275; EDUC 340; admission to teacher licensure)	4	
HDFS 320	Cognitive and Language Development (HDFS 310 or PSY 260)	3	
HDFS 334	Parenting Across the Lifespan (HDFS 310 or PSY 260)	3	4A, 4B
PSY 460	Childhood Exceptionality and Psychopathology (PSY 100)	3	
	TOTAL	31	
SENIOR			
EDUC 426	Early Childhood Education II (EDUC 425)	4	
EDUC 485C	Student Teaching-Early Childhood (EDUC 426)	12	
EDUC 493A	Seminar-Professional Relations (EDUC 426 or EDUC 450; EDUC 425; EDUC 426; concurrent reg. in EDUC 485C)	1	
<i>Select two of the following courses:</i>			
HDFS 302	Marriage and Family Relationships (HDFS 101 or SOC 100)	3	
HDFS 402	Family Studies (HDFS 101 or SOC 100)	3	
HDFS 403	Families in the Legal Environment	3	
HDFS 401	Childhood Socialization (HDFS 310 or PSY 260)	3	
HDFS 492	Seminar-Program Proposal Development (HDFS 477 or concurrent reg.; HDFS 488A or B or C or D or concurrent reg.)	3	4C
	TOTAL	29	
PROGRAM TOTAL = 120 credits			

¹ Select from departmental list of courses in category 3B in the All-University Core Curriculum (AUCC).

² Select from departmental list of courses in category 3A in the AUCC.

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.

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. Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, and the graduate program's website, www.hdfs.caahs.colostate.edu/Pages/Grad/index.aspx

For students interested in pursuing an interdisciplinary Ph.D. program in education and human development and

family studies (including counseling or early childhood education), the School of Education offers a doctoral program in education and human resource studies with emphasis in interdisciplinary studies, in which the Department of Human Development and Family Studies participates. Web site information may be found at <http://soe.cahs.colostate.edu/Pages/Grad/Specializations/ID/index.aspx>.

DEPARTMENT OF OCCUPATIONAL THERAPY

*Office in Occupational Therapy Building, Room 219
(970) 491-6253
<http://www.ot.cahs.colostate.edu>*

Karen C. Spencer, Associate Professor

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 masters 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 master of science in occupational therapy serves professional and post-professional students. The two-track graduate program addresses students' education needs whether they have a bachelor's degree in occupational therapy or another area. Please contact the Occupational Therapy Department for further details (Linda McDowell, (970) 491-6253; otinfo@cahs.colostate.edu).

An interdisciplinary studies program through the School of Education allows students the opportunity to earn a Ph.D.

in education and human resource studies with an emphasis in occupational therapy. Please contact the School of Education and Department of Occupational Therapy for further information (Linda McDowell, (970) 491-6253; otinfo@cahs.colostate.edu).

Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, <http://graduate.school.colostate.edu/index.asp?url=catalog>, and the department's website, www.ot.cahs.colostate.edu/

SCHOOL OF SOCIAL WORK

*Office in Education Building, Room 127
(970) 491-6612
<http://www.cahs.colostate.edu/sw/>*

*Professor Deborah Valentine, Director and Graduate Coordinator
Associate Professor Victor A. Baez, Undergraduate Coordinator*

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, or families – to assist with individual needs. 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 systems 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, accessing

community resources, and utilizing community policy making processes and practices.

- Knowledge and mastery of skills in establishing helping relationships, using established interviewing techniques, manifesting genuineness, respecting the client's definition of the problem, maintaining focus, exploring feelings, and conveying non-judgmental attitudes.
- Understanding 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 masters 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 work; 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 will 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 community settings. 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-.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one pair of courses from the following:</i>			
ANTH 120	Human Origins and Variation	3	3A
ANTH 121	Human Origins and Variation Laboratory (ANTH 120 or concurrent reg.)	1	3A
OR			
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
HDFS 101	Individual and Family Development	3	3C
PSY 100	General Psychology	3	3C

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>	<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
SOC 100	General Sociology OR	3		SOWK 488	Field Placement (AHS 300 or concurrent reg.; SOWK 341; SOWK 342)	10	
SOC 105	Social Problems	3		SOWK 492	Seminar (concurrent reg. in SOWK 488)	3	4C
SOWK 150	Introduction to Social Work (PSY 100 or concurrent reg.; SOC 100 or concurrent reg. or SOC 105 or concurrent reg.)	3			Social/behavioral sciences ¹⁰	6	
	Mathematics ¹	3	1B		Electives	5	
	ECON or POLS prefix course	3			TOTAL	30	
	Elective	5			PROGRAM TOTAL = 120 credits		
	TOTAL	30					
SOPHOMORE							
SOWK 233	Human Behavior in the Social Environment (HDFS 101 or concurrent reg.; SOWK 150 or concurrent reg.)	3					
SOWK 286A	Practicum-Communication Skills (SOWK 233 or concurrent reg.)	3					
SOWK 286B	Practicum-Applied Helping Skills (SOWK 286A)	3					
	Arts/humanities ²	3	3B				
	Biological/physical sciences ³	3	3A				
	Global and cultural awareness ⁴	3	3E				
	Health and wellness ⁵	2					
	Historical perspectives ⁶	3	3D				
	Logical/critical thinking ⁷	3					
	Electives	4					
	TOTAL	30					
JUNIOR							
AHS 300	Research in Applied Professions	3					
SOWK 330	Human Diversity Practice Issues (SOWK 233 or concurrent reg.)	3					
SOWK 340	Generalist Practice-Individuals and Families (SOWK 286B or concurrent reg.; progression into the major)	3					
SOWK 341	Generalist Practice-Small Groups (SOWK 340 or concurrent reg.)	3					
	Additional communication ⁸	3	2A or 2B or 3B				
	Arts/humanities ⁹	6					
	Electives	9					
	TOTAL	30					
SENIOR							
SOWK 342	Generalist Practice-Organizations/Communities (SOWK 340 or concurrent reg.)	3	4B				
SOWK 410	Social Welfare Policy (SOWK 342 or concurrent reg.)	3	4A				

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.
³ Select from the list of courses in category 3A in the AUCC.
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. First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (category 2B).
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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, and the department's website, <http://www.caahs.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
<http://www.biz.colostate.edu>

Professor Ajay Menon, Dean
Professor John Olienyk, Senior Associate Dean
Professor Susan Athey, Associate Dean
Professor John Hoxmeier, Associate Dean
Professor Paul Mallette, Associate Dean

MAJOR IN BUSINESS ADMINISTRATION WITH CONCENTRATIONS IN

Accounting
Finance
Information Systems
Marketing
Organization and Innovation Management
Real Estate

UNDERGRADUATE MINOR

Business Administration

The College of Business is accredited by the AACSB, the International 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) and master of accountancy (M.Acc.).

The programs of study offered provide functional business education in accounting, finance, information systems, finance, marketing, organization and innovation management, management operations, 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, <http://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. Additionally, students may qualify to teach business subjects at the secondary and postsecondary levels by completing the requirements for the business education and marketing education teacher licensure and credentialing

program. Admission to teacher licensure is through the School of Education, College of Applied Human Sciences.

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.

Students with an index of 111 or above will be admitted directly to the College of Business. Students not meeting the 111 index will be admitted to University Open Option Seeking Business. To be eligible for admission to the College, CSU students (including Open Option Seeking Business) 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 University Open Option Seeking Business and must complete the requirements stated above.

Learning Outcomes

Students will:

- Demonstrate a clear understanding of the marketing concept and articulate the fundamentals and purpose of marketing strategy within an environmental forces framework.
- Deliver messages effectively by articulating an objective toward a targeted audience, employing the correct channel and frame of reference for that audience and, openly seeking feedback.
- Understand the principles of financial management.
- Demonstrate the ability to use accounting information to report financial position and profitability (financial accounting) and to make internal planning and control decisions (managerial accounting).
- Demonstrate a clear understanding of business processes and the role of technology in executing these processes.

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 2.0000 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
BUS 100	Introduction to Business	1	
CIS 150	Business Computing Concepts and Applications	3	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
ECON 204	Principles of Macroeconomics (AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	
MATH 117	College Algebra in Context I ¹ (math placement exam)	1	1B
MATH 118	College Algebra in Context II ¹ (MATH 117)	1	1B
MATH 141	Calculus in Management Sciences (MATH 118)	3	1B
	Biological/physical sciences ²	4	3A
	Global and cultural awareness ³	3	3E
	TOTAL	25	
SOPHOMORE			
ACT 210	Introduction to Financial Accounting (BUS 100)	3	
ACT 220	Introduction to Managerial Accounting (ACT 205 or ACT 210; CIS 150 or concurrent reg. or CS 110 or concurrent reg.)	3	
BUS 200	Business Communications and Report Writing (BUS 100; CO 150 or HONR 193)	3	
BUS 260	Social-Ethical-Regulatory Issues in Business (BUS 100)	3	
STAT 204	Statistics for Business Students (MATH 117)	3	
	Additional communication ⁴	3	2A or 2B
	Arts/humanities ⁵	6	3B
	Biological/physical sciences ²	3	3A
	Historical perspectives ⁶	3	3D
	TOTAL	30	
JUNIOR⁷			
FIN 300	Principles of Finance ⁸ (ACT 205 or ACT 210; AREC 202 or ECON 202; ECON 204; MATH 141 or MATH 155 or MATH 160)	3	4A,4B
MGT 301	Supply Chain Management (AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160; STAT 204 or STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	

College of Business

Course	Title (Prerequisite)	Cr	AUCC
MGT 320	Contemporary Management Principles/Practices (BUS 200, AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160)	3	
MKT 300	Marketing ⁸ (AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160)	3	4B
SENIOR			
BUS 479	Strategic Management (FIN 300 or FIN 305; MGT 301; MGT 305 or MGT 320; MKT 300 or MKT 305)	3	4A, 4C
CIS 400	Information Management in the Enterprise (any two of FIN 300, MGT 301, MGT 320, MKT 300)	3	
TOTAL		<u>6</u>	
CORE TOTAL = 73 credits^{9,10}			

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 from 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 list in category 3B in the AUCC.

⁶ Select from list of courses in category 3D in the AUCC.

⁷ 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.

⁸ 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.

⁹ 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.

¹⁰ Students must choose electives to satisfy one of the following 1) pass a foreign language class at 300 level or higher; **OR** 2) take 6 upper-division credits outside the College of Business in one prefix; **OR** 3) take 12 credits of one prefix outside of the College of Business at any level; **OR** 4) complete one of the interdisciplinary studies programs at Colorado State (ex. Asian Studies, Biotechnology, Environmental Affairs, International Development, Latin American and Caribbean Studies, Russian, Eastern and Central European Studies, etc.); **OR** 5) complete 1 semester of study abroad.

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
AREC 202	Agricultural and Resource Economics	3	3C
OR			
ECON 202*	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
BUS 205	Legal and Ethical Issues in Business		
ECON 204*	Principles of Macroeconomics (AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
TOTAL		<u>9</u>	
JUNIOR			
FIN 305	Fundamentals of Finance (ACT 205 or ACT 210; ECON 204)	3	

Course	Title (Prerequisite)	Cr	AUCC
MGT 305	Fundamentals of Management	3	
MKT 305	Fundamentals of Marketing (AREC 202 or ECON 101 or ECON 202)	3	
TOTAL		<u>9</u>	
SENIOR			
<i>Select one course from the following:</i>			
BUS 405A	Contemporary Business Topics- Entrepreneurship (two courses from FIN 305, MGT 305, MKT 305)	3	
BUS 405B	Contemporary Business Topics- International Business (two courses from FIN 305, MGT 305, MKT 305)	3	
BUS 405C	Contemporary Business Topics- Business Information (two courses from FIN 305, MGT 305, MKT 305)	3	
TOTAL		<u>9</u>	
PROGRAM TOTAL = 24 credits			

*Additional credits may be required because of prerequisites.

DEPARTMENT OF ACCOUNTING

Office in Rockwell Hall, Room 205
(970) 491-5102; (970) 491-2676 (fax)
<http://www.biz.colostate.edu/accounting>

Professor Barry L. Lewis, 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 profit and not-for-profit firms. 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 curriculum also prepares

students to become a Certified Management Accountant (CMA) or Certified Internal Auditor (CIA).

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
- Legal knowledge of taxation (federal, state, personal)
- 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:

No accounting course (ACT prefix) with a grade less than C- (1.670) may count toward the accounting concentration.

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
	Electives	3	
JUNIOR			
ACT 311	Intermediate Accounting I (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)	3	
ACT 312	Intermediate Accounting II (ACT 311)	3	
ACT 321	Cost Management (ACT 220)	3	
ACT 350	Accounting Information Systems (ACT 220; ACT 321)	3	
	Accounting elective ¹	3	
	Electives	3	
	TOTAL	18	

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
ACT 330	Introduction to Taxation (ACT 205 or ACT 210)	3	
ACT 411	Advanced Accounting (ACT 312)	3	
ACT 441	Auditing Practices (ACT 312; ACT 350)	3	
	Electives ²	17	
	TOTAL	26	

PROGRAM TOTAL = 120 credits

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. Nine of these credits must be at the 300- or 400- level.

Business Education Option

Students interested in pursuing a teaching license through Colorado State University may refer to the School of Education section in the College of Applied Human Sciences chapter in this catalog for general information. Detailed information about the Educator Licensing Program and licensure requirements are available on the program's Web site (<http://soe.cahs.colostate.edu/Licensure>) or in room 100 of the Education Building.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BUS 100	Introduction to Business	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	6	3B
	Biological/physical sciences ²	7	3A
	Historical perspectives ²	3	3D
	Elective	2	
	TOTAL	30	
SOPHOMORE			
ACT 210	Introduction to Financial Accounting (BUS 100)	3	
ACT 220	Introduction to Managerial Accounting (ACT 205 or ACT 210; CIS 150 or concurrent reg. or CS 110 or concurrent reg.)	3	
BUS 200	Business Communications and Report Writing (BUS 100; CO 150 or HONR 193)	3	
BUS 260	Social-Ethical-Regulatory Issues in Business (BUS 100)	3	
ECON 204	Principles of Macroeconomics (AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3C
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
MATH 141	Calculus in Management Sciences (MATH 118)	3	1B
STAT 204	Statistics for Business Students (MATH 117)	3	
	Global and cultural awareness ⁴	3	3E
	TOTAL	32	

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
ACT 311	Intermediate Accounting I (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)	3	
ACT 312	Intermediate Accounting II (ACT 311)	3	
EDUC 350	Instruction I-Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3	
EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4	
EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
FIN 300	Principles of Finance (ACT 205 or ACT 210; AREC 202 or ECON 202; ECON 204; MATH 141 or MATH 155 or MATH 160)	3	4A,4B
MGT 301	Supply Chain Management (AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160; STAT 204 or STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	
MGT 320	Contemporary Management Principles/Practices (AREC 202 or ECON 202; BUS 200; MATH 141 or MATH 155 or MATH 160)	3	
MKT 300	Marketing (AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160)	3	4B
	Elective	4	
	TOTAL	30	
SENIOR			
ACT 321	Cost Management (ACT 220)	3	
ACT 350	Accounting Information Systems (ACT 220)	3	
ACT 421	Management Control Systems (ACT 220)	3	
BUS 479	Strategic Management (FIN 300 or FIN 305; MGT 301; MGT 305 or MGT 320; MKT 300 or MKT 305)	3	4A, 4C
EDCT 431	Methods/Materials in Business Education (EDUC 350 or concurrent reg. or EDUC 450 or concurrent reg.; concurrent reg. in EDCT 492)	4	
EDCT 485	Student Teaching (EDUC 450; EDCT 431)	11	
EDCT 492	Seminar-Professional Relations (EDUC 450; EDCT 431; concurrent reg. in EDCT 485)	1	
	TOTAL	28	
PROGRAM TOTAL = 120 credits			

¹ Select two courses from list of courses in category 3B of the All-University Core Curriculum (AUCC).

² Select from list of courses in category 3A of the AUCC. One course must have a laboratory component.

³ Select from list of courses in category 3D of the AUCC.

⁴ Select from list of courses in category 3E of the AUCC.

NOTE: A one credit independent study may be needed depending on documentation of meeting business content requirements as detailed in Colorado's Business and Marketing Education Guidelines.

DEPARTMENT OF COMPUTER INFORMATION SYSTEMS

Office in Rockwell Hall, Room 154
(970) 491-6203
<http://www.biz.colostate.edu/cis>

Professor Jon 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 (Prerequisite)	Cr	AUCC
SOPHOMORE			
CIS 210	Information Technology in Business	3	
CIS 240	Application Design and Development (CIS 210)	3	
	TOTAL	6	
JUNIOR			
CIS 320	Project Management for Information Systems (CIS 120 or CIS 210)	3	
CIS 350	Operating Systems and Networks (CIS 240)	3	
CIS 355	Business Database Systems (CIS 120 or CIS 210)	3	
CIS 360	Systems Analysis and Design (CIS 240)	3	
	Electives	6	
	TOTAL	18	
SENIOR			
	<i>Select two courses from the following:¹</i>		
CIS 340	Advanced Application Design and Development (CIS 240)	3	
CIS 410	Web Application Development (CIS 240; CIS 355)	3	
CIS 411	Enterprise Resource Planning Systems (ACT 220; FIN 300 or FIN 305; MGT 305 or MGT 320; MKT 300 or MKT 305)	3	
CIS 413	Advanced Networking and Security (CIS 350)	3	
CIS 462	Systems Development Project (CIS 320; CIS 360)	3	
	OR		
CIS 487	Internship (CIS 355; CIS 360)	3	
	Electives ²	14	
	TOTAL	23	
PROGRAM TOTAL = 120 credits			

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. Nine to ten 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

<http://www.biz.colostate.edu/finance>

Professor Timothy J. Gallagher, Chair

Finance Concentration

This program is designed to provide undergraduate students with comprehensive knowledge to effectively apply financial quantitative skills in specific areas such as time value of money and risk analysis. Finance students learn to apply market concepts, security analysis, and forecasting to the management of financial assets. The field is complex, constantly evolving, and action oriented.

Finance refers to the financial management of businesses and the management of their investments. The finance program prepares students to make and defend decisions in

financial planning, control, and policy. Students develop an understanding of the strategy and policies of financial institutions as well as the responses of firms to changing conditions in money and capital markets. The program also focuses on the theoretical and practical aspects of corporate securities investment, mutual funds, and other investment instruments relevant to individual and institutional investors. Computer applications and disciplines such as economics, accounting, and statistics are extensively used to evaluate investment alternatives and to construct asset portfolios to meet private and public investment objectives.

Learning Outcomes

At the end of the program, students will have demonstrated how to:

- Solve time value of money problems.
- Value securities.
- Measure and manage risk.
- Analyze the financial health of companies.
- Manage investment portfolios.

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
	Elective	3	
SOPHOMORE			
	Elective	3	
JUNIOR			
FIN 310	Financial Markets and Institutions (ECON 204)	3	
FIN 355	Principles of Investments (FIN 300 or FIN 305; FIN 310)	3	
	Upper division accounting	3	
	Option courses ¹	3-6	
	Electives	6	
	TOTAL	18-21	
SENIOR			
FIN 475	International Business Finance (FIN 300 or FIN 305)	3	
	Option courses ¹	6-9	
	Electives	11	
	TOTAL	20-23	
PROGRAM TOTAL = 120 credits			

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.

Corporate Finance Option

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
FIN 370	Financial Management-Theory and Application (FIN 300 or FIN 305)	3	
SENIOR			
FIN 470	Financial Risk Management (FIN 355)	3	
FIN 471	Enterprise Valuation (FIN 355; FIN 370) Finance or accounting elective	3	
	TOTAL	<u>3</u>	
OPTION TOTAL = 12 credits			

Financial Planning Option

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
FIN 342	Risk Management and Insurance (FIN 300 or FIN 305)	3	
FIN 350	Professional Financial Planning (FIN 300 or FIN 305; FIN 310)	3	
	TOTAL	<u>6</u>	
SENIOR			
FIN 450	Management of Financial Institutions (FIN 300 or FIN 305; FIN 310) Finance or real estate elective	3	
	TOTAL	<u>3</u>	
OPTION TOTAL = 12 credits			

Investment Analysis Option

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
FIN 311	Debt Securities Analysis (FIN 300 or FIN 305; FIN 310 or ECON 315; FIN 355)	3	
SENIOR			
FIN 455	Advanced Portfolio Management (FIN 311; FIN 355)	3	
FIN 470	Financial Risk Management (FIN 355) Finance or real estate elective	3	
	TOTAL	<u>3</u>	
OPTION TOTAL = 12 credits			

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 Objectives

Depending on the option selected, students will have gained skills and demonstrated understanding of:

- 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

Depending on the option completed, graduates find professional employment in many fields. Those students selecting the commercial real estate option 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. Those students selecting the real estate finance option 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. Those students selecting the residential real estate option 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:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
	Elective	3	
SOPHOMORE			
	Elective	3	
JUNIOR			
FIN 310	Financial Markets and Institutions (ECON 204)	3	
REL 360	Real Estate Principles (ECON 204)	3	
REL 367	Real Estate Law (BUS 205 or BUS 260 or HDFS 403)	3	
	Option courses ¹	0-3	
	Electives	<u>6</u>	
	TOTAL	15-18	
SENIOR			
REL 460	Real Estate Finance and Investment (FIN 300 or FIN 305; REL 360)	3	
	Option courses ¹	12-15	
	Electives	<u>8</u>	
	TOTAL	23-26	
PROGRAM TOTAL = 120 credits			

¹ In order to complete the real estate concentration, the business administration core courses and the real estate concentration core courses must be completed. Students

must also select one of the following options as well: commercial real estate, real estate finance, or residential real estate.

Commercial Real Estate Option

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
FIN 487	Internship	3	
REL 430	Real Estate Market Analysis (REL 360)	3	
REL 440	Real Estate Development (REL 367; REL 430; REL 460)	3	
----- <i>Select two courses from the following:</i>			
CON 362	Construction Contracts (CON 363 or concurrent reg.)	3	
CON 363	Plan Reading for Estimating (CON 131; CON 151; CON 261 or concurrent reg.)	3	
CON 461	Construction Project Scheduling and Cost Control (CON 365 or concurrent reg.)	3	
MGT 476	Negotiation and Conflict Management (MGT 320)	3	
NR 319	Geospatial Applications in Natural Resources (junior standing)	3	
OR			
NR 322	Introduction to Geographic Information Systems	4	
NR 440	Land Use Planning	3	
REL 435	Real Estate Marketing and Brokerage (REL 360; REL 367)	3	
	Upper division finance course	3	
----- TOTAL		15	

OPTION TOTAL = 15 credits

Real Estate Finance Option

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
FIN 311	Debt Securities Analysis (FIN 300 or FIN 305; FIN 310 or ECON 315; FIN 355)	3	
OR			
FIN 355	Principles of Investments (FIN 300 or FIN 305; FIN 310)	3	
----- <i>Select one course from the following:</i>			
FIN 455	Advanced Portfolio Management (FIN 311; FIN 355)	3	
NR 440	Land Use Planning	3	
REL 435	Real Estate Marketing and Brokerage (REL 360; REL 367)	3	
REL 440	Real Estate Development (REL 367; REL 430; REL 460)	3	

FIN 470	Financial Risk Management (FIN 355)	3	
REL 430	Real Estate Market Analysis (REL 360)	3	
	Elective	3	
----- TOTAL		12	

OPTION TOTAL = 15 credits

Residential Real Estate

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
FIN 487	Internship	3	
REL 435	Real Estate Marketing and Brokerage (REL 360; REL 367)	3	
----- <i>Select three courses from the following</i>			
CON 362	Construction Contracts (CON 363 or concurrent reg.)	3	
CON 363	Plan Reading for Estimating (CON 131; CON 151; CON 261 or concurrent reg.)	3	
FIN 350	Professional Financial Planning (FIN 300 or FIN 305; FIN 310)	3	
MKT 362	Professional Selling (MKT 300 or MKT 305)	3	
MKT 366	Services Marketing (MKT 300 or MKT 305)	3	
MKT 410	Marketing Research (MKT 300 or MKT 305; STAT 204)	3	

Course	Title (Prerequisite)	Cr	AUCC
NR 319	Geospatial Applications in Natural Resources (junior standing)	3	
OR			
NR 322	Introduction to Geographic Information Systems	4	
NR 440	Land Use Planning	3	
REL 430	Real Estate Market Analysis (REL 360)	3	
REL 440	Real Estate Development (REL 367; REL 430; REL 460)	3	
----- Upper division finance course			

OPTION TOTAL = 15 credits

DEPARTMENT OF MANAGEMENT

Office in Rockwell Hall, Room 213

(970) 491-5323

www.biz.colostate.edu/management

Professor Lisa Ellram, 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 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 their 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.
- Skills in change management and innovation.
- Application of business principles/practices in an international context.

Potential Occupations

Some examples include, but are not limited to: 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:

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
	Electives	3	
JUNIOR			
<i>Select three of the following courses:</i>			
MGT 310	Human Resource Management	3	
MGT 330	Designing Organizations-Innovation and Change (MGT 305 or MGT 320)	3	
MGT 375	Advanced Supply Chain Management (MGT 301)	3	
MGT 411	Leadership and Teams Management (MGT 305 or MGT 320)	3	
	Electives	12	
	TOTAL	21	
SENIOR			
<i>Select four of the following courses:</i> ¹			
MGT 325	Leadership Communication (BUS 200)	3	
MGT 340	Entrepreneurship in the Contemporary World	3	
MGT 350	Employment Relations: The Legal Environment	3	
MGT 410	Organizational Behavior (MGT 305 or MGT 320)	3	
MGT 425	Organizational Communication Strategies (FIN 300 or FIN 305; MGT 305 or MGT 320; MKT 300 or MKT 305)	3	
MGT 430	Leadership and Social Responsibility	3	
MGT 470	Managerial Decisions-Issues and Analysis (MGT 301; MGT 305 or MGT 320)	3	
MGT 471	Micro Issues in Supply Chain Management (MGT 301)	3	
MGT 472	Macro Issues in Supply Chain Management (MGT 301)	3	
MGT 473	Employment Relations: Labor and Management	3	
MGT 474	Human Resource Planning and Development (MGT 310)	3	
MGT 475	International Business Management (FIN 300 or FIN 305; MGT 305 or MGT 320; MKT 300 or MKT 305)	3	
MGT 476	Negotiation and Conflict Management (MGT 305 or MGT 320)	3	
MGT 477	Sustainable Supply Chain Management (MGT 301)	3	

Course	Title (Prerequisite)	Cr	AUCC
MGT 478	Projects in Supply Chain Management (MTG 301; MGT 375 or MGT 477)	3	
	Electives ²	11	
	TOTAL	23	

PROGRAM TOTAL = 120 credits

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.

Business Education Option

Students interested in pursuing a teaching license through Colorado State University may refer to the School of Education section in the College of Applied Human Sciences chapter in this catalog for general information. Detailed information about the Educator Licensing Program and licensure requirements are available on the program's Web site (<http://soe.cahs.colostate.edu/Licensure>) or in room 100 of the Education Building.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BUS 100	Introduction to Business	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	6	3B
	Biological/physical sciences ²	7	3A
	Historical perspectives ³	3	3D
	Elective	2	
	TOTAL	30	
SOPHOMORE			
ACT 210	Introduction to Financial Accounting (BUS 100)	3	
ACT 220	Introduction to Managerial Accounting (ACT 205 or ACT 210; CIS 150 or concurrent reg. or CS 110 or concurrent reg.)	3	
BUS 200	Business Communications and Report Writing (BUS 100; CO 150 or HONR 193)	3	
BUS 260	Social-Ethical-Regulatory Issues in Business (BUS 100)	3	
ECON 204	Principles of Macroeconomics (AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3C
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
MATH 141	Calculus in Management Sciences (MATH 118)	3	1B
MGT 340	Entrepreneurship in the Contemporary World	3	
MKT 300	Marketing (AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160)	3	4B
STAT 204	Statistics for Business Students (MATH 117)	3	
	TOTAL	32	
JUNIOR			
ACT 431	Corporate Taxation (ACT 220; ACT 330)	3	4A, 4B
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	

Course	Title (Prerequisite)	Cr	AUCC
EDUC 350	Instruction I-Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3	
EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent reg. in EDUC 350; admission to teacher licensure)	1	
EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4	
EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
EDCT 431	Methods/Materials in Business Education (EDUC 350 or concurrent reg. or EDUC 450 or concurrent reg.; concurrent reg. in EDCT 492)	4	
FIN 300	Principles of Finance (ACT 205 or ACT 210; AREC 202 or ECON 202; ECON 204; MATH 141 or MATH 155 or MATH 160)	3	
MGT 420	New Venture Creation (MGT 340)	3	
	Global and cultural awareness ⁴	3	3E
	Group I, II, or III courses ⁵	6	
	TOTAL	34	
SENIOR			
BUS 479	Strategic Management (MGT 301; FIN 300 or FIN 305; MGT 305 or MGT 320; MKT 300 or MKT 305)	3	4A, 4C
EDCT 485	Student Teaching (EDUC 450; EDCT 431)	11	
EDCT 492	Seminar-Professional Relations (EDUC 450; EDCT 431; concurrent reg. in EDCT 485)	1	
MGT 301	Supply Chain Management (AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160; STAT 204 or STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	
MGT 320	Contemporary Management Principles/Practices (AREC 202 or ECON 202; BUS 200; MATH 141 or MATH 155 or MATH 160)	3	
MGT 440	New Venture Management (MGT 420)	3	
	Group I, II, or III course ⁵	3	
	TOTAL	27	
PROGRAM TOTAL = 123 credits			

¹ Select two courses from list of courses in category 3B of the All-University Core Curriculum (AUCC).

² Select from list of courses in category 3A of the AUCC. One course must have a laboratory component.

³ Select from list of courses in category 3D of the AUCC.

⁴ Select from list of courses in category 3E of the AUCC.

⁵ Select from the following groups of courses.

Course	Title (Prerequisite)	Cr
Group I: Select one of the following:		
CIS 240	Application Design and Development (CIS 210) [use this course for an information system focus]	3
MKT 320	Integrated Marketing Communications (MKT 300 or MKT 305) [use this course if there is a possibility that you may wish to add Marketing as an endorsement]	3
REL 360	Real Estate Principles (ECON 204)	3
Group II: Select one of the following:		
CIS 360	Systems Analysis and Design (CIS 240) [use this course for an information system focus]	3
MKT 440	Pricing and Financial Analysis in Marketing (MKT 300 or MKT 305) [use this course if there is a possibility that you may wish to add Marketing as an endorsement]	3
REL 460	Real Estate Finance and Investment (FIN 300 or FIN 305)	3
Group III: Select one of the following:		
CIS 355	Business Database Systems (CIS 120 or CIS 210) [use this course for an information system focus]	3
MKT 360/DM 360	Retailing (MKT 300 or MKT 305) [use this course if there is a possibility that you may wish to add Marketing as an endorsement]	3
REL 367	Real Estate Law (BUS 205 or BUS 260 or HDFS 403)	3

DEPARTMENT OF MARKETING

Office in Rockwell Hall, Room 111

(970) 491-5063

<http://www.biz.colostate.edu/marketing>

Professor Thomas N. Ingram, 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 an organizational function and a set of processes for creating, communicating, and delivering value to customers and for managing customer relations in ways that benefit the organization and its stakeholders. 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.

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

College of Business

making. Internships and volunteer experiences often enhance skills and marketability.

Examples of possible careers include, but are not limited to: advertising; brand and product management; customer affairs; industrial marketing; international marketing; marketing management science and systems analysis; market research; physical distribution; purchasing; retailing management; sales and sales management; wholesaling management; service marketing; promotion management; brand management and distribution.

In addition to the business administration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
	Electives	3	
JUNIOR			
MKT 310	Marketing Decision Making (FIN 300 or FIN 305; MKT 300 or MKT 305)	3	
MKT 361	Buyer Behavior (MKT 300 or MKT 305)	3	
MKT 410	Marketing Research (MKT 300 or MKT 305; STAT 204)	3	
	Electives	12	
	TOTAL	21	
SENIOR			
<i>Select three of the following courses:</i>			
MKT 320	Integrated Marketing Communications (MKT 300 or MKT 305)	3	
MKT 330	Business Customer Relationships (MKT 300 or MKT 305)	3	
MKT 360/DM 360	Retailing (MKT 300 or MKT 305)	3	
MKT 362	Professional Selling (MKT 300 or MKT 305)	3	
MKT 363	Sales Management (MKT 300 or MKT 305)	3	
MKT 364	Product Development and Management (MKT 300 or MKT 305)	3	
MKT 365	International Marketing (MKT 300 or MKT 305)	3	
MKT 366	Services Marketing (MKT 300 or MKT 305)	3	
MKT 440	Pricing and Financial Analysis in Marketing (MKT 300 or MKT 305)	3	
MKT 492	Seminar (MKT 300 or MKT 305; written consent of instructor)	3	
MKT 479	Marketing Strategy and Management (MKT 310; MKT 410)	3	
	Electives ¹	11	
	TOTAL	23	
PROGRAM TOTAL = 120 credits			

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.

Marketing Education Option

Students interested in pursuing a teaching license through Colorado State University may refer to the School of Education section in the College of Applied Human Sciences chapter in this catalog for general information. Detailed information about the Educator Licensing Program and licensure requirements are available on the program's Web site (<http://soe.cahs.colostate.edu/Licensure>) or in room 100 of the Education Building.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BUS 100	Introduction to Business	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	6	3B
	Biological/physical sciences ²	7	3A
	Historical perspectives ³	3	3D
	Elective	2	
	TOTAL	30	
SOPHOMORE			
ACT 210	Introduction to Financial Accounting (BUS 100)	3	
ACT 220	Introduction to Managerial Accounting (ACT 205 or ACT 210; CIS 150 or concurrent reg. or CS 110 or concurrent reg.)	3	
BUS 200	Business Communications Processes (BUS 100; CO 150 or HONR 193)	3	
BUS 260	Social-Ethical-Regulatory Issues in Business. (BUS 100)	3	
ECON 204	Principles of Macroeconomics (AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3C
MATH 141	Calculus in Management Sciences (MATH 118)	3	1B
MKT 300	Marketing (AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	4B
STAT 204	Statistics for Business Students (MATH 117)	3	
	Global and cultural awareness ⁴	3	3E
	TOTAL	30	
JUNIOR			
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
EDUC 350	Instruction I-Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3	
EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent reg. in EDUC 350; admission to teacher licensure)	1	
FIN 300	Principles of Finance (ACT 205 or ACT 210; AREC 202 or ECON 202; ECON 204; MATH 141 or MATH 155 or MATH 160)	3	4A, 4B
MGT 301	Supply Chain Management (AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160; STAT 204 or STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	
MGT 320	Contemporary Management Principles/Practices (AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160)	3	
MKT 320	Integrated Marketing Communications (MKT 300 or MKT 305)	3	
MKT 330	Business Customer Relationships (MKT 300 or MKT 305)	3	
MKT 360/DM 360	Retailing (MKT 300 or MKT 305)	3	
MKT 410	Marketing Research (MKT 300 or MKT 305; STAT 204)	3	
MKT 440	Pricing and Financial Analysis in Marketing (MKT 300 or MKT 305)	3	

Course	Title (Prerequisite)	Cr	AUCC
	TOTAL	33	
SENIOR			
BUS 479	Strategic Management (FIN 300 or FIN 305; MGT 301; MGT 305 or MGT 320; MKT 300 or MKT 305)	3	4A, 4C
EDCT 431	Methods/Materials in Business Education (EDUC 350 or concurrent reg. or EDUC 450 or concurrent reg.; concurrent reg. in EDCT 492)	4	
EDCT 441	Methods/Materials-Vocational Marketing Education (EDCT 431; EDUC 350 or concurrent reg. or EDUC 450 or concurrent reg.)	1	
EDCT 485	Student Teaching (EDUC 450; EDCT 431; EDCT 441)	12	
EDCT 492	Seminar-Professional Relations (EDUC 450; EDCT 431; EDCT 441; concurrent reg. in EDCT 485)	1	
EDCT 494	Independent Study	1	
EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4	
EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
MKT 479	Marketing Strategy and Management (MKT 310; MKT 410)	3	
	TOTAL	30	
PROGRAM TOTAL = 123 credits			

² Select from list of courses in category 3A of the AUCC. One course must have a laboratory component.

³ Select from list of courses in category 3D of the AUCC.

⁴ Select from list of courses in category 3E of the AUCC.

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.) and master of accountancy (M.Acc.). 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.

Students interested in graduate work should refer to the *Graduate and Professional Bulletin*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, and the College's website, <http://www.biz.colostate.edu>.

¹ Select two courses from list of courses in category 3B of the All-University Core Curriculum (AUCC).

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

Professor Sandra Woods, Dean
Professor Thomas Siller, Associate Dean

UNDERGRADUATE MAJORS

Chemical Engineering¹
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 are either accredited at the basic level by the Accreditation Board for Engineering and Technology (ABET) except for the newest major, computer engineering, which was evaluated for initial accreditation in 2007.

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, and
- 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,

¹ A request to change the name of the major in chemical engineering to chemical and biological engineering was under consideration by the Board of Governors and the Colorado Department of Higher Education at the time of the printing of the catalog. It is anticipated the name of the major will be changed by the beginning of Fall Semester 2007.

- 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; and
- 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 <http://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). Credits for these review courses may not be used toward an engineering degree.

Transfer Students

Students who wish to transfer into engineering must have completed at least one semester of calculus and one semester of calculus-based physics or chemistry equivalent to CHEM 111, with at least one B and no grade less than a C. 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. Advisers in each department are available to assist students who wish to transfer.

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 major at Colorado State to an engineering major must have one semester of calculus (MATH 160), one semester of physics (PH 141) or chemistry (CHEM 111) with at least one B and no grade less than a C, and a minimum 2.300 grade point average. Some majors may specify more stringent math, science, and grade point average requirements to be eligible for consideration. Students 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 CSU 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

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 <http://www.engr.colostate.edu/es/>.

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECE 102	Digital Circuit Logic	4	
ECE 103	DC Circuit Analysis (MATH 160)	3	
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B

Course	Title (Prerequisite)	Cr	AUCC
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
PH 141	Physics for Scientists and Engineering I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
	Global and cultural awareness ¹	3	3E
	TOTAL	31	
SOPHOMORE			
CIVE 260	Engineering Mechanics-Statics (MATH 160; PH 141 or concurrent reg.)	3	
CIVE 261	Engineering Mechanics-Dynamics (CIVE 260)	3	
ECE 202	Circuit Theory Applications (ECE 103)	4	
ECE 251	Introduction to Microprocessors (ECE 102 with a C- or better)	4	
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
MATH 340	Introduction to Ordinary Differential Equations (MATH 255 or MATH 261)	4	4A, 4B
MECH 237	Introduction to Thermal Sciences (MATH 160; PH 141)	3	
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
	Social/behavioral sciences ²	3	3C
	TOTAL	33	
JUNIOR			
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
CIVE 300	Fluid Mechanics (CIVE 261 or CIVE 262; MECH 237)	4	
OR			
MECH 342	Mechanics and Thermodynamics of Flow Processes (MATH 340 with a C or better; MECH 337 with a C or better or concurrent reg.; PH 141 with a C or better)	3	
ECE 341	Electromagnetic Fields and Devices I (MATH 340 with a C- or better or MATH 345 with a C- or better; PH 142 with a C- or better)	3	
ECE 342	Electromagnetic Fields and Devices II (ECE 341 with a C- or better)	3	
PH 314	Introduction to Modern Physics (PH 142; MATH 261 or concurrent reg.)	4	
PH 315	Modern Physics Laboratory (PH 314 or concurrent reg.)	2	
	Additional communication ³	3	2A or 2B
	Arts/humanities ⁴	6	3B
	Historical perspectives ⁵	3	3D
	TOTAL	31-32	
SENIOR			
ECE 401	Senior Design Project I (ECE 312 with a C- or better; CS 301 with a C- or better or ECE 332 with a C- or better; ECE 342 with a C- or better or ECE 452 with a C- or better)	3	4A
ECE 402	Senior Design Project II (ECE 401)	3	4C
PH 353	Optics and Waves (MATH 261; PH 142)	4	
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	
	Mathematics ⁶	3	
	Technical electives ⁷	17-18	
	Electives	5	
	TOTAL	38-39	
PROGRAM TOTAL = 134 credits			

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.

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.

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 broadness 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CIVE 102	Introduction: Civil/Environmental Engineering	3	
CIVE 103	Engineering Graphics and Computing (CIVE 102)	3	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
L* 200 ¹	Second Year Language I (L* 107 or L* 108 or placement exam)	3	
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	
TOTAL		31	
SOPHOMORE			
ECON 204	Principles of Macroeconomics (AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	
L* 201 ¹	Second Year Language II (L* 200 or L* 228A or placement exam)	3	
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	

Course	Title (Prerequisite)	Cr	AUCC
MATH 340	Introduction to Ordinary Differential Equations (MATH 255 or MATH 261)	4	4A, 4B
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
POLS 131	Current World Problems	3	3E
SPCM 200	Public Speaking	3	2A
Technical electives ²		3	
TOTAL		33	
JUNIOR			
CIVE 260	Engineering Mechanics-Statics (MATH 160; PH 141 or concurrent reg.)	3	
CIVE 261	Engineering Mechanics-Dynamics (CIVE 260)	3	
MECH 237	Introduction to Thermal Sciences (MATH 160; PH 141)	3	
POLS 232	International Relations	3	
OR			
POLS 241	Comparative Government and Politics	3	
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	
Foreign language minor ³		6	
Historical perspectives ⁴		3	3D
Electives from approved list ⁵		3	
Technical electives ²		3	
TOTAL		30	
SENIOR			
CIVE 300	Fluid Mechanics (CIVE 261 or CIVE 262; MECH 237)	4	
ECE 204	Introduction to Electrical Engineering (MATH 161; PH 142)	3	
ECON 370	Comparative Economic Systems (AREC 202 or ECON 101 or ECON 202)	3	
Foreign language minor ³		6	
Technical electives ²		13-15	
TOTAL		29-31	
FIFTH YEAR			
<i>Select one of the following pairs of courses:</i>			
CBE 451	Chemical Engineering Design I (CBE 320; CBE 330; CBE 442/ENVE 442 or concurrent reg.) ⁶	3	4C
CBE 452	Chemical Engineering Design II (CBE 451)	3	4C
OR			
CIVE 402	Senior Design Principles (CIVE 303 or CIVE 322/ENVE 322) ⁶	3	
CIVE 403	Senior Project Design (CIVE 402)	3	4C
OR			
ECE 401	Senior Design Project I (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) ⁶	3	
ECE 402	Senior Design Project II (ECE 401)	3	4C
OR			
MECH 486A	Engineering Design Practicum I (CIVE 363 or concurrent reg.; MECH 302 with a C or better; MECH 338 or concurrent reg.) ⁶	4	4C
MECH 486B	Engineering Design Practicum II (MECH 486A with a C or better)	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	
TOTAL		32-34	
PROGRAM TOTAL = 157 credits			

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.

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A

Select one of the following pairs of courses:			
CIVE 102	Introduction: Civil/Environmental Engineering	3	
CIVE 103	Engineering Graphics and Computing (CIVE 102)	3	
OR			
MECH 101	Introduction to Manufacturing Processes (Mechanical engineering freshman majors only)	3	
MECH 102	Mechanical Engineering Problem Solving (concurrent registration in MATH 160 and PH 141)	3	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
PH 141	Physics for Scientists and Engineering I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
	Global and cultural awareness ¹	3	3E
	TOTAL	30	
SOPHOMORE			
CIVE 260	Engineering Mechanics-Statics (MATH 160; PH 141 or concurrent reg.)	3	
CIVE 261	Engineering Mechanics-Dynamics (CIVE 260)	3	
ECE 204	Introduction to Electrical Engineering (MATH 161; PH 142)	3	
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
MATH 340	Introduction to Ordinary Differential Equations (MATH 255 or MATH 261)	4	4A, 4B
MECH 201	Engineering Design I (MECH 102 with a C or better)	3	
MECH 337	Thermodynamics (MATH 261 with a C or better; PH 141 with a C or better)	4	
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
	Historical perspectives ²	3	3D
	TOTAL	32	
JUNIOR			
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	

Course	Title (Prerequisite)	Cr	AUCC
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
CIVE 300	Fluid Mechanics (CIVE 261 or CIVE 262; MECH 237)	4	
OR			
MECH 342	Mechanics and Thermodynamics of Flow Processes (MATH 340 with a C or better; MECH 337 with a C or better or concurrent reg.; PH 141 with a C or better)	3	
CIVE 360	Mechanics of Solids (CIVE 260 or CIVE 262)	3	
CIVE 367	Structural Analysis (CIVE 360)	3	
MECH 302	Engineering Design III (MECH 202 with a C or better; MECH 307 or a C or better or concurrent reg.; MECH 324 with a C or better or concurrent reg.; MECH 325 with a C or better or concurrent reg.; MECH 331 with a C or better or concurrent reg.; MECH 342 with a C or better; MECH 344 with a C or better or concurrent reg.) ³	3	
MECH 307	Mechatronics and Measurement Systems (CIVE 261 with a C or better; ECE 204 with a C or better; MATH 340 with a C or better)	4	
	Additional communication ⁴	3	2A or 2B
	Arts/humanities ⁵	6	3B
	Social/behavioral sciences ⁶	3	3C
	TOTAL	32-33	
SENIOR			

Select one pair of courses from the following:			
CIVE 402	Senior Design Principles (CIVE 303 or CIVE 322/ENVE 322) ³	3	
CIVE 403	Senior Project Design (CIVE 402)	3	4C
OR			
MECH 486A	Engineering Design Practicum I (CIVE 363 or concurrent reg.; MECH 302 with a C or better; MECH 338 or concurrent reg.) ³	4	4C
MECH 486B	Engineering Design Practicum II (MECH 486A with a C or better)	4	4C
MECH 344	Heat and Mass Transfer (MECH 342 with a C or better)	3	
MECH 417	Control Systems (MATH 340; MECH 302)	3	
MECH 460	Aeronautics (MECH 342)	3	
MECH 468	Space Propulsion and Power Engineering (ECE 204; MECH 337; MECH 342)	3	
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	
	Mathematics, upper division	6	
	Technical electives ⁷	11-12	
	Electives	3	
	TOTAL	42-43	
PROGRAM TOTAL = 137 credits			

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 from the list of courses in category 3B in the AUCC.

⁶ Select from the list of courses in category 3C in the AUCC.

⁷ Select courses with adviser's approval.

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.

College of Engineering

Detailed information about the Educator Licensing Program and licensure requirements are available on the program's web site (<http://soe.cahs.colostate.edu/Licensure>) or in room 100 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent registration or CHEM 117 or concurrent reg.)	1	3A

<i>Select one pair of courses from the following:</i>			
CBE 101	Chemical and Biological Engineering I	3	
CBE 102	Chemical and Biological Engineering II (CBE 101)	3	
OR			
CIVE 102	Introduction: Civil/Environmental Engineering	3	
CIVE 103	Engineering Graphics and Computing (CIVE 102)	3	
OR			
ECE 102	Digital Circuit Logic	4	
ECE 103	DC Circuit Analysis (MATH 160)	3	
OR			
MECH 101	Introduction to Manufacturing Processes (mechanical engineering freshman majors only) ¹	3	
MECH 102	Mechanical Engineering Problem Solving (concurrent registration in MATH 160 or concurrent reg.; PH 141 or concurrent reg.)	3	

CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition placement exam or CO 130)	3	1A
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
	Arts and humanities ²		
	TOTAL	<u>6</u>	3B
		33-34	
SOPHOMORE			
CIVE 262	Engineering Mechanics (MATH 161; PH 141)	4	
ECE 204	Introduction to Electrical Engineering (MATH 161; PH 142)	3	
EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3C
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
MATH 340	Introduction to Ordinary Differential Equations (MATH 255 or MATH 261)	4	4A, 4B
MECH 201	Engineering Design I (MECH 102) ³	3	
MECH 237	Introduction to Thermal Sciences (MATH 160; PH 141)	3	
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
	TOTAL	<u>32</u>	
JUNIOR			
CIVE 300	Fluid Mechanics (CIVE 261 or CIVE 262; MECH 237)	4	
CIVE 360	Mechanics of Solids (CIVE 260 or CIVE 262)	3	
CIVE 367	Structural Analysis (CIVE 360)	3	

Course	Title (Prerequisite)	Cr	AUCC
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
EDUC 350	Instruction I-Individualization/Management (EDUC 275; EDUC 340; concurrent registration in EDUC 386; admission to Teacher Licensure Program)	3	
EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent registration in EDUC 350; admission to teacher licensure)	1	
MECH 307	Mechatronics and Measurement Systems (CIVE 261 with a C or better; ECE 204 with a C or better; MATH 340 with a C or better) ¹	4	
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	
	Technical electives ⁴		
	TOTAL	<u>7</u>	
		30	
SENIOR			

<i>Select one pair of courses from the following:</i>			
CIVE 402	Senior Design Principles (CIVE 303 or CIVE 322/ENVE 322) ⁵	3	
CIVE 403	Senior Project Design (CIVE 402)	3	4C
OR			
MECH 486A	Engineering Design Practicum I (CIVE 363 or concurrent reg.; MECH 302 with a C or better; MECH 338 or concurrent reg.) ¹	4	4C
MECH 486B	Engineering Design Practicum II (MECH 486A with a C or better)	4	4C

EDCT 465	Methods and Materials in Technology Education (EDUC 350 or concurrent reg. or EDUC 450 or concurrent reg.)	3	
EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4	
EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
MECH 325	Machine Design (CIVE 360 with a C or better)	3	
SPCM 200	Public Speaking	3	2A
	Global and cultural awareness ⁵	3	3E
	Historical perspectives ⁶	3	3D
	Social/behavioral science ⁷	3	3C
	TOTAL	<u>29-31</u>	
FIFTH YEAR			
EDCT 492	Seminar-Professional Relations (EDUC 450; EDCT 465; concurrent registration in EDUC 485B or EDCT 485)	1	

EDUC 485B	Student Teaching-Secondary (EDUC 450; EDCT 465)	11	
OR			
EDCT 485	Student Teaching (EDUC 450; EDCT 465)	11	
	TOTAL	<u>12</u>	
PROGRAM TOTAL = 137-139 credits			

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).

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.

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 College of Liberal Arts, liberal arts major, for information on the liberal arts concentrations in engineering science.)

DEPARTMENT OF ATMOSPHERIC SCIENCE

Office in Atmospheric Science Building, Foothills
Campus, Room 117
(970) 491-8360
www.atmos.colostate.edu

Professor Richard H. Johnson, 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 in the *Graduate and Professional Bulletin*, <http://graduateschool.colostate.edu/index.asp?url=catalog>

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*.

DEPARTMENT OF CHEMICAL AND BIOLOGICAL ENGINEERING

Office in Glover Building, Room 100
(970) 491-5252
<http://www.engr.colostate.edu/cheme>

Professor David S. Dandy, Interim Department Head

Major in Chemical Engineering²

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, and environmental engineering, and interdisciplinary studies programs in biotechnology and biomedical engineering.

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 www.engr.colostate.edu/cheme/.

Potential Occupations

Chemical and biological engineering graduates find employment with the biotechnology, biomedical, microelectronics, environmental, consulting, petroleum, chemical, food, pharmaceutical, and other private sector industries and with government agencies. Participation in internships, volunteer activities, or cooperative education

² A request to change the name of the major in chemical engineering to chemical and biological engineering was under consideration by the Board of Governors and the Colorado Department of Higher Education at the time of the printing of the catalog. It is anticipated the name of the major will be changed by the beginning of Fall Semester 2007.

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CBE 101	Chemical and Biological Engineering I	3	
CBE 102	Chemical and Biological Engineering II (CBE 101)	3	
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent registration)	1	
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
TOTAL		32	
SOPHOMORE			
CBE 201	Material and Energy Balances (CHEM 111; MATH 160; PH 141; one course in computer programming)	3	
CBE 202	Thermodynamic Process Analysis (CBE 201)	3	
CHEM 345	Organic Chemistry I (CHEM 113; CHEM 114)	4	
CHEM 346	Organic Chemistry II (CHEM 345)	4	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
MATH 340	Introduction to Ordinary Differential Equations (MATH 255 or MATH 261)	4	4A, 4B
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
Arts/humanities ¹		3	3B
TOTAL		33	
JUNIOR			
BC 351	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346)	4	
CBE 320	Chemical and Biological Reactor design (CBE 201; LIFE 102; MATH 340)	3	
CBE 330	Process Simulation (CBE 202; MATH 340)	3	
CBE 331	Momentum Transfer and Mechanical Separations (CBE 201; CBE 202 or MECH 237; MATH 340)	3	4B
CBE 332	Heat Transfer and Mass Transfer Fundamentals (CBE 331; MATH 340)	3	
CBE 333	Momentum and Heat Transfer Laboratory (CBE 332 or concurrent reg.)	2	
CHEM 472	Physical Chemistry for Engineers (CHEM 113; MATH 261; PH 142)	4	
Additional communication ²		3	2A or 2B
Global and cultural awareness ³		3	3E
Bioscience elective ⁴		3	
Technical elective ⁴		3	

Course	Title (Prerequisite)	Cr	AUCC
TOTAL		34	
SENIOR			
CBE 430	Process Control and Instrumentation (CBE 320; CBE 330; CBE 442/ENVE 442)	3	
CBE 442/ENVE 443	Separation Processes (CBE 332; one course in physical chemistry)	3	
CBE 443	Mass Transfer and Separation Laboratory (CBE 442/ENVE 442 or concurrent reg.)	2	
CBE 451	Chemical Engineering Design I (CBE 320; CBE 330; CBE 442/ENVE 442 or concurrent reg.)	3	4C
CBE 452	Chemical Engineering Design II (CBE 451)	3	4A, 4C
CBE 493	Seminar	1	
Arts/humanities ¹		3	3B
Historical perspectives ⁵		3	3D
Social/behavioral sciences ⁶		3	3C
Technical electives ⁴		6	
TOTAL		30	
PROGRAM TOTAL = 129 credits			

¹Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC).

²Select 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).

³Select from the list of courses in category 3E in the AUCC.

⁴Select from departmental list of approved courses.

⁵Select from the list of courses in category 3D in the AUCC.

⁶Select 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*, <http://graduate.school.colostate.edu/index.asp?url=catalog>, 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

<http://www.engr.colostate.edu/ce>

Professor Luis Garcia, Acting Head

Professor Marvin E. Criswell, Associate Department Head

Professor Darrell G. Fontane, Associate Department Head

Laurie Howard, 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 subdisciplines, 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

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CIVE 102	Introduction: Civil/Environmental Engineering	3	
CIVE 103	Engineering Graphics and Computing (CIVE 102)	3	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
	Arts/humanities ¹	6	3B
	Social/behavioral sciences ²	3	3C
	TOTAL	34	
SOPHOMORE			
CIVE 202	Numerical Modeling and Risk Analysis (CIVE 103; MATH 160 or concurrent reg.)	3	
CIVE 203	Engineering Systems and Decision Analysis (CIVE 202)	3	
CIVE 260	Engineering Mechanics-Statics (MATH 160; PH 141 or concurrent reg.)	3	
CIVE 261	Engineering Mechanics-Dynamics (CIVE 260)	3	
CIVE 360	Mechanics of Solids (CIVE 260 or CIVE 262)	3	
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
MATH 340	Introduction to Ordinary Differential Equations (MATH 255 or MATH 261)	4	4A, 4B
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
	TOTAL	33	
JUNIOR			
CIVE 300	Fluid Mechanics (CIVE 261 or CIVE 262; MECH 237)	4	
CIVE 302	Evaluation of Civil Engineering Materials (CHEM 111; CIVE 203; CIVE 360)	3	
CIVE 303	Infrastructure and Transportation Systems (CIVE 203)	3	
CIVE 322/ ENVE 322	Basic Hydrology (CBE 331 or CIVE 300 or WR 416; CIVE 202 or STAT 301 or STAT 315)	3	
CIVE 367	Structural Analysis (CIVE 360)	3	
CIVE 450	Introduction to Geotechnical Engineering (CIVE 360)	4	
CIVE 466	Design and Behavior of Steel Structures (CIVE 367)	3	
ECE 204	Introduction to Electrical Engineering (MATH 161; PH 142)	3	
MECH 237	Introduction to Thermal Sciences (MATH 160; PH 142)	3	
	Additional communications ³	3	2A or 2B
	TOTAL	32	
SENIOR			
CIVE 401	Hydraulic Engineering (CIVE 300)	3	
CIVE 402	Senior Design Principles (CIVE 303)	3	
CIVE 403	Senior Project Design (CIVE 402)	3	4C

College of Engineering

Course	Title (Prerequisite)	Cr	AUCC
CIVE 438/ ENVE 438	Pollution Control Engineering (CHEM 113; CBE 331 or CIVE 300 or MECH 342)	4	
CIVE 467	Design of Reinforced Concrete Structures (CIVE 367)	3	
	Global and cultural awareness ⁴	3	3E
	Historical perspectives ⁵	3	3D
	Technical electives ⁶	9	
	TOTAL	31	

PROGRAM TOTAL = 130 credits

¹ Select two courses from department list of those in category 3B in the All-University Core Curriculum (AUCC).

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.

Soil and Water Resource Engineering Concentration

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory II (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CIVE 102	Introduction: Civil/Environmental Engineering	3	
CIVE 103	Civil Engineering Graphics and Computing (CIVE 102)	3	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
	Arts/humanities ¹	6	3B
	Social/behavioral sciences ²	3	3C
	TOTAL	34	
SOPHOMORE			
CIVE 202	Numerical Modeling and Risk Analysis (CIVE 103; MATH 160 or concurrent reg.)	3	
CIVE 203	Engineering Systems and Decision Analysis (CIVE 202)	3	
CIVE 260	Engineering Mechanics-Statics (MATH 160; PH 141 or concurrent reg.)	3	
CIVE 261	Engineering Mechanics-Dynamics (CIVE 260)	3	
CIVE 360	Mechanics of Solids (CIVE 260 or CIVE 262)	3	
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
MATH 340	Introduction to Ordinary Differential Equations (MATH 255 or MATH 261)	4	4A, 4B
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
	TOTAL	33	
JUNIOR			
CIVE 300	Fluid Mechanics (CIVE 261 or CIVE 262; MECH 237)	4	
CIVE 302	Evaluation of Civil Engineering Materials (CHEM 111; CIVE 203; CIVE 360)	3	

Course	Title (Prerequisite)	Cr	AUCC
CIVE 303	Infrastructure and Transportation Systems (CIVE 203)	3	
CIVE 322/ ENVE 322	Basic Hydrology (CBE 331 or CIVE 300 or WR 416; CIVE 202 or STAT 301 or STAT 315)	3	
CIVE 367	Structural Analysis (CIVE 360)	3	
CIVE 450	Introduction to Geotechnical Engineering (CIVE 360)	4	
ECE 204	Introduction to Electrical Engineering (MATH 161; PH 142)	3	
MECH 237	Introduction to Thermal Sciences (MATH 160; PH 141)	3	
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
	TOTAL	30	

SENIOR

CIVE 401	Hydraulic Engineering (CIVE 300)	3	
CIVE 402	Senior Design Principles (CIVE 303)	3	
CIVE 403	Senior Project Design (CIVE 402)	3	4C
CIVE 425	Soil and Water Engineering (CBE 331 or CIVE 300 or SOCR 240)	3	
CIVE 440	Nonpoint Source Pollution (CIVE 330 or CIVE 322/ENVE 322 or SOCR 240 or WR 416)	3	
SOCR 420	Crop and Soil Management Systems I (HORT 100 or SOCR 100; SOCR 240)	3	
	Additional communications ³	3	2A or 2B
	Global and cultural awareness ⁴	3	3E
	Historical perspectives ⁵	3	3D
	Technical electives ⁶	6	
	TOTAL	33	

PROGRAM TOTAL = 130 credits

¹ Select two courses from departmental list of those in category 3B in the All-University Core Curriculum (AUCC).

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.

Major in Environmental Engineering

Environmental engineers design solutions to prevent future pollution as well as correct existing pollution problems. The curriculum 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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent registration)	1	
CIVE 102	Introduction: Civil/Environmental Engineering	3	
CIVE 103	Engineering Graphics and Computing (CIVE 102)	3	
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
TOTAL		33	
SOPHOMORE			
AREC 202	Agricultural and Resource Economics	3	3C
OR			
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
<i>Select four credits from the following courses:</i>			
BZ 110	Principles of Animal Biology	3	3A
AND			
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
BZ 120	Principles of Plant Biology	4	3A

Course	Title (Prerequisite)	Cr	AUCC
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
CIVE 260	Engineering Mechanics-Statics (MATH 160; PH 141 or concurrent reg.)	3	
CIVE 261	Engineering Mechanics-Dynamics (CIVE 260)	3	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
MATH 340	Introduction to Ordinary Differential Equations (MATH 255 or MATH 261)	4	4A, 4B
	Additional communication ¹	3	2A or 2B
TOTAL		31	
JUNIOR			
CBE 201	Material and Energy Balances (CHEM 111; MATH 160; PH 141; one course in computer programming)	3	
OR			
MECH 237	Introduction to Thermal Sciences (MATH 160; PH 141)	3	
CIVE 300	Fluid Mechanics (CIVE 261 or CIVE 262; MECH 237)	4	
CIVE 322/ENVE 322	Basic Hydrology (CBE 331 or CIVE 300 or WR 416; CECC 202 or STAT 301 or STAT 315)	3	
CIVE 360	Mechanics of Solids (CIVE 260 or CIVE 262)	3	
CIVE 438/ENVE 438	Pollution Control Engineering (CHEM 113; CBE 331 or CIVE 300 or MECH 342)	4	
ERHS 446	Environmental Toxicology (CHEM 245 or CHEM 346)	3	
MIP 300	General Microbiology (BZ 110 or BZ 120 or LIFE 102; CHEM 113)	3	
MIP 301	Fundamental Microbiology Laboratory Techniques (MIP 300 or concurrent reg.)	1	
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	
	Arts/humanities ²	3	3B
	Technical electives ³	3	
TOTAL		33	
SENIOR			
CIVE 401	Hydraulic Engineering (CIVE 300)	3	
CIVE 402	Senior Design Principles (CIVE 322/ENVE 322)	3	
CIVE 403	Senior Project Design (CIVE 402)	3	4C
CIVE 425	Soil and Water Engineering ⁴ (CBE 331 or CIVE 300 or SOCR 240)	3	
CIVE 439/CBE 439	Environmental Engineering Chemical Concepts (CHEM 113; MATH 340)	3	
ENVE 441	Water and Wastewater Characterization (CIVE 440 or concurrent reg. or CIVE 438/ENVE 438 or concurrent reg.)	1	
ERHS 446	Environmental Toxicology (CHEM 245 or CHEM 343 or CHEM 346)	3	
	Arts/humanities ²	3	3B
	Global and cultural awareness ⁵	3	3E
	Historical perspectives ⁶	3	3D
	Technical electives ³	5	
TOTAL		33	
PROGRAM TOTAL = 130 credits			

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 category 3B in the AUCC.

³ Select courses with adviser's approval.

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.

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 (Prerequisite)	Cr	AUCC
LOWER DIVISION			
CHEM 245*	Fundamentals of Organic Chemistry ^{1,2} (CHEM 107 or CHEM 113)	4	
CHEM 246*	Fundamentals of Organic Chemistry Laboratory ^{1,2} (CHEM 108 or CHEM 112 or CHEM 114; CHEM 245 or concurrent reg.)	1	
	TOTAL	5	
UPPER DIVISION			
----- <i>Select four to five credits from the following:</i> ⁴			
BC 351*	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent registration in CHEM 346)	4	
CBE 439/ CIVE 439*	Environmental Engineering Chemical Concepts (CHEM 113; MATH 340)	3	
CBE 443*	Mass Transfer and Separation Laboratory (CBE 341 or CBE 442/ENVE 442 or concurrent reg.)	2	
CIVE 440*	Nonpoint Source Pollution (CIVE 300 or CIVE 322/ENVE 322 or SOCR 240 or WR 416)	3	
ERHS 446	Environmental Toxicology (CHEM 245 or CHEM 343 or CHEM 346)	3	
MECH 463*	Building Energy Systems (MECH 344)	3	
MIP 432	Microbial Ecology (MIP 301 or MIP 302)	3	
PHIL 345	Environmental Ethics (sophomore standing or higher)	3	
CHEM 471*	Physical Chemistry for Biological Sciences (CHEM 113; MATH 161 or MATH 255; PH 122 or PH 142)	4	
CIVE 438/ ENVE 438*	Pollution Control Engineering ^{3,4} (CBE 331 or CIVE 300 or MECH 342; CHEM 113)	4	
OR			
MECH 448/ ENVE 448*	Pollution Prevention (CBE 331 or CIVE 300 or MECH 342) ⁴	3	
MIP 300*	General Microbiology (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or concurrent reg. or CHEM 341 or concurrent reg. or CHEM 345 or concurrent reg.)	3	
MIP 301	Fundamental Microbiology Laboratory Techniques (MIP 300 or concurrent reg.)	1	
	TOTAL	16	
PROGRAM TOTAL = 21 credits without prerequisites			

*Additional course work may be required because of 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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>. The civil engineering departmental *Graduate Studies Bulletin* and research in civil engineering may be found at www.engr.colostate.edu/ce.

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

Office in Engineering Building, Room 104

(970) 491-6600

<http://www.engr.colostate.edu/ece>

Professor Anthony Maciejewski, 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 five major disciplines:

- Communications and signal processing
- Computer engineering
- Controls and robotics
- Lasers, optics, and applications
- Electromagnetics and remote sensing.

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 and computer engineers design, develop, and supervise the manufacture of electrical, electronic, and computer systems or components. Engineers also test new equipment/systems, write performance requirements, develop maintenance schedules, and solve operating problems. 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 2007 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

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-.

Computer engineering emphasizes computer electronics, digital system design, digital computing and networking, and computer programming.

Computer engineering students are required to take three computer science courses and choose senior elective courses in computer-related areas.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
CS 160	Foundations in Programming (MATH 118 with C or better)	4	
ECE 102	Digital Circuit Logic	4	2B
ECE 103	DC Circuit Analysis (MATH 160)	3	
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
	Historical perspectives ¹	3	3D
	TOTAL	30	
SOPHOMORE			
CS 161	Object-Oriented Problem Solving (CS 160 with a C or better; MATH 141 or concurrent reg. or MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	4	
CS 200	Algorithms and Data Structures (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)	4	
ECE 202	Circuit Theory Applications (ECE 103)	4	
ECE 251	Introduction to Microprocessors (ECE 102 with a C- or better)	4	
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
----- <i>Select 4-6 credits from the following:</i>			
MATH 229	Matrices and Linear Equations (MATH 141 or MATH 155 or MATH 160)	2	
AND			
MATH 345	Differential Equations (MATH 229; MATH 161 or MATH 255)	4	
OR			
MATH 340	Introduction to Ordinary Differential Equations (MATH 255 or MATH 261)	4	
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
	Arts/humanities ²	3	3B
	TOTAL	32-34	
JUNIOR			
CS 253	Problem Solving with C++ (CS 200 with C or better; CS 270 with C or better or ECE 251 with a C or better)	4	
CS 301	Foundations of Computer Science ³ (CS 200 with a C or better; CS 253 with a C or better; MATH 161 with a C or better; MATH 229 with a C or better)	4	

Course	Title (Prerequisite)	Cr	AUCC
OR			
ECE 332	Electronics Principles II ⁴ (ECE 331 with a C- or better)	4	
CS 370	System Architecture and Software (CS 200 with a C or better; CS 270 with a C or better or ECE 251 with a C or better)	4	
ECE 311	Linear System Analysis I (ECE 202 with a C- or better; MATH 340 or MATH 345)	3	
ECE 312	Linear System Analysis II (ECE 311 with a C- or better)	3	
ECE 331	Electronics Principles I (ECE 202 with a C- or better; MATH 340 or MATH 345)	4	
ECE 450	Digital System Design Laboratory (concurrent reg. in ECE 451)	1	
ECE 451	Digital System Design (ECE 251 with a C- or better; concurrent reg. in ECE 450)	3	
ECE 452	Principles of Digital Computing and Networking (ECE 251 with a C- or better)	3	
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
TOTAL		32	
SENIOR			
ECE 303/ STAT 303	Introduction to Communications Principles (MATH 261; ECE 311 or concurrent reg.)	3	
ECE 401	Senior Design Project I (ECE 312 with a C- or better; CS 301 with a C- or better or ECE 332 with a C- or better; ECE 342 with a C- or better or ECE 452 with a C- or better)	3	4A, 4B
ECE 402	Senior Design Project II (ECE 401)	3	4C
SPCM 200	Public Speaking	3	2A
	Arts/humanities ²	3	3B
	Global and cultural awareness ⁵	3	3E
	Technical electives ⁶	15	
TOTAL		33	
PROGRAM TOTAL = 127-129 credits			

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.

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.

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 129 and 132 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. All students complete a year-long senior design project under the direction of a faculty member.

A maximum of six credits of ROTC courses may be used to meet the total requirement for the major. (Not all ROTC

courses fulfill the requirement.) At least one course in economics and one in speech is required.

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-.

Electrical Engineering Concentration

Electrical engineering focuses on traditional subjects such as circuits, electronics, electromagnetic fields, and electromechanical devices.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
<i>Select 3-4 credits from the following:</i>			
CS 155	Introduction to Unix	1	
CS 156	Introduction to C Programming I (CS 155; MATH 118)	1	
CS 157	Introduction to C Programming II (CS 156; MATH 118)	1	
CS 160	Foundations in Programming (MATH 118 with a CHEM or better)	4	
ECE 102	Digital Circuit Logic	4	
ECE 103	DC Circuit Analysis (MATH 160)	3	
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
	Historical perspectives ¹	3	3D
TOTAL		29-30	
SOPHOMORE			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
ECE 202	Circuit Theory Applications (ECE 103)	4	
ECE 251	Introduction to Microprocessors (ECE 102 with a C- or better)	4	
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
MATH 340	Introduction to Ordinary Differential Equations (MATH 255 or MATH 261)	4	
OR			
MATH 345	Differential Equations (MATH 161 or MATH 255; MATH 229)	4	
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
	Science/engineering elective ²	6	
TOTAL		31	
JUNIOR			
ECE 303/ STAT 303	Introduction to Communication Principles (MATH 261; ECE 311 or concurrent reg.)	3	
ECE 311	Linear System Analysis I (ECE 202 with a C- or better; MATH 340 or MATH 345)	3	
ECE 312	Linear System Analysis II (ECE 311 with a C- or better)	3	
ECE 331	Electronic Principles I (ECE 302 with a C- or better; MATH 340 or MATH 345)	4	
ECE 332	Electronics Principles II (ECE 331 with a C- or better)	4	4A

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* <http://graduateschool.colostate.edu/index.asp?url=catalog> and the department's website, www.engr.colostate.edu/ece/.

DEPARTMENT OF MECHANICAL ENGINEERING

Office in Engineering Building, Room A101
(970) 491-6558
<http://www.engr.colostate.edu/me>

Professor Allan T. Kirkpatrick, Head
Vicki Jensen, Undergraduate Adviser
Marie Zimenoff, Graduate Adviser

Major in Mechanical Engineering

Would you enjoy the challenge of finding alternative energy sources, doing computer-aided design, or biomedical research? Does creating new designs for the auto industry, or in the fields of aeronautics and aerospace sound interesting? Would designing, analyzing, and 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? If your answer to any of these questions is "yes," then a major in mechanical engineering may be for you.

Mechanical engineers design, develop, and manufacture the machines and instrumentation that run energy, manufacturing, and transport systems. Examples include production machinery, ground/air/space vehicles, robots, environmental control equipment, and power plants. They are also involved in design and manufacture of biomedical devices and equipment. Mechanical engineers are involved in nearly all aspects of energy conversion, environmental control, heat and mass transfer, propulsion, system dynamics and design, manufacturing systems, and computing 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 design course to help students in the transition from college to career. Students also choose technical

electives from the energy, industrial engineering, materials, mechanics and controls, and thermal sciences areas. Participation in labs further develops design, modeling, and analysis skills. Students participate in an intercollegiate engineering competition, applying their knowledge to the solution of real world problems.

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

Industrial organizations hire mechanical engineers to work in design, manufacturing, field engineering, research, development, and management. Mechanical engineers also work in the technological development of medical implants and health care technologies, new engines, emission reduction, creating lightweight composite materials, and design. Mechanical engineers in the building industry seek to reduce the energy consumption of new and existing buildings with the use of advanced control systems, energy efficient design, and solar and other renewable energies.

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.

All undergraduate mechanical engineering majors must obtain a minimum grade of C (a grade of C- is not acceptable) in each engineering, technical elective, physics, chemistry, and mathematics course used to satisfy graduation requirements.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
MECH 100	Introduction to Mechanical Engineering (mechanical engineering freshmen only)	1	
MECH 101	Introduction to Manufacturing Processes (mechanical engineering freshmen only)	3	
MECH 102	Mechanical Engineering Problem Solving (concurrent reg. in MATH 160 and PH 141)	3	

Course	Title (Prerequisite)	Cr	AUCC	Course	Title (Prerequisite)	Cr	AUCC
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.) Arts/humanities ¹	5	3A	MECH 338	Thermosciences Laboratory (MECH 337 with a C or better; MECH 342 with a C or better; MECH 344 with a C or better or concurrent reg.)	1	
		<u>3</u>	3B	MECH 342	Mechanics and Thermodynamics of Flow Processes (MATH 340 with a C or better; MECH 337 with a C or better or concurrent reg.; PH 141 with a C or better)	3	
	TOTAL	31		MECH 344	Heat and Mass Transfer (MECH 342 with a C or better)	3	4B
SOPHOMORE					Science technical elective	<u>3</u>	
CIVE 260	Engineering Mechanics-Statics (MATH 160; PH 141 or concurrent reg.)	3			TOTAL	32	
CIVE 261	Engineering Mechanics-Dynamics (CIVE 260)	3		SENIOR			
ECE 204	Introduction to Electrical Engineering (MATH 161; PH 142)	3		MECH 486A	Engineering Design Practicum I (CIVE 363 or concurrent reg.; MECH 302 with a C or better; MECH 338 or concurrent reg.)	4	4C
MATH 261	Calculus for Physical Scientists III (MATH 161)	4		MECH 486B	Engineering Design Practicum II (MECH 486A with a C or better)	4	4C
MATH 340	Introduction to Ordinary Differential Equations (MATH 255 or MATH 261)	4			Arts/humanities ¹	3	3B
MECH 201	Engineering Design I (MECH 102 with a C or better)	3			Global and cultural awareness ³	3	3E
MECH 202	Engineering Design II (MECH 101; MECH 201 with a C or better)	3			Historical perspectives ⁴	3	3D
MECH 337	Thermodynamics (MATH 261 with a C or better; PH 141 with a C or better)	4			Social/behavioral sciences ⁵	3	3C
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A		Technical electives ⁶	<u>12</u>	
	Additional communication ²	3	2A or 2B		TOTAL	32	
	TOTAL	<u>35</u>		PROGRAM TOTAL = 130 credits			
JUNIOR				¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC).			
CIVE 360	Mechanics of Solids (CIVE 260 or CIVE 262)	3		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).			
CIVE 363	Material Properties (CIVE 360)	1		³ Select from the list of courses in category 3E in the AUCC.			
MECH 302	Engineering Design III (MECH 202 with a C or better; MECH 307 with a C or better or concurrent reg.; MECH 324 with a C or better or concurrent reg.; MECH 325 with a C or better or concurrent reg.; MECH 331 with a C or better or concurrent reg.; MECH 342 with a C or better; MECH 344 with a C or better or concurrent reg.)	3	4A	⁴ Select from the list of courses in category 3D in the AUCC.			
	Mechatronics and Measurement Systems (CIVE 261 with a C or better; ECE 204 with a C or better; MATH 340 with a C or better)	4		⁵ Select from the list of courses in category 3C in the AUCC.			
MECH 307	Dynamics of Machines (CIVE 261; MATH 340 with a C or better or concurrent reg.)	4		⁶ Select from department list of approved courses.			
MECH 324	Machine Design (CIVE 360 with a C or better)	3		Graduate Programs in Mechanical Engineering			
MECH 325	Introduction to Engineering Materials (CHEM 111 with a C or better; CHEM 112 with a C or better; PH 142 with a C or better)	4		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 <i>Graduate and Professional Bulletin</i> , http://graduateschool.colostate.edu/index.asp?url=catalog and the department's website, http://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

Office in Clark Building, Room C138
(970) 491-5421
<http://www.colostate.edu/Colleges/LibArts/>

Professor Ann Gill, Dean
Professor Alexandra Bernasek, Associate Dean
Professor Stephan Weiler, Interim Associate Dean

UNDERGRADUATE MAJORS

Anthropology
Art
Economics
English
History
Languages, Literatures, and Cultures
Liberal Arts
Music
Performing Arts
Philosophy
Political Science
Sociology
Speech Communication
Technical Journalism

UNDERGRADUATE MINORS

Anthropology
Art History
Criminology and Criminal Justice
Economics
English
Ethnic Studies
French
General Philosophy
German
History
Japanese
Media Studies
Music
Political Science
Religious Studies
Sociology
Spanish
Studio Art
Theatre-Acting/Directing
Theatre-Design/Technical Theatre

The College of Liberal Arts aims to educate committed and active citizens who have an understanding of humans, including their history, literature, and art; their social, political, and economic systems; and their relationship to the
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environment. The College offers courses in the arts, humanities, and social sciences, which are 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 on the following pages.

Students should consider simultaneously completing the requirements of a second major, a minor, or an interdisciplinary studies program, 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 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 gain practical experience through internships and understand how their skills will benefit potential employers.

Prelaw

Offices in Clark Building, Rooms C138

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 which develops their skills in speaking and writing; their insights into social, cultural, economic, and political forms, and their analytical capabilities. Law schools generally require an undergraduate degree for admission.

International Studies

The College of Liberal Arts encourages students to consider study abroad, international travel, and international careers.

One of the concentrations in the liberal arts major is 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 you study abroad as it compliments this program and gives the student an extraordinary experience they will never forget. Visit the web sit for more information: <http://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 adviser and by visiting the Office of International Programs in Laurel Hall or the web site www.studyabroad.colostate.edu.

Foreign Service Officer Career

Students wishing a foreign service officer career may prepare for both the general Foreign Service Officer Examination and the associated language examination within the following majors: economics; history; languages, literatures, and cultures; liberal arts; political science; sociology; or technical journalism.

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 has two interdisciplinary master's degrees. The Departments of English, Journalism and Technical Communication, and Speech 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. Information may be obtained from any participating department.

For detailed information about graduate programs, contact individual departments. See also the *Graduate and Professional Bulletin*, <http://graduateschool.colostate.edu/index.asp?url=catalog>.

OPEN OPTION PROGRAM

This program is for freshmen who are undecided about their majors but with interests in the general areas of the College of Liberal Arts. Students must declare a specific major before completing 28-30 credits or a HOLD will be placed on their registration.

INTERDEPARTMENTAL MAJOR IN LIBERAL ARTS

*Office in Clark Building, Room C138
(970) 491-5421*

<http://www.colostate.edu/Colleges/LibArts/lamajor>

*Professor Alexandra Bernasek, Interim Associate Dean
Blane Harding, Director for Advising, Recruitment, and Retention*

Liberal arts majors can select from six concentrations – American studies; arts and humanities; ethnic studies; international studies; social sciences; 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. With the aid of an academic adviser, liberal arts majors have the flexibility to choose a curriculum that best suits individual interests.

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/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.

American Studies Concentration

A concentration in American studies offers a multidisciplinary and interdisciplinary exploration of the American culture. This is a multidisciplinary and interdisciplinary program that explores the themes of unity and diversity in American culture, including the ways cultural forms join and give coherence to the American experience and the ways class, gender, race, and ethnicity provide a variety of cultural expressions to the American experience.

Several options are available in this concentration including *American identities*, which encompasses the variety of peoples and cultures that comprise American society; *American images and aesthetics*, which focuses on literature, music, and culture; *American institutions*, which highlights history, political institutions, and social, political, and economic conditions; and *American regions*, which emphasizes a regional approach to the study of American society and culture.

American Studies Core

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
	Arts/humanities ¹	6	3B
	Biological/physical sciences ²	4	3A
	Mathematics ³	3	1B
	Electives	14	
	TOTAL	30	
SOPHOMORE			
AMST 100	Self/Community in American Culture, 1600-1877	3	3D
AMST 101	Self/Community in American Culture Since 1877	3	3D

Course	Title (Prerequisite)	Cr	AUCC
	Additional communication ⁴	3	2A or 2B
	Biological/physical sciences ²	3	3A
	Global and cultural awareness ⁵	3	3E
	Social/behavioral sciences ⁶	3	3C
	Electives	12	
	TOTAL	30	
JUNIOR			
AMST 300/E 300	American Lives-Methods in American Studies (AMST 100; AMST 101)	3	4A, 4B
	American identities ⁷	6	
	American studies option ⁸	10	
	Foreign language ⁹	6-10	
	Electives	1-5	
	TOTAL	30	
SENIOR			
AMST 492	Seminar in American Studies (AMST 300/E 300)	3	4C
AMST 499	Thesis in American Studies (AMST 492)	3	
OR			
	Additional course from American studies option ¹⁰	3	
	American identities ⁷	3	
	American studies option ⁸	11	
	Electives	10	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

¹ Select two courses from list of courses in category 3B of the All-University Core Curriculum (AUCC).
² Select from list of courses in category 3A of the AUCC. One course must have a laboratory component.
³ Select a minimum of three credits from list of courses in category 1B 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 an advanced writing course (category 2B).
⁵ Select from list of courses in category 3E of the AUCC.
⁶ Select from list of courses in category 3C of the AUCC.
⁷ Students must select 3 courses (9 credits) from the American identities option. Students choosing the American identities option will select 3 courses from other options in consultation with the program director.
⁸ Students must select one of the following options: American images and aesthetics, American identities, American institutions, or American regions. Within each option, students must select courses totaling 21 credits from at least 3 different subject codes from an approved list for the option.
⁹ Placement exam required. One year (2 semesters) college or university foreign language courses required, regardless of level; i.e. first or second year in the SAME language (L* 105/L* 107, L* 200/L* 201 or L* 300). 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 one course from any of the American studies options.

American Identities Option

In addition to the American studies concentration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
<i>Select 21 credits from the following course (minimum of 3 prefixes):</i>			
ANTH 412	Indians of North America (ANTH 100 or ANTH 200 or ANTH 413 or ANTH 414/ETST 414)	3	
ANTH 413	Indigenous Peoples Today (ANTH 200 or ANTH 412 or ANTH 414/ETST 414)	3	
ART 314	Women in Art History (ART 212)	3	
E 330	Images of Women in Literature	3	
E 332	Modern Women Writers	3	
ETST 100	Introduction to Ethnic Studies	3	
ETST 310	African American Studies	3	
ETST 312	African American Situation	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	

Course	Title (Prerequisite)	Cr	AUCC
ETST 410	African American Periods and Personalities	3	
ETST 412	Africa and African Diaspora	3	
ETST 424	Asian Pacific-American Literature and Culture	3	
ETST 430	Latina/o/Creative Expression (junior or senior status)	3	
ETST 432	Latina/o Routes to Empowerment (junior or senior status)	3	
ETST 444/ SOC 444	Federal Indian Law and Policy	3	
HIST 250/ ETST 250	African American History	3	3D
HIST 359	American Women's History Since 1800 (HIST 101 or HIST 150 or HIST 151 or HIST 171)	3	
POLS 413	U.SOC. Civil Rights and Liberties (POLS 101)	3	
POLS 423	American Political Theories (POLS 101)	3	
SOC 100	General Sociology	3	3C
SOC 105	Social Problems	3	3C
SOC 205	Contemporary Race-Ethnic Relations	3	3E
SOC 332	Comparative Majority-Minority Relations (SOC 100 or SOC 105)	3	
SOC 333	Gender Roles in Society (SOC 100 or SOC 105)	3	
SOC 341	Sociology of Rural Life (SOC 100 or SOC 105)	3	
SOC 342	Leisure and Society (SOC 100 or SOC 105)	3	
SOC 343	Sport and Society	3	
SOC 372	Sociology of Deviance (SOC 100 or SOC 105)	3	
SOC 375	Sociology of Religion and Medicine (SOC 100 or SOC 105)	3	
Other options ¹		9	
TOTAL		30	

¹ Students must select three courses from other options in consultation with program director.

American Images and Aesthetics Option

In addition to the American studies concentration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
<i>Select 21 credits from the following courses (minimum of 3 prefixes):</i>			
ART 310	History of American Art to 1945 (ART 212)	3	
ART 315	United States Art Since 1945 (ART 212)	3	
E 234/ ETST 234	Native American Literature	3	
E 247	Vietnam War in Fiction	3	
E 270	Introduction to American Literature	3	3B
E 330	Images of Women in Literature	3	
E 332	Modern Women Writers	3	
E 335	American Folklore	3	
E 337	Western Mythology	3	
E 345	American Drama	3	
E 403	Nature Writing (one course in literature or CO 301A-D or E 311A-C)	3	
E 438/ ETST 438	Contemporary Native American Literature	3	
E 475	American Poetry Before 1900 (E 240)	3	
HIST 356	American Intellectual History (HIST 101 or HIST 150 or HIST 151 or HIST 171)	3	
MU 230	Music of Black Americans	3	
MU 332	History of Jazz	3	
MU 431	American Music	3	
PHIL 350	Social and Political Philosophy (PHIL 105 or PHIL 205 or PHIL 206 or any upper-division course in philosophy)	3	
POLS 423	American Political Theories (POLS 101)	3	
SOC 342	Leisure and Society (SOC 100 or SOC 105)	3	
SOC 343	Sport and Society	3	

Course	Title (Prerequisite)	Cr	AUCC
SOC 375	Sociology of Religion and Medicine (SOC 100 or SOC 105)	3	
SPCM 311	Historical Speeches on American Issues	3	
SPCM 349	Freedom of Speech	3	
SPCM 411	Contemporary Speeches on American Issues	3	
Identities ¹		9	
TOTAL		30	

¹ Students must select three courses from the American identities option, for a total of nine credits.

American Institutions Option

In addition to the American studies concentration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
<i>Select 21 credits from the following courses (minimum of 3 prefixes):</i>			
ECON 310	Poverty and the Welfare State (ECON 101 or ECON 202 or EACC 202)	3	
ECON 379/ HIST 379	Economic History of the United States (AREC 202 or ECON 101 or ECON 202 or any two courses in American history)	3	
HIST 340	Colonial and Provincial America to 1740 (HIST 101 or HIST 150 or HIST 171)	3	
HIST 341	Era of the American Revolution (HIST 101 or HIST 150 or HIST 171)	3	
HIST 343	Early U.S. Republic (HIST 101 or HIST 150 or HIST 171)	3	
HIST 344	Age of Jackson (HIST 101 or HIST 150 or HIST 171)	3	
HIST 345	Civil War Era (HIST 101 or HIST 150 or HIST 171)	3	
HIST 346	Reconstruction and the New South (HIST 101 or HIST 150 or HIST 171)	3	
HIST 347	United States, 1876-1917 (HIST 101 or HIST 150 or HIST 171)	3	
HIST 348	United States, 1917-1945 (HIST 101 or HIST 150 or HIST 171)	3	
HIST 349	United States Since 1945 (HIST 101 or HIST 150 or HIST 171)	3	
PHIL 350	Social and Political Philosophy (PHIL 105 or PHIL 205 or PHIL 206 or any upper-division course in philosophy)	3	
PHIL 447	Ethical Theory (PHIL 205 or PHIL 300 or PHIL 301)	3	
POLS 101	American Government and Politics	3	3C
POLS 103	State and Local Government and Politics	3	3C
POLS 301	Political Parties and Interest Groups (POLS 101)	3	
POLS 304	Legislative Politics (POLS 101)	3	
POLS 305	Judicial Politics (POLS 101)	3	
POLS 306	Executive Politics (POLS 101)	3	
POLS 309	Urban Politics (POLS 101 or POLS 103)	3	
POLS 351	Public Administration (POLS 101)	3	
POLS 361	U.SOC. Environmental Politics and Policy (POLS 101)	3	
POLS 413	U.SOC. Civil Rights and Liberties (POLS 101)	3	
POLS 423	American Political Theories (POLS 101)	3	
SOC 330	Social Stratification (SOC 100 or SOC 105)	3	
SOC 360	Political Sociology (SOC 100 or SOC 105)	3	
Identities ¹		9	
TOTAL		30	

¹ Students must select three courses from the American identities option, for a total of nine credits.

American Regions Option

In addition to the American studies concentration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
<i>Select 21 credits from the following courses (minimum of 3 prefixes):</i>			
ANTH 350	Archaeology of North America (ANTH 140)	3	
ANTH 412	Indians of North America (ANTH 100 or ANTH 200 or ANTH 413 or ANTH 414/ETST 414)	3	
ANTH 413	Indigenous Peoples Today (ANTH 200 or ANTH 412 or ANTH 414/ETST 414)	3	
ANTH 455	Great Plains Archaeology (ANTH 140)	3	
E 179	Western American Literature	3	
E 234/ETST 234	Native American Literature	3	
E 403	Nature Writing (one course in literature or COCC 301A-D or E 311A-C)	3	
E 438/ETST 438	Contemporary Native American Literature	3	
HIST 351	American West to 1900 (HIST 101 or HIST 150 or HIST 171)	3	
HIST 352	American West Since 1900 (HIST 101 or HIST 150 or HIST 171)	3	
HIST 353	U.S.-Mexico Borderlands (HIST 101 or HIST 150 or HIST 151 or HIST 171)	3	
POLS 331	Politics and Society Along Mexican Border	3	
SOC 341	Sociology of Rural Life (SOC 100 or SOC 105)	3	
	Identities ¹	9	
	TOTAL	30	

¹ Students must select three courses from the American identities option, for a total of nine credits.

Arts and Humanities Concentration

This concentration enables you to study the many forms of artistic, literary, or philosophical expression. It provides students with flexibility to choose courses and a minor in areas of the arts and humanities: art, English, ethnic studies, foreign languages and literatures, music, theatre, and dance, philosophy, and speech.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
	Arts and humanities ¹	6	3B
	Biological/physical sciences ²	3	3A
	Historical perspectives ³	6	3D
	Mathematics ⁴	3	1B
	Social/behavioral sciences ⁵	3	3C
	Electives	6	
	TOTAL	30	
SOPHOMORE			
	Biological/physical sciences ²	4	3A
	Global and cultural awareness ⁶	3	3E
	Minor/certificate courses ⁷	6	
	Electives ⁸	17	
	TOTAL	30	
JUNIOR			
	Additional communication ⁹	3	2A or 2B
	Minor/certificate courses ⁷	9	
	Arts and humanities upper division electives ¹⁰	12	
	Electives ⁸	6	
	TOTAL	30	

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
LB 300	Liberal Arts Research Methods	1	
	<i>Select one of the following:</i>		
LB 455/SPCM 455	Narrative Fiction Film as a Liberal Art ¹¹ (senior standing)	3	4B
LB 456/JTC 456	Documentary Film as a Liberal Art ¹¹ (senior standing)	3	4B
	Other CLA 4B course ¹¹	3	4B
LB 492	Liberal Arts Capstone Seminar	2	4A, 4C
	Minor/certificate courses ⁷	6	
	Arts and humanities upper division electives ¹⁰	6	
	Electives ⁸	12	
	TOTAL	30	
PROGRAM TOTAL = 120 credits¹²			

¹ From All-University Core Curriculum (AUCC) category 3B select two courses. These two courses double count in either the arts and humanities electives required by the major or minor/certificate program. Any course counted here cannot, however, double count in the global and cultural awareness category.

² Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

³ 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 100 counts for 3E, not 3D), HIST 120/HIST 121 (HIST 120 counts for 3E, not 3D), HIST 150/HIST 151, HIST 170/HIST 171 (HIST 170 counts for 3E, not 3D). Students may also select a pair of courses designed to achieve programmatic objectives, if approved by the adviser, but at least one must be on the category 3D list.

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 with any of the following subject codes: ANTH, ECON, JTC, POLS, PSY, or SOC.

⁶ Select from the list of courses in category 3E in the AUCC with any of the following subject codes: ANTH, E, ECON, ETST, HIST, L*, LB, PF, PHIL, POLS, SOC, SA, or SPCM. *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.).

⁷ Students must complete a minor in the arts and humanities or one of the following interdisciplinary certificate 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 of adviser and the College of Liberal Arts, any other minor or interdisciplinary studies program consistent with the student's program of study in the arts and humanities. A minimum total is 21 credits, 12 of which are upper-division.

⁸ Because of the possibilities of double counting courses, 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.

⁹ 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).

¹⁰ Eighteen upper-division credits in at least two subject codes in the arts and humanities (ART, D, E, L*, MU, SPCM, TH or AMST, ETST, or LB, if the course has an arts or humanities focus). *See footnote 6.

¹¹ Either take LB 455/SPCM 455 or LB 456/JTC 456 or any category 4B course in the College of Liberal Arts that is appropriate to the student's program of study or one of the following psychology courses: PSY 315, PSY 320, PSY 325.

¹² Students must complete 120 credits, and a minimum total of 42 upper-division credits.

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. 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.

MATH 117, MATH 118, MATH 124, MATH 125, MATH 126, M CC 120A-B, and M CC 121 are considered review courses for this concentration. Credits for review courses may not be used toward a degree in engineering.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CIVE 102	Introduction: Civil/Environmental Engineering	3	
CIVE 103	Engineering Graphics and Computing (CIVE 102)	3	
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
	Arts/humanities ¹	6	3B
	Global and cultural awareness ²	3	3E
	TOTAL	29	
SOPHOMORE			
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
SPCM 200	Public Speaking	3	2A
	Historical perspectives ³	6	3D
	Social/behavioral sciences ⁴	3	3C
	TOTAL	31	
JUNIOR			
CIVE 260	Engineering Mechanics-Statics (MATH 160; PH 141 or concurrent reg.)	3	
CIVE 261	Engineering Mechanics-Dynamics (CIVE 260)	3	
MATH 340	Introduction to Ordinary Differential Equations (MATH 255 or MATH 261)	4	4A, 4B
MECH 237	Introduction to Thermal Sciences (MATH 160; PH 141)	3	
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	
	Minor or certificate ⁵	9	
	Arts and humanities electives ⁶	6	
	TOTAL	31	
SENIOR			
CIVE 300	Fluid Mechanics (CIVE 261 or CIVE 262; MECH 237)	4	
ECE 204	Introduction to Electrical Engineering (MATH 161; PH 142)	3	
	Minor or certificate ⁵	12	
	Arts and humanities electives ⁶	6	
	Technical electives in engineering ⁷	3-5	
	TOTAL	28-30	
FIFTH YEAR			
CBE 451	Select one of the following pairs of courses: Chemical Engineering Design I (CBE 320; CBE 330; CBE 442/EV 442 or concurrent reg.) ⁸	3	4C
CBE 452	Chemical Engineering Design II (CBE 451)	3	4C
OR			
CIVE 402	Senior Design Principles (CIVE 303 or CIVE 322/ENVE 322) ⁸	3	
CIVE 403	Senior Project Design (CIVE 402)	3	4C
OR			

Course	Title (Prerequisite)	Cr	AUCC
ECE 401	Senior Design Project I (CS 201 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) ⁸	3	
ECE 402	Senior Design Project II (ECE 401)	3	4C
OR			
MECH 486A	Engineering Design Practicum I (CIVE 363 or concurrent reg.; MECH 302 with a C or better; MECH 338 or concurrent reg.) ⁹	4	4C
MECH 486B	Engineering Design Practicum II (MECH 486A with a C or better)	4	4C

		Technical electives in engineering ⁷	25
		TOTAL	31-33

PROGRAM TOTAL = 152 credits

¹ From All-University Core Curriculum (AUCC) category 3B select two courses. One must have a prefix of ART, D, MU, or MU and another a 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/certificate program. Any course counted here cannot double count in the global and cultural awareness category.

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, HIST 120, HIST 121, L* 250, LB 170, LB 171, PHIL 170, POLS 131, POLS 241, SOC 205, SA 482. *Effective Fall 2007, foreign language courses are in separate prefixes (all starting with L and followed by three letters designating the language, e.g., LFRF is French, LGER is German, etc.).

³ 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 100 counts for 3E), HIST 150/HIST 151, HIST 170/HIST 171 (HIST 170 counts for 3E). 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.

⁴ 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.

⁵ Students must complete a minor in the arts and humanities or one of the following interdisciplinary certificate programs: Asian Studies; Environmental Affairs; Latin American and Caribbean Studies; Religious Studies; Russian, Eastern and Central European Studies; Women's Studies; or, with the approval of the student's adviser and the College of Liberal Arts, any other minor or interdisciplinary studies program consistent with the student's program in the arts and humanities. The minor or certificate 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 certificate program can vary.

⁶ 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. *See footnote 2.

⁷ Select courses from departmental list.

⁸ Students in this concentration may need to obtain a prerequisite override from the appropriate department to enroll in this course.

Ethnic Studies Concentration

The ethnic studies concentration offers an interdisciplinary curriculum designed to develop critical skills and understanding of the histories and cultures of African Americans, Asian/Pacific Americans, Chicana/o and Latina/o, and indigenous peoples or Natives in the United States. Courses examine the local, national, global, and comparative contexts of racial and ethnic formation, community formation, culture, migration, and intergroup conflicts. The program emphasizes an understanding of the intersecting dynamics of race, ethnicity, gender, class, and nation.

For more information and to sign up for this concentration, contact the Center for Applied Studies in American Ethnicity (CASAE), C127 Clark Building, (970) 491-2481.

College of Liberal Arts

All ethnic studies concentration students must receive a grade of C (not C-) or better in each of their ethnic studies classes (includes cross-listed classes) used to fulfill the requirements for the concentration.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
----- Select one course from the following: ¹			
CO 301A	Writing in the Disciplines-Arts and Humanities (CO 150 or HONR 193)	3	2B
CO 301B	Writing in the Disciplines-Sciences (CO 150 or HONR 193)	3	2B
CO 301C	Writing in the Disciplines-Social Sciences (CO 150 or HONR 193)	3	2B
CO 301D	Writing in the Disciplines-Education (CO 150 or HONR 193)	3	2B
SPCM 200	Public Speaking	3	2A
ETST 100	Introduction to Ethnic Studies	3	3C
	Arts/humanities ²	6	3B
	Biological/physical sciences ³	3	3A
	Global and cultural awareness ⁴	3	3E
	Historical perspectives ⁵	3	3D
	Mathematics ⁶	3	1B
	Electives	2-3	
	TOTAL	29-30	

SOPHOMORE			
Select one course from the following:			
ETST 208/ ART 208	Native American Art and Material Culture	3	
ETST 234/ E 234	Native American Literature	3	
ETST 240	Native American Cultural Expressions	3	
ETST 255/ HIST 255	Native American History	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 414/ ANTH 414	Development in Indian Country	3	
ETST 438/ E 438	Contemporary Native American Literature	3	
ETST 444/ SOC 444	Federal Indian Law and Policy	3	
----- Select one course from the following:			
ETST 310	African American Studies	3	
ETST 312	African American Situation	3	
ETST 354	A Century of Black Cinema	3	
ETST 410	African American Periods and Personalities	3	
ETST 412	Africa and African Diaspora	3	
----- Select one course from the following:			
ETST 239/ E 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	Latina/o Creative Expression (junior or senior status)	3	
ETST 432	Latina/o Routes to Empowerment (junior or senior status)	3	
ETST 454/ SPCM 454	Chicano/a Film and Video	3	
----- Select one course from the following:			
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 424	Asian Pacific American Literature and Culture	3	

	Minor/certificate/concentration ⁷	3	
	Biological/physical sciences ³	4	3A
	Social/behavioral science ⁸	3	3C

Course	Title (Prerequisite)	Cr	AUCC
	Electives	9	
	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

	African American course ⁹	3	
	Asian/Pacific American course ¹⁰	3	
	Chicano(a)/Latino(a) course ¹¹	3	
	Native American course ¹²	3	
	Minor/certificate/concentration ⁷	8	
	Electives ¹³	10	
	TOTAL	33	

SENIOR			
ETST 487	Internship (ETST 100)	1-3	
ETST 493	Ethnic Studies Research Methods and Writing (ETST 100; 18 additional ETST credits; senior standing)	3	4A, 4B, 4C
	Minor/certificate/concentration ⁷	10	
	Electives ¹³	10-13	
	TOTAL	26-27	

PROGRAM TOTAL = 120 credits			

¹ First-time students entering a college or university on or after July 1, 2008, must take an advanced writing courses (CO 301A-D).
² Select two courses from the list in category 3B in the All-University Core Curriculum (AUCC).
³ Select a total of seven credits from category 3A in the AUCC. One of the courses selected must have a laboratory component.
⁴ Select one course from the list in category 3E in the AUCC.
⁵ Select one course from the list in category 3D in the AUCC.
⁶ Select at least three credits from the list in category 1B in the AUCC.
⁷ Students must complete a minor/certificate/concentration studies program consistent with the student's program of study. A minimum total of 21 credits, 12 of which are upper division, is required.
⁸ Select one course from the list in category 3C in the AUCC.
⁹ Select one course from the list of African American courses in the sophomore year.
¹⁰ Select one course from the list of Asian/Pacific American courses in the sophomore year.
¹¹ Select one course from the list of Chicano(a)/Latino(a) courses in the sophomore year.
¹² Select one course from the list of Native American courses in the sophomore year.
¹³ 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.

International Studies Concentration

The international studies concentration is a multidisciplinary program designed to help students understand the nature of diverse cultures and peoples. There are four options: *Asian Studies*, *European Studies*, *Latin American Studies*, or *Middle East and North African Studies*. Courses are required in language, history, and international studies, with other courses chosen from literature and cultural studies, the arts, philosophy, political science, art, ethnic studies, anthropology, and economics.

International Studies Core

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A

GR 100	Introduction to Geography	3	
	Arts/humanities ¹	6	3B
	Global and cultural awareness ²	3	3E
	Historical perspectives ³	3	3D
	Mathematics ⁴	3	1B
	TOTAL	21	

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
L* 200 ⁵	Second Year Language I (L* 107 or L* 108 or placement exam)	3-5	
	Biological/physical sciences ⁶	7	3A
	Social/behavioral sciences ⁷	3	3C
	TOTAL	13-15	
JUNIOR			
INST 300	Approaches to International Studies (GR 100; junior or senior standing)	3	4B
	Additional communication ⁸	3	2A or 2B
	TOTAL	6	
SENIOR			
INST 492A-D	Seminar ⁹	3	4A, 4C
CORE TOTAL = 43-45 credits¹⁰			

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 5.)

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 at least three credits from the list of courses in category 1B in the AUCC.

⁵ 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.).

⁶ Select 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 3C in the AUCC. AUCC courses used to fulfill option requirements cannot be used to fulfill AUCC requirements.

⁸ Select from the list of courses in category 2A and 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).

⁹ Select subtopic according to option.

¹⁰ Select one of the following options – Asian studies, European studies, Latin American studies, or Middle East and North African studies – to complete the concentration.

Asian Studies Option

In addition to the international studies concentration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
LCHI 105	First Year Chinese I (no previous experience in language)	5	
	OR		
LJPN 105	First Year Japanese I (no previous experience in language)	5	
LCHI 107	First Year Chinese II (LCHI 105)	5	
	OR		
LJPN 107	First Year Japanese II (LJPN 105)	5	
	TOTAL	10	
SOPHOMORE			
HIST 120	Asian Civilizations I	3	
	OR		
HIST 121	Asian Civilizations II ¹	3	
	<i>Select one course from the following:</i>		
HIST 120	Asian Civilizations II ²	3	
HIST 121	Asian Civilizations II ²	3	
HIST 430	Ancient Near East (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
HIST 434	Crusades in the Near East (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
HIST 438	The Modern Middle East (HIST 101 or HIST 115 or HIST 171)	3	
HIST 440	Modern South Asia (HIST 101 or HIST 120 or HIST 121 or HIST 171)	3	
HIST 451	Medieval China and Central Asia (HIST 100 or HIST 115 or HIST 120 or HIST 170)	3	
LCHI 201	Second Year Chinese I (LCHI 200 or LCHI 228A or placement exam)	5	
	OR		
LJPN 201	Second Year Japanese I (LJPN 200 or LJPN 228A or placement exam)	5	
	TOTAL	11	
JUNIOR			
	Track courses ³	18	
	Electives ⁴	9	

Course	Title (Prerequisite)	Cr	AUCC
TOTAL		27	
SENIOR			
	Track courses ³	3	
	Electives ⁴	24	
TOTAL		27	
PROGRAM TOTAL = 120 credits			

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 each track, for a total of 21 credits. *Track I—History and Politics of Asia:* HIST 300, HIST 430, HIST 431, HIST 433, HIST 434, HIST 438, HIST 440, HIST 450, HIST 451, HIST 452, HIST 455, HIST 464, HIST 465, HIST 466, IE 271, POLS 445; *Track II—The Thought and Culture of Asia:* ANTH 312, ART 112, ART 316, E 356, LCHI 250 or LJPN 250, LCHI 304 or LJPN 304, LCHI 305 or LJPN 305, LCHI 309, LGEN 465B, LJPN 496, PHIL 106, PHIL 172, PHIL 309, PHIL 349, PHIL 360, PHIL 371, PHIL 379, PHIL 455.

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 12 elective credits must be upper division.

European Studies Option

In addition to the international studies concentration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
L* 105 ¹	First-Year Language I (no previous experience in language)	5	
L* 107 ¹	First-Year Language II (L* 105 or L* 106)	5	
	TOTAL	10	
SOPHOMORE			
L* 201 ¹	Second-Year Language II (L* 200 or L* 228A or placement exam)	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	
	Track courses ⁵	18	
	Electives ²	3	
	TOTAL	27	
SENIOR			
	Track courses ⁵	3	
	Electives ²	25	
	TOTAL	28	
PROGRAM TOTAL = 120 credits			

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 15 elective credits must be upper division.

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 each track, for a total of 21 credits. *Track I—History and Politics of Europe:* ECON 376, HIST 300, HIST 301, HIST 303, HIST 304, HIST 308, HIST 309, HIST 311, HIST 317, HIST 319, HIST 320, HIST 321, HIST 323, HIST 324, HIST 326, HIST 327, HIST 329, HIST 330, HIST 331, HIST 332, HIST 335, HIST 434, HIST 461, POLS 341, POLS 345, POLS 420, POLS 421; *Track II—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, BUS 350, 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 460, E 463, E 475, INTD 357, L* 310, L* 313, L* 335 L* 345, L* 355, L* 413, LFRE 433A-B, LGER 434, LSPA 437, L* 441, LSPA 450, L* 452, L* 453, L* 454, LFRE 460, LGEN 465C, LAND 120, MU 334, MU 335, PHIL 300, PHIL 301, PHIL 302, PHIL 409.

Latin American Studies Option

In addition to the international studies concentration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
LSPA 105	First-Year Spanish I (no previous study in language)	5	
LSPA 107	First-Year Spanish II (LSPA 105 or LSPA 106)	5	
	TOTAL	10	
SOPHOMORE			
HIST 411	Latin America Since Independence (HIST 101 or HIST 151 or HIST 171)	3	
LSPA 201	Second-Year Spanish II (LSPA 200 or LSPA 228A or placement exam)	3	
	Electives	6	
	TOTAL	12	
JUNIOR			
<i>Select one of the following courses:</i>			
HIST 410	Colonial Latin America (HIST 101 or HIST 171)	3	
HIST 412	Mexico (HIST 101 or HIST 151 or HIST 171)	3	
HIST 413	Caribbean Civilization (HIST 101 or HIST 151 or HIST 171)	3	
HIST 414	Revolutions in Latin America (HIST 101 or HIST 151 or HIST 171)	3	
	Track courses ¹	18	
	Electives ²	6	
	TOTAL	27	
SENIOR			
	Track courses ¹	3	
	Electives ²	25	
	TOTAL	28	
PROGRAM TOTAL = 120 credits²			

¹Three different subject codes, 6 credits minimum from each track, for a total of 21 credits. *Track I-Social Sciences*: ANTH 319, ANTH 332, ANTH 451, AREC 460, POLS 331, POLS 446, POLS 447, SOC 366; *Track II-Civilization, History, and Literature of Latin America*: ART 312, HIST 412, HIST 413, HIST 414, LGEN 465A, LSPA 310, LSPA 335, LSPA 336, LSPA 345, LSPA 435, LSPA 436, LSPA 441, LSPA 445, LSPA 449, LSPA 452, LSPA 453, LSPA 454. If HIST 410, HIST 412, HIST 413, or HIST 414 is used for the history sequence, that course cannot double count as a Track II course.

²Minimum number of elective credits needed to complete the program. To fulfill the 42 upper-division credit minimum, at least 15 elective credits must be upper-division.

Middle East and North African Studies Option

In addition to the international studies concentration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
LARA 105	First-Year Arabic I (no previous experience in language)	5	
LARA 107	First-Year Arabic II (LARA 105)	5	
	TOTAL	10	
SOPHOMORE			
HIST 115	Islamic World to 1800	3	
HIST 438	The Modern Middle East (HIST 101 or HIST 115 or HIST 171)	3	
LARA 201	Second Year Arabic II (LARA 200 or LARA 228A or placement exam)	4	
	TOTAL	10	
JUNIOR			
	Track courses ¹	18	
	Electives ²	9	
	TOTAL	27	
SENIOR			
	Track courses ¹	3	
	Electives ²	25	
	TOTAL	28	
PROGRAM TOTAL = 120 credits²			

¹Three different prefixes, for a total of 21 credits. *History, Religion, and Culture of the Middle East/North Africa*: ANTH 351, ART 311, HIST 303, HIST 308, HIST 422, HIST 430, HIST 431, HIST 432, HIST 433, HIST 434, LARA 250, PHIL 171, PHIL 335, PHIL 370, PHIL 379, PHIL 455, POLS 449.

²Minimum number of elective credits to complete the program. To fulfill the 42 upper-division credit minimum, at least 12 elective credits must be upper division.

Social Sciences Concentration

This program enables you to study human behavioral, institutional, and social patterns. It provides students with flexibility to choose courses and a minor in areas of the social sciences: anthropology, economics, ethnic studies, history, journalism, political science, and sociology.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
	Arts and humanities ¹	3	3B
	Biological/physical sciences ²	4	3A
	Historical perspectives ³	6	3D
	Mathematics ⁴	3	1B
	Social/behavioral sciences ⁵	3	3C
	Electives ⁶	8	
	TOTAL	30	
SOPHOMORE			
	Minor/certificate courses ⁷	6	
	Arts and humanities ¹	3	3B
	Biological/physical sciences ²	3	3A
	Global and cultural awareness ⁸	3	3E
	Electives ⁶	15	
	TOTAL	30	
JUNIOR			
	Additional communication ⁹	3	2A or 2B
	Minor/certificate courses ⁷	9	
	Social science upper division electives ¹⁰	12	
	Electives ⁶	6	
	TOTAL	30	
SENIOR			
LB 300	Liberal Arts Research Methods	1	
<i>Select one of the following:</i>			
LB 455/	Narrative Fiction Film as a Liberal Art ¹¹	3	4B
SPCM 455	(senior standing)		
LB 456/	Documentary Film as a Liberal Art ¹¹ (senior standing)	3	4B
JTC 456			
	Other CLA 4B course ¹¹	3	4B
LB 492	Liberal Arts Capstone Seminar	2	4A, 4C
	Minor/certificate courses ⁷	6	
	Social science upper division electives ¹⁰	6	
	Electives ⁶	12	
	TOTAL	30	
PROGRAM TOTAL = 120 credits¹²			

¹From All-University Core Curriculum (AUCC) category 3B select two courses. Any course counted here cannot double count in the global and cultural awareness category.

²Select from the list of courses in category 3A in the All-University Core Curriculum (AUCC). One course must have a laboratory component.

³Select 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 100 counts in 3E), HIST 120/HIST 121 (HIST 120 counts in 3E), HIST 150/HIST 151, HIST 170/HIST 171 (HIST 170 counts in 3E). 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.

⁴Select at least three credits from the list of courses in category 1B in the AUCC.

⁵Select from the list of courses in category 3C with the following prefixes: ANTH, ECON, JTC, POLS, PSY, or SOC.

⁶Because of the possibilities of double counting courses, 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.

⁷Students must complete a minor in the social sciences, or one of the following interdisciplinary certificate 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 of adviser and College of

Liberal Arts, any other minor or interdisciplinary studies program consistent with the student's program of study in the social sciences. A minimum total is 21 credits of which 12 are upper-division.

⁸Select from the list of courses in category 3E in the AUCC with any of the following prefixes: ANTH, E, ECON, ETST, HIST, L*, LB, PF, PHIL, POLS, SOC, SA, SPCM. [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..)]

⁹Select 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).

¹⁰Eighteen upper-division credits in at least two subject codes in the social sciences (ANTH, AMST, ECON, HIST, JTC, POLS, PSY, SOC, or ETST or LB if the course has a social sciences focus).

¹¹Either take LB 455/SPCM 455 or LB 456/JTC 456 or any category 4B course in the College of Liberal Arts that is appropriate to the student's program of study or one of the following psychology courses: PSY 315, PSY 320, PSY 325.

¹²Students must complete 120 credits, and a minimum total of 42 upper-division credits.

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.

MATH 117, MATH 118, MATH 124, MATH 125, MATH 126, M CC 120A-B, and M CC 121 are considered review courses for this concentration. Credits for review courses may not be used toward a degree in engineering.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CIVE 102	Introduction: Civil/Environmental Engineering	3	
CIVE 103	Engineering Graphics and Computing (CIVE 102)	3	
MATH 160	Calculus for Physical Scientists I (MATH 126; MATH 124 or concurrent reg.)	4	1B
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
	Historical perspectives ¹	6	3D
	Social/behavioral sciences ²	3	3C
	TOTAL	29	
SOPHOMORE			
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
SPCM 200	Public Speaking	3	2A
	Arts and humanities ³	6	3B

Course	Title (Prerequisite)	Cr	AUCC
	Global and cultural awareness ⁴	3	3E
	TOTAL	31	
JUNIOR			
CIVE 260	Engineering Mechanics-Statics (MATH 160; PH 141 or concurrent reg.)	3	
CIVE 261	Engineering Mechanics-Dynamics (CIVE 260)	3	
MATH 340	Introduction to Ordinary Differential Equations (MATH 255 or MATH 261)	4	4A, 4B
MECH 237	Introduction to Thermal Sciences (MATH 160; PH 141)	3	
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	
	Minor or certificate ⁵	12	
	Social science electives ⁶	6	
	TOTAL	34	
SENIOR			
CIVE 300	Fluid Mechanics (CIVE 261 or CIVE 262; MECH 237)	4	
ECE 204	Introduction to Electrical Engineering (MATH 161; PH 142)	3	
	Minor or certificate ⁵	9	
	Social science electives ⁶	6	
	Technical electives in engineering ⁷	6	
	TOTAL	28	
FIFTH YEAR			
<i>Select one of the following pairs of courses:</i>			
CBE 451	Chemical Engineering Design I (CBE 320; CBE 330; CBE 442/ENVE 442 or concurrent reg.) ⁸	3	4C
CBE 452	Chemical Engineering Design II (CBE 451)	3	4C
OR			
CIVE 402	Senior Design Principles (CIVE 303 or CIVE 322/ENVE 322) ⁸	3	
CIVE 403	Senior Project Design (CIVE 402)	3	4C
OR			
ECE 401	Senior Design Project I (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) ⁸	3	
ECE 402	Senior Design Project II (ECE 401)	3	4C
OR			
MECH 486A	Engineering Design Practicum I (CIVE 363 or concurrent reg.; MECH 302 with a C or better; MECH 338 or concurrent reg.) ⁸	4	4C
MECH 486B	Engineering Design Practicum II (MECH 486A with a C or better)	4	4C
	Technical electives in engineering ⁸	25-27	
	TOTAL	33	

PROGRAM TOTAL = 155 credits

¹Select 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 100 counts for 3D), HIST 120/HIST 121 (HIST 120 counts for 3E), HIST 150/HIST 151, HIST 170/HIST 171 (HIST 170 counts for 3E). 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.

²Select from the list of courses in category 3C in the AUCC with the following prefixes: ANTH, ECON, JTC, POLS, PSY, or SOC.

³From 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.

⁴Select from the following subset of courses in category 3E in the AUCC: ANTH 200, E 238, E 245, ECON 211, ETST 253, ETST 256, HIST 120, HIST 121, L* 250, LB 170, LB 171, PF 110, PHIL 170, POLS 131, POLS 241, SA 482, SOC 205. The HIST courses, if selected here, cannot also be counted in category 3D. [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..)]

⁵Students must complete a minor in the social sciences, or one of the following interdisciplinary certificate programs: Asian Studies; Environmental Affairs; Latin American and Caribbean Studies; Religious Studies; Russian, Eastern and Central European Studies; Women's Studies; or, with approval of the student's adviser and the College of Liberal Arts, any other minor or interdisciplinary studies program consistent with the student's program in the social sciences. The minor or certificate 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 certificate program can vary.

⁶Students must complete 12 upper-division credits in at least two social sciences prefixes, not including the minor. Social sciences prefixes are ANTH, AMST, ECON,

College of Liberal Arts

HIST, JTC, POLS, PSY, SOC, ETST (if the course has a social sciences focus), LB (456).

⁷Select from department list.

⁸Students in this concentration may need to obtain a prerequisite override from the appropriate department to enroll in this course.

Minor in Ethnic Studies

The ethnic studies minor offers courses about the past and present experiences of African Americans, Asian/Pacific Americans, Chicana/o and Latina/os, and indigenous peoples or Native Americans in the United States as well as international ethnic populations. Courses offer a fundamental understanding of the comparative histories and contemporary dynamics of these groups. Students majoring in the humanities, social sciences, and education should find the program especially beneficial.

For more information on the minor contact the Center for Applied Studies in American Ethnicity, C127 Clark, (970) 491-2418.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
ETST 100	Introduction to Ethnic Studies	3	3E
	Asian Pacific American course ¹	3	
	TOTAL	6	
SOPHOMORE			
	African American course ²	3	
	Native American course ³	3	
	TOTAL	6	
JUNIOR			
ETST 404	Race Formation in the United States	3	
OR			
ETST 405	Ethnicity, Class, and Gender in the U.S. Chicano(a) course ⁴	3	
	TOTAL	6	
SENIOR			
ETST 493	Ethnic Studies Research Methods and Writing (ETST 100; 18 additional ETST credits; senior standing)	3	
PROGRAM TOTAL = 21 credits⁵			

¹ Select one course from the following: ETST 252/HIST 252, ETST 320, ETST 324, ETST 424.

² Select one course from the following: ETST 310, ETST 312, ETST 354, ETST 410, ETST 412.

³ 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.

⁴ 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.

⁵ A minimum of 12 credits must be upper division.

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 Speech Communication.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
JTC 100	Media in Society	3	3C
OR			
SPCM 100	Communication and Popular Culture	3	3B
UPPER DIVISION			
<i>Select one course from the following:</i>			
JTC 415	Communications Law	3	
SPCM 349	Freedom of Speech	3	
SPCM 449	Law and Policy of Communication Technologies	3	
<i>Select 15 credits from the following:</i>			
JTC 311	History of Media	3	
JTC 316/	Multiculturalism and the Media	3	
ETST 316			
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/	Documentary Film as a Liberal Art (senior standing)	3	
LB 456			
SPCM 341	Evaluating Contemporary Television	3	
SPCM 342	Critical Media Studies	3	
SPCM 346	Virtual Culture and Communication (SPCM 100 or SPCM 342)	3	
SPCM 354	History and Appreciation of Film	3	
SPCM 355	Evaluating Contemporary Film (SPCM 354)	3	
SPCM 454/	Chicano/a Film and Video	3	
ETST 454			
SPCM 455/	Narrative Fiction Film as a Liberal Art	3	
LB 455	(senior standing)		
TOTAL			18
PROGRAM TOTAL = 21 credits			

DEPARTMENT OF ANTHROPOLOGY

Office in Clark Building, Room C207
(970) 491-5447

<http://www.colostate.edu/Depts/Anthropology>

Professor Kathleen Galvin, 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, in order to advance and expand knowledge of the field of anthropology; 3) to participate actively in programs of interdisciplinary research. One of the ways we accomplish these things is 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 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 three programmatic areas of research and scholarship that students can benefit from: environment, globalization, and development.

Anthropology bridges the natural and social sciences and humanities. 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. Majors can specialize in *cultural anthropology*, *archaeology*, and *biological anthropology*.

Anthropology majors follow a liberal arts curriculum that provides a broad education with an emphasis on learning how to learn. The department has six research and teaching laboratories and two summer field schools. Field classes that involve the excavation of archaeological sites are offered during the summer. A cultural anthropology field school studies a myriad of issues on Indian reservations. Graduates should be able to view the human condition with equal ability from its behavioral, biological, and historical perspectives. The well-rounded liberal arts education plus acquisition of important marketable skills including analytical ability, communication, and people skills, make anthropology graduates valuable in health, international development, 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.

Learning Outcomes

Students will:

- Demonstrate knowledge related to basic appreciation of anthropology and its potentials 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 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. Many 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, 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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
ANTH 100	Introductory Cultural Anthropology	3	3C
OR			
ANTH 200	Cultures and the Global System	3	3E
ANTH 120	Human Origins and Variation	3	3A
ANTH 121	Human Origins and Variation Laboratory (ANTH 120 or concurrent reg.)	1	3A
ANTH 140	Introduction to Prehistory	3	3D
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
	Additional communication ¹	3	2A or 2B
	Mathematics ²	3	1B
	Elective	11	
	TOTAL	30	
SOPHOMORE			
	Arts and humanities ³	9	3B
	Biological and physical sciences ⁴	10-11	3A
	Global and cultural awareness ⁵	3	3E
	Social and behavioral science ⁶	6	
	Anthropology elective ⁶	3	
	TOTAL	31-32	

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
ANTH 400	History of Anthropological Theory (ANTH 100 or ANTH 200; ANTH 120; ANTH 121; ANTH 140)	3	4B
----- Select one of the following:			
SOC 210	Quantitative Sociological Analysis (MATH 118)	3	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
STAT 307/ ERHS 307	Introduction to Biostatistics (MATH 117)	3	
STAT 311	Statistics for Behavioral Sciences I (MATH 117)	3	

	Social and behavioral sciences ⁶	3	
	Upper-division archaeology ⁷	3	
	Upper-division biological anthropology ⁷	3	
	Upper-division cultural anthropology ⁷	3	
	Anthropology electives ⁶	3	
	Electives	9	
	TOTAL	30	
SENIOR			
----- Select one of the following:			
ANTH 329	Cultural Change (ANTH 100)	3	4A
ANTH 330	Human Ecology (ANTH 100; ANTH 120 or BZ 101 or LAND 220/SOCR 220)	3	4A
ANTH 332	Peoples of the Caribbean (ANTH 100 or ANTH 200)	3	4A
ANTH 334	Narrative Traditions and Social Experience (ANTH 100 or ANTH 200 or E 140 or SOC 100)	3	4A
ANTH 340	Medical Anthropology (ANTH 100)	3	4A
ANTH 374	Human Biological Variation (ANTH 120 or BZ 101 or BZ 110 or LIFE 102)	3	4A
ANTH 376	Evolution of Human Adaptation (ANTH 120 or BZ 101 or BZ 110 or LIFE 102)	3	4A
ANTH 412	Indians of North America (ANTH 100 or ANTH 200 or ANTH 413 or ANTH 414/ETST 414)	3	4A
ANTH 415	Indigenous Ecologies and the Modern World	3	4A
ANTH 450	Hunter-Gatherer Ecology (ANTH 100; ANTH 120; ANTH 121; ANTH 140)	3	4A
ANTH 451	Andean Archaeology and Ethnohistory (ANTH 100 or ANTH 140)	3	4A
ANTH 455	Great Plains Archaeology (ANTH 140)	3	4A
ANTH 461	Anthropological Report Preparation (ANTH 460; written consent of instructor)	3	4A
ANTH 493 ⁸	Capstone Seminar (concurrent registration in one of the following: ANTH 329; ANTH 330; ANTH 332; ANTH 334; ANTH 374; ANTH 412; ANTH 450; ANTH 451; ANTH 455; ANTH 461)	1	4C
	Arts/humanities ⁶	3	
	Social/behavioral sciences ⁶	3	
	Anthropology elective ⁶	3	
	Electives	15-16	
	TOTAL	28-29	
PROGRAM TOTAL = 120 credits			

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 three credits, except MATH 133, from the courses in category 1B in the AUCC.

³ Select two courses from the list of courses in category 3B in the AUCC. See department advising manual for selection of the remaining three credits.

⁴ Select 3-4 credits from the list of courses in category 3A in the AUCC. See department advising manual for selection of the remaining seven credits (must include one lab course).

⁵ Select from the list of courses in category 3E in the AUCC.

⁶ See department advising manual for course selection.

⁷ See department advising manual for course selection. The same class may be used to fulfill the 4A/4C requirement.

⁸ Students taking Senior Honors Thesis (HONR 499, 3 credits) are also required to register for ANTH 493 (1 credit).

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 subdisciplinary divisions such as physical, archaeology, ethnology, or applied anthropology; or it may be distributed across the fields like the major requirements.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
ANTH 100	Introductory Cultural Anthropology	3	3C
OR			
ANTH 200	Cultures and the Global System	3	3E
ANTH 120	Human Origins and Variation	3	3A
ANTH 121	Human Origins and Variation Laboratory (ANTH 120 or concurrent reg.)	1	3A
ANTH 140	Introduction to Prehistory	3	3D
	TOTAL	10	
UPPER DIVISION			
	*Any combination of upper-division anthropology courses	12	
PROGRAM TOTAL = 22 credits without prerequisites			

*Additional course work 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, <http://www.colostate.edu/Depts/Anthropology>.

DEPARTMENT OF ART

Office in Visual Arts Building, Room G100
(970) 491-6774

<http://www.colostate.edu/Depts/Art/>

Associate Professor Patrick Fahey, 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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
ART 105	Issues and Practices in Art	1	
ART 110	Art History I	3	
ART 111	Art History II (ART 110)	3	
ART 135	Introduction to Drawing	3	
ART 136	Introduction to Figure Drawing (ART 135)	3	
ART 160	Two-Dimensional Visual Fundamentals	3	
ART 170	Three-Dimensional Visual Fundamentals	3	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
	Arts/humanities ¹	3	3B
	Health and wellness ²	2	3G
	Elective	3	
	TOTAL	28	
SOPHOMORE			
ART 212	Art History III (ART 111)	3	

Select three of the following courses:			
ART 230	Photo Image Making I (ART 111; ART 136; ART 160; ART 170)	3	
ART 240	Pottery I (ART 111; ART 136; ART 160; ART 170)	3	
ART 245	Metalsmithing and Jewelry I (ART 111; ART 136; ART 160; ART 170)	3	
ART 250	Fibers I (ART 110; ART 135; ART 160 or ART 170)	3	
ART 255	Introduction to Graphic Design (ART 111; ART 136; ART 160; ART 170)	3	
ART 260	Painting I (ART 111; ART 136; ART 160; ART 170)	3	
ART 265	Printmaking I-Intaglio and Relief (ART 110; ART 135; ART 160 or ART 170)	3	
ART 270	Sculpture I (ART 111; ART 136; ART 160; ART 170)	3	

ART 235	Intermediate Drawing I (ART 136)	3	
	Additional communication ²	3	2A or 2B
	Arts/humanities ¹	3	3B
	Historical perspectives ³	3	3D
	Mathematics ⁴	3	1B
	Social/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/physical sciences ⁸	7	3A
	Non-art electives	15	
	TOTAL	22	
PROGRAM TOTAL = 92 credits⁹			

¹ Select from the list of courses (other than ART 100) in category 3B in the All-University Core Curriculum (AUCC).

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 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 (Prerequisite)	Cr	AUCC
JUNIOR			
ART 335	Intermediate Drawing II (ART 235)	3	
ART 336	Intermediate Drawing III (ART 335)	3	
	Art electives ¹	16	
	TOTAL	22	
SENIOR			
ART 435	Advanced Drawing I (ART 336)	3	4C
ART 436	Advanced Drawing II (ART 435)	3	4C
	TOTAL	6	
PROGRAM TOTAL = 120 credits			

¹At least 12 upper-division credits.

Fibers Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
ART 350	Fibers II (ART 250)	4	
ART 351	Fibers III (ART 250)	4	
	Art electives ¹	12	
	TOTAL	20	
SENIOR			
ART 450	Fibers IV (ART 350; ART 351)	4	4C
ART 451	Fibers V (ART 351 or ART 450)	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

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:

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
ART 355	Typography and Design Systems (ART 255)	4	
ART 356	Illustration (ART 255; six credits in drawing)	4	
	Art electives ¹	12	
	TOTAL	20	
SENIOR			
ART 455	Advanced Typography and Design Systems (ART 355)	4	4C
ART 456	Advanced Illustration (ART 356)	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

¹ At least eight upper-division credits.

Metalsmithing Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
ART 345	Metalsmithing and Jewelry II (ART 245)	4	
ART 346	Metalsmithing and Jewelry III (ART 245)	4	
	Art electives ¹	12	
	TOTAL	20	
SENIOR			
ART 445	Metalsmithing and Jewelry IV (ART 345; ART 346)	4	4C
ART 446	Metalsmithing and Jewelry V (ART 345; ART 346)	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

¹ At least eight upper-division credits.

Painting Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
ART 360	Painting II (ART 260)	4	
ART 361	Painting III (ART 235; ART 260)	4	
	Art electives ¹	12	
	TOTAL	20	
SENIOR			
ART 460	Advanced Painting I (ART 360; ART 361)	4	4C
ART 461	Advanced Painting II (ART 460)	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

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:

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
ART 330	Photo Image Making II (ART 230 or portfolio review)	4	
ART 331	Photo Image Making III (ART 330)	4	
	Art electives ¹	12	
	TOTAL	20	
SENIOR			
ART 430	Advanced Photo Image Making I (ART 331)	4	4C
ART 431	Advanced Photo Image Making II (ART 430)	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

¹ At least eight upper-division credits.

Pottery Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
ART 340	Pottery II (ART 240)	4	

Course	Title (Prerequisite)	Cr	AUCC
ART 341	Pottery III (ART 340) Art electives ¹	4 12	
	TOTAL	20	
SENIOR			
ART 440	Pottery IV (ART 341)	4	4C
ART 441	Pottery V (ART 440)	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

¹At least eight upper-division credits.

Printmaking Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
ART 365	Printmaking II-Lithography (ART 136)	4	
ART 366	Printmaking III-Studio Workshop (ART 365) Art electives ¹	4 12	
	TOTAL	20	
SENIOR			
ART 465	Printmaking IV-Studio Workshop (ART 366)	4	4C
ART 466	Printmaking V-Studio Workshop (ART 465)	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

¹At least eight upper-division credits.

Sculpture Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
ART 370	Sculpture II (ART 270)	4	
ART 371	Sculpture III (ART 270) Art electives ¹	4 12	
	TOTAL	20	
SENIOR			
ART 470	Sculpture IV (ART 370; ART 371)	4	4C
ART 471	Sculpture V (ART 470)	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

¹At 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.

Students interested in pursuing a teaching license through Colorado State University may refer to the School of Education, 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 (<http://soe.cahs.colostate.edu/Licensure>) or in room 100 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
ART 105	Issues and Practices in Art	1	
ART 110	Art History I	3	
ART 111	Art History II (ART 110)	3	
ART 135	Introduction to Drawing	3	
ART 136	Introduction to Figure Drawing (ART 135)	3	
ART 160	Two-Dimensional Visual Fundamentals	3	
ART 170	Three-Dimensional Visual Fundamentals	3	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
	Biological/physical sciences ¹	7	3A
	TOTAL	29	
SOPHOMORE			
ART 212	Art History III (ART 111)	3	
ART 230	Photo Image Making I (ART 111; ART 136; ART 160; ART 170)	3	
ART 240	Pottery I (ART 111; ART 136; ART 160; ART 170)	3	
ART 260	Painting I (ART 111; ART 136; ART 160; ART 170)	3	
ART 270	Sculpture I (ART 111; ART 136; ART 160; ART 170)	3	
EDUC 275	Schooling in the United States (completion of 30 credits of course work) Additional communication ²	3	3C
	Arts/humanities ³	3	2A or 2B
	Global and cultural awareness ⁴	3	3B
	Mathematics ⁵	3	3E
	Social/behavioral sciences ⁶	3	1B
	TOTAL	33	3C
JUNIOR			
ART 325	Concepts in Art Education (EDUC 275; admission to teacher licensure)	3	
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
EDUC 350	Instruction I-Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3	
EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent reg. in EDUC 350; admission to teacher licensure)	1	
	Arts/humanities ³	3	3B
	Historical perspectives ⁷	3	3D
	Studio teaching emphasis ⁸	8	
	Upper-division art history ⁹	6	4B
	TOTAL	34	

College of Liberal Arts

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
ART 326	Art Education Studio (EDUC 275; admission to teacher licensure)	4	
EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4	
EDUC 466	Methods and Assessment in K-12 Art Education (EDUC 275; admission to teacher licensure)	4	
EDUC 485A	Student Teaching-Elementary (EDUC 450; EDUC 466)	6	4A, 4C
EDUC 485B	Student Teaching-Secondary (EDUC 450; EDUC 466)	6	4A, 4C
EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
EDUC 493A	Seminar-Professional Relations (EDUC 426 or EDUC 450 EDUC 466; concurrent reg. in EDUC 485A or B or C)	1	4C
TOTAL		<u>26</u>	

PROGRAM TOTAL = 120 credits

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 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, except ART 100, in category 3B in the AUCC.

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 from the list of courses in category 3D in the AUCC.

⁸ Select eight credits from one upper-division concentration area other than graphic design.

⁹ Select six credits of upper-division art history. In order to complete category 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.

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
ART 105	Issues and Practices in Art	1	
ART 110	Art History I ¹	3	
ART 111	Art History II (ART 110)	3	
ART 135	Introduction to Drawing	3	
ART 160	Two-Dimensional Visual Fundamentals	3	
ART 170	Three-Dimensional Visual Fundamentals	3	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
	Arts/humanities ²	6	3B
	Global and cultural awareness ³	3	3E
	Elective	3	
TOTAL		<u>31</u>	

SOPHOMORE

<i>Select two courses from the following:</i>			
ART 112	History of Asian Art	3	
ART 113	Native Art Survey	3	
ART 230	Photo Image Making I (ART 111; ART 136; ART 160; ART 170)	3	

Course	Title (Prerequisite)	Cr	AUCC
ART 240	Pottery I (ART 111; ART 136; ART 160; ART 170)	3	
ART 245	Metalsmithing and Jewelry I (ART 111; ART 136; ART 160; ART 170)	3	
ART 250	Fibers I (ART 110; ART 135; ART 160 or ART 170;)	3	
ART 255	Introduction to Graphic Design (ART 111; ART 136; ART 160; ART 170)	3	
ART 260	Painting I (ART 111; ART 136; ART 160; ART 170)	3	
ART 265	Printmaking I-Intaglio and Relief (ART 110; ART 135; ART 160 or ART 170)	3	
ART 270	Sculpture I (ART 111; ART 136; ART 160; ART 170)	3	

ART 212	Art History III (ART 111)	3	
	Additional communication ⁴	3	2A or 2B
	Historical perspectives ⁵	3	3D
	Mathematics ⁶	3	1B
	Second field ⁷	9	
	Social/behavioral sciences ⁸	3	3C
TOTAL		<u>30</u>	

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 ⁹	Second-Year Language I (L* 107 or L* 108 or placement exam)	3	
PHIL 318	Aesthetics-Visual Arts	3	
	Second field ⁷	12	
	Art history upper-division electives ¹⁰	9	4A, 4B
TOTAL		<u>30</u>	

SENIOR

ART 419	Historiography and Methodology of Art History (written consent of instructor)	3	4C
	Biological/physical sciences ¹¹	7	3A
	Art electives, upper-division	4	
	Art history electives, upper-division ¹⁰	12	4A, 4B
	Non-art electives	3	
TOTAL		<u>29</u>	

PROGRAM TOTAL = 120 credits

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).

³ Select from the list of courses in category 3E in 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 an advanced writing course (category 2B).

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
ART 105	Issues and Practices in Art	1	
ART 110	Art History I	3	
ART 111	Art History II (ART 110)	3	
ART 135	Introduction to Drawing	3	
ART 136	Introduction to Figure Drawing (ART 135)	3	
ART 160	Two-Dimensional Visual Fundamentals	3	
ART 170	Three-Dimensional Visual Fundamentals	3	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
	Arts/humanities ¹	3	3B
	Mathematics ²	3	1B
	Elective	2-3	
	TOTAL	30-31	
SOPHOMORE			
ART 212	Art History III (ART 111)	3	
<i>Select two of the following courses:</i>			
ART 230	Photo Image Making I (ART 111; ART 136; ART 160; ART 170)	3	
ART 240	Pottery I (ART 111; ART 136; ART 160; ART 170)	3	
ART 245	Metalsmithing and Jewelry I (ART 111; ART 136; ART 160; ART 170)	3	
ART 250	Fibers I (ART 110; ART 135; ART 160 or ART 170)	3	
ART 255	Introduction to Graphic Design (ART 111; ART 136; ART 160; ART 170)	3	
ART 260	Painting I (ART 111; ART 136; ART 160; ART 170)	3	
ART 265	Printmaking I-Intaglio and Relief (ART 110; ART 135; ART 160 or ART 170)	3	
ART 270	Sculpture I (ART 111; ART 136; ART 160; ART 170)	3	
	Additional communication ³	3	2B
	Arts/humanities ¹	3	3B
	Global and cultural awareness ⁴	3	3E
	Historical perspectives ⁵	3	3D
	Social/behavioral sciences ⁶	3	3C
	Non-art electives	6	
	TOTAL	30	
JUNIOR			
	Biological/physical sciences ⁷	7	3A
	Foreign language	10	
	Upper division art history ⁸	6	4A, 4B
	Upper division concentration ⁹	8	
	TOTAL	31	
SENIOR			
<i>Select four credits from the following in the appropriate concentration:</i>			
ART 430	Advanced Photo Image Making I (ART 331)	4	4C
ART 431	Advanced Photo Image Making II (ART 430)	4	4C
ART 435	Advanced Drawing I (ART 336)	3	4C
ART 436	Advanced Drawing II (ART 435)	3	4C
ART 440	Pottery IV (ART 341)	4	3C
ART 441	Pottery V (ART 440)	4	4C
ART 445	Metalsmithing and Jewelry IV (ART 345; ART 346)	4	4C
ART 446	Metalsmithing and Jewelry V (ART 345; ART 346)	4	4C
ART 450	Fibers IV (ART 350; ART 351)	4	4C
ART 451	Fibers V (ART 351 or ART 450)	4	4C
ART 455	Advanced Typography and Design Systems (ART 355)	4	4C
ART 456	Advanced Illustration (ART 356)	4	4C
ART 460	Advanced Painting I (ART 360; ART 361)	4	4C
ART 461	Advanced Painting II (ART 460)	4	4C
ART 465	Printmaking IV-Studio Workshop (ART 366)	4	4C
ART 466	Printmaking V-Studio Workshop (ART 465)	4	4C

Course	Title (Prerequisite)	Cr	AUCC
ART 470	Sculpture IV (ART 370; ART 371)	4	4C
ART 471	Sculpture V (ART 470)	4	4C
Art electives ¹⁰		9	
Non-art electives		15-16	
TOTAL		28-29	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 3B (other than ART 100) in the All-University Core Curriculum (AUCC).

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 2A or 2B in the AUCC. First-time student 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 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 (Prerequisite)	Cr	AUCC
ART 100	Introduction to the Visual Arts	3	3B
OR			
ART 110	Art History I	3	
ART 111	Art History II (ART 110)	3	
ART 212	Art History III (ART 111)	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	12	

UPPER DIVISION

ART Art history 15

PROGRAM TOTAL = 27 credits**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.

College of Liberal Arts

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
ART 100	Introduction to the Visual Arts	3	3B
OR			
ART 110	Art History I	3	
ART 111	Art History II (ART 110)	3	
ART 212	Art History III (ART 111)	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

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* <http://graduateschool.colostate.edu/index.asp?url=catalog> and the department's website, <http://www.colostate.edu/Depts/Art/>

DEPARTMENT OF ECONOMICS

Office in Clark Building, Room C306

(970) 491-6324

<http://www.colostate.edu/Depts/Econ/>

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, 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
MATH 117	College Algebra in Content I (Math Placement Exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
----- <i>Select one course from the following:</i>			
MATH 141	Calculus in Management Sciences (MATH 118)	3	1B
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B

	Arts/humanities ¹	6	3B
	Historical perspectives ²	3	3D
	Electives ³	9-10	
	TOTAL	30	
SOPHOMORE			
ECON 204	Principles of Macroeconomics (AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
----- <i>Select one of the following courses:</i>			
STAT 201	General Statistics (placement in MATH 130 or higher)	3	
STAT 204	Statistics for Business Students (MATH 117)	3	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	

	Biological/physical sciences ⁴	7	3A
	Minor/second major/interdisciplinary studies program ⁵	6	
	Additional social sciences ⁶	9	
	Electives	2	
	TOTAL	30	
JUNIOR			
----- <i>Select one of the following:</i>			
CO 300	Writing Arguments (CO 150 or HONR 193)	3	2B
CO 301A	Writing in the Disciplines-Arts and Humanities (CO 150 or HONR 193)	3	2B
CO 301B	Writing in the Disciplines-Sciences (CO 150 or HONR 193)	3	2B
CO 301C	Writing in the Disciplines-Social Sciences (CO 150 or HONR 193)	3	2B
CO 301D	Writing in the Disciplines-Education (CO 150 or HONR 193)	3	2B
CO 302	Writing Online (CO 150 or HONR 193)	3	2B
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B

ECON 304	Intermediate Macroeconomics (ECON 204; MATH 141 or MATH 155 or MATH 160)	3	
ECON 306	Intermediate Microeconomics (ECON 204; MATH 141 or MATH 155 or MATH 160)	3	4A, 4B
----- <i>Select one course from the following:</i>			
ECON 332/ POLS 332	International Political Economy (AREC 202 or ECON 202; POLS 232)	3	
ECON 370	Comparative Economic Systems (AREC 202 or ECON 101 or ECON 202)	3	
ECON 372	History of Economic Institutions and Thought (AREC 202 or ECON 101 or ECON 202)	3	

Course	Title (Prerequisite)	Cr	AUCC
ECON 376	Marxist Economic Thought (AREC 202 or ECON 101 or ECON 202)	3	
ECON 379/ HIST 379	Economic History of the United States (AREC 202 or ECON 101 or ECON 202 or any 2 courses in American history)	3	
ECON 474	Recent Economic Thought (ECON 304; ECON 306)	3	

ECON 335/ AREC 335	Introduction to Econometrics (ECON 204; STAT 201 or STAT 204 or STAT 301)	3	
	Economics ⁷	6	
	Minor/second major/interdisciplinary studies program ⁵	6	
	Electives ³	3	
	TOTAL	30	
SENIOR			
ECON 492	Seminar	3	4A, 4B, 4C
	Economics ⁸	6	
	Minor/second major/interdisciplinary studies program ⁴	12	
	Electives ³	9	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

¹ Select two courses from list in category 3B in the All-University Core Curriculum (AUCC).

² Select from list of courses in category 3D in the AUCC.

³ Because of the possibilities of double-counting courses, 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. One elective course (3 credits) must fulfill the AUCC global and cultural awareness requirement (category 3E) unless that requirement has been met in economics, second major, minor, certificate, or additional social sciences.

⁴ Select seven credits (including one course with a lab) from the list of courses in category 3A in the AUCC.

⁵ Students must complete a minor, second major, or interdisciplinary studies certificate program. A minimum total is 21 credits of which 12 are upper division.

⁶ Select any 3 courses from department list. One must fulfill the AUCC global and cultural awareness requirement (category 3E) unless that requirement has been met in economics, additional arts/humanities, minor, second major, certificate, or electives.

⁷ Select any 2 ECON courses.

⁸ Select any 2 upper-division 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 (Prerequisite)	Cr	AUCC
LOWER DIVISION			
ECON 202*	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
ECON 204*	Principles of Macroeconomics (AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
	TOTAL	6	
UPPER DIVISION			
ECON 304*	Intermediate Macroeconomics (ECON 204; MATH 141 or MATH 155 or MATH 160)	3	
ECON 306*	Intermediate Microeconomics (ECON 204; MATH 141 or MATH 155 or MATH 160)	3	

Course	Title (Prerequisite)	Cr	AUCC
ECON*	Economics, numbered ECON 304 or higher (with prior department approval)	9	
	TOTAL	15	
PROGRAM TOTAL = 21 credits without 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. Four primary areas of specialization are presently emphasized: social and political economics, international and development economics, regional economics, and public finance.

A brochure describing the graduate program in economics is available from the department. Also refer to the *Graduate and Professional Bulletin*, <http://graduateschool.colostate.edu/index.asp?url=catalog>.

DEPARTMENT OF ENGLISH

Office in Eddy Hall, Room 359
(970) 491-6428

<http://www.colostate.edu/Depts/English>

Professor Bruce Ronda, Chair
Associate Professor William Marvin, Undergraduate
Coordinator
Associate Professor Deborah Thompson, 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 1) formulating, developing, and supporting interpretive positions with appropriate evidence; 2) using technical and conceptual vocabulary knowledgeably; 3) using appropriate methodologies, critical approaches, and theoretical perspectives; and 4) 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; 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, and nonfiction; lyricist.

Creative Writing Concentration

The creative writing concentration gives students the opportunity to strengthen both their creative writing 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 change 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one pair of courses from the following:</i>			
AMST 100	Self/Community in American Culture, 1600-1877	3	3D
AMST 101	Self/Community in American Culture Since 1877	3	3D
OR			
HIST 100	Western Civilization, Pre-Modern	3	3E
HIST 101	Western Civilization, Modern	3	3D
OR			
HIST 150	U.S. History to 1876	3	3D
HIST 151	U.S. History Since 1876	3	3D
OR			
HIST 170	World History, Ancient-1500	3	3E
HIST 171	World History, 1500-Present	3	3D
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	6	3B
	Mathematics ²	3	1B
	English elective	3	
	Elective	5	
	TOTAL	29	
SOPHOMORE			
E 210	Beginning Creative Writing (any lower level E prefix course)	3	
E 240	Introduction to Poetry	3	
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
	Biological/physical sciences ³	7	3A
	Global and cultural awareness ⁴	3	3E
	Philosophy ⁵	3	
	Social/behavioral sciences ⁶	3	3C
	Elective	3	
	TOTAL	31	
JUNIOR			
<i>Select one course from the following:</i>			
CO 300	Writing Arguments (CO 150 or HONR 193)	3	
CO 301A	Writing in the Disciplines-Arts and Humanities (CO 150 or HONR 193)	3	
CO 301B	Writing in the Disciplines-Sciences (CO 150 or HONR 193)	3	
CO 301C	Writing in the Disciplines-Social Science (CO 150 or HONR 193)	3	
CO 301D	Writing in the Disciplines-Education (CO 150 or HONR 193)	3	
<i>Select one of the following:</i>			
E 311A	Intermediate Creative Writing-Fiction (E 210 with a B or better)	3	
E 311B	Intermediate Creative Writing-Poetry (E 210 with a B or better)	3	
E 311C	Intermediate Creative Writing-Nonfiction (CO 150 or HONR 193; E 210 with a B or better or JTC 210)	3	
E 341	Principles of Literary Criticism (one course in literature)	3	4A, 4B
	Second field ⁷	3	
	English elective ⁸	3	
	Upper division English/composition ⁹	6	
	Electives	9	
	TOTAL	30	
SENIOR			
<i>Select one of the following:</i> ¹⁰			
E 412A	Creative Writing Workshop-Fiction (E 311A with a B or better)	3	

Course	Title (Prerequisite)	Cr	AUCC
E 412B	Creative Writing Workshop-Poetry (E 311B with a B or better)	3	
E 412C	Creative Writing Workshop-Nonfiction (E 311A with a B or better or E 311C with a B or better)	3	
<i>Select one of the following:</i>			
E 460	Chaucer (E 341; one other upper-division E prefix course)	3	4C
E 463	Milton (E 341; one other upper-division E prefix course)	3	4C
E 465	Topics in Literature and Language (E 341; one other upper-division E prefix course)	3	4C
E 470	Individual Author (E 341; one other upper-division E prefix course)	3	4C
<i>Second field⁷</i>			
	Upper division English/composition ⁹	12	
	Electives	3	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

¹ Select two courses from the list of courses in category 3B (but excluding E and PHIL prefix courses) in the All-University Core Curriculum (AUCC).

² Select at least three credits from the list of courses in category 1B in the AUCC.

³ Select two courses, one with lab, from list of courses in category 3A in the AUCC.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select from the list of PHIL courses on English Department green sheet.

⁶ Select from the list of courses in category 3C in the AUCC.

⁷ 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.

⁸ Select any lower or upper level E prefix course.

⁹ 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 genre course. See the departmental check sheet for the courses that fulfill these 4 categories.

¹⁰ Selection must match subtopic 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 Education, 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 (<http://soe.cahs.colostate.edu/Licensure>) or in room 100 of the Education Building.

College of Liberal Arts

For graduation, an English major must attain a minimum grade point average of 2.000 in upper-division composition and English courses.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	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/humanities ¹	3	3B
	Biological/physical sciences ²	4	3A
	Historical perspectives ³	3	3D
	Mathematics ⁴	3	1B
	Electives	6	
	TOTAL	31	
SOPHOMORE			
CO 301D	Writing in the Disciplines-Education (CO 150 or HONR 193)	3	
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
E 342	Shakespeare I	3	
OR			
E 343	Shakespeare II	3	
EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3C
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	3	3A
	Social/behavioral sciences ³	3	3C
	Electives	2	
	TOTAL	31	
JUNIOR			
E 322	English Language for Teachers I	3	
E 323	English Language for Teachers II (E 322)	3	
E 341	Principles of Literary Criticism (one course in literature)	3	4A, 4B
E 401	Teaching Reading (CO 301D)	3	
E 405	Adolescents' Literature	3	
EDUC 350	Instruction I-Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3	
EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent reg. in EDUC 350; admission to teacher licensure)	1	
EDUC 463	Methods in Teaching Language Arts (admission to teacher licensure)	4	
	Upper-division English electives ⁶	9	
	TOTAL	32	
SENIOR			
E 402	Teaching Composition (CO 301A or B or C or D)	3	
EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4	
EDUC 485B	Student Teaching-Secondary (EDUC 450; EDUC 463)	11	
EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
EDUC 493A	Seminar-Professional Relations (EDUC 426 or EDUC 450; EDUC 463; concurrent registration in EDUC 485B)	1	
	English elective ⁷	3	
	Upper-division English elective ⁶	3	4C
	TOTAL	26	
PROGRAM TOTAL = 120 credits			

¹Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC).

²Select from the list of courses in 3A in the AUCC. One must have a laboratory component.

³Select one course from the following: AMST 100, AMST 101, HIST 101, HIST 150, HIST 151, HIST 171.

⁴Select at least three credits from the list of courses in category 1B in the AUCC.

⁵Select from the list of courses in category 3C in the AUCC.

⁶The department requires licensure concentrators 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.

⁷Any 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one pair of courses from the following:</i>			
AMST 100	Self/Community in American Culture, 1600-1877	3	3D
AMST 101	Self/Community in American Culture Since 1877	3	3D
OR			
HIST 100	Western Civilization, Pre-Modern	3	3E
HIST 101	Western Civilization, Modern	3	3D
OR			
HIST 150	U.S. History to 1876	3	3D
HIST 151	U.S. History Since 1876	3	3D
OR			
HIST 170	World History, Ancient-1500	3	3E
HIST 171	World History, 1500-Present	3	3D
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
E 270	Introduction to American Literature	3	
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	6	3B
	Foreign language ²	3-5	
	Mathematics ³	3	1B
	Electives	1-4	
	TOTAL	30-31	
SOPHOMORE			
E 240	Introduction to Poetry	3	
E 276	Survey of British Literature I	3	
OR			
E 277	Survey of British Literature II	3	
	Biological and physical sciences ⁴	7	3A
	Foreign language ²	3-5	
	Global and cultural awareness ⁵	3	3E
	Philosophy ⁶	3	
	Social/behavioral science ⁷	3	3C
	Electives	3-5	
	TOTAL	30	
JUNIOR			
<i>Select one course from the following:</i>			
CO 300	Writing Arguments (CO 150 or HONR 193)	3	
CO 301A	Writing in the Disciplines-Arts and Humanities (CO 150 or HONR 193)	3	

Course	Title (Prerequisite)	Cr	AUCC
CO 301B	Writing in the Disciplines-Sciences (CO 150 or HONR 193)	3	
CO 301C	Writing in the Disciplines-Social Sciences (CO 150 or HONR 193)	3	
CO 301D	Writing in the Disciplines-Education (CO 150 or HONR 193)	3	
E 322	English Language for Teachers I	3	
E 323	English Language for Teachers II (E 322)	3	
E 326	Development of the English Language	3	
E 341	Principles of Literary Criticism (one course in literature)	3	4A, 4B
E 342	Shakespeare I	3	
OR			
E 343	Shakespeare II	3	
	Foreign language ²	5	
	Electives	7	
	TOTAL	30	
SENIOR			
E 460	Chaucer (E 341; one other upper-division E prefix course)	3	4C
OR			
E 465	Topics in Literature and Language (E 341; one other upper-division E prefix course)	3	4C
	Foreign language ²	5	
	Upper division English/composition ⁸	15	
	Electives	6-7	
	TOTAL	29-30	

PROGRAM TOTAL = 120 credits

¹ Select two courses from the list in category 3B (excluding E and PHIL prefix courses) in the All-University Core Curriculum (AUCC).

² 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.)

³ Select at least three credits from the list of courses in category 1B in the AUCC.

⁴ Select two courses, one with a lab, 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 on English Department green sheet.

⁷ Select from the list of courses in category 3C in the AUCC.

⁸ 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.

Literature Concentration

The study of literature has lain at the heart of the liberal arts since their inception, for literature affords a view of the world as it is only knowable through limitless variety of perception and expression. The English Department offers a curriculum featuring critical study of literature ancient and modern, in poetry and prose. 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one pair of courses from the following:</i>			
AMST 100	Self/Community in American Culture, 1600-1877	3	3D

Course	Title (Prerequisite)	Cr	AUCC
AMST 101	Self/Community in American Culture Since 1877	3	3D
OR			
HIST 100	Western Civilization, Pre-Modern	3	3E
HIST 101	Western Civilization, Modern	3	3D
OR			
HIST 150	U.S. History to 1876	3	3D
HIST 151	U.S. History Since 1876	3	3D
OR			
HIST 170	World History, Ancient-1500	3	3E
HIST 171	World History, 1500-Present	3	3D
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
E 240	Introduction to Poetry	3	
E 270	Introduction to American Literature	3	
	Arts/humanities ¹	6	3B
	Mathematics ²	3	1B
	Elective	5	
	TOTAL	29	
SOPHOMORE			
E 276	Survey of British Literature I	3	
E 277	Survey of British Literature II	3	
	Biological/physical sciences ³	7	3A
	Global and cultural awareness ⁴	3	3E
	Philosophy ⁵	3	
	Social/behavioral sciences ⁶	3	3C
	English elective ⁷	3	
	Electives	6	
	TOTAL	31	

JUNIOR

<i>Select one course from the following:</i>			
CO 300	Writing Arguments (CO 150 or HONR 193)	3	2B
CO 301A	Writing in the Disciplines-Arts and Humanities (CO 150 or HONR 193)	3	2B
CO 301B	Writing in the Disciplines-Sciences (CO 150 or HONR 193)	3	2B
CO 301C	Writing in the Disciplines-Social Sciences (CO 150 or HONR 193)	3	2B
CO 301D	Writing in the Disciplines-Education (CO 150 or HONR 193)	3	2B
E 341	Principles of Literary Criticism (one course in literature)	3	4A, 4B
E 342	Shakespeare I	3	
OR			
E 343	Shakespeare II	3	
	Second field ⁸	6	
	Upper-division English/composition elective ⁹	6	
	Electives	9	
	TOTAL	30	

SENIOR

<i>Select one of the following:</i>			
E 460	Chaucer (E 341; one other upper-division E prefix course)	3	4C
E 463	Milton (E 341; one other upper-division E prefix course)	3	4C
E 465	Topics in Literature and Language (E 341; one other upper-division E prefix course)	3	4C
E 470	Individual Author (E 341; one other upper-division E prefix course)	3	4C
	Second field ⁸	6	
	Upper-division electives ⁹	12	
	Electives	9	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

¹ Select two courses from the list in category 3B (excluding E and PHIL prefix courses) in the All-University Core Curriculum (AUCC).

² Select at least three credits from the list of courses in category 1B in the AUCC.

³ Select two courses, one having a lab, from the list of courses for category 3A in the AUCC.

⁴ Select from the list of courses in category 3E in the AUCC.

⁵ Select PHIL course from English Department green sheet list of courses.

⁶ Select from the list of courses in category 3C in the AUCC.

⁷ Select any lower or upper division E prefix course.

⁸ 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

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language or by completing 12 hours of upper division credit in a coherent field of study outside English.

⁹ 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one pair of courses from the following:</i>			
AMST 100	Self/Community in American Culture, 1600-1877	3	3D
AMST 101	Self/Community in American Culture Since 1877	3	3D
OR			
HIST 100	Western Civilization, Pre-Modern	3	3E
HIST 101	Western Civilization, Modern	3	3D
OR			
HIST 150	U.S. History to 1876	3	3D
HIST 151	U.S. History Since 1876	3	3D
OR			
HIST 170	World History, Ancient-1500	3	3E
HIST 171	World History, 1500-Present	3	3D
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
E 240	Introduction to Poetry	3	
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	6	3B
	Mathematics ²	3	1B
	Electives	6	
	TOTAL	30	
SOPHOMORE			
E 270	Introduction to American Literature	3	
E 276	Survey of British Literature I	3	
OR			
E 277	Survey of British Literature II	3	
	Biological/physical sciences ³	7	3A
	English elective ⁴	3	
	Global and cultural awareness ⁵	3	3E
	Philosophy ⁶	3	
	Social/behavioral sciences ⁷	3	3C
	Electives	5	
	TOTAL	30	
JUNIOR			
<i>Select one course from the following:</i>			
CO 300	Writing Arguments (CO 150 or HONR 193)	3	
CO 301A	Writing in the Disciplines-Arts and Humanities (CO 150 or HONR 193)	3	
CO 301B	Writing in the Disciplines-Sciences (CO 150 or HONR 193)	3	
CO 301C	Writing in the Disciplines-Social Sciences (CO 150 or HONR 193)	3	

Course	Title (Prerequisite)	Cr	AUCC
CO 301D	Writing in the Disciplines-Education (CO 150 or HONR 193)	3	
E 341	Principles of Literary Criticism (one course in literature)	3	4A, 4B
	Second field ⁸	6	
	Upper-division English/composition ⁹	6	
	Electives	12	
	TOTAL	30	
SENIOR			
CO 401	Writing and Style (CO 300 or CO 301 A-D or CO 302)	3	
E 406	Topics in Literacy	3	
<i>Select one of the following:</i>			
E 460	Chaucer (E 341; one other upper-division E prefix course)	3	4C
E 463	Milton (E 341; one other upper-division E prefix course)	3	4C
E 465	Topics in Literature and Language (E 341; one other upper-division E prefix course)	3	4C
E 470	Individual Author (E 341; one other upper-division E prefix course)	3	4C
	Second field ⁸	6	
	Upper-division electives ⁹	9	
	Electives	6	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

¹ Select two courses from the list in category 3B (but excluding E and PHIL prefix courses) in the All-University Core Curriculum (AUCC).

² Select at least three credits from the list of courses in category 1B in the AUCC.

³ Select two courses, one with a lab, from the list of courses for category 3A in the AUCC.

⁴ Select any lower or upper-division E prefix course.

⁵ Select from the list of courses in category 3E in the AUCC.

⁶ Select from the list of PHIL courses on English Department green sheet.

⁷ Select from the list of courses in category 3C in the AUCC.

⁸ 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.

⁹ 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, CO 302, E 311C, E 403); 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.

Students minoring in English must maintain a 2.000 grade point average in all English courses and a 2.000 grade point average in all upper-division composition or English courses.

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, teaching, teaching of English as a foreign language or second language, or communication development. The department shares a joint master of arts degree in foreign languages and the teaching of English as a second language.

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, <http://www.colostate.edu/Depts/English.s>

DEPARTMENT OF FOREIGN LANGUAGES AND LITERATURES

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Professor Paola Malpezzi-Price, Chair
Associate Professor Fernando Valerio-Holguin,
Undergraduate Coordinator
Associate Professor Maria del Mar Lopez-Cabrales,
Graduate Coordinator

Major in Languages, Literatures, and Cultures

Gaining insight into a foreign culture through proficiency in its language and familiarity with its literature furthers intercultural understanding and international perspectives in a student's total program of study. It is particularly valuable in fields such as social work, international relations and political science, international business or finance, computer science, tourism, and natural sciences. The programs in foreign languages emphasize oral and written proficiency. They also develop knowledge of the culture and literature, and the critical and analytical skills necessary for an understanding of their relationships. A major in a second language focuses on broadening and deepening proficiency and integrates this knowledge with the strengths of a liberal arts curriculum. The department offers one major in languages, literatures, and cultures with concentrations in French, German, and Spanish.

Language majors accomplish:

- Real and measurable functional competencies in the target language;
- A practical command of grammar and pronunciation approach 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 China,

Japan, France, Spain, and Germany. Students should visit the department before going on study abroad for clarification on course transfers. A wide variety of other options are available through the Study Abroad Office on campus.

Minors are offered in French, German, Japanese, and Spanish. Basic courses may also be taken in Arabic, Chinese, Italian, Latin, Russian, and American Sign Language.

Learning Outcomes

Students will demonstrate:

- Communicative oral skills in the target language, including grammatical accuracy, correct use of tense and aspect, fluency, appropriate intonation, suitable vocabulary and discourse devices when they express opinions or give 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 and appreciation of cultural and linguistic differences.

Potential Occupations

Available career choices include, but are not limited to: bilingual educator; foreign language teacher; interpreter; literary researcher; translator; multi-lingual receptionist; flight attendant or ground host(ess); exchange program coordinator, director, assistant; foreign correspondent; intelligence specialist; immigration and custom inspector; tourism specialist; attaché; librarian; bilingual work in social services.

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A

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Course	Title (Prerequisite)	Cr	AUCC
LFRE 105	First-Year French I (no previous study in the language)	5	
LFRE 107	First-Year French II (LFRE 105 or LFRE 106)	5	
	Arts/humanities ¹	3	3B
	Historical perspectives ²	3	3D
	Non-U.S. history ³	3	
	Social/behavioral sciences ⁴	3	3C
	Elective	5	
	TOTAL	30	
SOPHOMORE			
LFRE 200	Second-Year French I (LFRE 107 or LFRE 108 or placement exam)	3	
LFRE 201	Second-Year French II (LFRE 200 or LFRE 228A or placement exam)	3	
	Additional communication ⁵	3	2A or 2B
	Arts/humanities ¹	3	3B
	Global and cultural awareness ⁶	3	3E
	Mathematics ⁷	3	1B
	Biological/physical sciences ⁸	7	3A
	Elective	3	
	TOTAL	28	
JUNIOR			
LFRE 300	Reading and Writing for Communication-French (LFRE 201 or LFRE 208 or LFRE 228B or placement)	3	
<i>Select two of the following courses:</i>			
LFRE 301	Oral Communication-French (LFRE 201 or LFRE 228B)	3	
LFRE 312	Introduction to French Linguistics (LFRE 300 or concurrent reg. or LFRE 328A)	3	
LFRE 313	Introduction to French Translation and Interpreting (LFRE 300 or LFRE 328A)	3	
LFRE 326	French Phonetics (LFRE 300 or concurrent reg. or LFRE 328A)	3	
LFRE 345	Business French (LFRE 300 or LFRE 328A)	3	
LFRE 355	20th-Century French Literature (LFRE 310 or LFRE 328B)	3	
LFRE 365	Studies in Foreign Film-French (LFRE 310 or LFRE 335)	3	
LFRE 413	Advanced French Translation and Interpreting (LFRE 313)	3	
LFRE 433A	Advanced French/Francophone Culture-Representations (LFRE 328C or LFRE 400) ⁹	3	
LFRE 433B	Advanced French/Francophone Culture-Center and Margins (LFRE 328C or LFRE 400) ⁹	3	
LFRE 441	Advanced Business French (LFRE 345)	3	
LFRE 460	French/Francophone Women Writers (LFRE 300 or LFRE 328A; LFRE 310 or LFRE 328B)	3	
LFRE 470	French Grammar Constructions (LFRE 312)	3	
LFRE 310	Approaches to French Literature (LFRE 300 or LFRE 328A)	3	
LRE 335	Issues in Francophone Culture (LFRE 300 or LFRE 328A)	3	
	Electives	15	
	TOTAL	30	
SENIOR			
LFRE 400	Advanced Communication Skills-French (LFRE 300 or LFRE 328A)	3	
LFRE 433A	Advanced French/Francophone Culture-Representations (LFRE 328C or LFRE 400)	3	4A
	OR		
LFRE 433B	Advanced French/Francophone Culture-Center and Margins (LFRE 328C or LFRE 400)	3	4A
<i>Select one course from the following:</i>			
LFRE 450	Selected French Literary Movements and Periods (LFRE 300 or LFRE 328A; LFRE 310 or LFRE 328B)	3	
LFRE 452	Genre Studies in French (LFRE 300 or LFRE 328A; LFRE 310 or LFRE 328B)	3	
LFRE 453	Author Studies in French (LFRE 300 or LFRE 328A; LFRE 310 or LFRE 328B)	3	
LFRE 454	Topic Studies in French (LFRE 300 or LFRE 328A; LFRE 310 or LFRE 328B)	3	

Course	Title (Prerequisite)	Cr	AUCC
LFRE 492	Seminar-French Language, Literature and Society (LFRE 310 or LFRE 328B; two 400-level French courses; senior status)	3	4B, 4C
	OR		
LGEN 492	Seminar-Language, Literature and Society-General (LFRE 310 or LGER 310 or LSPA 310 or LFRE 328B or LGER 328B or LSPA 328B; two 400-level courses; senior status)	3	4B, 4C
	400-level French ¹⁰	3	
	Electives ¹¹	17	
	TOTAL	32	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 3B of the All-University Core Curriculum (AUCC).

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 approved courses in the department. First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (category 2B).

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.

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
LGER 105	First-Year German I (no previous study in the language)	5	
LGER 107	First-Year German II (LGER 105)	5	
	Arts/humanities ¹	3	3B
	Historical perspectives ²	3	3D
	Non-U.S. history ³	3	
	Social/behavioral sciences ⁴	3	3C
	Elective	5	
	TOTAL	30	
SOPHOMORE			
LGER 200	Second-Year German I (LGER 107 or LGER 108 or placement exam)	3	
LGER 201	Second-Year German II (LGER 200 or LGER 228A or placement exam)	3	
	Additional communication ⁵	3	2A or 2B
	Arts/humanities ¹	3	3B
	Biological/physical sciences ⁶	7	3A
	Global and cultural awareness ⁷	3	3E
	Mathematics ⁸	3	1B
	Elective	3	
	TOTAL	28	
JUNIOR			
LGER 300	Reading and Writing for Communication-German (LGER 201 or LGER 208 or LGER 228B or placement)	3	

Course	Title (Prerequisite)	Cr	AUCC
<i>Select two of the following courses:</i>			
LGER 301	Oral Communication-German (LGER 201 or LGER 228B)	3	
LGER 313	Introduction to German Translation and Interpreting (LGER 300 or LGER 328A)	3	
LGER 326	German Phonetics (LGER 300 or concurrent registration or LGER 328A)	3	
LGER 345	Business German (LGER 300 or LGER 328A)	3	
LGER 355	20th Century German Literature (LGER 310 or LGER 328B)	3	
LGER 365	Studies in Foreign Film-German (LGER 310 or LGER 335)	3	
LGER 413	Advanced German Translation and Interpreting (LGER 313)	3	
LGER 441	Advanced Business German (LGER 345)	3	
LGER 450	Selected German Literary Movements and Periods (LGER 300 or LGER 328A; LGER 310 or LGER 328B)	3	
LGER 452	Genre Studies in German (LGER 300 or LGER 328A; LGER 310 or LGER 328B)	3	
LGER 453	Author Studies in German (LGER 300 or LGER 328A; LGER 310 or LGER 328B)	3	
LGER 454	Topic Studies in German (LGER 300 or LGER 328A; LGER 310 or LGER 328B)	3	
LGER 310	Approaches to German Literature (LGER 201 or LGER 208 or LGER 228B)	3	
LGER 335	Issues in German Culture (LGER 300 or LGER 328A)	3	
	Electives	15	
	TOTAL	30	
SENIOR			
LGER 400	Advanced Communication Skills-German (LGER 300 or LGER 328A)	3	
LGER 434	Advanced German Culture (LGER 335 or LGER 328C)	3	4A
<i>Select one course from the following:</i> ³			
LGER 450	Selected German Literary Movements and Periods (LGER 300 or LGER 328A; LGER 310 or LGER 328B)	3	
LGER 452	Genre Studies in German (LGER 300 or LGER 328A; LGER 310 or LGER 328B)	3	
LGER 453	Author Studies in German (LGER 300 or LGER 328A; LGER 310 or LGER 328B)	3	
LGER 454	Topic Studies in German (LGER 300 or LGER 328A; LGER 310 or LGER 328B)	3	
LGEN 492	Language, Literature and Society-General (LFRE 310 or LFRE 328B or LGER 310 or LGER 328B or LSPA 310 or LSPA 328B; two 400-level courses; senior status)	3	4B, 4C
OR			
LGER 492	Seminar-German Language, Literature and Society (LGER 310 or LGER 328B; two 400-level German courses; senior status)	3	4B, 4C
	400-level German ¹⁰	3	
	Electives ¹¹	20	
	TOTAL	32	
PROGRAM TOTAL = 120 credits			

¹ Select from the list of courses in category 3B of the All-University Core Curriculum (AUCC).

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 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).

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.

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, LJPJ, LKOR, LLAT, LRUS, LSGN, or LSPA subject code.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
LSPA 105	First-Year Spanish I (no previous study in the language)	5	
LSPA 107	First-Year Spanish II (LSPA 105 or LSPA 106)	5	
	Arts/humanities ¹	3	3B
	Historical perspectives ²	3	3D
	Non-U.S. history ³	3	
	Social/behavioral sciences ⁴	3	3C
	Elective	5	
	TOTAL	30	
SOPHOMORE			
LSPA 200	Second-Year Spanish I (LSPA 107 or LSPA 108 or placement exam)	3	
LSPA 201	Second-Year Spanish II (LSPA 200 or LSPA 228A or placement exam)	3	
	Additional communication ⁵	3	2A or 2B
	Arts/humanities ¹	3	3B
	Global and cultural awareness ⁶	3	3E
	Mathematics ⁷	3	1B
	Biological/physical sciences ⁸	7	3A
	Elective	3	
	TOTAL	28	
JUNIOR			
LSPA 300	Reading and Writing for Communication-Spanish (LSPA 201 or LSPA 208 or LSPA 228B or placement)	3	
<i>Select two of the following courses:</i> ²			
LSPA 301	Oral Communications-Spanish (LSPA 201 or LSPA 228B)	3	
LSPA 312	Introduction to Spanish Linguistics (LSPA 300 or concurrent reg. or LSPA 328A)	3	
LSPA 313	Introduction to Spanish Translation and Interpreting (LSPA 300 or LSPA 328A)	3	
LSPA 326	Spanish Phonetics (LSPA 300 or concurrent reg. or LSPA 328A)	3	
LSPA 345	Business Spanish (LSPA 300 or LSPA 328A)	3	
LSPA 346	Spanish for Health Care (LSPA 300 or LSPA 328A)	3	
LSPA 365	Studies in Foreign Film-Spanish (LSPA 310 or LSPA 335)	3	
LSPA 413	Advanced Spanish Translation and Interpreting (LSPA 313)	3	
LSPA 435	Caribbean Culture in Hispanic Literature (LSPA 335 or LSPA 328C)	3	
LSPA 436	Advanced Latin American Culture (LSPA 335 or LSPA 328C)	3	
LSPA 437	Advanced Spanish Culture (LSPA 335 or LSPA 328C)	3	
LSPA 441	Advanced Business Spanish (LSPA 345)	3	
LSPA 443	Spanish Theatre (LSPA 300 or LSPA 328A; LSPA 310 or LSPA 328B)	3	
LSPA 445	Women Writers in the Hispanic Worlds (LSPA 300 or LSPA 328A; LSPA 310 or LSPA 328B)	3	
LSPA 449	Spanish-American Literary Movements and Periods (LSPA 300 or LSPA 328A; LSPA 310 or LSPA 328B)	3	
LSPA 452	Genre Studies in Spanish (LSPA 300 or LSPA 328A; LSPA 310 or LSPA 328B)	3	
LSPA 453	Author Studies in Spanish (LSPA 300 or LSPA 328A; LSPA 310 or LSPA 328B)	3	
LSPA 454	Topic Studies in Spanish (LSPA 300 or LSPA 328A; LSPA 310 or LSPA 328B)	3	

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Course	Title (Prerequisite)	Cr	AUCC
LSPA 468	Spanish Vocabulary and Word Formation (LSPA 312)	3	
LSPA 470	Spanish Grammatical Constructions (LSPA 400)	3	
LSPA 310	Approaches to Literature-Spanish (LSPA 300 or LSPA 328A)	3	
LSPA 335	Issues in Hispanic Culture (LSPA 300 or LSPA 328A)	3	
	Electives	15	
	TOTAL	30	
SENIOR			
LSPA 400	Advanced Communication Skills-Spanish (LSPA 300 or LSPA 328A)	3	
<i>Select one of the following courses:¹⁰</i>			
LSPA 435	Caribbean Culture in Hispanic Literature (LSPA 335 or LSPA 328C)	3	4A
LSPA 436	Advanced Latin American Culture (LSPA 335 or LSPA 328C)	3	4A
LSPA 437	Advanced Spanish Culture (LSPA 335 or LSPA 328C)	3	4A
<i>Select one course from the following:¹⁰</i>			
LSPA 449	Spanish-American Literary Movements and Periods (LSPA 300 or LSPA 328A; LSPA 310 or LSPA 328B)	3	
LSPA 452	Genre Studies in Spanish (LSPA 300 or LSPA 328A; LSPA 310 or LSPA 328B)	3	
LSPA 453	Author Studies in Spanish (LSPA 300 or LSPA 328A; LSPA 310 or LSPA 328B)	3	
LSPA 454	Topic Studies in Spanish (LSPA 300 or LSPA 328A; LSPA 310 or LSPA 328B)	3	
LGEN 492	Seminar-Language, Literature and Society-General (LFRE 310 or LGER 310 or LSPA 310 or LFRE 328B or LGER 328B or LSPA 328B; two 400-level courses; senior status)	3	4B, 4C
OR			
LSPA 492	Seminar-Spanish Language, Literature and Society-Spanish (LSPA 310 or LSPA 328B; two 400-level courses; senior status)	3	4B, 4C
	400-level Spanish ¹¹	6	
	Electives ¹²	14	
	TOTAL	32	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 3B of the All-University Core Curriculum (AUCC).

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 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).

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 one of the two 400-level Spanish courses, 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 12 credits of electives must be 300- and 400-level courses. The minimum is increased to 15 if option c) is selected in note 12.

Teaching Endorsement

Students interested in pursuing a teaching license through Colorado State University may refer to the School of Education, 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 programs Web site

(<http://soe.caahs.colostate.edu/Licensure>) or in room 100 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, LJPJ, LKOR, LLAT, LRUS, LSGN, or LSPA subject code.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
L* 200 ¹	Second Year Language I (L* 107 or L* 108 or placement)	3	
L* 201 ¹	Second Year Language II (L* 200 or L* 228A or placement)	3	
LB 192	College of Liberal Arts First Year Seminar	3	
SPCM 200	Public Speaking	3	2A
	Biological/physical sciences ²	4	3A
	Historical perspectives ³	6	3D
	Mathematics ⁴	3	1B
	TOTAL	30	
SOPHOMORE			
CO 300	Writing Arguments (CO 150 or HONR 193)	3	2B
EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3C
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
L* 300 ¹	Reading and Writing for Communication (L* 201 or L* 208 or L* 228B or placement)	3	
L* 310 ¹	Approaches to Literature (LFRE 300 or LFRE 328A or LGER 201 or LGER 208 or LGER 228 or LSPA 300 or LSPA 328A)	3	
L* 326 ¹	Phonetics (L* 300 or concurrent reg. or L* 328A)	3	
L* 335 ¹	Issues in Culture (L* 300 or L* 328A)	3	
PSY 100	General Psychology	3	3C
	Arts/humanities ⁵	3	3B
	Biological/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	Introduction to French Linguistics (LFRE 300 or concurrent reg. or LFRE 328A)	3	
LSPA 312	Introduction to Spanish Linguistics (LSPA 300 or concurrent reg. or LSPA 328A)	3	
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
EDUC 350	Instruction I-Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3	
EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent reg. in EDUC 350; admission to teacher licensure)	1	
L* 400 ¹	Advanced Communication Skills (L* 300 or L* 328A)	3	
<i>Select one of the following courses:</i>			
LFRE 433A-B	Advanced French/Francophone Culture (LFRE 328C or LFRE 400)	3	4A
LGER 434	Advanced German Culture (LGER 335 or LGER 328C)	3	4A
LSPA 435	Caribbean Culture in Hispanic Literature (LSPA 335 or LSPA 328C)	3	4A
LSPA 436	Advanced Latin American Culture (LSPA 335 or LSPA 328C)	3	4A

Course	Title (Prerequisite)	Cr	AUCC
LSPA 437	Advanced Spanish Culture (LSPA 335 or LSPA 328C)	3	4A
L* ¹	300- or 400-level language	6	
L* ¹	400-level language	3	
	Arts/humanities ⁵	3	3B
	Elective	3	
	TOTAL	31	
SENIOR			
E 324	Teaching English as a Second Language (E 320 or E 322)	3	
OR			
LSPA 470	Spanish Grammatical Constructions (LSPA 400)	3	
EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4	
EDUC 462	Methods and Assessment in Teaching Languages (admission to teacher licensure; oral and written competency in the language endorsement area)	4	
EDUC 485B	Student Teaching-Secondary (EDUC 450; EDUC 462)	11	
EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
EDUC 493A	Seminar-Professional Relations (EDUC 426 or EDUC 450; EDUC 462; concurrent reg. in EDUC 485B)	1	
L* 492 ⁴	Language, Literature, and Society (L* 310 or L* 328B; two 400-level language courses; senior status)	3	4B, 4C
	TOTAL	27	
PROGRAM TOTAL = 120 credits			

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.

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 other countries 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 of 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 prefix.

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 an M.A. degree in languages, literatures, and cultures (with specializations in French, German, or Spanish), or can pursue a joint program leading to one of two master's degrees, one in languages, literatures, and cultures (with specialization in the above) and the other in English (TEFL/TESL). Please consult the *Graduate and Professional Bulletin*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, or the department's website, <http://www.colostate.edu/depts/FLL>, for more information.

DEPARTMENT OF HISTORY

Office in Clark Building, Room B357

(970) 491-6334

<http://www.colostate.edu/Depts/Hist/index.html>

Associate Professor Doug Yarrington, 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

College of Liberal Arts

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.

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.

Liberal Arts Concentration

The liberal arts concentration is an excellent major for students planning careers in history, government service, and other professional occupations requiring broad intellectual and practical skills. It is an outstanding choice for students planning further professional study in law, medicine, ministry, academia, business, and many other fields.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition placement exam or CO 130)	3	1A
<i>Select one course from the following:</i>			
HIST 100	Western Civilization, Pre-Modern ¹	3	3E
HIST 115	Islamic World to 1800 ¹	3	3E
HIST 120	Asian Civilizations I ¹	3	3E
HIST 170	World History, Ancient-1500 ¹	3	3E
HIST 101	Western Civilization, Modern ¹	3	3D
OR			
HIST 171	World History, 1500-Present ¹	3	3D

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
	Arts/humanities ²	6	3B
	Biological/physical sciences ³	7	3A
	Mathematics ⁴	3	1B
	Elective	5	
	TOTAL	30	
SOPHOMORE			
HIST 150	U.S. History to 1876 ¹	3	3D
OR			
HIST 151	U.S. History Since 1876 ¹	3	3D
	Additional communication ³	3	2A or 2B
	Social/behavioral sciences ⁶	3	3C
	Language and quantitative options ⁷	3-10	
	Electives	11-18	
	TOTAL	30	
JUNIOR			
	History, upper-division ^{8,9}	3	4A
	History, upper-division non-U.S. ^{9,10}	6	
	History, upper-division U.S. ⁹	3	
	Language and quantitative options ⁷	3-6	
	Electives	12-15	
	TOTAL	30	
SENIOR			
HIST 492	Capstone Seminar (senior status; history majors only)	3	4A, 4B, 4C
	History electives, upper-division ⁹	9	
	Electives	18	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

¹ Grade of C or better required.

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 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 2A or 2B in the AUCC. First-time students entering a college or university on or after July 1, 2008, must take an advance writing course (category 2B).

⁶ Select from the list of courses in category 3C in the AUCC.

⁷ Each history major must choose either the foreign language option or the quantitative option (see below). The credit distribution for these options ranges from 6-16

⁸ See approved list of upper-division history courses that may be used to fulfill the category 4A requirement

⁹ 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.

¹⁰ Select one upper-division course from two categories-Africa, East Asia, Europe, Latin America/ Caribbean, Middle East, South Asia, World.

Language Option

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
L* 105 ¹	First Year Language I ² (no previous study in the language)	5	
L* 107 ¹	First Year Language II (L* 105 or L* 106)	5	
	TOTAL	10	
JUNIOR			
L* 200 ¹	Second Year Language I (L* 107 or L* 108 or placement exam)	3	
L* 201 ¹	Second Year Language II (L* 200 or L* 228A or placement exam)	3	
	TOTAL	6	

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 Placement exam required.

Quantitative Option

Student must successfully complete STAT 301, Introduction to Statistics, plus three credits of upper-division statistics (STAT).

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
JUNIOR			
	Upper division statistics	3	

Social Studies Teaching Concentration

The social studies teaching concentration is for students who plan to teach in junior high or high school. Students must also complete the requirements for the social studies undergraduate teaching licensure in the School of Education.

Students interested in pursuing a teaching license through Colorado State University may refer to the School of Education, 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 programs Web site (<http://soe.cahs.colostate.edu/Licensure>) or in room 100 of the Education Building.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
----- <i>Select one course from the following:</i>			
HIST 100	Western Civilization, Pre-Modern ¹	3	3E
HIST 115	Islamic World to 1800 ¹	3	3E
HIST 120	Asian Civilizations I ¹	3	3E
HIST 170	World History, Ancient-1500 ¹	3	3E
HIST 101	Western Civilization, Modern ¹	3	3D
OR			
HIST 171	World History, 1500-Present ¹	3	3D
SPCM 200	Public Speaking ²	3	2A
	Art/humanities ³	3	3B
	Biological/physical sciences ⁴	7	3A
	Mathematics ⁵	3	1B
	Electives	5	
	TOTAL	30	

SOPHOMORE			
----- <i>Select one of 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 of the following courses:</i>			
ECON 101	Economics of Social Issues	3	3C
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
ECON 204	Principles of Macroeconomics (AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
ECON 211	Gender in the Economy	3	3E
ECON 212	Racial Inequality and Discrimination	3	3C
ECON 240/	Issues in Environmental Economics	3	3C
AREC 240			
EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3C
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
GR 100	Introduction to Geography	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
	TOTAL	30	
JUNIOR			

Course	Title (Prerequisite)	Cr	AUCC
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
EDUC 350	Instruction I-Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3	
EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent reg. in EDUC 350; admission to teacher licensure)	1	
EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486; admission to teacher licensure)	4	
EDUC 465	Methods and Materials in Social Studies (admission to teacher licensure)	4	
EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
GR 320	Cultural Geography (GR 100)	3	
	History, upper-division, non-U.S. ⁶	3	4A
	Upper-division U.S. history ⁶	9	4A
	TOTAL	30	
SENIOR			
EDUC 485B	Student Teaching-Secondary (EDUC 450; EDUC 465)	11	
EDUC 493A	Seminar-Professional Relations (EDUC 426 or EDUC 450; EDUC 465; concurrent reg. in EDUC 485B)	1	
HIST 492	Capstone Seminar (senior status; history majors only)	3	4A, 4B, 4C
	Arts/humanities ³	3	3B
	Upper-division non-U.S. history	6	
	Electives	6	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

¹ Grade of C or better required.

² Students must earn a B in SPCM 200 for it to count toward certification.

³ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC).

⁴ Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

⁵ Select at least three credits from the list of courses in category 1B in the AUCC.

⁶ See approved list of upper-division history courses that may be used to fulfill the category 4A requirement. Only one three-credit course is needed to fulfill category 4A.

Minor in History

The minor, consisting of 21 credits allows non-majors to earn a credential in history.

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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, and the department's website, www.colostate.edu/Depts/Hist/histhome.html.

DEPARTMENT OF JOURNALISM AND TECHNICAL COMMUNICATION

Office in Clark Building, Room C225
(970) 491-6310
www.colostate.edu/Depts/TJ

Professor Greg Luft, Chair
Professor Don Zimmerman, Graduate Coordinator

Major in Technical Journalism

The study of journalism and mass communication combines high-level professional training with a broad foundation in the liberal arts. Students complete a 15-credit core in one of five concentrations and 6-9 credits of mass media and society courses. Students may also complete a professionally-administered media internship program. Additional practical experience can be gained on the staffs of the daily *Rocky Mountain Collegian*, the award-winning campus television station CTV, and KCSU 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 encouraged 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, economics, business, speech communication, psychology, or natural or applied sciences is possible.

The Department of Journalism and Technical Communication is one of a relatively small number of departments recognized nationally by the Accrediting Council on Education in Journalism and Mass Communications. Concentrations are offered in computer-mediated communication; news-editorial; public relations; specialized and technical communication; and television news and video communication. Participation in internships, volunteer activities, or cooperative education opportunities 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 technical journalism program emphasizes the role of mass media in society and prepares students for entry-level work in a variety of capacities in private business, government, and education. Depending upon the concentration chosen, students may enter print and broadcast news media, public relations and marketing departments in private businesses and public institutions, publications firms and agencies oriented toward specialized audiences, and a variety of professional positions related to news video and computer-based communication. Some career opportunities include, but are not limited to: news reporter/editor; publication editor; media consultant; investigative journalist; advertising specialist; television/radio broadcaster; television camera operator; documentary producer; special events coordinator; technical advertising specialist; video producer/editor; fund-raising specialist; columnist; communications officer or program director.

Technical Journalism Core Courses

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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
JTC 100	Media in Society	3	
	Arts/humanities ¹	6	3B
	Biological/physical sciences ²	7	3A
	Global and cultural awareness ³	3	3E
	Historical perspectives ⁴	3	3D
	Mathematics ⁵	3	1B
	Electives	2	
	TOTAL	30	
SOPHOMORE			
JTC 210	Newswriting (satisfactory performance on typing and diagnostic test)	3	
JTC 211	Computer-Mediated Visual Communication (JTC 210)	3	
	Additional communication ⁶	3	2A or 2B
	Statistics ⁷	3	
	Social/behavioral sciences ⁸	3	3C
	Concentration courses ⁹	0-6	
	Option area/electives ¹⁰	9-15	
	TOTAL	30	
JUNIOR			
<i>Select one course 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	4B
JTC 412	International Mass Communication	3	
JTC 413	New Communication Technologies and Society	3	
JTC 414	Media Effects	3	
JTC 415	Communications Law	3	4B
JTC 471	Communication Research Methods (one statistics course)	3	
	Concentration courses ⁹	9-15	
	Option area/electives ¹⁰	12-18	
	TOTAL	30	

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
JTC 411	Media Ethics and Issues ¹¹	3	4B
OR			
JTC 415	Communications Law ¹¹	3	4B
		6-12	
		15-21	
TOTAL		30	

PROGRAM TOTAL = 120 credits¹²

¹ Select two courses from category 3B in the All-University Core Curriculum (AUCC)

² Select a total of seven credits from category 3A in the AUCC, including one laboratory course.

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 at least three credits from the list in category 1B in the AUCC.

⁶ Select from the list of courses (except JTC 300) 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) other than JTC 300.

⁷ Select a three credit statistics course offered by any department.

⁸ Select from the list of courses (except JTC 100) in category 3C in the AUCC. Students in the news-editorial concentration should select POLS 101 or POLS 103. Public relations students should take AREC 202 or ECON 202 as a prerequisite for MKT 305. News-editorial students who select a course other than POLS 101 or POLS 103 and public relations students who select a course other than AREC 202 or ECON 202 will have their elective credits reduced by three.

⁹ In order to complete a major in technical journalism, students must select a concentration in computer-mediated communication, news-editorial, public relations, specialized and technical communication, or television news and video communication. The total credits in the concentrations range from 21 to 27 credits. See concentration details below.

¹⁰ See department advising manual for Option Area choices. Technical Journalism students must take a total of 65 credits in liberal arts outside of the department. These can include any course in the AUCC, any course in the College of Liberal Arts or the College of Natural Sciences, or approved courses in other colleges (see department).

¹¹ If either JTC 411 or JTC 415 is chosen to satisfy the choice in the junior year, the other course may be chosen here, if desired, by students in computer-mediated communication, public relations, specialized and technical communication or television news and video communication concentrations. Or take a different concept course to fulfill the junior year requirement and apply JTC 411 or JTC 415 here.

¹² Students must take 80 or more credits outside the department. Completion of more than 40 JTC credits will require earning more than the minimum of 120 credits to graduate.

Computer-Mediated Communication Concentration

The computer-mediated communication concentration is for those who seek a career in web site design and management for mass media organizations, corporations, or not-for-profit organizations.

In addition to the technical journalism core courses, the following must be completed:

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.

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
JTC 310	Copy Editing (JTC 100; JTC 210)	3	
<i>Select one of the following:</i>			
JTC 320	Reporting (JTC 210)	3	
JTC 328	Feature Writing (JTC 210)	3	
JTC 341	Broadcast News (JTC 210)	3	
JTC 351	Public Relations Practices (JTC 210; JTC 211; JTC 350)	3	
JTC 361	Writing for Specialized Magazines (JTC 210)	3	
JTC 365	Computer-Mediated Communication Foundations (junior or senior standing)	3	4A
TOTAL		9	
SENIOR			
<i>Select three courses from the following:</i>			

Course	Title (Prerequisite)	Cr	AUCC
JTC 326	Online Writing and Journalism (JTC 210; JTC 211)	3	
JTC 335	Digital Photojournalism (JTC 211)	3	
JTC 372	Web Design and Management (JTC 210; JTC 211)	3	
JTC 373	Digital Promotion Management (JTC 211)	3	
JTC 460	Media Development (JTC 211; JTC 310; JTC 371 or JTC 372)	3	
JTC 487	Internship (written consent of department)	3	
JTC 468	Convergence and Hypermedia (JTC 310; JTC 365; 9 credits selected from JTC 326, JTC 372, JTC 373, or JTC 487)	3	4C
TOTAL		12	

CONCENTRATION TOTAL = 21 credits

News-Editorial Concentration

The news-editorial concentration is for those who seek careers as newspaper and general magazine writers, reporters, and editors.

In addition to the technical journalism core courses, the following must be completed:

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.

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
POLS 101	American Government and Politics ¹	3	3C
AND/OR			
POLS 103	State and Local Government and Politics ¹	3	3C
TOTAL		6	
JUNIOR			
JTC 310	Copy Editing (JTC 100; JTC 210)	3	
JTC 320	Reporting (JTC 210)	3	
<i>Select two of the following courses:²</i>			
<i>Writing courses</i>			
JTC 328	Feature Writing (JTC 210)	3	
JTC 361	Writing for Specialized Magazines (JTC 210)	3	
JTC 461	Writing about Science, Health, and Environment (JTC 210)	3	
<i>Editing-design courses</i>			
JTC 371	Publications Design and Production (JTC 211)	3	
JTC 372	Web Design and Management (JTC 210; JTC 211)	3	
JTC 460	Media Development (JTC 211; JTC 310; JTC 371 or JTC 372)	3	
TOTAL		12	
SENIOR			
JTC 411	Media Ethics and Issues ³	3	4B
OR			
JTC 415	Communications Law ³	3	4B
JTC 420	Advanced Reporting (JTC 211; JTC 310; JTC 320)	3	4A, 4C
		3	
TOTAL		9	

CONCENTRATION TOTAL = 24 credits

¹ Complete POLS 101 or POLS 103, whichever course was not used to fulfill category 3C in the AUCC. If a different course was used to fulfill category 3C, both courses must be taken.

² Complete a combination of courses from the two groups, based on whether your interest is in writing or editing-design. Select a minimum of 6 credits and maximum of 9 credits from these two groups.

³ News-editorial students must take both JTC 411 and JTC 415. Select the course not used to fulfill the JTC 411 or JTC 415 requirement under the technical journalism core. News-editorial students must choose a different course (not JTC 411 or JTC 415) to fulfill the upper-division concept course requirement in the department's core (select from JTC 311, JTC 316/ETST 361, JTC 412, JTC 413, JTC 414, or JTC 471).

⁴ JTC 335 or JTC 487 are recommended. Or, select a third course from the writing and editing-design courses above.

Public Relations Concentration

The public relations concentrating trains communication specialists in business, government, non-profit organizations, and public relations and advertising agencies.

In addition to the technical journalism core courses, the following must be completed:

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.

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
AREC 202	Agricultural and Resource Economics ¹	(3)	3C
OR			
ECON 202	Principles of Microeconomics ¹ (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	(3)	3C
JUNIOR			
<i>Select one of the following:</i>			
JTC 310	Copy Editing (JTC 100; JTC 210)	3	
JTC 320	Reporting (JTC 210)	3	
JTC 326	Online Writing and Journalism (JTC 210; JTC 211)	3	
JTC 328	Feature Writing (JTC 210)	3	
JTC 361	Writing for Specialized Magazines (JTC 210)	3	
JTC 461	Writing about Science, Health, and Environment (JTC 210)	3	
JTC 350	Public Relations	3	
JTC 351	Public Relations Practices (JTC 210; JTC 211; JTC 350)	3	
MGT 305	Fundamentals of Management	3	
MKT 305	Fundamentals of Marketing (AREC 202 or ECON 101 or ECON 202)	3	
		15	
SENIOR			
JTC 353	Public Relations Campaigns (JTC 210; JTC 350)	3	
<i>Select one course from the following:</i>			
JTC 371	Publications Design and Production (JTC 211)	3	
JTC 372	Web Design and Management (JTC 210; JTC 211)	3	
JTC 373	Digital Promotion Management (JTC 211)	3	
JTC 450	Public Relations Cases (JTC 351; JTC 353; JTC 371 or JTC 372 or JTC 373)	3	4A, 4C
		3	
Journalism elective			
TOTAL		12	
CONCENTRATION TOTAL = 27 credits			

¹ AREC 202 or ECON 202 are required as a prerequisite for MKT 305. Choice of another course toward fulfillment of category 3C in the AUCC will mean a reduction in elective credits available.

Specialized and Technical Communication Concentration

The specialized communication concentration is for those who wish to write or edit for publications aimed at professional, technical, and other specialized audiences.

In addition to the technical journalism core courses, the following must be completed:

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.

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
JTC 310	Copy Editing and Production (JTC 100; JTC 210)	3	
<i>Select one course from the following:</i>			
JTC 326	Online Writing and Journalism (JTC 210; JTC 211)	3	
JTC 335	Digital Photojournalism (JTC 211)	3	
JTC 340	Video Editing (JTC 210)	3	
JTC 341	Broadcast News (JTC 210)	3	
JTC 350	Public Relations	3	
JTC 460	Media Development (JTC 211; JTC 310; JTC 371 or JTC 372)	3	
JTC 487	Internship (written consent of department)	3	
JTC 361	Writing for Specialized Magazines (JTC 210)	3	
		9	
SENIOR			
JTC 371	Publications Design and Production (JTC 211)	3	
OR			
JTC 372	Web Design and Management (JTC 210; JTC 211)	3	
JTC 461	Writing about Science, Health, and Environment (JTC 210)	3	
OR			
JTC 464	Technical Writing (JTC 310; JTC 361)	3	
JTC 465	Specialized and Technical Editing (JTC 211; JTC 310; JTC 361; JTC 371 or JTC 372; JTC 461 or JTC 464)	3	4A, 4C
		3	
Journalism electives			
TOTAL		12	
CONCENTRATION TOTAL = 21 credits			

Television News and Video Communication Concentration

The television news and video communication concentration is for students pursuing television news and video production careers in corporations, government agencies and institutions, cable television, and the news media.

In addition to the technical journalism core courses, the following must be completed:

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.

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
JTC 340	Video Editing (JTC 210)	3	
JTC 341	Broadcast News (JTC 210)	3	
JTC 345	Electronic Field Production (JTC 340)	3	
		9	
SENIOR			
<i>Select two of the following courses:</i> ¹			
JTC 320	Reporting (JTC 210)	3	
JTC 343	Advanced Television News Production (JTC 341)	3	
JTC 433	Advanced Video Editing (JTC 345)	3	
JTC 435	Documentary Video Production (JTC 345)	3	
JTC 487	Internship (written consent of department)	3	
JTC 440	Advanced Electronic Media Production (JTC 341; JTC 345)	3	4A, 4C
		3	
Journalism elective			
TOTAL		12	
CONCENTRATION TOTAL = 21 credits			

¹ JTC 544, Corporate and Institutional Media Production, may also be selected as a choice here.

Media Studies Minor

The Departments of Journalism and Technical Communication and Speech 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 Technical Communication

The department offers a master of science degree in technical communication 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 program is offered in Denver as well as on campus. A description of this program may be found in the *Graduate and Professional Bulletin*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, and the department's website, www.colostate.edu/Depts/TJ.

DEPARTMENT OF MUSIC, THEATRE, AND DANCE

Office in Music Building, Room 102
(970) 491-5529
www.colostate.edu/Depts/Music

Professor Michael Thaut, 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MU 117	Music Theory I (MU 111 or satisfactory completion of placement exam)	4	
MU 118	Music Theory II (MU 117)	4	
MU 131	Introduction to Music History and Literature	3	3B
MU 172	Freshman Voice Studio ¹ (concurrent reg. in any music ensemble)	2	
OR			
MU 272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2	
MU 252A-G	Instrumental Techniques	2	
MU	Ensemble ²	2	
SPCM 200	Public Speaking	3	2A
	Mathematics ³	3	1B
	Electives	3	
	TOTAL	29	

College of Liberal Arts

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
MU 217	Music Theory III (MU 118)	4	
MU 218	Music Theory IV (MU 217)	4	
MU 252A-G	Instrumental Techniques	2	
MU 254	Beginning Conducting (MU 117)	2	
MU 272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2	
MU 273	Composition Instruction (MU 118; MU 131)	2	
MU	Ensemble ²	2	
PSY 100	General Psychology	3	3C
	Historical perspectives ⁴	3	3D
	Electives	6	
	TOTAL	30	
JUNIOR			
MU 252A-G	Instrumental Techniques	2	
MU 311	Counterpoint I (MU 217)	2	
OR			
MU 312	Counterpoint II (MU 217)	2	
MU 334	Music History I (MU 100 or MU 131; MU 118)	3	4A, 4B
MU 335	Music History II (MU 100 or MU 131; MU 118)	3	4A, 4B
MU 355	Choral Conducting and Literature	2	
OR			
MU 356	Instrumental Conducting and Literature	2	
MU 416	Stylistic Analysis (MU 218)	3	
MU 471	Recital (written consent of instructor)	1	
MU 473	Composition Instruction (MU 273; successful completion of upper-division qualifying exam)	4	
MU	Ensemble ²	2	
	Arts/humanities ⁵	3	3B
	Music electives	3	
	Electives	3	
	TOTAL	31	
SENIOR			
MU 311	Counterpoint I (MU 217) ⁵	2	
OR			
MU 312	Counterpoint II (MU 217) ⁶	2	
MU 411	Orchestration (MU 218)	3	
MU 471	Recital (written consent of instructor)	1	4C
MU 473	Composition Instruction (MU 273; successful completion of upper-division qualifying exam)	4	
MU	Ensemble ²	2	
	Biological/physical sciences ⁷	7	3A
	Global and cultural awareness ⁸	3	3E
	Music electives	3	
	Electives	5	
	TOTAL	30	

PROGRAM TOTAL = 120 credits⁹

¹ First-year voice students take MU 172 for 2 semesters, then MU 272Q the second year for 2 semesters; instrumentalists take MU 272A-V on major instrument for 2 semesters each of the first 2 years.

² Two semesters.

³ Select at least three credits from the list of courses in category 1B in the AUCC.

⁴ Select a course from the list in category 3D of the AUCC.

⁵ Select from the list of courses in category 3B in the AUCC.

⁶ Select course not taken in the junior year.

⁷ Select two courses (one with a laboratory) from the list of courses in category 3A in the AUCC.

⁸ Select from the list of courses in category 3E in the AUCC.

⁹ 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 of Education, College of Applied Human Sciences, section in this catalog for general information. Detailed information at the Educator Licensing Program and licensure requirements are available on the program's Web site (<http://soe.cahs.colostate.edu/Licensure>) or in room 100 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MU 117	Music Theory I (MU 111 or satisfactory completion of placement exam)	4	
MU 118	Music Theory II (MU 117)	4	
MU 131	Introduction to Music History and Literature	3	3B
MU 251	Voice Techniques (instrumental music education majors only)	1	
MU 252A	Instrumental Techniques-Low Brass	1	
MU 252D	Instrumental Techniques-Double Reeds and Flute	1	
MU 252G	Instrumental Techniques-Percussion	1	
MU 272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2	
MU	Ensembles ²	2	
	Arts/humanities ³	3	3B
	Historical perspectives ⁴	3	3D
	Mathematics ⁵	3	1B
	TOTAL	31	
SOPHOMORE			
EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3C
MU 217	Music Theory III (MU 118)	4	
MU 218	Music Theory IV (MU 217)	4	
MU 252B	Instrumental Techniques-High Brass	1	
MU 252C	Instrumental Techniques-Clarinet and Saxophone	1	
MU 252E	Instrumental Techniques-Strings	1	
MU 254	Beginning Conducting (MU 117)	2	
MU 272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2	
MU 286	Practicum-Music Education	1	
MU 425	Jazz Pedagogy	2	
MU	Ensembles ²	2	
PSY 100	General Psychology	3	3C
SPCM 200	Public Speaking	3	2A
	Biological/physical sciences ⁶	3	3A
	TOTAL	32	
JUNIOR			
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
EDUC 350	Instruction I-Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3	
EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent reg. in EDUC 350; admission to teacher licensure)	1	

Course	Title (Prerequisite)	Cr	AUCC	Course	Title (Prerequisite)	Cr	AUCC
EDUC 474	Elementary Music Methods I (admission to teacher licensure)	2		MU 252D	Instrumental Techniques-Double Reeds and Flute ²	1	
EDUC 475	Elementary School Music Methods II (EDUC 474)	2		MU 252E	Instrumental Techniques-Strings Ensembles ¹	1	
MU 334	Music History I (MU 100 or MU 131; MU 118)	3	4A, 4B	MU	Arts/humanities ³	2	
MU 335	Music History II (MU 100 or MU 131; MU 118)	3	4A, 4B	MU	Historical perspectives ⁴	3	3B
MU 356	Instrumental Conducting and Literature	2		MU	Mathematics ⁵	3	3D
MU 411	Orchestration (MU 218)	3			TOTAL	3	1B
MU 416	Stylistic Analysis (MU 218)	3				30	
MU 420	Marching Band Techniques (MU 204)	2					
MU 472A-V	Applied Music Instruction ¹ (MU 272A-V; concurrent reg. in any music ensemble; successful completion of upper-division qualifying exam)	2					
MU	Ensembles ²	2					
	TOTAL	33					
SENIOR				SOPHOMORE			
EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4		EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3C
EDUC 477	Instrumental Methods for Secondary Schools (MU 217; admission to teacher licensure)	2		MU 217	Music Theory III (MU 118)	4	
EDUC 485A	Student Teaching-Elementary (EDUC 450; EDUC 475)	6		MU 218	Music Theory IV (MU 217)	4	
EDUC 485B	Student Teaching-Secondary (EDUC 450; EDUC 477)	6		MU 252B	Instrumental Techniques-High Brass ²	(1)	
EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1		MU 252C	Instrumental Techniques-Clarinet and Saxophone ²	(1)	
EDUC 493A	Seminar-Professional Relations (EDUC 450; EDUC 475; EDUC 477; concurrent reg. in EDUC 485A or B)	1		MU 254	Beginning Conducting (MU 117)	2	
MU 471	Recital (written consent of instructor)	1	4C	MU 265A	Singers Diction-German/English	1	
MU 472A-V	Applied Music Instruction (MU 272A-V; concurrent reg. in any music ensemble; successful completion of upper-division qualifying exam)	1		MU 265B	Singers Diction-French/Italian (MU 265A)	1	
MU	Ensemble ²	1		MU 272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2	
	Biological/physical sciences ⁶	4	3A	MU 286	Practicum-Music Education	1	
	Global and cultural awareness ⁷	3	3E	MU 425	Jazz Pedagogy	2	
	TOTAL	30		MU	Ensembles ¹	2	
PROGRAM TOTAL = 126 credits				PSY 100	General Psychology	3	3C
				SPCM 200	Public Speaking	3	2A
					Biological/physical sciences ⁶	3	3A
					TOTAL	31	
				JUNIOR			
				EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
				EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
				EDUC 350	Instruction I-Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3	
				EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent reg. in EDUC 350; admission to teacher licensure)	1	
				EDUC 474	Elementary Music Methods I (admission to teacher licensure)	2	
				EDUC 475	Elementary School Music Methods II (EDUC 474)	2	
				MU 334	Music History I (MU 100 or MU 131; MU 118)	3	4A, 4B
				MU 335	Music History II (MU 100 or MU 131; MU 118)	3	4A, 4B
				MU 355	Choral Conducting and Literature	2	
				MU 411	Orchestration (MU 218)	3	
				MU 416	Stylistic Analysis (MU 218)	3	
				MU 466	Song Literature	2	
				MU 467	Vocal Pedagogy (MU 265A; MU 265B; concurrent reg. in MU 472Q)	2	
				MU 472A-V	Applied Music Instruction ¹ (MU 272A-V; concurrent reg. in any music ensemble; successful completion of upper-division qualifying exam)	2	
				MU	Ensembles ¹	2	
					TOTAL	35	
				SENIOR			
				EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4	
				EDUC 476	Choral Methods for Secondary Schools (MU 217; admission to teacher licensure)	2	
				EDUC 485A	Student Teaching-Elementary (EDUC 450; EDUC 475)	6	
				EDUC 485B	Student Teaching-Secondary (EDUC 450; EDUC 476)	6	
				EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
				EDUC 493A	Seminar-Professional Relations (EDUC 450; EDUC 475; EDUC 476; concurrent reg. in EDUC 485A or B)	1	
				MU 471	Recital (written consent of instructor)	1	4C

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).

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 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.

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MU 117	Music Theory I (MU 111 or satisfactory completion of placement exam)	4	
MU 118	Music Theory II (MU 117)	4	
MU 131	Introduction to Music History and Literature	3	3B
MU 172	Freshman Voice Studio ¹ (concurrent reg. in any music ensemble)	2	
MU 252A	Instrumental Techniques-Low Brass ²	1	

College of Liberal Arts

Course	Title (Prerequisite)	Cr	AUCC
MU 472A-V	Applied Music Instruction (MU 272A-V; concurrent reg. in any music ensemble; successful completion of upper-division qualifying exam)	1	
MU	Ensemble	1	
	Biological/physical sciences ⁶	4	3A
	Global and cultural awareness ⁷	3	3E
	TOTAL	30	

PROGRAM TOTAL = 126 credits

¹ Two semesters.

² Vocal majors take MU 252A or B; C or D.

³ Select from list of courses in category 3B in the All-University Core Curriculum (AUCC).

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 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CHEM 103	Chemistry in Context	3	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MU 117	Music Therapy I (MU 111 or satisfactory completion of placement exam)	4	
MU 118	Music Theory II (MU 117)	4	
MU 131	Introduction to Music History and Literature	3	3B
MU 155	Guitar Class I	2	
MU 172	Freshman Voice Studio ¹ (concurrent reg. in any music ensemble)	2	
OR			
MU 272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2	
MU 241	Introduction to Music Therapy	3	
PSY 100	General Psychology	3	3C
	Ensemble ²	2	
	Mathematics ³	3	1B
	TOTAL	32	
SOPHOMORE			
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
MU 153	Piano Class IV (MU 152)	2	
MU 217	Music Theory III (MU 118)	4	
MU 218	Music Theory IV (MU 217)	4	
MU 250	Music Therapy Practice	2	
MU 252G	Instrumental Techniques-Percussion	1	
MU 254	Beginning Conducting (MU 117)	2	
MU 272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2	
MU	Ensemble ²	2	
OT 215	Medical Terminology	1	

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Course	Title (Prerequisite)	Cr	AUCC
PHIL 100	Appreciation of Philosophy	3	3B
SPCM 200	Public Speaking	3	2A
	Historical perspectives ⁴	3	3D
	TOTAL	33	
JUNIOR			
BMS 300	Principles of Human Physiology (BZ 101 or BZ 110 or LIFE 102; CHEM 103 or CHEM 107 or CHEM 111)	4	
BMS 345	Functional Neuroanatomy (BMS 300 or BMS 360)	4	
----- <i>Select two credits from the following:</i>			
MU 157	Voice Class I ⁵	2	
OR			
MU 265A	Singers Diction-German/English ⁵	1	
MU 265B	Singers Diction-French/Italian ⁵ (MU 265A)	1	

MU 335	Music History II (MU 100 or MU 131; MU 118)	3	4A, 4B
MU 342	Psychology of Music (PSY 100)	3	
MU 440	Music Therapy Methods I (MU 241; admission to professional curriculum)	3	
MU 443	Music Therapy Methods II (BMS 300; MU 241)	3	
MU 472A-V	Applied Music Instruction (MU 272A-V; concurrent registration in any music ensemble; successful completion of upper-division qualifying exam)	1	
MU 486A	Practicum-Music Therapy (piano proficiency)	1	
MU	Ensemble ⁶	2	
PSY 320	Abnormal Psychology (PSY 100)	3	
	TOTAL	28	
SENIOR			
MU 343	Research Methods in Music Therapy (STAT 201)	3	
MU 444	Music Therapy Methods III (admission to professional curriculum)	3	
MU 445	Improvisation Techniques in Music Therapy (admission to professional curriculum)	2	
MU 486A	Practicum-Music Therapy ² (piano proficiency)	5	4C
MU 487	Internship (completion of all course work in the music therapy curriculum)	1	

PSY 452	Cognitive Psychology (PSY 250)	3	
OR			
PSY 454	Physiological Psychology (PSY 250)	3	
STAT 201	General Statistics (placement in MATH 130 or higher)	3	
	Global and cultural awareness ⁷	3	3E
	Music electives	4	
	TOTAL	27	
PROGRAM TOTAL = 120 credits			

¹ First-year voice students take MU 172 for 2 semesters, then MU 272Q the second year for two semesters; instrumentalists take MU 272A-V on 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 from the list of courses in category 3D in the AUCC.

⁵ Instrumental majors must select MU 157; voice majors must select MU 265A and MU 265B.

⁶ One semester.

⁷ Select from the list of courses in category 3E 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MU 117	Music Theory I (MU 111 or satisfactory completion of placement exam)	4	
MU 118	Music Theory II (MU 117)	4	
MU 131	Introduction to Music History and Literature	3	3B
MU	Ensemble ¹	2	
SPCM 200	Public Speaking	3	2A
	Mathematics ²	3	1B
	Elective	2	
	TOTAL	24	
SOPHOMORE			
MU 217	Music Theory III (MU 118)	4	
MU 218	Music Theory IV (MU 217)	4	
MU	Ensemble ¹	2	
PSY 100	General Psychology	3	3C
	Historical perspectives ³	3	3D
	Elective	3	
	TOTAL	19	
JUNIOR			
MU 254	Beginning Conducting ⁴ (MU 117)	2	
MU 311	Counterpoint I (MU 217)	2	
OR			
MU 312	Counterpoint II ⁵ (MU 217)	2	
MU 334	Music History I (MU 100 or MU 131; MU 118)	3	4A, 4B
MU 335	Music History II (MU 100 or MU 131; MU 118)	3	4A, 4B
MU 416	Stylistic Analysis (MU 218)	3	
MU 471	Recital ⁶ (written consent of instructor)	1	
MU 472A-V	Applied Music Instruction ⁷ (MU 272A-V; successful completion of upper-division qualifying exam; concurrent reg. in any music ensemble)	4	
MU	Ensemble ¹	2	
	Arts/humanities ⁸	3	3B
	Music electives ⁹	3	
	TOTAL	21-26	
SENIOR			
MU 411	Orchestration ¹⁰ (MU 218)	3	
MU 471	Recital (written consent of instructor)	1	4C
MU 472A-V	Applied Music Instruction ⁷ (MU 272A-V; successful completion of upper-division qualifying examination; concurrent reg. in any music ensemble)	4	
MU	Ensemble ¹¹	2	
OR			
MU 407	Accompanying ¹² (MU 272I)	2	
	Biological/physical sciences ¹³	7	3A
	Global and cultural awareness ¹⁴	3	3E
	Music electives	3	
	TOTAL	20-23	
PROGRAM TOTAL = 84-92 credits¹⁵			

¹ Two semesters.

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 3D in the AUCC.

⁴ MU 254 is not required for the piano pedagogy option.

⁵ MU 312 is required for the organ and string pedagogy options.

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.

⁹ Not required for voice option.

¹⁰ Not required for the piano pedagogy or voice options.

¹¹ Not required for the piano and piano pedagogy options.

¹² For the piano and piano pedagogy options only.

¹³ Select from the list of courses in category 3A of the AUCC. One course must have a laboratory component.

¹⁴ Select from the list of courses in category 3E of the AUCC.

¹⁵ 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).

Orchestral Instrument Option

In addition to the performance concentration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
MU 272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2-4	
	Electives	2-4	
	TOTAL	6	
SOPHOMORE			
MU 272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	4	
	Electives	7	
	TOTAL	11	
JUNIOR			
	Electives	4	
SENIOR			
	Electives	7	
PROGRAM TOTAL = 120 credits			

¹ Two semesters; major instrument

Organ Option

In addition to the performance concentration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
MU 272H	Applied Music Instruction-Organ ¹ (concurrent reg. in any music ensemble)	2-4	
	Electives	2-4	
	TOTAL	6	
SOPHOMORE			
MU 272H	Applied Music Instruction-Organ ¹ (concurrent reg. in any music ensemble)	4	
	Foreign language ¹	10	
	TOTAL	14	
JUNIOR			
	Electives	4	
SENIOR			
MU 437	History and Structure of the Organ (MU 472H)	2	
MU 468	Organ Literature (MU 437)	2	
	TOTAL	4	
PROGRAM TOTAL = 120 credits			

¹ Two semesters.

Piano Option

In addition to the performance concentration core courses, the following must be completed

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
MU 272I	Applied Music Instruction-Piano ¹ (concurrent reg. in any music ensemble)	2-4	
	Electives	2-4	
	TOTAL	6	
SOPHOMORE			
MU 272I	Applied Music Instruction-Piano ¹ (concurrent reg. in any music ensemble)	4	

College of Liberal Arts

Course	Title (Prerequisite)	Cr	AUCC
	Foreign language ¹	10	
	TOTAL	14	
JUNIOR			
	Electives	3	
SENIOR			
MU 465	Keyboard Literature	2	
	Electives	3	
	TOTAL	5	
PROGRAM TOTAL = 120 credits			

¹Two semesters.

Piano Pedagogy Option

In addition to the performance concentration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
MU 272I	Applied Music Instruction-Piano ¹ (concurrent reg. in any music ensemble)	2	
	Electives	4	
	TOTAL	6	
SOPHOMORE			
MU 272I	Applied Music Instruction-Piano ¹ (concurrent reg. in any music ensemble)	4	
	Foreign language ¹	10	
	TOTAL	14	
JUNIOR			
MU 495G	Independent Study-Pedagogy	3	
PSY 260	Child Psychology (PSY 100)	3	
OR			
PSY 465	Adolescent Psychology (PSY 100)	3	
	TOTAL	6	
SENIOR			
MU 465	Keyboard Literature	2	
MU 495G	Independent Study-Pedagogy	3	
	Electives	3	
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

¹Two semesters.

String Pedagogy Option

In addition to the performance concentration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
MU 272K-P	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2	
	Electives	4	
	TOTAL	6	
SOPHOMORE			
MU 272K-P	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2-4	
	Electives	7-9	
	TOTAL	11	
JUNIOR			
MU 272K-P	Applied Music Instruction ² (concurrent reg. in any music ensemble)	1	
MU 495G	Independent Study-Pedagogy	2	
PSY 260	Child Psychology (PSY 100)	3	
OR			
PSY 465	Adolescent Psychology (PSY 100)	3	
	TOTAL	6	
SENIOR			
MU 495E	Independent Study-Music Literature	2	
	Electives	4	
	TOTAL	6	
PROGRAM TOTAL = 120 credits			

¹Two semesters.

²Complementary instrument.

Voice Option

In addition to the performance concentration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
D 120A-C	Dance Techniques I	2	
MU 172	Freshman Voice Studio ¹	2	
TH 151	Beginning Acting	3	
	Foreign language (German)	5	
	TOTAL	12	
SOPHOMORE			
MU 272Q	Applied Music Instruction-Voice ¹ (concurrent reg. in any music ensemble)	4	
	Foreign language (French)	5	
	Foreign language (Italian)	5	
	TOTAL	14	
JUNIOR			
MU 265A	Singers Diction-German/English	1	
SENIOR			
MU 265B	Singers Diction-French/Italian (MU 265A)	1	
MU 466	Song Literature	2	
MU 467	Vocal Pedagogy (MU 265A; MU 265B; concurrent reg. in MU 472Q)	2	
	Electives	2	
	TOTAL	7	
PROGRAM TOTAL = 120 credits			

¹Two semesters.

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MU 117	Music Theory I (MU 111 or satisfactory completion of placement exam)	4	
MU 118	Music Theory II (MU 117)	4	
MU 131	Introduction to Music History and Literature	3	3B
MU 172	Freshman Voice Studio ¹ (concurrent reg. in any music ensemble)	2	
OR			
MU 272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2	
MU	Ensemble ²	2	
	Mathematics ³	3	1B
	Electives	8	
	TOTAL	29	
SOPHOMORE			
MU 217	Music Theory III (MU 118)	4	
MU 218	Music Theory IV (MU 217)	4	
MU 272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2	

Course	Title (Prerequisite)	Cr	AUCC
MU	Ensemble ²	2	
SPCM 200	Public Speaking	3	2A
	Foreign language ²	6	
	Option ⁴	6	
	Electives	3	
	TOTAL	30	
JUNIOR			
MU 334	Music History I (MU 100 or MU 131; MU 118)	3	4A, 4B
MU 335	Music History II (MU 100 or MU 131; MU 118)	3	4A, 4B
	Arts/humanities ⁵	3	3B
	Biological/physical sciences ⁶	3	3A
	Historical perspectives ⁷	3	3D
	Option ⁴	6	
	Music theory, upper-division	2	
	Music electives ⁸	3	
	Electives	6	
	TOTAL	32	
SENIOR			
MU 471	Recital (written consent of instructor)	1	4C
OR			
MU 499	Thesis (music majors only)	1	4C
	Biological/physical sciences ⁶	4	3A
	Global and cultural awareness ⁹	3	3E
	Option ⁴	9	
	Social/behavioral sciences ¹⁰	3	3C
	Music electives ¹¹	6	
	Electives	3	
	TOTAL	29	
PROGRAM TOTAL = 120 credits			

¹ First-year voice students take MU 172 for 2 semesters, then MU 272Q the second year for two semesters; instrumentalists take MU 272A-V on major instrument for 2 semesters each of the first 2 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 A coherent field of study outside the field of music, including at least 12 upper-division credits.

⁵ Select from the list of courses in category 3B in the AUCC.

⁶ Select from the list of courses in category 3A. One course must have a laboratory component.

⁷ Select from the list of courses in category 3D in the AUCC.

⁸ Select from the following: history and literature, theory, composition or orchestration; applied music-performance; maximum of 4 credits in ensemble.

⁹ Select from the list of course in category 3E in the AUCC.

¹⁰ Select from the list of courses in category 3C of the AUCC.

Minor in Music

A minor in music enables a student to broaden career opportunities or to pursue avocational interests. The student music minor must complete a minimum of 23 credits of which a minimum of 12 must be upper division (300- and/or 400-level courses). Some examples of courses open to the music minor include music history, music theory, applied lessons, and ensembles.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
MU 100	Music Appreciation	3	3B
MU 111	Music Theory Fundamentals ¹	3	3B
MU 272A-V	Applied Music Instruction ² (concurrent reg. in any music ensemble)	4	
	TOTAL	10	
UPPER DIVISION			
	Music ensembles	8	
	Music electives	4	
	TOTAL	12	
PROGRAM TOTAL = 22 credits without 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 in music education, music education with Kodaly emphasis, music therapy, performance, and 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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, and the department's website, <http://www.colostate.edu/Depts/Music>.

Major in Performing Arts

Dance Concentration

Office in General Services Building, Room 347
(970) 491-6330

Associate 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, modern, and jazz 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, jazz, 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 CSU 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
BZ 101	Humans and Other Animals	3	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
D 286	Practicum (D 121A; D 121B)	1	
TH 160	Graphic Expression for the Theatre	3	
TH 161	Technical Theatre I (TH 160)	3	
	Arts and humanities ¹	6	3B
	Dance techniques-ballet ²	6	
	Dance techniques-modern ³	4	
	Mathematics ⁴	3	1B
	TOTAL	32	
SOPHOMORE			
CHEM 103	Chemistry in Context	3	3A
CHEM 104	Chemistry in Context Laboratory (CHEM 103 or concurrent reg.)	1	3A
D 226	Dance Choreography I (D 121A or B or C)	2	
D 286	Practicum (D 121A; D 121B)	2	
D 325	Dance Production (TH 161)	3	
SPCM 200	Public Speaking	3	2A
	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	Principles of Human Physiology (BZ 101 or BZ 110 or LIFE 102; CHEM 103 or CHEM 107 or CHEM 111)	4	
D 286	Practicum (D 121A; D 121B)	2	
D 324	Teaching Creative Movement for Children	2	
D 326	Dance Choreography II (D 226)	2	
D 427	Dance History I	3	4A
HES 207	Anatomical Kinesiology	3	
TH 263	Costume and Makeup I (TH 160)	3	
	Dance techniques-ballet ²	6	
	Dance techniques-modern ³	6	
	TOTAL	31	
SENIOR			
D 424	Dance Pedagogy (D 324)	3	
D 428	Dance History II	3	4B
D 471	Dance Concert (D 321A-C; D 325; D 326; D 330; written consent of faculty; dance majors only)	3	4C

Course	Title (Prerequisite)	Cr	AUCC
D 486	Practicum (D 221 A or B or C; D 324; D 424)	3	
	Dance techniques-ballet ²	6	
	Dance techniques-modern ³	6	
	Global and cultural awareness ⁷	3	3E
	TOTAL	27	
PROGRAM TOTAL = 120 credits			

¹Select two courses from the list of courses in category 3B in the All-University Core Curriculum (AUCC).
²Select appropriate level course (one each semester).
³Select appropriate level course.
⁴Select at least three credits from the list of courses in category 1B in 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

Office in Johnson Hall, Room 220
 (970) 491-5562

Associate Professor Laura 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 wide range of genres and styles, from classical and contemporary dramatic literature.

Within the School of the Arts, Division of Theatre and Dance, the CSU 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, designing or lighting a main stage production, presenting an acting recital, or writing a major research paper.

Our mission is to give undergraduates to tools and background to develop their own artistic visions, 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 CSU and the greater Fort Collins 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 large, fully-equipped theatre space, *The Instant 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 Laura Jones at her office at the University Center for the Arts, 1400 Remington Street, (970) 491-5561, or by e-mail: Laura.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 CSU 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 CSU 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 (Prerequisite)	Cr	AUCC
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	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
TH 141	Introduction to Theatre ¹	3	3B
TH 192	From Page to State: Freshman Theatre Seminar ²	3	
OR			
TH 151	Beginning Acting	3	
TH 160	Graphic Expression for the Theatre	3	
TH 161	Technical Theatre I (TH 160)	3	
TH 286	Practicum	2	
	Biological/physical science ³	3	3A
	Mathematics ⁴	3	1B
	Electives	5	
	TOTAL	31	
SOPHOMORE			
TH 251	Intermediate Acting (TH 151)	3	
TH 263	Costume and Makeup I (TH 160)	3	
TH 265	Design I (TH 160; TH 161)	3	
TH 286	Practicum	1	
	Arts/humanities ⁵	3	3B
	Biological/physical sciences ³	4	3A
	Global and cultural awareness ⁵	3	3E
	Historical perspectives ⁶	3	3D
	Social/behavioral sciences ⁷	3	3C
	Electives	3	
	TOTAL	29	
JUNIOR			
TH 341	History of Theatre I	3	4A, 4B
TH 342	History of Theatre II	3	4A, 4B
TH 470A-D	Applied Theatre Production ⁸ (written consent of instructor)	4	
	Additional communication ⁹	3	2A or 2B
	Directed study ¹⁰	6	
	Upper division focus ¹¹	6	
	Electives	5	
	TOTAL	30	
SENIOR			
TH 470A-D	Applied Theatre Production ⁸ (written consent of instructor)	2	
TH 499	Thesis ¹² (TH 341; TH 342; performing arts-theatre majors only)	3	4C
	Directed study ¹⁰	6	
	Upper division focus ¹¹	3	
	Electives	16	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

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 Select from list of approved courses in Category 3A of the AUCC. One course must have a laboratory component.

⁴ Select at least three credits from the list of approved courses in category 1B of the AUCC.

⁵ Select from list of approved courses in category 3E of the AUCC.

⁶ Select from list of approved courses in category 3D of the AUCC.

⁷ Select from list of approved courses in category 3C of the AUCC.

⁸ Students must take at least two different subtopics in TH 470A-D.

⁹ 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).

¹⁰ Students must complete a second major, minor, or an adviser approved upper division 12 credit area of study.

¹¹ Choose three courses from the following list: D 325, TH 351, TH 355, TH 361, TH 363, TH 365, TH 475.

¹² Students must secure a faculty adviser in the junior year.

Minors in Theatre

Acting/Directing Minor

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
TH 141	Introduction to Theatre	3	3B
TH 151	Beginning Acting	3	
TH 255	Directing I (TH 151)	3	
	TOTAL	9	
UPPER DIVISION			
TH 341	History of Theatre I	3	
TH 342	History of Theatre II	3	
TH 351*	Advanced Acting (TH 251 or written consent of instructor)	3	
TH 355*	Directing II (TH 251; junior status or written consent of instructor)	3	
	TOTAL	12	

PROGRAM TOTAL = 21 credits

*Additional course work may be required because of prerequisites.

Design/Technical Theatre Minor

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
TH 141	Introduction to Theatre	3	3B
TH 160	Graphic Expression for the Theatre	3	
TH 161	Technical Theatre I (TH 160)	3	
TH 263	Costume and Makeup I (TH 160)	3	
TH 265	Design I (TH 160; TH 161)	3	
	TOTAL	15	
UPPER DIVISION			
TH 341	History of Theatre I	3	
TH 342	History of Theatre II	3	
----- Select two courses from the following:			
D 325	Dance Production (TH 161)	3	
TH 361	Technical Theatre II (TH 161)	3	
TH 363	Costume and Makeup II (TH 263)	3	
TH 365	Design II (TH 265)	3	
	TOTAL	12	

PROGRAM TOTAL = 27 credits

DEPARTMENT OF PHILOSOPHY

Office in Eddy Hall, Room 243
(970) 491-6315

<http://www.colostate.edu/Depts/Philosophy/>

Professor Jane Kneller, Chair

Assistant Professor Michael McCulloch, Undergraduate Coordinator

Professor Michael Losonsky, Graduate Coordinator

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. Participating in internships and cooperative education opportunities is highly recommended to enhance practical training and development. The high level of skill philosophy majors acquire in communication, 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.

Philosophy Core Courses

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
PHIL 110	Logic and Critical Thinking	3	3B
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	7	3A
	Historical perspectives ³	3	3D
	Social/behavioral sciences ⁴	6	3C
	TOTAL	25	
SOPHOMORE			
	Additional communication ⁵	3	2A or 2B
	Global and cultural awareness ⁶	6	3E
	Mathematics ⁷	3	1B
	Electives	12	
	TOTAL	24	
JUNIOR			
	Electives ⁸	16	
SENIOR			
	Electives ⁹	16	
CORE TOTAL = 81 credits¹⁰			

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 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 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).

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 Students in the philosophy, science, and technology concentration only take 15 credits of electives in the junior year.

⁹ Take appropriate number of electives to bring total credits for the core to 81. Each concentration is 39 credits. Total credits required to graduate is 120, of which 42 must be upper-division.

¹⁰ In order to complete the major, each student must complete one of the following concentrations: general philosophy; philosophy and religion; or philosophy, science, and technology.

General Philosophy Concentration

In addition to the philosophy core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
	<i>Select one of the following:</i>		
PHIL 100	Appreciation of Philosophy	3	3B
PHIL 103	Moral and Social Problems	3	3B
PHIL 105	Introduction to Philosophy	3	
PHIL 120	History and Philosophy of Scientific Thought	3	3B
	OR		
PHIL 170	World Philosophies	3	3E
	TOTAL	6	
SOPHOMORE			

Course	Title (Prerequisite)	Cr	AUCC
PHIL 205	Introduction to Ethics (sophomore standing or higher)	3	
PHIL 206	Knowledge and Existence-An Introduction (sophomore standing or higher)	3	
PHIL 210	Introduction to Formal Logic (sophomore standing or higher)	3	
	TOTAL	9	
JUNIOR			
PHIL 300	Ancient Greek Philosophy (PHIL 205 or PHIL 206 or PHIL 210)	3	4A
PHIL 301	17th and 18th Century European Philosophy (PHIL 206 or PHIL 210 or PHIL 300)	3	4A
PHIL 302	19th-Century Philosophy (PHIL 301)	3	
	OR		
PHIL 409	20th-Century Philosophy (PHIL 301) Upper-division philosophy	3	
	TOTAL	12	
SENIOR			
PHIL 425	Epistemology (PHIL 210 or PHIL 300 or PHIL 301)	3	
PHIL 435	Metaphysics (PHIL 210 or PHIL 300 or PHIL 301)	3	
PHIL 447	Ethical Theory (PHIL 205 or PHIL 300 or PHIL 301)	3	
PHIL 462	Capstone Seminar (senior standing; any two of the following courses: PHIL 300, PHIL 301, PHIL 302, PHIL 409)	3	4B, 4C
	TOTAL	12	
PROGRAM TOTAL = 120 credits			

Philosophy and Religion Concentration

In addition to the philosophy core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
PHIL 106	Wisdom of the East-Oriental Philosophy	3	
	OR		
PHIL 172	Religions of the East	3	
PHIL 170	World Philosophies	3	3E
PHIL 171	Religions of the West	3	
	TOTAL	9	
SOPHOMORE			
PHIL 205	Introduction to Ethics (sophomore standing or higher)	3	
	OR		
PHIL 206	Knowledge and Existence-An Introduction (sophomore standing or higher)	3	
PHIL 210	Introduction to Formal Logic (sophomore standing or higher)	3	
PHIL 270	Issues in the Study of Religion (sophomore standing or higher)	3	
	TOTAL	9	
JUNIOR			
PHIL 300	Ancient Greek Philosophy (PHIL 205 or PHIL 206 or PHIL 210)	3	4A
PHIL 301	17th and 18th Century European Philosophy (PHIL 206 or PHIL 210 or PHIL 300)	3	4A
	<i>Select one of the following:</i>		
PHIL 355	Philosophy of Religion (PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270)	3	
PHIL 370	Contemporary Western Religious Thought (PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270)	3	
PHIL 372	Meaning and Truth in Religion (PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270)	3	
PHIL 375	Science and Religion (PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270)	3	
	<i>Select one of the following:</i>		
PHIL 349	Philosophy of Tao and Zen (sophomore standing or higher)	3	
PHIL 360	Topics in Oriental Philosophy (sophomore standing or higher)	3	
PHIL 371	Contemporary Eastern Religious Thought	3	
PHIL 379	Mysticism East and West (PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270)	3	

College of Liberal Arts

Course	Title (Prerequisite)	Cr	AUCC
TOTAL		12	
SENIOR			
PHIL 425	Epistemology (PHIL 210 or PHIL 300 or PHIL 301)	3	
OR			
PHIL 435	Metaphysics (PHIL 210 or PHIL 300 or PHIL 301)	3	
<i>Select one course from the following:</i>			
PHIL 447	Ethical Theory (PHIL 205 or PHIL 300 or PHIL 301)	3	
PHIL 455	Islamic Philosophy (PHIL 206; PHIL 210)	3	
PHIL 463	Seminar in Religious Studies	3	
PHIL 462	Capstone Seminar (senior standing; any two of the following courses: PHIL 300, PHIL 301, PHIL 302, PHIL 409)	3	4B, 4C
TOTAL		9	

PROGRAM TOTAL = 120 credits

Philosophy, Science, and Technology Concentration

In addition to the philosophy core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
PHIL 120	History and Philosophy of Scientific Thought	3	3B
SOPHOMORE			
PHIL 205	Introduction to Ethics (sophomore standing or higher)	3	
PHIL 206	Knowledge and Existence-An Introduction (sophomore standing or higher)	3	
PHIL 210	Introduction to Formal Logic (sophomore standing or higher)	3	
	Science and technology elective ¹	3	
TOTAL		12	
JUNIOR			
PHIL 300	Ancient Greek Philosophy (PHIL 205 or PHIL 206 or PHIL 210)	3	4A
PHIL 301	17th and 18th Century European Philosophy (PHIL 206 or PHIL 210 or PHIL 300)	3	4A
PHIL 302	19th-Century Philosophy (PHIL 301)	3	
OR			
PHIL 409	20th-Century Philosophy (PHIL 301)	3	
PHIL 325	Philosophy of Natural Science (PHIL 210; one course in natural sciences)	3	
OR			
PHIL 327	Philosophy of Behavioral Sciences (PHIL 105 or PHIL 120 or PHIL 205 or PHIL 206 or PHIL 210 or any upper-division course in philosophy)	3	
PHIL 345	Environmental Ethics (sophomore standing or higher)	3	
OR			
PHIL 375	Science and Religion (PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270)	3	
TOTAL		15	
SENIOR			
PHIL 410	Formal Logic (PHIL 210 or CS 270)	3	
OR			
PHIL 415	Logic and Scientific Method	3	
PHIL 425	Epistemology (PHIL 210 or PHIL 300 or PHIL 301)	3	
PHIL 435	Metaphysics (PHIL 210 or PHIL 300 or PHIL 301)	3	
PHIL 462	Capstone Seminar (senior standing; any two of the following courses: PHIL 300, PHIL 301, PHIL 302, PHIL 409)	3	4B, 4C
TOTAL		12	

PROGRAM TOTAL = 120 credits

¹ Three credits in addition to the AUCC science requirement. Course must be in the College of Natural Sciences or the College of Engineering.

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 (Prerequisite)	Cr	AUCC
LOWER DIVISION			
<i>Select one of the following courses:</i>			
PHIL 100	Appreciation of Philosophy	3	3B
PHIL 103	Moral and Social Problems	3	3B
PHIL 105	Introduction to Philosophy	3	
PHIL 120	History and Philosophy of Scientific Thought	3	3B
PHIL 170	World Philosophies	3	3E
PHIL 205	Introduction to Ethics (sophomore standing or higher)	3	
OR			
PHIL 206	Knowledge and Existence-An Introduction (sophomore standing or higher)	3	
PHIL 210	Introduction to Formal Logic (sophomore standing or higher)	3	
TOTAL		9	
UPPER DIVISION			
PHIL 300	Ancient Greek Philosophy (PHIL 205 or PHIL 206 or PHIL 210)	3	
PHIL 301	17th and 18th Century European Philosophy (PHIL 206 or PHIL 210 or PHIL 300)	3	
PHIL 425	Epistemology (PHIL 210 or PHIL 300 or PHIL 301)	3	
OR			
PHIL 435	Metaphysics (PHIL 210 or PHIL 300 or PHIL 301)	3	
PHIL 447	Ethical Theory (PHIL 205 or PHIL 300 or PHIL 301)	3	
OR			
PHIL 462	Capstone Seminar (senior standing; any 2 of the following: PHIL 300, PHIL 301, PHIL 302, PHIL 409)	3	
TOTAL		12	

PROGRAM TOTAL = 21 credits

Substitutions allowed with prior approval of department chair.

Minor in Religious Studies

Course	Title (Prerequisite)	Cr	AUCC
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	Introduction to Ethics (sophomore standing or higher)	3	
OR			
PHIL 206	Knowledge and Existence-An Introduction (sophomore standing or higher)	3	
PHIL 270	Issues in the Study of Religion (sophomore standing or higher)	3	
TOTAL		9	
UPPER DIVISION			
PHIL 300	Ancient Greek Philosophy (PHIL 205 or PHIL 206 or PHIL 210)	3	
OR			
PHIL 301	17th and 18th Century European Philosophy (PHIL 206 or PHIL 210 or PHIL 300)	3	

Course	Title (Prerequisite)	Cr	AUCC

Select one course from the following:			
PHIL 349	Philosophy of Tao and Zen (sophomore standing or higher)	3	
PHIL 360	Topics in Oriental Philosophy (sophomore standing or higher)	3	
PHIL 371	Contemporary Eastern Religious Thought	3	
PHIL 379	Mysticism East and West (PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270)	3	

Select one course from the following:			
PHIL 355	Philosophy of Religion (PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270)	3	
PHIL 370	Contemporary Western Religious Thought (PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270)	3	
PHIL 372	Meaning and Truth in Religion (PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270)	3	
PHIL 375	Science and Religion (PHIL 106 or PHIL 171 or PHIL 172 or PHIL 270)	3	

PHIL 447	Ethical Theory (PHIL 205 or PHIL 300 or PHIL 301)	3	
OR			
PHIL 462*	Capstone Seminar (senior standing; any two of the following courses: PHIL 300, PHIL 301, PHIL 302, PHIL 409)	3	

TOTAL		12	
PROGRAM TOTAL = 21 credits			

Substitutions allowed with prior approval of department chair.
* 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 specialize in applied ethics, particularly animal welfare and environmental ethics, comparative philosophy, and the traditional subfields of philosophy, including ethical theory, history of philosophy, metaphysics, aesthetics, and epistemology.

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, <http://www.colostate.edu/Depts/Philosophy/>

DEPARTMENT OF POLITICAL SCIENCE

Office in Clark Building, Room C346
(970) 491-5156
<http://www.colostate.edu/Depts/PoliSci/>

Professor William J. Chaloupka, 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 every where.

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 graduate 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
POLS 101	American Government and Politics	3	3C
POLS 103	State and Local Government and Politics	3	3C
	Arts/humanities ¹	6	3B
	Biological/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> ⁵			
CO 300	Writing Arguments (CO 150 or HONR 193)	3	2B
CO 301A	Writing in the Disciplines-Arts and Humanities (CO 150 or HONR 193)	3	2B
CO 301B	Writing in the Disciplines-Sciences (CO 150 or HONR 193)	3	2B
CO 301C	Writing in the Disciplines-Social Sciences (CO 150 or HONR 193)	3	2B
CO 301D	Writing in the Disciplines-Education (CO 150 or HONR 193)	3	2B
CO 302	Writing Online (CO 150 or HONR 193)	3	2B
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
SPCM 200	Public Speaking	3	2A
<i>Select from the following:</i>			
ECON 101	Economics of Social Issues	3	3C
OR			
ECON 202	Principles of Microeconomics ⁶ (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
AND			
ECON 204	Principles of Macroeconomics (AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
POLS 232	International Relations	3	3E
POLS 241	Comparative Government and Politics	3	3E
	Biological/physical sciences ²	3	3A
	Political science, upper-division ⁷	3	
	Support option ⁸	3-6	
	Electives	6-9	
	TOTAL	30-33	
JUNIOR			
	Political science, upper-division ⁷	9	
	Support option ⁸	6-12	
	Electives	9-12	
	TOTAL	27-30	
SENIOR			
POLS 492	Capstone Seminar (upper-division course in at least 4 sub-fields of political science)	3	4A, 4B, 4C
	Political science, upper-division ⁷	9	4A, 4B
	Support option ⁸	6-12	
	Electives ⁹	6-12	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC).

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 First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (any course in this choice except SPCM 200).

⁶ ECON 202 and ECON 204 should be taken by students who plan to take advanced courses in economics.

⁷ At least 24 credits of upper division political science courses must be completed for the major, including a senior capstone course and at least one upper-division course in each of the following subfields: American politics and law, comparative politics, international relations, political theory, and public policy and administration. POLS 320 must be completed by students choosing the methods support option. 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.

⁸ 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, a second major, or a certificate program.

(4) An approved program proposed by student containing at least 21 credits including at least 12 upper-division credits.

⁹ 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.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
POLS 101	American Government and Politics	3	3C
<i>Select two courses from the following:</i>			
POLS 103	State and Local Government and Politics	3	3C
POLS 232	International Relations	3	3E
POLS 241	Comparative Government and Politics	3	3E
	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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, and the department's website, <http://www.colostate.edu/Depts/PoliSci/>.

DEPARTMENT OF SOCIOLOGY

Office in Clark Building, Room B258
(970) 491-6045

<http://www.colostate.edu/Depts/Sociology/>

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 attain certification in one of the interdisciplinary study programs such as Asian studies, Latin American and Caribbean studies, religious studies, or Russian, Eastern and Central European 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

The criminology and criminal justice concentration supplements general sociological training with course work focused on the social aspects of crime and criminal justice. 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
SOC 100	General Sociology	3	3C
OR			
SOC 105	Social Problems	3	3C
SOC 253	Introduction to Criminal Justice (SOC 100 or SOC 105)	3	
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	3-4	3A
	Social/behavioral sciences ³	3	
	Electives	7-8	
	TOTAL	29	
SOPHOMORE			
	Additional communication ⁴	3	2A or 2B
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	3-4	3A
	Global and cultural awareness ⁵	3	3E
	Historical perspectives ⁶	3	3D
	Social/behavioral sciences ³	6	
	Electives	9	
	TOTAL	30-31	
JUNIOR			
SOC 210	Quantitative Sociological Analysis (MATH 118)	3	
SOC 301	Development of Sociological Thought (SOC 100 or SOC 105)	3	
OR			
SOC 302	Contemporary Sociological Theory (SOC 100 or SOC 105)	3	
SOC 311	Methods of Sociological Inquiry (SOC 100 or SOC 105)	3	4A, 4B
SOC 313	Computer Methods in Sociology (SOC 210)	1	
SOC 352	Criminology (SOC 100 or SOC 105)	3	
OR			
SOC 372	Sociology of Deviance (SOC 100 or SOC 105)	3	
SOC 354	Law Enforcement and Society (SOC 253)	3	
	Social/behavioral sciences ³	12	
	Electives	3	
	TOTAL	31	
SENIOR			
POLS 413	U.S. Civil Rights and Liberties (POLS 101)	3	
OR			
SOC 355	Sociology of Law (SOC 253)	3	
<i>Select one of the following:</i>			
SOC 358	Correctional Organizations (SOC 253)	3	
SOWK 371B	Social Work-Juvenile Offenders	3	
SOWK 371C	Social Work-Adult Offenders	3	
SOC 403	Capstone Seminar (SOC 210; SOC 301 or SOC 302; SOC 311; SOC 313)	3	4C
OR			
SOC 487	Internship (SOC 210; SOC 301 or SOC 302; SOC 311; SOC 313)	3	4C
AND			
SOC 492	Seminar (SOC 210; SOC 301 or SOC 302; SOC 311; SOC 313; concurrent reg. in SOC 487)	1	4C
	Electives ⁷	19-21	
	TOTAL	29-30	
PROGRAM TOTAL = 120 credits			

- 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 3A in the AUCC. One course must have a laboratory component.
- ³ Select from a department list of approved courses.
- 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 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 enough elective credits to bring program total to 120 credits. A minimum of 42 upper-division credits is required.

General Sociology Concentration

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
SOC 100	General Sociology	3	3C
OR			
SOC 105	Social Problems	3	3C
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	3-4	3A
	Social/behavioral sciences ³	3	
	Sociology electives ⁴	3	
	Electives	8-9	
	TOTAL	30	
SOPHOMORE			
	Additional communication ⁵	3	2A or 2B
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	3-4	3A
	Global and cultural awareness ⁶	3	3E
	Historical perspectives ⁷	3	3D
	Social/behavioral sciences ³	6	
	Sociology electives ⁴	6	
	Electives	3	
	TOTAL	30-31	
JUNIOR			
SOC 210	Quantitative Sociological Analysis (MATH 118)	3	
SOC 301	Development of Sociological Thought (SOC 100 or SOC 105)	3	
OR			
SOC 302	Contemporary Sociological Theory (SOC 100 or SOC 105)	3	
SOC 311	Methods of Sociological Inquiry (SOC 100 or SOC 105)	3	4A, 4B
SOC 313	Computer Methods in Sociology (SOC 210)	1	
SOC 352	Criminology (SOC 100 or SOC 105)	3	
OR			
SOC 372	Sociology of Deviance (SOC 100 or SOC 105)	3	
SOC 354	Law Enforcement and Society (SOC 253)	3	
	Social/behavioral sciences ³	12	
	Electives	3	
	TOTAL	31	
SENIOR			
SOC 403	Capstone Seminar (SOC 210; SOC 301 or SOC 302; SOC 311; SOC 313)	3	4C
OR			
SOC 487	Internship (SOC 210; SOC 301 or SOC 302; SOC 311; SOC 313)	3	4C
AND			
SOC 492	Seminar (SOC 210; SOC 301 or SOC 302; SOC 311; SOC 313; concurrent reg. in SOC 487)	1	4C
	Upper division sociology	3	
	Electives ⁸	23-24	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

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 3A in the AUCC. One course must have a laboratory component.

³ Select from a department list of approved courses.

⁴ Select courses representing the major areas of sociology.

⁵ 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).

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 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 (Prerequisite)	Cr	AUCC
LOWER DIVISION			
SOC 100	General Sociology	3	3C
OR			
SOC 105	Social Problems	3	3C
SOC 253	Introduction to Criminal Justice (SOC 100 or SOC 105)	3	
TOTAL		6	
UPPER DIVISION			
SOC 301	Development of Sociological Thought (SOC 100 or SOC 105)	3	
OR			
SOC 302	Contemporary Sociological Theory (SOC 100 or SOC 105)	3	
SOC 311	Methods of Sociological Inquiry (SOC 100 or SOC 105)	3	
Choose one course from three of the following five categories:			
Category I			
SOC 352	Criminology (SOC 100 or SOC 105)	3	
SOC 372	Sociology of Deviance (SOC 100 or SOC 105)	3	
Category II			
SOC 354	Law Enforcement and Society (SOC 253)	3	
Category III			
POLS 413*	Civil Rights and Liberties (POLS 101)	3	
SOC 355	Sociology of Law (SOC 253)	3	
Category IV			
SOC 358	Correctional Organizations (SOC 253)	3	
SOWK 371B	Social Work with Juvenile Offenders	3	
SOWK 371C	Social Work with Adult Offenders	3	
Category V			
SOC 564	Environmental Justice (SOC 100 or SOC 105)	3	
TOTAL		15	
PROGRAM TOTAL = 21 credits			

* 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 (Prerequisite)	Cr	AUCC
LOWER DIVISION			
SOC 100	General Sociology	3	3C
OR			
SOC 105	Social Problems	3	3C
UPPER DIVISION			
SOC 301	Development of Sociological Thought (SOC 100 or SOC 105)	3	
OR			
SOC 302	Contemporary Sociological Theory (SOC 100 or SOC 105)	3	
SOC 311	Methods of Sociological Inquiry (SOC 100 or SOC 105)	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	
PROGRAM TOTAL = 21 credits*			

*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*, <http://graduate.school.colostate.edu/index.asp?url=catalog>, and the department's website, <http://www.colostate.edu/Depts/Sociology/>. Direct inquiries to the Department of Sociology, B258 Clark Building.

DEPARTMENT OF SPEECH COMMUNICATION

Office in Eddy Hall, Room 202
(970) 491-6140

www.colostate.edu/Depts/Speech/

Professor David Vest, Chair

Major in Speech Communication

Speech communication majors receive a broad-based liberal arts education, designed to equip them for the challenges of the 21st century, including the likelihood of more than one career and the need to adapt to a rapidly changing workplace. The major encompasses many facets of oral, electronic, and computer-mediated communication. Along with courses in speech communication, the major requires courses in history and electives in the arts and humanities and the social sciences.

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 communications, 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. Within the major of speech communication are four concentrations –

communication studies, media studies, rhetorical studies, and teacher licensure.

Learning Outcomes

Students will demonstrate:

- Breadth of knowledge within the discipline including but not limited to history, theory, criticism, and application of pragmatic principles of human communication in a variety of settings and media
- Depth of knowledge within the discipline conducive to extended oral presentation in public, business, and professional settings that include principles of selecting a topic, planning the presentation, analyzing audiences, developing speaker credibility, carrying out research, organizing the material into logically sound component parts, offering emotional appeals, and delivering the presentation in a way that develops and maintains attention while enhancing the content.
- Depth of knowledge within the discipline through excellence in written communication that includes the abilities to: 1) write critically and analytically, 2) structure a persuasive argument, 3) research thoroughly, 4) document sources accurately and in appropriate fashion, and 5) write at a professional level within the discipline.

Potential Occupations

The speech communication 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. Speech communication majors are trained to think independently and critically, communicate effectively, and function in a multicultural world. Many majors find employment in public relations, politics, sales, advertising, video production, radio, television, cable, government, sports information, business management, promotions, and education. Recently, some majors have entered and even created careers in computer-mediated communication. Some students move on to graduate work in speech communication and broadcasting, for teaching at various levels; and for post-graduate study in law and theology.

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. Internships are available to speech communication majors and 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.

Career opportunities include, but are not limited to: program manager; production manager; associate director; television schedule coordinator; camera operator; audio operator;

audio-visual production specialist; contact representative; employee relations specialist; employment or guidance counselor; human resource adviser; industrial relations representative; public relations specialist; labor relations consultant; training representative; vocational rehabilitation counselor; newscaster; sportscaster; weathercaster; editor; commentator; medical and scientific illustrator; advance agent; business communicator; equal opportunity representative; foreign service officer; cooperative extension service worker; politician; lobbyist; speechwriter; press agent; educator; literary agent; interviewer; advertising sales representative; communications equipment sales representative; radio and television time sales representative; lyricist; playwright; screenwriter; scriptwriter; lawyer; teacher.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
SPCM 100	Communication and Popular Culture	3	3B
SPCM 200	Public Speaking	3	
	Biological/physical sciences ¹	7	3A
	Historical perspectives ²	3	3D
	Mathematics ³	3	1B
	Social/behavioral sciences ⁴	3	3C
	Elective	6	
	TOTAL	31	
SOPHOMORE			
SPCM 201	Rhetoric in Western Thought	3	3B
SPCM 207	Rhetoric and Argumentation	3	
	Advanced writing ⁵	3	2B
	Arts/humanities ⁶	6	
	Global and cultural awareness ⁷	3	3E
	Historical perspectives ⁸	6	
	Social/behavioral sciences ⁹	6	
	TOTAL	30	
JUNIOR			
	Minor or certificate program ¹⁰	15	
	Speech electives ¹¹	15	
	TOTAL	30	
SENIOR			
<i>Select one of the following courses:</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 355	Evaluating Contemporary Film (SPCM 354)	3	4A, 4B
SPCM 411	Contemporary Speeches on American Issues	3	4A, 4B
SPCM 412	Evaluating Contemporary Rhetoric	3	4A, 4B
SPCM 479	Capstone: Life in Postmodernity (seniors in speech communication only)	3	4C
	Minor or certificate program ¹⁰	0-6	
	Speech electives ¹¹	9	
	Electives ¹²	8-14	
	TOTAL	29	
PROGRAM TOTAL = 120 credits			

¹ Select two courses (one with a laboratory component) from category 3A in the All-University Core Curriculum (AUCC).
² Select one HIST-prefix course 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 2B in the AUCC.
⁶ Select six credits from the following subject codes: ART, D, E, ETST, L*, MU, PHIL, or 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).]
⁷ Select any course in category 3E in the AUCC.
⁸ Six additional credits from HIST-prefix courses.
⁹ Select a total of six credits from the following prefixes: ANTH, ECON, ETST, HIST, JTC, POLS, PSY, or SOC.
¹⁰ Students must complete a university approved minor or interdisciplinary studies program.

¹¹ Select a total of 24 credits of SPCM prefix courses with the following restrictions: Maximum credit for SP 215 and SP 315 combined is three credits. Credit for SPCM 384, SPCM 387, SPCM 495 cannot be applied in this category.

¹² Select credits to total 120, a minimum of 42 upper-division credits are required.

Communication Studies Concentration

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
<i>Select twelve credits from the following:</i> ¹			
SPCM 232	Group Communication (SPCM 200)	3	
SPCM 331	Nonverbal Communication	3	
SPCM 332	Interpersonal Communication Skills	3	
SPCM 334	Co-Cultural Communication	3	
SPCM 335	Women and Communication	3	
SPCM 431	Communication, Language, and Thought	3	
SPCM 433	Communication in Organizations	3	
SPCM 434	Intercultural Communication	3	
SPCM 436	Conflict Management and Communication	3	
SPCM 437	Studies in Persuasion	3	
	B.A. Core requirements ²	108	
	TOTAL	120	

PROGRAM TOTAL = 120 credits

¹ SPCM 532, SPCM 533, and SPCM 534 can also be selected as part of this choice.

² All requirements for the Speech Communication (Core) are retained for this concentration with the following exception: Speech electives are reduced to twelve credits, and the preceding choice is added.

Media Studies Concentration

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
<i>Select twelve credits from the following:</i> ¹			
SPCM 341	Evaluating Contemporary Television	3	
SPCM 342	Critical Media Studies	3	
SPCM 346	Virtual Culture and Communication (SPCM 100 or SPCM 342)	3	
SPCM 347	Visual Rhetoric (SPCM 100 or SPCM 342)	3	
SPCM 349	Freedom of Speech	3	
SPCM 354	History and Appreciation of Film	3	
SPCM 355	Evaluating Contemporary Film (SPCM 354)	3	
SPCM 447	Television-Radio Programming and Management (SPCM 342)	3	
SPCM 449	Law and Policy of Communication Technologies	3	
SPCM 454/ ETST 454	Chicano/a Film and Video	3	
SPCM 455/ LB 455	Narrative Fiction Film as a Liberal Art (senior standing)	3	
	B.A. Core requirements ²	108	
	TOTAL	120	

PROGRAM TOTAL = 120 credits

¹ SPCM 547, SPCM 548, SPCM 549, and SPCM 550 may also be selected as part of this choice.

² All requirements for the Speech Communication (Core) are retained for this concentration with the following exception: Speech electives are reduced to 12 credits, and the preceding choice is added as a requirement.

Rhetorical Studies Concentration

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
<i>Select twelve credits from the following:</i> ¹			
SPCM 311	Historical Speeches on American Issues	3	
SPCM 335	Women and Communication	3	
SPCM 401	Rhetoric in Contemporary Social Movements	3	
SPCM 411	Contemporary Speeches on American Issues	3	
SPCM 412	Evaluating Contemporary Rhetoric	3	
SPCM 415	Rhetoric and Civility (SPCM 201; SPCM 207)	3	
SPCM 420	Political Communication	3	
SPCM 431	Communication, Language, and Thought	3	
SPCM 437	Studies in Persuasion	3	
	B.A. Core requirements ²	108	

Course	Title (Prerequisite)	Cr	AUCC
TOTAL		120	

PROGRAM TOTAL = 120 credits

¹ SPCM 504, SPCM 511, SPCM 520, SPCM 523, and SPCM 540/ETST 540 may also be taken as part of this choice.

² All requirements for the Speech Communication (Core) are retained for this concentration with the following exception: Speech electives are reduced to twelve credits, and the preceding choice is added.

Teacher Licensure Concentration

Students interested in pursuing a teaching license through Colorado State University may refer to the School of Education, 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 programs Web site (<http://soe.cahs.colostate.edu/Licensure>) or in room 100 of the Education Building.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	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
	Biological/physical sciences ¹	7	3A
	Mathematics ²	3	1B
	Elective	5	
	TOTAL	30	
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	Schooling in the United States (completion of 30 credits of course work)	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	Rhetoric and Argumentation	3	
	Global and cultural awareness ³	3	3E
	Option courses ⁴	9	
	TOTAL	30	
JUNIOR			
<i>Select one course from the following:</i>			
CO 301A	Writing in the Disciplines-Arts and Humanities (CO 150 or HONR 193)	3	2B
CO 301B	Writing in the Disciplines-Science (CO 150 or HONR 193)	3	2B
CO 301C	Writing in the Disciplines-Social Sciences (CO 150 or HONR 193)	3	2B
CO 301D	Writing in the Disciplines-Education (CO 150 or HONR 193)	3	2B
E 402	Teaching Composition (CO 301A or B or C or D)	3	
E 405	Adolescents' Literature	3	
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	

College of Liberal Arts

Course	Title (Prerequisite)	Cr	AUCC
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
EDUC 350	Instruction I- Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3	
EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent reg. in EDUC 350, admission to teacher licensure)	1	
EDUC 463	Methods in Teaching Language Arts (admission to teacher licensure)	4	
	English elective ⁵	3	
	Option courses ⁴	6-7	
	TOTAL	31-32	
SENIOR			
EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4	
EDUC 485B	Student Teaching-Secondary (EDUC 450; EDUC 463)	11	
EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
EDUC 493A	Seminar-Professional Relations (EDUC 450; EDUC 463; EDUC 485B or concurrent reg.)	1	
SPCM 479	Capstone: Life in Postmodernity (senior in speech communication)	3	4C
	Option courses ⁴	9	
	TOTAL	29	
PROGRAM TOTAL = 120-121 credits			

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 Student must also complete one of the following options: speech or theatre.

⁵ Three credit elective with E prefix.

Speech Option

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
SPCM 232	Group Communication (SPCM 200)	3	
OR			
SPCM 332	Interpersonal Communication Skills Speech electives ¹	3 6	
	TOTAL	9	
JUNIOR			
SPCM 300	Advanced Public Speaking (SPCM 200)	3	
OR			
SPCM 333	Professional Communication (SPCM 200)	3	
SPCM 334	Co-Cultural Communication	3	
OR			
SPCM 434	Intercultural Communication	3	
	TOTAL	6	
SENIOR			
SPCM 311	Historical Speeches on American Issues	3	4A, 4B
OR			
SPCM 411	Contemporary Speeches on American Issues Speech electives ¹	3 6	4A, 4B
	TOTAL	9	
OPTION TOTAL = 24 credits			

¹ Any two 3-credit courses with SPCM prefix.

Theatre Option

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
TH 151	Beginning Acting	3	
TH 160	Graphic Expression for the Theatre Theatre electives ¹	3 3	
	TOTAL	9	
JUNIOR			
TH 286	Practicum	1	
TH 341	History of Theatre I	3	4A, 4B
OR			
TH 342	History of Theatre II Theatre electives ¹	3 3	4A, 4B
	TOTAL	7	
SENIOR			
	Theatre electives ¹	9	
OPTION TOTAL = 25 credits			

¹ Any course with TH prefix.

Media Studies Minor

The Departments of Speech Communication 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 Speech Communication

The graduate program leads to a master of arts in speech communication. Graduate coursework, as well as a required thesis, enables students to develop expertise in one or a combination of three areas of emphasis: (1) communication studies, (2) media studies, and/or (3) rhetorical studies. In each of these areas, students select course work from among the following topics: (1) communication theories, communication and diversity, research methods, interpersonal theories, and discourse and organization, (2) contemporary issues in media, media theories, media audiences, media texts, and media industries, (3) public address, rhetoric and public affairs, rhetorical theory, race and identity, rhetoric of everyday life, and feminist theory.

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, www.colostate.edu/Depts/Speech/.

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 Joseph O'Leary, Dean
Associate Professor Melinda Laituri, Associate Dean

UNDERGRADUATE MAJORS

*Fishery Biology*¹
Forestry
Geology
Natural Resource Recreation and Tourism
Natural Resources Management
Rangeland Ecology
Watershed Science
*Wildlife Biology*¹

UNDERGRADUATE MINORS

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

¹ The majors of Fishery Biology and Wildlife Biology are being consolidated by the Department of Fish, Wildlife, and Conservation Biology into a major in Fish, Wildlife, and Conservation Biology. The consolidated major is under review by the Board of Governors and the Colorado Department of Higher Education at the time of publication of this catalog. For more information, see the department section later in this chapter.

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.

Environmental Studies Open Option

Office in Natural Resource Building, Room 103

Students who have a strong interest and aptitude in the broad area of natural resources, but who have not decided on a specific major, may enroll in the Environmental Studies Open Option. This option extends through the two semesters of the freshman year. Selection of a major must be made prior to the beginning of the sophomore year.

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, Rangeland, and Watershed Stewardship. The Department of Fish, Wildlife, and Conservation Biology also offers a professional degree, master of fishery and wildlife biology. Descriptions of the various graduate programs may be found in the *Graduate and Professional Bulletin*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, 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 FISH, WILDLIFE, AND CONSERVATION BIOLOGY

*Office in Wagar Building, Room 136
(970) 491-5020
www.warnercnr.colostate.edu/FWB/*

Professor Kenneth R. Wilson, Interim Head

During the 2006-2007 academic year, the faculty in the Department of Fish, Wildlife, and Conservation Biology decided to consolidate the two majors in the department – fishery biology and wildlife biology – into one major of fish, wildlife, and conservation biology with three concentrations. Those concentrations are conservation biology, fisheries and aquatic sciences, and wildlife biology.

The reorganized program is currently under review by the Board of Governors and the Colorado Department of Higher Education, but final approval had not been received by the deadline for this catalog to go to print. Students are encouraged to visit the web site <http://core.colostate.edu/postdy/poscollege.cfm?collID=5> and follow the links to the major in fish, wildlife, and conservation biology

Major in Fish, Wildlife, and Conservation Biology

Professor Ken Wilson, in charge

A fish, wildlife, and conservation biology degree is a broad-based program with three concentrations: fisheries and aquatic sciences; wildlife biology; and conservation biology. The faculty is wide ranging in expertise, and innovative in teaching and research methods. Students graduating from our program will possess technical skills, problem solving, integrative group decision making, and oral and verbal communication specific for natural resource management. Our program will also prepare students for professional careers in fishery, wildlife, and conservation industries, in the private sector as well as federal and state agencies or graduate school. Students also 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 sciences include general biology, vertebrate biology, botany, calculus, and statistics. A summer field training program at the Colorado State University mountain campus at Pingree Park gives students an on-site, hands-on look at resource ecology and the measurement of its components.

Learning Outcomes

Students will:

- Demonstrate mathematical, statistical, and study design knowledge and skills required for careers in fishery, wildlife, and conservation biology.
- Demonstrate a mastery of fundamental fish, wildlife, and conservation biology techniques and ecological concepts and principles and how they apply to fish, wildlife, and conservation management issues.
- Become effective members of a multi-disciplinary team approach to solving integrated natural resource management issues through group participation, planning and organization, creation of a group product, and communication of that product.

Potential Occupations

Private, federal, and state agencies that manage natural resource offer most of the employment opportunities in fish, wildlife, and conservation biology. These agencies include federal agencies such as the U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, U.S. Geologic Survey, U.S. National Park Service, U.S. Environmental Protection Agency, U.S. Bureau of Reclamation, National Marine Fisheries Service; state departments of wildlife and natural resources; non-governmental organizations such as The Nature Conservancy, and private companies and organizations. Along with a strong technical foundation, cooperation, speaking, and writing skills are necessary to resolve difficult issues that natural resource personnel face in today's world. 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. A fish, wildlife, and conservation biology degree is also excellent preparation for veterinary school.

Some examples of career opportunities include, but are not limited to: fishery/wildlife/conservation biologist; specialist; manager; ecologist; rehabilitation specialist, consultant; research scientist/associate; educator. Within these areas, a variety of specializations are possible including fish, wildlife, and conservation education and interpretation, harvest management, administration, research, law enforcement, habitat enhancement, fish, wildlife, and conservation sampling, statistical analyses, and resolution of human-wildlife problems.

MATH 117, MATH 118, MATH 124, MATH 125, M CC 120A-B, and M CC 121, 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.

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.

Visit the web site <http://core.colostate.edu/postdy/poscollege.cfm?collID=5> and follow the links to the major in fish, wildlife, and conservation biology

Conservation Biology Concentration

Associate Professor Kevin Crooks, in charge

The conservation biology concentration focuses on understanding the processes necessary to conserve biological diversity with an emphasis on fish and wildlife species.

MATH 117, MATH 118, MATH 124, MATH 125, M CC 120A-B, and M CC 121, 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.

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.

Visit the web site <http://core.colostate.edu/postdy/poscollege.cfm?collID=5> and follow the links to the conservation biology concentration.

Fisheries and Aquatic Sciences Concentration

Associate Professor Chris Myrick, in charge

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.

Student choosing the fisheries and aquatic sciences concentration are also required to complete at least 160 hours of employment related to fishery and aquatic biology.

MATH 117, MATH 118, MATH 124, MATH 125, M CC 120A-B, and M CC 121 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.

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.

Visit the web site <http://core.colostate.edu/postdy/poscollege.cfm?collID=5> and follow the links to the fishery and aquatic sciences concentration.

Wildlife Biology Concentration

Special Assistant Professor Tom Seibert, in charge

Wildlife biology focuses primarily on terrestrial vertebrates and builds a strong foundation in basic wildlife ecology, management, and conservation.

MATH 117, MATH 118, MATH 124, MATH 125, M CC 120A-B, and M CC 121 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.

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.

Visit the web site <http://core.colostate.edu/postdy/poscollege.cfm?collID=5> and follow the links to the wildlife biology concentration.

Minor in Fishery Biology

Students majoring in fish, wildlife, and conservation biology (except those in the fisheries and aquatic sciences concentration), 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 (Prerequisite)	Cr	AUCC
LOWER DIVISION			
BIO 320*	Ecology (BZ 110 or BZ 120 or LIFE 103; MATH 141 or MATH 155 or MATH 160)	3	
OR			
LAND 220/ SOCR 220*	Fundamentals of Ecology (3 credits of 100-level biology or HORT; 3 credits of 100-level mathematics)	3	
Select one of the following pairs of courses:			
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
OR			
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A

Course	Title (Prerequisite)	Cr	AUCC
LIFE 103	Biology of Organisms-Animals and Plants (LIFE 102)	4	
TOTAL			7-11
LOWER OR UPPER DIVISION			
<i>Select one course from the following:</i>			
FW 204	Introduction to Fishery Biology	3	
FW 260*	Principles of Wildlife Management (MATH 124)	3	
FW 370*	Design of Fish and Wildlife Projects (BIO 320 or LAND 220/SOCR 220; FW 260; MATH 155 or MATH 160; NR 220; STAT 301 or STAT 307/ERHS 307)	3	
TOTAL			3
UPPER DIVISION			
FW 300	Ichthyology (BZ 111 or LIFE 103)	2	
FW 301	Ichthyology Laboratory (FW 300 or concurrent reg.)	2	
Select two courses from the following:			
FW 400	Fish Ecology (BIO 320 or LAND 220/SOCR 220; FW 300; FW 370)	3	
FW 401*	Fishery Science (FW 300; MATH 141 or MATH 155 or MATH 160; STAT 301 or STAT 307/ERHS 307)	3	
FW 402	Fish Culture (FW 300)	4	
Adviser-approved aquatic course			3-4
TOTAL			13-15
PROGRAM TOTAL = 23-29 credits without 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 fishery and wildlife biology, master of science, and doctor of philosophy degrees. 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, www.warnercnr.colostate.edu/FWB/.

Students should indicate their interest when writing for further information about graduate programs and research. Contact the department for application instructions.

DEPARTMENT OF FOREST, RANGELAND, AND WATERSHED STEWARDSHIP

Office in Forestry Building, Room 131
(970) 491-6911
www.warnercnr.colostate.edu/frws/

Professor N. Thompson Hobbs, Head

Major in Forestry

Professor Dan Binkley, in charge

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, Rangeland, and Watershed 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.

MATH 117, MATH 118, MATH 125, MATH 126, M CC 120A-B, and M CC 121 are considered review courses and may not be used toward a degree in the forestry major.

Forestry Core Program

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BZ 120	Principles of Plant Biology	4	3A
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
F 210	Forest Ecogeography (BZ 120)	3	
SPCM 200	Public Speaking	3	2A
	Electives	2	
	TOTAL	20	
SOPHOMORE			
BIO 320	Ecology (BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 102; MATH 141 or MATH 155 or MATH 160)	3	
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
	TOTAL	10	
JUNIOR			
F 311	Forestry Ecology (BIO 320 or LAND 220/SOCR 220)	3	
F 321	Forest Biometry (NR 220; STAT 201 or STAT 301)	3	
F 322	Economics of the Forest Environment (AREC 202 or ECON 202 or ECON 240/AREC 240)	3	
F 325	Silviculture (F 230; F 311; NR 326)	3	
NR 320	Natural Resources History and Policy	3	3D
	TOTAL	15	
SENIOR			
NR 420	Integrated Ecosystem Management (BIO 320 or LAND 220/SOCR 220; NR 220; NR 320; senior standing)	4	4C
CORE TOTAL = 49 credits¹			

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

Professor William H. Romme, in charge

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:

Warner College of Natural Resources

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125) Arts/humanities ¹	4	1B
	TOTAL	6	3B
SOPHOMORE			
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
F 230	Forestry Field Measurements	2	
NR 220	Natural Resources Ecology and Measurements (BZ 110 and BZ 111 or BZ 120 or LIFE 103; MATH 118)	5	
PH 121	General Physics I (MATH 125 or concurrent reg.) Global and cultural awareness ²	5	
	TOTAL	3	3E
JUNIOR			
BZ 440	Plant Physiology (BZ 120 or LIFE 103)	3	
STAT 301	Introduction to Statistical Methods (MATH 117) Field experience ³ Electives	3	
	TOTAL	0	
SENIOR			
BSPM 365	Integrated Tree Health Management (BZ 120 or LIFE 102)	4	4A
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
NR 425	Natural Resource Policy and Sustainability (F 325; NR 320) Biology electives ⁴	3	4B
	TOTAL	12	
PROGRAM TOTAL = 120 credits			
		22	

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 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

Professor William H. Romme, in charge

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
MATH 141	Calculus in Management Sciences ¹ (MATH 118)	3	1B
PH 110	Descriptive Physics Elective	3	3A
	TOTAL	3	
SOPHOMORE			
ATS 350	Introduction to Weather and Climate	2	
F 230	Forestry Field Measurements	2	
NR 220	Natural Resources Ecology and Measurements (BZ 110 and BZ 111 or BZ 120 or LIFE 103; MATH 118)	5	
STAT 301	Introduction to Statistical Methods (MATH 117) Arts/humanities ²	3	
	TOTAL	6	3B

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
TOTAL			
18			
BSPM 365	Integrated Tree Health Management (BZ 120 or LIFE 102)	4	
CO 300	Writing Arguments (CO 150 or HONR 193)	3	2B
F 324	Fire Effects and Adaptations (BIO 320 or LAND 220/SOCR 220)	3	
F 330	Timber Harvesting and the Environment (F 230 or F 321)	3	
NR 319	Geospatial Applications in Natural Resources (junior standing) Field experience ³ Electives	4	
	TOTAL	0	
SENIOR			
F 421	Timber Management (F 230; F 321; F 322; F 325)	4	4A
F 422	Quantitative Methods in Forest Management (F 321; F 322)	3	
F 424	Wildland Fire Behavior and Management (BIO 320 or LAND 220/SOCR 220)	3	4B
F 425	Advanced Wildland Fire Behavior and Management (F 424; NR 319)	3	
NR 425	Natural Resource Policy and Sustainability (F 325; NR 320)	3	4B
NR 444	Fire Economics and Policy (AREC 202 or ECON 202) Global and cultural awareness ⁴ Electives	3	3E
	TOTAL	3	
PROGRAM TOTAL = 120 credits			
		25	

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).

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

Professor Frederick W. Smith, in charge

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
MATH 141	Calculus in Management Sciences (MATH 118) Elective	3	1B
	TOTAL	4	
SOPHOMORE			
F 230	Forestry Field Measurements	2	
F 331	Wood Products in Society	3	
NR 220	Natural Resources Ecology and Measurements (BZ 110 and BZ 111 or BZ 120 or LIFE 103; MATH 118)	5	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
	Arts/humanities ¹	6	3B
	Global and cultural awareness ²	3	3E
	TOTAL	<u>22</u>	
JUNIOR			
F 330	Timber Harvesting and the Environment (F 230 or F 321)	3	
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
NR 319	Geospatial Applications in Natural Resources (junior standing)	4	
	Field experience ³	0	
	Electives	5	
	TOTAL	<u>15</u>	
SENIOR			
BSPM 365	Integrated Tree Health Management (BZ 120 or LIFE 102)	4	
F 421	Timber Management (F 230; F 321; F 322; F 325)	4	4A
F 422	Quantitative Methods in Forest Management (F 321; F 322)	3	
F 424	Wildland Fire Behavior and Management (BIO 320 or LAND 220/SOCR 220)	3	
NR 425	Natural Resource Policy and Sustainability (F 325; NR 320)	3	4B
	Electives	10	
	TOTAL	<u>27</u>	
PROGRAM TOTAL = 120 credits			

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 3E in the AUCC.
³ Students must complete one summer of acceptable field experience.

Forestry-Business Concentration

Professor Douglas B. Rideout, in charge

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:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
MATH 141	Calculus in Management Sciences (MATH 118)	3	1B
SOPHOMORE			
STAT 204	Statistics for Business Students (MATH 117)	3	
	Arts/humanities ¹	6	3B
	Electives	12	
	TOTAL	<u>21</u>	
JUNIOR			
ACT 205	Fundamentals of Accounting	3	
F 330	Timber Harvesting and the Environment (F 230 or F 321)	3	
F 331	Wood Products in Society	3	
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
MKT 305	Fundamentals of Marketing (AREC 202 or ECON 101 or ECON 202)	3	
	Global and cultural awareness ²	3	3E
	Field experience ³	0	
	TOTAL	<u>18</u>	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
SENIOR			
BSPM 365	Integrated Tree Health Management (BZ 120 or LIFE 102)	4	
BUS 205	Legal and Ethical Issues in Business	3	
F 421	Timber Management (F 230; F 321; F 322; F 325)	4	4A
F 422	Quantitative Methods in Forest Management (F 321; F 322)	3	
F 424	Wildland Fire Behavior and Management (BIO 320 or LAND 220/SOCR 220)	3	
FIN 305	Fundamentals of Finance (ACT 205 or ACT 210; ECON 204)	3	
MGT 301	Supply Chain Management (AREC 202 or ECON 202; MATH 141 or MATH 155 or MATH 160; STAT 204 or STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	
MGT 305	Fundamentals of Management ⁴	3	
NR 425	Natural Resource Policy and Sustainability (F 325; NR 320)	3	4B
	TOTAL	<u>29</u>	
PROGRAM TOTAL = 120 credits			

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 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

Professors Richard L. Knight and Robert O. Coleman, in charge

The goal of the natural resources management major is to provide students with a broad-based understanding of the use and management of natural resources. 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 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, natural resource policy, recreation resources, watershed management, wildlife management, or other topics related to natural resources management.

The first year, students are expected to complete most of the undergraduate core curriculum as well as courses in biology, chemistry, and mathematics. The second year, students develop the initial foundation in natural resources through courses in ecology, ecogeography, geology, microeconomics, soils, and statistics. 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.

The beginning of the third year, students must declare a minor. Required courses in the third year complete much of the core curriculum in the different disciplines that make up the major; these include courses in natural resources policy,

forest ecology, vegetation management, remote sensing and geographic information systems, and technical writing. The fourth year, students are required to complete their minor and take the final set of courses in public relations, natural resource sampling, and the capstone course in integrated ecosystem management.

Students are encouraged to participate in internships and obtain related work experience. At the completion of the program, students should have the technical and communication skills that are critical in resolving important natural resource management problems.

Learning Outcomes

Students will:

- Accurately communicate their knowledge of natural resources, 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; students will also demonstrate knowledge of social science analytic techniques.
- Demonstrate comprehensive knowledge of subject areas relevant to the major fields of study in natural resources management.

Potential Occupations

Opportunities are available worldwide. Graduates apply their education in science, technology, and the social sciences to solve today’s critical natural resource and environmental problems. Positions are found in federal, state, and local government, industry, and education. Some natural resource professionals are employed in environmental consulting firms and corporate environmental departments. The nonprofit sector provides a variety of environmentally-related jobs. In general, competition is quite intense while some positions require a graduate degree. Participating in seasonal and voluntary work, internships, and cooperative education opportunities will enhance your chances for permanent full-time employment. The demographics of an aging work force in federal natural resource management agencies will be creating significant employment opportunities for graduate of our program over the next three to five years.

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.

MATH 117, MATH 118, MATH 125, M CC 120A-B, and M CC 121 are considered review courses by the department. Credits in these courses, either by examination or completion, may not be used toward a degree in natural resources management.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
BZ 110	Principles of Animal Biology	3	3A
BZ 120	Principles of Plant Biology	4	3A
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A
MATH 141	Calculus in Management Sciences (MATH 118)	3	1B
OR			
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	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			
BIO 320	Ecology (BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 102; MATH 141 or MATH 155 or MATH 160)	3	
OR			
LAND 220/ SOCR 220	Fundamentals of Ecology (3 credits of 100-level biology or HORT 100; 3 credits 100-level mathematics)	3	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
F 210	Forest Ecogeography (BZ 120)	3	
GEOL 120	Exploring Earth: Physical Geology	3	3A
OR			
GEOL 124	Geology of Natural Resources	3	3A
GEOL 121	Introductory Geology Laboratory (GEOL 120 or concurrent reg. or GEOL 122 or concurrent reg. or GEOL 124 or concurrent reg.)	1	3A
NR 220	Natural Resources Ecology and Measurements (BZ 110 and BZ 111 or BZ 120 or LIFE 103; MATH 118)	5	
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
OR			
STAT 307/ ERHS 307	Introduction to Biostatistics (MATH 117)	3	
	Minor ³	3	
	TOTAL	31	
JUNIOR			
<i>Select one of the following courses:</i>			
BZ 471	Stream Biology and Ecology (BIO 320 or LAND 220/SOCR 220)	3	
F 311	Forest Ecology (BIO 320 or LAND 220/SOCR 220)	3	
RS 351	Range Plant Production and Decomposition (BIO 320 or LAND 220/SOCR 220; SOCR 240)	3	
<i>Select one of the following courses:</i>			
CO 300	Writing Arguments (CO 150 or HONR 193)	3	2B
CO 301B	Writing in the Disciplines-Science (CO 150 or HONR 193)	3	2B
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B

Course	Title (Prerequisite)	Cr	AUCC
AREC 340/ ECON 340	Introduction to Economics of Natural Resources (AREC 202 or ECON 202)	3	
OR			
F 322	Economics of the Forest Environment (AREC 202 or ECON 202 or ECON 240/AREC 240)	3	
NR 319	Geospatial Application in Natural Resources (junior standing)	4	
NR 320	Natural Resources History and Policy	3	3D
NR 326	Forest Vegetation Management (NR 220)	3	
	Minor ³	6	
	Electives	4	
	TOTAL	29	
SENIOR			
<i>Select two of the following courses:</i>			
FW 260	Principles of Wildlife Management (MATH 124)	3	
RS 300	Principles of Range Management (BZ 120 or LIFE 103)	3	
		3	
NR 400	Public Relations in Natural Resources (NR 320)	3	4A, 4B
NR 420	Integrated Ecosystem Management (BIO 320 or LAND 220/SOCR 220; NR 220; NR 320)	4	4C
NR 421	Natural Resources Sampling (NR 220; STAT 201 or STAT 301; senior standing)	3	
WR 304	Principles of Watershed Management	3	3A
OR			
WR 416	Land Use Hydrology (SOCR 240; STAT 201)	3	
		12	
		0	
		31	
PROGRAM TOTAL = 120-121 credits			

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 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

Professor William Lauenroth, in charge

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.

Four concentrations are offered – range and forest management; rangeland management; restoration ecology; and science.

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; 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.

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.

MATH 117, MATH 118, M CC 120A-B, and M CC 121 are considered review courses, credits in these courses may not be used toward the degree in rangeland ecology.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
AREC 202	Agricultural and Resource Economics ¹	3	3C
BZ 120	Principles of Plant Biology	4	3A
CHEM 107	Fundamentals of Chemistry ² (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
F 230	Forestry Field Measurements	2	
LAND 220/ SOCR 220	Fundamentals of Ecology ² (3 credits of 100-level biology or HORT 100; three credits of 100-level mathematics)	3	3A
MATH 141	Calculus in Management Sciences ² (MATH 118)	3	1B
	Arts/humanities ³	6	3B
	Electives	2	
	TOTAL	34	
SUMMER SESSION			
NR 220	Natural Resources Ecology and Measurements ² (BZ 110 and BZ 111 or BZ 120 or LIFE 103; MATH 118)	5	
SOPHOMORE			
BZ 223	Plant Identification (BZ 120 or LIFE 103)	3	
F 210	Forest Ecogeography (BZ 120)	3	
FW 260	Principles of Wildlife Management ² (MATH 124)	3	
RS 300	Principles of Range Management (BZ 120 or LIFE 103)	3	
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
SPCM 200	Public Speaking	3	2A
STAT 307/ ERHS 307	Introduction to Biostatistics ^{2,4} (MATH 117)	3	
WR 304	Principles of Watershed Management	3	3A
	TOTAL	25	
JUNIOR			
F 311	Forest Ecology (BIO 320 or LAND 220/SOCR 220)	3	
F 322	Economics of the Forest Environment (AREC 202 or ECON 202 or ECON 240/AREC 240)	3	
F 325	Silviculture (F 230; F 311; NR 220)	3	
NR 367	Concepts in Vertebrate Nutrition (CHEM 245)	3	
RS 331	Rangeland Ecogeography (BZ 223 or F 210 or NR 220; RS 300)	3	
RS 332	Range Measurements (NR 220 or RS 331; RS 300 or concurrent reg.; STAT 201 or STAT 301 or STAT 307/ERHS 307)	2	
RS 351	Range Plant Production and Decomposition (BIO 320 or LAND 220/SOCR 220; SOCR 240)	3	4A, 4B
RS 420	Grass Taxonomy (BZ 223)	3	
RS 452	Range Animal-Habitat Interactions (NR 367; RS 300 or RS 320/SOCR 320)	2	4B
	Global and cultural awareness ⁵	3	3E
	TOTAL	28	
SENIOR			
ANEQ 472	Sheep Systems (senior status)	3	
OR			
ANEQ 478	Beef Systems (senior status)	3	
F 321	Forest Biometry (NR 220; STAT 201 or STAT 301)	3	
NR 320	Natural Resources History and Policy	3	3D
NR 322	Introduction to Geographic Information Systems	4	
NR 420	Integrated Ecosystem Management (senior standing; BIO 320 or LAND 220/SOCR 220; NR 220; NR 320)	4	
RS 400	Rangeland Improvements (RS 300 or RS 320/SOCR 320)	2	

Course	Title (Prerequisite)	Cr	AUCC
RS 471	Rangeland Planning and Grazing Management (RS 300 or RS 320/SOCR 320)	2	4C
SOCR 440	Pedology	4	
	Elective ⁶	4	
	TOTAL	29	

PROGRAM TOTAL = 120 credits

¹ ECON 202 may be substituted for AREC 202.

² MATH 117 and MATH 118 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/ERHS 307.

³ Select two courses from the list of courses in category 3B in the All-University Core Curriculum (AUCC).

⁴ STAT 301 may be substituted for STAT 307/ERHS 307.

⁵ Select from the list of courses in category 3E in the AUCC.

⁶ 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).

Rangeland Management Concentration

Rangeland management focuses on multi-use rangeland management issues and techniques.

MATH 117, MATH 118, M CC 120A-B, and M CC 121 are considered review courses; credits in these courses may not be used toward the degree in rangeland ecology.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
LAND 220/ SOCR 220	Fundamentals of Ecology ¹ (3 credits in 100-level biology or HORT 100; 3 credits in 100-level mathematics)	3	3A
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
LIFE 103	Biology of Organisms-Animals and Plants (LIFE 102)	4	
MATH 141	Calculus in Management Sciences ¹ (MATH 118)	3	1B
	Electives	5	
	TOTAL	30	
SOPHOMORE			
ANEQ 300E	Topics in Animal Sciences-Family Ranching ² (ANEQ 101 or ANEQ 102)	1	
BZ 223	Plant Identification (BZ 120 or LIFE 103)	3	
AREC 202	Agricultural and Resource Economics ³	3	3C
AREC 310	Agricultural Marketing (AREC 202 or ECON 202)	3	
NR 224/ AGRI 224	Integrated Resource Management I ² (AGRI 192)	3	
RS 300	Principles of Range Management (BZ 120 or LIFE 103)	3	
RS 331	Rangeland Ecogeography (BZ 223 or F 210 or NR 220; RS 300)	3	
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
SPCM 200	Public Speaking	3	2A
STAT 307/ ERHS 307	Introduction to Biostatistics ^{1,4} (MATH 117)	3	
	TOTAL	29	
JUNIOR			
BZ 440	Plant Physiology (BZ 120 or LIFE 103; CHEM 245 or concurrent reg.)	3	
FW 260	Principles of Vertebrate Management ¹ (MATH 124)	3	
NR 320	Natural Resources History and Policy	3	3D
NR 424/ AGRI 424	Integrated Resource Management II (NR 224/AGRI 224)	3	

Course	Title (Prerequisite)	Cr	AUCC
RS 351	Range Plant Production and Decomposition (BIO 320 or LAND 220/SOCR 220; SOCR 240)	3	4A, 4B
RS 420	Grass Taxonomy (BZ 223)	3	
RS 452	Range Animal-Habitat Interactions ² (NR 367; RS 300 or RS 320/SOCR 320)	2	4B
SOC 341	Sociology of Rural Life ² (SOC 100 or SOC 105)	3	
WR 304	Principles of Watershed Management Arts/humanities ⁵	3	3A
	TOTAL	6	3B
		32	
SENIOR			
ANEQ 472	Sheep Systems (senior status)	3	
OR			
ANEQ 478	Beef Systems (senior status)	3	
AREC 305	Agricultural and Resource Enterprise Analysis ² (AGRI 140 or CS 110; AREC 202 or ECON 202)	3	
AREC 478	Agricultural Policy (AREC 202 or ECON 202 or AREC 240/ECON 240)	3	
NR 367	Concepts in Vertebrate Nutrition (CHEM 245)	3	
NR 383/AGRI 383	U.S. Travel-Integrated Resource Management	2	
NR 420	Integrated Ecosystem Management (BIO 320 or LAND 220/SOCR 220; NR 220; NR 320; senior standing)	4	
RS 400	Rangeland Improvements (RS 300 or RS 320/SOCR 320)	2	
RS 471	Rangeland Planning and Grazing Management (RS 300 or RS 320/SOCR 320)	2	4C
SOCR 440	Pedology (SOCR 240)	4	
	Global and cultural awareness ⁶	3	3E
	Elective	2	
	TOTAL	29	

PROGRAM TOTAL = 120 credits

¹ MATH 117 and MATH 118 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 CHEM 107, MATH 141, STAT 307/ERHS 307.

² In order to take this course, students may need to obtain a registration override from the appropriate department.

³ ECON 202 may be substituted for AREC 202.

⁴ STAT 301 may be substituted for STAT 307/ERHS 307.

⁵ Select two courses from the list of courses in category 3B in the AUCC.

⁶ Select from the list of courses in category 3E in the AUCC.

Restoration Ecology Concentration

Restoration ecology provides students with skills important to restoration and rehabilitation of damaged rangeland ecosystems.

MATH 117, MATH 118, M CC 120A-B, and M CC 121 are considered review courses; credits in these courses may not be used toward the degree in rangeland ecology.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CHEM 107	Fundamentals of Chemistry ¹ (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
LAND 220/SOCR 220	Fundamentals of Ecology (3 credits in 100-level biology or HORT 100; 3 credits in 100-level math)	3	3A
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
LIFE 103	Biology of Organisms-Animals and Plants (LIFE 102)	4	

Course	Title (Prerequisite)	Cr	AUCC
MATH 141	Calculus in Management Sciences ¹ (MATH 118)	3	1B
	Electives	1	
	TOTAL	26	
SUMMER SESSION			
NR 220	Natural Resources Ecology and Measurements (BZ 110 and BZ 111 or BZ 120 or LIFE 103; MATH 118) ¹	5	
SOPHOMORE			
BZ 223	Plant Identification (BZ 120 or LIFE 103)	3	
AREC 202	Agricultural and Resource Economics ²	3	
RS 300	Principles of Range Management (BZ 120 or LIFE 103)	3	
RS 331	Rangeland Ecogeography (BZ 223 or F 210 or NR 220; RS 300)	3	
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
SPCM 200	Public Speaking	3	2A
STAT 307/ERHS 307	Introduction to Biostatistics ^{1,3} (MATH 117)	3	
	Social/behavioral sciences ⁴	3	3C
	TOTAL	25	
JUNIOR			
BZ 440	Plant Physiology (BZ 120 or LIFE 103; CHEM 245 or concurrent reg.)	3	
FW 260	Principles of Wildlife Management ¹ (MATH 124)	3	
NR 322	Introduction to Geographic Information Systems	4	
RS 332	Range Measurements (NR 220 or RS 331; RS 300 or concurrent reg.; STAT 201 or STAT 301 or STAT 307/ERHS 307)	2	
RS 351	Range Plant Production and Decomposition (BIO 320 or LAND 320/SOCR 320; SOCR 240)	3	4A, 4B
RS 420	Grass Taxonomy (BZ 223)	3	
RS 452	Range Animal-Habitat Interactions ⁵ (NR 367; RS 300 or RS 320/SOCR 320)	2	4B
SOCR 350	Soil Fertility Management (SOCR 240)	3	
WR 416	Land Use Hydrology (SOCR 240; STAT 201)	3	
	Arts/humanities ⁶	6	3B
	TOTAL	32	
SENIOR			
<i>Select two of the following courses:</i>			
ERHS 446	Environmental Toxicology (CHEM 245 or CHEM 343 or CHEM 346)	3	
PHIL 345	Environmental Ethics (sophomore standing or higher)	3	
SOCR 442	Forest and Range Soils (SOCR 240)	3	
SOCR 455	Soil Microbiology (MIP 300 or SOCR 240)	3	
SOCR 470	Soil Physics (SOCR 240)	3	
NR 320	Natural Resources History and Policy	3	3D
NR 420	Integrated Ecosystem Management (BIO 320 or LAND 220/SOCR 220; NR 220; NR 320; senior standing)	4	
RS 400	Rangeland Improvements (RS 300 or RS 320/SOCR 320)	2	
RS 471	Rangeland Planning and Grazing Management (RS 300 or RS 320/SOCR 320)	2	4C
RS 478	Restoration Ecology (BZ 450 or F 311 or LAND 220/SOCR 220; SOCR 240)	3	4A
SOCR 440	Pedology	4	
WR 418	Land Use and Water Quality (CHEM 107; WR 416)	3	
	Global and cultural awareness ⁷	3	3E
	Electives	2	
	TOTAL	32	
PROGRAM TOTAL = 120 credits			

¹ MATH 117 and MATH 118 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/ERHS 307.

² ECON 202 may be substituted for AREC 202.

³ STAT 301 may be substituted for STAT 307/ERHS 307.

⁴ Select from the list of courses in category 3C in the All-University Core Curriculum (AUCC).

⁵ In order to take this course, students may need to obtain a registration override from the appropriate department.

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.

Science Concentration

The science concentration prepares students for research and graduate studies in rangeland management and rangeland science.

MATH 117, MATH 118, M CC 120A-B, and M CC 121 are considered review courses; credits in these courses may not be used toward the degree in rangeland ecology.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CHEM 107	Fundamentals of Chemistry ¹ (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
LAND 220/ SOCR 220	Fundamentals of Ecology ¹ (3 credits in 100-level biology or HORT 100; 3 credits in 100-level mathematics)	3	3A
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
LIFE 103	Biology of Organisms-Animals and Plants (LIFE 102)	4	
MATH 155	Calculus for Biological Scientists I ¹ (MATH 124; MATH 125)	4	1B
	Electives		
	TOTAL	2	
		28	
SUMMER SESSION			
NR 220	Natural Resources Ecology and Measurements (BZ 110 or BZ 111 or BZ 120 or LIFE 103; MATH 118)	5	
SOPHOMORE			
BZ 223	Plant Identification (BZ 120 or LIFE 103)	3	
AREC 202	Agricultural and Resource Economics ²	3	3C
PH 141	Physics for Scientists and Engineers I ³ (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	
RS 300	Principles of Range Management (BZCC 120 or LIFE 103)	3	
RS 331	Rangeland Ecogeography (BZ 223 or F 210 or NR 220; RS 300)	3	
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
SPCM 200	Public Speaking	3	2A
STAT 307/ ERHS 307	Introduction to Biostatistics ⁴ (MATH 117)	3	
	Global and cultural awareness ⁵	3	3E
	TOTAL	30	
JUNIOR			
ATS 350	Introduction to Weather and Climate	2	
ATS 351	Introduction to Weather and Climate Laboratory (ATS 350 or concurrent reg.)	1	
BZ 440	Plant Physiology (BZ 120 or LIFE 103)	3	
FW 260	Principles of Wildlife Management (MATH 124)	3	
NR 322	Introduction to Geographic Information Systems	4	
RS 332	Range Measurements (NR 220 or RS 331; RS 300 or concurrent reg.; STAT 201 or STAT 301 or STAT 307/ERHS 307)	2	
RS 351	Range Plant Production and Decomposition (BIO 320 or LAND 220/SOCR 220; SOCR 320)	3	4A, 4B
RS 452	Range Animal-Habitat Interactions (NR 367; RS 300 or RS 320/SOCR 320)	2	4B
WR 304	Principles of Watershed Management Arts/humanities ⁶	3	3A
	Electives ⁷	6	3B
	TOTAL	29	
SENIOR			
BZ 450	Plant Ecology (BZ 223 or BZ 325)	4	
NR 320	Natural Resources History and Policy	3	3D

Course	Title (Prerequisite)	Cr	AUCC
NR 367	Concepts in Vertebrate Nutrition (CHEM 245)	3	
NR 420	Integrated Ecosystem Management (BIO 320 or LAND 220/SOCR 220; NR 220; NR 320)	4	
RS 400	Rangeland Improvements (RS 300 or RS 320/SOCR 320)	2	
RS 471	Rangeland Planning and Grazing Management (RS 300 or RS 320/SOCR 320)	2	4C
RS 495	Independent Study-Rangeland Ecosystem	2	
SOCR 440	Pedology	4	
	Electives ⁷	4	
	TOTAL	28	

PROGRAM TOTAL = 120 credits

¹ MATH 117 and MATH 118 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 CHEM 107, NR 220, STAT 307/ERHS 307.

² ECON 202 may be substituted for AREC 202.

³ In order to take this course, students may need to obtain a registration override from the appropriate department.

⁴ STAT 301 may be substituted for STAT 307/ERHS 307.

⁵ Select from the list of courses in category 3E in the All-University Core Curriculum (AUCC).

⁶ Select from the list of courses in category 3B in the AUCC.

⁷ Enough elective credits must be taken to bring program total to 120 credits. Forty two upper-division (300- and 400-level) courses are required.

Major in Watershed Science

Professor Melinda Laituri, in charge

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 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 cooperative 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
BZ 104	Basic Concepts of Plant Life	3	3A
OR			
LIFE 103	Biology of Organisms-Animals and Plants ⁴ (LIFE 102)	4	
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124 or placement)	3	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
GEOL 150	Physical Geology for Scientists and Engineers	4	
OR			
GR 210	Physical Geography ²	3	
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
MATH 125	Numerical Trigonometry (MATH 118 or placement)	1	1B
MATH 126	Analytical Trigonometry (MATH 125 or placement)	1	1B
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
OR			
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
		3	3C
		2	
TOTAL		29-31	
SOPHOMORE			
<i>Select one of the following courses:</i>			
BIO 320	Ecology (BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 102; MATH 141 or MATH 155 or MATH 160)	3	

Course	Title (Prerequisite)	Cr	AUCC
LAND 220/ SOCR 220	Fundamentals of Ecology (3 credits 100-level biology or HORT 100; 3 credits 100-level math)	3	3A
NR 220	Natural Resources Ecology and Measurements (BZ 110 and BZ 111 or BZ 120 or LIFE 103; MATH 118)	5	
<i>Select one course from the following:</i>			
CO 301A	Writing in the Disciplines-Arts and Humanities (CO 150 or HONR 193)	3	2B
CO 301B	Writing in the Disciplines-Science (CO 150 or HONR 193)	3	3B
CO 301C	Writing in the Disciplines-Social Sciences (CO 150 or HONR 193)	3	3B
CO 301D	Writing in the Disciplines-Education (CO 150 or HONR 193)	3	2B
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
OR			
MATH 255	Calculus for Biological Scientists II (concurrent reg. in MATH 126; MATH 155)	4	1B
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
SPCM 200	Public Speaking	3	2A
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
		3	3E
		3	3D
TOTAL		31-33	
JUNIOR			
CIVE 322/ ENVE 322	Basic Hydrology ² (CBE 331 or CIVE 300 or WR 416; CIVE 202 or STAT 301 or STAT 309)	3	
SOCR 322	Principles of Microclimatology (3 credits in PH)	3	
WR 416	Land Use Hydrology ² (SOCR 240; STAT 201)	3	4B
WR 417	Watershed Measurements ² (concurrent reg. in WR 416)	2	
WR 418	Land Use and Water Quality ² (CHEM 107; WR 416)	3	
WR 419	Water Quality Laboratory for Wildland Managers (concurrent reg. in WR 418)	2	
WR 420	Watershed Field Practicum (concurrent reg. in WR 416 and WR 417)	2	
WR 474	Snow Hydrology (CIVE 322/ENVE 322 or WR 416)	3	
		6	3B
		4	
TOTAL		31	
SENIOR			
GEOL 452	Hydrogeology (GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or GR 210; MATH 161 or MATH 255; PH 141)	4	
GEOL 454	Geomorphology (GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or GR 210; MATH 155 or MATH 160)	4	
GR 342	Geography of Water Resources ²	3	
<i>Select one of the following courses:</i>			
SOCR 440	Pedology	4	
SOCR 442	Forest and Range Soils	3	
WR 465	Eolian and Fluvial Transport Processes (PH 141)	4	
SOCR 470	Soil Physics (SOCR 240)	3	
SOCR 471	Soil Physics Laboratory (SOCR 470 or concurrent reg.)	1	
WR 440	Watershed Problem Analysis (CIVE 322/ENVE 322; WR 416)	3	4A, 4B, 4C
		3-8	
TOTAL		25-29	
PROGRAM TOTAL = 120 credits			

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.
⁷ Consult with adviser.

Minors in Forest, Rangeland, and Watershed Stewardship

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 (Prerequisite)	Cr	AUCC
LOWER DIVISION			
F 210*	Forest Ecogeography (BZ 120)	3	
UPPER DIVISION			
BSPM 365*	Integrated Tree Health Management (BZ 120 or LIFE 102)	4	
OR			
F 424*	Wildland Fire Behavior and Management (BIO 320 or LAND 220/SOCR 220)	3	
F 311*	Forest Ecology (BIO 320 or LAND 220/SOCR 220)	3	
F 321*	Forest Biometry (NR 220; STAT 201 or STAT 301)	3	
F 325*	Silviculture (F 230; F 311; NR 220)	3	
F 330	Timber Harvesting and the Environment (F 230 or F 321)	3	
F 421*	Timber Management (F 230; F 321; F 322; F 325)	4	
NR 319	Geospatial Applications in Natural Resources (junior standing)	4	
TOTAL		23-24	

PROGRAM TOTAL = 26-27 credits without 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 (Prerequisite)	Cr	AUCC
LOWER DIVISION			
<i>Select a minimum of nine credits from the following:¹</i>			
BZ 223*	Plant Identification (BZ 110 and BZ 111 or BZ 120 or LIFE 103)	3	
F 210*	Forest Ecogeography (BZ 120)	3	
LAND 220/ SOCR 220*	Fundamentals of Ecology (3 credits 100-level biology; 3 credits 100-level mathematics)	3	
NR 220*	Natural Resources Ecology and Measurements (BZ 110 and BZ 111 or BZ 120 or LIFE 103; MATH 118)	5	

Course	Title (Prerequisite)	Cr	AUCC
SOCR 240*	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
UPPER DIVISION			
RS 300*	Principles of Range Management (BZ 120 or LIFE 103)	3	
OR			
RS 320/ SOCR 320*	Forage and Range Management	3	
RS 331	Rangeland Ecogeography (BZ 223 or F 210 or NR 220; RS 300)	3	
RS 332*	Range Measurements (NR 220 or RS 331; RS 300 or concurrent reg.; STAT 201 or STAT 301 or STAT 307/ERHS 307)	2	
<i>Select a minimum of five credits from the following:</i>			
RS 351	Range Plant Production and Decomposition (BIO 320 or LAND 220/SOCR 220; SOCR 240);	3	
RS 400	Rangeland Improvements (RS 300 or RS 320/SOCR 320)	2	
RS 452*	Range Animal-Habitat Interactions (NR 367; RS 300 or RS 320/SOCR 320)	2	
RS 470*	Rangeland Economics and Analysis (AREC 202 or ECON 202; RS 300)	2	
RS 471	Rangeland Planning and Grazing Management (RS 300 or RS 320/SOCR 320)	2	
RS 472	Rangeland Ecosystem Planning (RS 471)	4	
RS 478	Restoration Ecology (BZ 450 or F 311 or LAND 220/SOCR 220; SOCR 240)	3	
TOTAL		13	

PROGRAM TOTAL = 22 credits without 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

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
CS 150	Interactive Programming with Java (placement in MATH 117 or MATH 130)	4	
LOWER DIVISION OR UPPER DIVISION			
<i>Select a minimum of four credits from the following:¹</i>			
CS 200*	Algorithms and Data Structures (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)	4	
GR 100	Introduction to Geography	3	
GR 210	Physical Geography	3	
NR 401*	Techniques in Public Relations (SPCM 200)	2	
NR 440	Land Use Planning	3	
NR 493	Seminar on GIS and Remote Sensing Applications ² (NR 322 or NR 323 or written consent of instructor)	1	
NR 495	Independent Study	Var	
STAT 305*	Sampling Technique (STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	
STAT 312*	Statistics for Behavioral Sciences II (STAT 311 or written consent of instructor)	3	
STAT 460*	Applied Multivariate Analysis (STAT 340)	3	
UPPER DIVISION			
NR 322	Introduction to Geographic Information Systems	4	
NR 323	Remote Sensing of Natural Resources	3	
NR 422	GIS Applications in Natural Resource Management (NR 322)	4	
NR 423	Applications of Global Positioning Systems (NR 322 or NR 505)	1	
NR 493	Seminar on GIS and Remote Sensing Applications ² (NR 322 or NR 323)	1	
TOTAL		13	

PROGRAM TOTAL = 21 credits without 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.

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 (Prerequisite)	Cr	AUCC
LOWER DIVISION			
GEOL 150	Physical Geology for Scientists and Engineers	4	
OR			
GR 210	Physical Geography	3	
UPPER DIVISION			
GEOL 454*	Geomorphology (GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or GR 210; MATH 155 or MATH 160)	4	
<i>Select at least 7-9 credits from the following:</i>			
CIVE 423*	Groundwater Engineering (CBE 331 or CIVE 300 or WR 416)	3	
CIVE 440*	Nonpoint Source Pollution (one course in soil science, hydrology, or fluid mechanics)	3	
GEOL 452*	Hydrogeology (GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or GR 210; MATH 161 or MATH 255; PH 141)	4	
GEOL 492	Seminar	2	
GR 342	Geography of Water Resources	3	
WR 417	Watershed Measurements (concurrent registration in WR 416)	2	
WR 419	Water Quality Laboratory for Wildland Managers (concurrent registration in WR 418)	2	
WR 465*	Eolian and Fluvial Transport Processes (PH 141)	4	
WR 474*	Snow Hydrology (CIVE 322/ENVE 322 or WR 416)	3	
WR 416*	Land Use Hydrology (SOCR 240, STAT 201)	3	
WR 418*	Land Use and Water Quality (CHEM 107; WR 416)	3	
PROGRAM TOTAL = 21-22 credits without prerequisites		17-19	

* Additional course work may be required because of prerequisites.

Graduate Programs in Forest, Rangeland, and Watershed 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/index.asp?url=catalog>, and the department's website, www.warnercnr.colostate.edu/frws/.

DEPARTMENT OF GEOSCIENCES

Office in Natural Resources Building, Room 322
(970) 491-5661
<http://www.warnercnr.colostate.edu/geo/>

Associate Professor Sally Sutton, Interim 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 arts program. 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 and biological sciences, communications, and the liberal arts. Two concentrations are offered in environmental geology and geology.

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; 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.

MATH 117, MATH 118, M CC 120A-B, and M CC 121 are considered review courses; credits may not be used toward a degree in geology.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
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CO 300	Writing Arguments (CO 150 or HONR 193)	3	2B
CO 301B	Writing in the Disciplines-Science (CO 150 or HONR 193)	3	2B
SPCM 200	Public Speaking	3	2A
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GEOL 120	Exploring Earth: Physical Geology	3	
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GEOL 121	Introductory Geology Laboratory (GEOL 120 or concurrent reg. or GEOL 122 or concurrent reg. or GEOL 124 or concurrent reg.)	1	
GEOL 150	Physical Geology for Scientists and Engineers	4	
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<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
<hr/>			
GEOL 154	Historical and Analytical Geology (GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150)	4	
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
MATH 125	Numerical Trigonometry (MATH 118 or placement)	1	1B
MATH 126	Analytic Trigonometry (MATH 125 or placement)	1	1B
	Arts/humanities ²	3	3B
	Elective	1	
	TOTAL	30	
SOPHOMORE			
GEOL 232	Mineralogy (CHEM 111 or concurrent reg.; GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150; MATH 124)	3	
GEOL 332	Optical Mineralogy (GEOL 232 or concurrent reg.)	2	
GEOL 364	Igneous and Metamorphic Petrology (GEOL 232)	4	4B
MATH 155	Calculus for Biological Scientists I ³ (MATH 124; MATH 125)	4	1B
MATH 255	Calculus for Biological Scientists II ³ (concurrent reg. in MATH 126; MATH 155)	4	1B
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
	Global and cultural awareness ⁴	3	3E
	Historical perspectives ⁵	3	3D
	Social/behavioral sciences ⁶	3	3C
	TOTAL	31	
JUNIOR			
GEOL 344	Stratigraphy and Sedimentology (GEOL 154)	4	4A
GEOL 372	Structural Geology (GEOL 154; MATH 125; PH 141 or concurrent reg.)	4	4B
GEOL 376	Geologic Field Methods (GEOL 344; GEOL 372 or concurrent reg.)	3	4A, 4C
GEOL 454	Geomorphology (GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or GR 210; MATH 155 or MATH 160)	4	
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NR 319	Geospatial Applications in Natural Resources (junior standing)	4	
OR			
NR 322	Introduction to Geographic Information Systems	4	
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PH 142	Physics for Scientists and Engineers II (PH 141; MATH 161 or concurrent reg. or MATH 255 or concurrent reg.)	5	3A
OR			
SOCR 470	Soil Physics (SOCR 240)	3	
SOCR 240	Introductory Soil Science (CHEM 107 or CHEM 111)	4	
STAT 301	Introduction to Statistical Methods (MATH 117) ⁷	3	
	Arts/humanities ²	3	3B
	TOTAL	32-34	
SUMMER SESSION			
GEOL 436	Geology Summer Field Course (GEOL 364; GEOL 376)	6	4C
SENIOR			
<i>Select a total of 4 credits from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
AND			
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
BZ 120	Principles of Plant Biology	4	3A
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
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GEOL 366	Sedimentary Petrology and Geochemistry (CHEM 113; GEOL 154; GEOL 364)	4	4A, 4B
GEOL 446	Environmental Geology (GEOL 454 or concurrent registration)	3	
GEOL 452	Hydrogeology (GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or GR 210; MATH 161 or MATH 255; PH 141)	4	
	Sociopolitical elective ⁸	3	
	Technical elective ⁹	3	
	TOTAL	21	
PROGRAM TOTAL = 120-122 credits			

¹ First-time students entering a college or university on or after July 1, 2008, must take either CO 300 or CO 301B.
² Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC).
³ MATH 160, MATH 161, and MATH 261 may be substituted for MATH 151 and MATH 255.
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 MATH 340 may be substituted for STAT 301.
⁸ Chosen from departmental advising list.
⁹ Earth resources course with upper-division prerequisite or upper-division science/engineering course, excluding geology.

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. By obtaining a teaching certificate, graduates can teach earth sciences and related subjects in primary and secondary schools.

MATH 117, MATH 118, M CC 120A-B, and M CC 121 are considered review courses; credits may not be used toward a degree in geology.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or concurrent reg.; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
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<i>Select four credits from the following</i>			
GEOL 120	Exploring Earth: Physical Geology	3	
AND			
GEOL 121	Introductory Geology Laboratory (GEOL 120 or concurrent reg. or GEOL 122 or concurrent reg. or GEOL 124 or concurrent reg.)	1	
GEOL 150	Physical Geology for Scientists and Engineers	4	
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GEOL 154	Historical and Analytical Geology (GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150)	4	
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
MATH 125	Numerical Trigonometry (MATH 118 or placement)	1	1B
MATH 126	Analytic Trigonometry (MATH 125 or placement)	1	1B
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	3	3B
	Elective	<u>1</u>	
	TOTAL	30	
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SOPHOMORE			
GEOL 232	Mineralogy (CHEM 111 or concurrent reg.; GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150; MATH 124)	3	
GEOL 332	Optical Mineralogy (GEOL 232 or concurrent reg.)	2	
GEOL 364	Igneous and Metamorphic Petrology (GEOL 232)	4	4B
MATH 155	Calculus for Biological Scientists I ² (MATH 124; MATH 125)	4	1B

Course	Title (Prerequisite)	Cr	AUCC
MATH 255	Calculus for Biological Scientists II ² (MATH 155; concurrent reg. in MATH 126)	4	1B
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
	Global and cultural awareness ³	3	3E
	Historical perspectives ⁴	3	3D
	Social/behavioral sciences ⁵	3	3C
	TOTAL	<u>31</u>	
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JUNIOR			
CO 300	Writing Arguments (CO 150 or HONR 193)	3	2B
OR			
CO 301B	Writing in the Disciplines-Science (CO 150 or HONR 193)	3	2B
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GEOL 344	Stratigraphy and Sedimentology (GEOL 154)	4	4A
GEOL 372	Structural Geology (GEOL 154; MATH 125; PH 141 or concurrent reg.)	4	4B
GEOL 376	Geologic Field Methods (GEOL 344; GEOL 372 or concurrent reg.)	3	4A, 4C
GEOL 454	Geomorphology (GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or GR 210; MATH 155 or MATH 160)	4	
<hr/>			
NR 319	Geospatial Applications in Natural Resources (junior standing)	4	
OR			
NR 322	Introduction to Geographic Information Systems	4	
<hr/>			
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
OR			
SOCR 470	Soil Physics (SOCR 240)	3	
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STAT 301	Introduction to Statistical Methods ⁶ (MATH 117)	3	
	Arts/humanities ¹	3	3B
	TOTAL	<u>31-33</u>	
<hr/>			
SUMMER SESSION			
GEOL 436	Geology Summer Field Course (GEOL 364; GEOL 376)	6	4C
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SENIOR			
<i>Select a total of 4 credits from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
AND			
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
BZ 120	Principles of Plant Biology	4	3A
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
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GEOL 366	Sedimentary Petrology and Geochemistry (CHEM 113; GEOL 154; GEOL 364)	4	4A, 4B
	Geology electives ⁷	6	
	Technical elective ⁸	3	
	Electives	<u>3-5</u>	
	TOTAL	<u>20-22</u>	
<hr/>			
PROGRAM TOTAL = 120 credits			

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC).
² MATH 160, MATH 161, and MATH 261 may be substituted for MATH 151 and MATH 255.
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 MATH 340 may be substituted for STAT 301.
⁷ Select upper-division geology course with upper-division prerequisite and/or GEOL 342. Written adviser approval required.
⁸ Select upper-division science or engineering course, excluding geology, from departmental advising list.

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.

DEPARTMENT OF HUMAN DIMENSIONS OF NATURAL RESOURCES

Office in Forestry Building, Room 233
(970) 491-6591
www.warnercnr.colostate.edu/nrrt

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.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION Required:			
<i>Select four credits from the following</i>			
GEOL 120	Exploring Earth: Physical Geology	3	3A
AND			
GEOL 121	Introductory Geology Laboratory (GEOL 120 or concurrent reg. or GEOL 122 or concurrent reg. or GEOL 124 or concurrent reg.)	1	3A
GEOL 150	Physical Geology for Scientists and Engineers	4	
GEOL 154	Historical and Analytical Geology (GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150)	4	
TOTAL		8	
Recommended:			
GEOL 232*	Mineralogy ¹ (CHEM 111 or concurrent reg.; GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150; MATH 124)	3	
UPPER DIVISION			
<i>Select 10 credits from the following:</i>			
GEOL 332	Optical Mineralogy (GEOL 232 or concurrent reg.)	2	
GEOL 342	Paleontology (GEOL 154)	3	
GEOL 344	Stratigraphy and Sedimentology (GEOL 154)	4	
GEOL 364	Igneous and Metamorphic Petrology (GEOL 232)	4	
GEOL 372*	Structural Geology (GEOL 154; MATH 125; PH 141 or concurrent reg.)	4	
GEOL 376	Geologic Field Methods (GEOL 344; GEOL 372 or concurrent reg.)	3	
GEOL 446*	Environmental Geology (GEOL 454 or concurrent reg.)	3	
GEOL 452*	Hydrogeology (GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or GR 210; MATH 161 or MATH 255; PH 141)	4	
GEOL 454*	Geomorphology (GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or GR 210; MATH 155 or MATH 160)	4	
Upper division geology ²		2	
TOTAL		12	

PROGRAM TOTAL = 21 credits without prerequisites

¹ If GEOL 232 is not taken, any one additional geology course, upper or lower division, may be applied to the program minimum total of 21 credits.

² Additional upper division credits may come from the above list or from any other upper-division geology course.

*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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, and the department's website, www.warnercnr.colostate.edu/geo/.

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select four credits from the following:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
OR			
BZ 120	Principles of Plant Biology	4	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
PSY 100	General Psychology	3	3C
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	6	3B
	Biological/physical sciences ²	3	3A
	Elective	5	
	TOTAL	30	
SOPHOMORE			
<i>Select two of the following courses:</i>			
F 311	Forest Ecology (BIO 320 or LAND 220/SOCR 220)	3	
FW 200	Wildlife Conservation (MATH 118)	3	
NR 300	Biological Diversity (NR 120A or B or one course in biology)	3	
RS 300	Principles of Range Management (BZ 120 or LIFE 103)	3	
WR 304	Principles of Watershed Management	3	
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
LAND 220/SOCR 220	Fundamentals of Ecology (3 credits 100-level biology or HORT 100; 3 credits 100-level mathematics)	3	
NR 220	Natural Resource Ecology and Measurements (BZ 110 and BZ 111 or BZ 120 or LIFE 103; MATH 118)	5	
NRRT 231	Principles Parks/Protected Area Management	3	
NRRT 262	Principles of Environmental Communication	3	
NRRT 270	Principles of Natural Resource Tourism	3	
STAT 201	General Statistics (placement in MATH 130 or higher)	3	
	Global and cultural awareness ³	3	3E
	TOTAL	32	
JUNIOR			
<i>Select three of the following courses:</i>			
JTC 210	Newswriting (satisfactory performance on typing and diagnostic test)	3	
JTC 316/ETST 316	Multiculturalism and the Media	3	
JTC 342	Writing for Specialized Electronic Media (JTC 210)	3	
SPCM 232	Group Communication (SPCM 200)	3	
SPCM 300	Advanced Public Speaking (SPCM 200)	3	
JTC 350	Public Relations	3	
OR			
NR 400	Public Relations in Natural Resources (NR 320)	3	
NR 320	Natural Resources History and Policy	3	3D
NR 365	Environmental Education	3	
NR 387	Internship I	1	
NRRT 330	Social Aspects of Natural Resource Management	3	4A
NRRT 376	Recreation Measurements (STAT 201)	3	
	Guided electives ⁶	3	
	TOTAL	28	
SENIOR			
<i>Select two of the following courses:</i> ⁶			
JTC 372	Web Design and Management (JTC 210; JTC 211)	3	
JTC 413	New Communication Technologies and Society	3	
JTC 461	Writing about Science, Health, and Environment (JTC 210)	3	

Warner College of Natural Resources

Course	Title (Prerequisite)	Cr	AUCC
NR 460	Wilderness Management (LAND 220/SOCR 220; NRRT 231)	3	
OR			
NRRT 331	Management of Parks and Protected Areas (NRRT 231; NRRT 330)	3	
NRRT 371	Techniques in Interpretation (NRRT 262)	3	
NRRT 462	Environmental Communication-Natural Resources (NRRT 262)	3	4B, 4C
NRRT 487	Internship	5	
<i>Select 3-4 credits from the following:</i>			
PSY 340	Organizational Psychology (PSY 100; STAT 201; concurrent reg. in PSY 341)	3	
AND			
PSY 341	Organizational Psychology Laboratory (PSY 250; concurrent reg. in PSY 340; departmental statistics requirement)	1	
SPCM 332	Interpersonal Communication Skills	3	
SPCM 436	Conflict Management and Communication	3	
	Natural resource elective ⁴	4	
	Social/natural science elective ⁵	3	
	TOTAL	30-31	

PROGRAM TOTAL = 120-121 credits

¹ Select two courses from the list of courses in category 3B of the All-University Core Curriculum (AUCC).
² Select from the list of courses in category 3A of the AUCC.
³ Select from the list of courses in category 3E or the AUCC.
⁴ With adviser's approval, another JTC or SPCM course may be selected as part of this choice.
⁵ With adviser's approval, select from list of courses available in the department.
⁶ With adviser's approval, another JTC course may be selected as part of this choice.

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, LJPN 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
L* 107 ¹	First Year Language II (L* 105 or L* 106)	5	
OR			
L* 108 ¹	Intensive Language I (A in L* 105 or L* 106 and written consent of instructor or placement exam)	5	
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B

Course	Title (Prerequisite)	Cr	AUCC
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 ¹	Second Year Language I (L* 107 or L* 108 or placement exam)	3	
L* 201 ¹	Second Year Language II (L* 200 or L* 228A or placement exam)	3	
RRM 101	Hospitality Industry	3	
RRM 200	Resort Operations (RRM 101)	3	
NRRT 270	Principles of Natural Resource Tourism	3	
STAT 201	General Statistics (placement in MATH 130 or higher)	3	
	Arts/humanities ²	3	3B
	TOTAL	27	

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
<i>Select one of the following:</i>			
CO 300	Writing Arguments (CO 150 or HONR 193)	3	2B
CO 301A	Writing in the Disciplines-Arts and Humanities (CO 150 or HONR 193)	3	2B
CO 301B	Writing in the Disciplines-Science (CO 150 or HONR 193)	3	2B
CO 301C	Writing in the Disciplines-Social Sciences (CO 150 or HONR 193)	3	2B
CO 301D	Writing in the Disciplines-Education (CO 150 or HONR 193)	3	2B
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
L* 300 ¹	Reading and Writing for Communication (L* 201 or L* 208 or L* 228B)	3	
OR			
L* 304 ¹	Third-Year Language I (L* 201 or L* 228B or placement exam)	3	
L* 305 ¹	Third-Year Language II (L* 304 or L* 328A or placement exam)	3	
OR			
L* 335 ¹	Issues in Culture (L* 300 or L* 328A)	3	
MGT 305	Fundamentals of Management	3	
MKT 305	Fundamentals of Marketing (AREC 202 or ECON 101 or ECON 202)	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	Managing Tourism in the E-Commerce Era (NRRT 270)	3	
NRRT 376	Recreation Measurements (STAT 201)	3	
	Global and cultural awareness ⁴	0	3E
	TOTAL	28	
SENIOR			
MGT 475	International Business Management ⁶ (FIN 300 or FIN 305; MKT 300 or MKT 305; MGT 305 or MGT 320)	3	
OR			
MKT 365	International Marketing (MKT 300 or MKT 305)	3	
NR 300	Biological Diversity (NR 120A or B or one course in biology)	3	
NRRT 442	Tourism Planning (NRRT 270)	3	4B, 4C
NRRT 470	Tourism Impacts (NRRT 270)	3	4A
NRRT 471	Starting and Managing Tourism enterprise (NRRT 231 or NRRT 262 or NRRT 270)	3	
NRRT 487	Internship	4	
NRRT 499	Senior Thesis	3	
RRM 350	Restaurant and Resort Marketing (RRM 101)	3	
	Upper-division language electives	3	
	TOTAL	34	
PROGRAM TOTAL = 120-121 credits			

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).

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, and social science to develop appropriate skills for work in recreation and tourism enterprises.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
AGRI 140	Technology in Agriculture	3	
OR			
CIS 150	Business Computing Concepts and Applications	3	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECON 202	Principles of Macroeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	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	General Statistics (placement in MATH 130 or higher)	3	
	Guided elective ³	3	
	TOTAL	27	
JUNIOR			
MGT 305	Fundamentals of Management	3	
MKT 305	Fundamentals of Marketing (AREC 202 or ECON 101 or ECON 202)	3	
JTC 350	Public Relations	3	
OR			
NR 400	Public Relations in Natural Resources (NR 320)	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	Recreation Measurements (STAT 201)	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	Tourism Promotion (NRRT 270)	3	
NRRT 442	Tourism Planning (NRRT 270)	3	4B, 4C

Course	Title (Prerequisite)	Cr	AUCC
NRRT 460/	Event and Conference Planning (NRRT 270 or RRM 101)	3	
RRM 460			
NRRT 470	Tourism Impacts (NRRT 270)	3	4A
NRRT 471	Starting and Managing Tourism Enterprise (NRRT 231 or NRRT 262 or NRRT 270)	3	
NRRT 487	Internship	5	
	Guided electives ³	9	
	TOTAL	32	

PROGRAM TOTAL = 120 credits

¹ Select two courses from the list in category 3B in the All-University Core Curriculum (AUCC).

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.

MATH 117 and M CC 120A-B are considered review courses; credit in these courses may not be used toward a degree in the parks and protected area management concentration in the major in natural resource recreation and tourism.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select four credits from the following courses:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
OR			
BZ 120	Principles of Plant Biology	4	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	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	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
PSY 100	General Psychology	3	3C

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Course	Title (Prerequisite)	Cr	AUCC
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	6	3B
	Guided electives ²	3	
	TOTAL	31	
SOPHOMORE			
FW 200	Wildlife Conservation (MATH 118)	3	
LAND 220/ NR 220	Fundamentals of Ecology (3 credits in biology or HORT 100; 3 credits in 100-level mathematics)	3	
NR 220	Natural Resources Ecology and Measurements (BZ 110 and BZ 111 or BZ 120 or LIFE 103; MATH 118)	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	General Statistics (MATH 117)	3	
	Global and cultural awareness ³	3	3E
	Guided electives ²	5	
	TOTAL	31	

JUNIOR

Course	Title (Prerequisite)	Cr	AUCC
<i>Select one course from the following:</i>			
CO 300	Writing Arguments (CO 150 or HONR 193)	3	2B
CO 301A	Writing in the Disciplines-Arts and Humanities (CO 150 or HONR 193)	3	2B
CO 301B	Writing in the Disciplines-Science (CO 150 or HONR 193)	3	2B
CO 301C	Writing in the Disciplines-Social Sciences (CO 150 or HONR 193)	3	2B
CO 301D	Writing in the Disciplines-Education (CO 150 or HONR 193)	3	2B
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
NR 300	Biological Diversity (NR 120A or B or one course in biology)	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	Management of Parks and Protected Areas (NRRT 231; NRRT 330)	3	4B
NRRT 376	Recreation Measurements (STAT 201)	3	
PHIL 330/ AGRI 330	Agricultural Ethics	3	
OR			
PHIL 345	Environmental Ethics (sophomore standing or higher)	3	
	Guided electives ²	6	
	TOTAL	28	

SENIOR

Course	Title (Prerequisite)	Cr	AUCC
<i>Select one course from the following:</i>			
NR 365	Environmental Education	3	
NRRT 371	Techniques in Interpretation (NRRT 262)	3	
NRRT 462	Environmental Communication-Natural Resources (NRRT 262)	3	
NR 420	Integrated Ecosystem Management (BIO 320 or LAND 220/SOCR 220; NR 220; NR 320; senior standing)	4	4C
NR 440	Land Use Planning	3	
NR 460	Wilderness Management (BIO 220; NRRT 231)	3	
OR			
NRRT 439	Open Space and Natural Area Management (NR 440 or NRRT 431)	3	
NRRT 431	Park and Protected Area Management (NRRT 231; NRRT 331)	3	

Course	Title (Prerequisite)	Cr	AUCC
NRRT 441	Spatial Analysis of Protected Areas (NRRT 231)	3	
NRRT 487	Internship Electives	5	
	TOTAL	6	

PROGRAM TOTAL = 120 credits

¹ Select two courses from the list of courses in category 3B in the All-University Core Curriculum (AUCC).

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 (Prerequisite)	Cr	AUCC
UPPER DIVISION			
NRRT 450	Wilderness Philosophy and Ethic Development	3	
NRRT 451	National Wilderness Preservation System (NRRT 450)	3	
NRRT 452	Management of the Wilderness Resources (NRRT 451)	4	
NRRT 453	Management of Recreation Resources (NRRT 451)	3	
NRRT 454	Wilderness Management Planning (NRRT 451)	3	
NRRT 455	Wilderness Management Skills and Projections (NRRT 451)	3	
NRRT 487	Internship	3	
	TOTAL	22	

PROGRAM TOTAL = 22 credits

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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, and the department's website, www.warnercnr.colostate.edu/nr.

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.colostate.edu/Depts/NatSci*

*Professor Rick Miranda, Dean
Professor Janice Nerger, Associate Dean
Professor Donald Mykels, Associate Dean
Professor James Sites, Associate Dean
Dr. John C. McGrew, Assistant 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*

In addition to degree programs, the College of Natural Sciences provides fundamental 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.

COLLEGE PROGRAMS

Undergraduate Majors

The College's 8 departments offer 10 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.

Preparation for the Health Professions

Special advisers assist students in planning for entrance into accredited colleges of dentistry and dental hygiene, human medicine and osteopathy, nursing, optometry, pharmacy, physical therapy, physician assistant, podiatry, chiropractic, and other health professions. Since the advisers are acquainted with University courses and requirements of the professional schools, they can help students fulfill requirements, plan for alternate but related careers, and make the most of their total undergraduate experience.

Students entering a health preprofessional program must declare a formal academic major and be assigned an appropriate adviser. No preprofessional program is a major in itself. The major may be in any college and should be chosen with the student's educational and alternative vocational objectives in mind.

Students planning to enter a health field may make initial inquiry at the Center for Advising and Student Achievement (CASA), northeast wing of Aylesworth Hall.

Freshman Open Option

Office in Statistics Building, Room 117

Students who have not decided on a major but whose interests, aptitudes, and high school academic preparation in mathematics and the natural sciences clearly point to a major in this college may enroll as Natural Sciences Open Option. This option extends through the two semesters of the freshman year. Students may declare a departmental or interdepartmental major any time during their freshman year and are required to do so at the beginning of their sophomore year.

Courses that should be taken by Natural Sciences Open Option students are mathematics, one or two basic science courses (chemistry, biology, physics), arts and humanities courses, behavioral and social sciences courses, and CO 150. If biology is chosen as one of the science courses, it is strongly recommended that general chemistry also be taken.

Life Science Open Option

Center for Advising and Student Achievement (CASA)
Aylesworth Hall, Northeast Wing
(970) 491-7095

Students who have not decided on a major but whose interests lie in the life sciences (biochemistry, biological science, botany, psychology, or zoology) may enroll as Life Science Open Option. Life Science Open Option students are advised by the Center for Advising and Student Achievement (CASA).

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 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, www.studyabroad.colostate.edu.

The College of Natural Sciences has a special agreement to exchange students with the University of Tasmania.

Graduate Programs

The master of science and doctor of philosophy degrees are offered by all departments. For detailed information, see the *Graduate and Professional Bulletin*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, and consult the appropriate department.

INTERDEPARTMENTAL MAJOR

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.

Recent graduates have found employment as: technical writers; atmospheric scientists; computer sales representatives; crime laboratory analysts; patent examiners; quality control technicians.

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, etc. the All-University Core Curriculum, and professional classes in the School of Education (SOE). In addition, the SOE 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 School of Education within 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 (<http://soe.cahs.colostate.edu/Licensure>) or in room 100 of the Education Building.

Biology Education Concentration

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
----- <i>Select four credits from the following</i>			
AA 100	Introduction to Astronomy	3	3A
AA 101	Astronomy Laboratory (AA 100 or concurrent reg.)	1	3A
OR			

Course	Title (Prerequisite)	Cr	AUCC	Course	Title (Prerequisite)	Cr	AUCC
GEOL 120	Exploring Earth: Physical Geology	3	3A	SENIOR			
GEOL 121	Introductory Geology Laboratory (GEOL 120 or concurrent reg. or GEOL 122 or concurrent reg. or GEOL 124 or concurrent reg.)	1	3A	EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4	
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A	EDUC 460	Methods and Materials in Teaching Science (admission to teacher licensure program)	4	
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A	EDUC 485B	Student Teaching-Secondary (EDUC 450; EDUC 460)	11	4A, 4B, 4C
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A	EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
LIFE 103	Biology of Organisms-Animals and Plants (LIFE 102)	4		EDUC 493A	Seminar-Professional Relations (EDUC 450; EDUC 460; concurrent reg. in EDUC 485B)	1	4C
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B	LIFE 205	Survey of Microbial Biology	3	
	Arts/humanities ¹	3	3B	LIFE 206	Microbial Biology Laboratory (LIFE 205 or concurrent reg.)	2	
	Global and cultural awareness ²	3	3E		Arts/humanities ¹	3	3B
	Written communication ³	3	1A		TOTAL	29	
	TOTAL	30		PROGRAM TOTAL = 122-123 credits			
SOPHOMORE				¹ Select from list of courses in category 3B in the All-University Core Curriculum (AUCC).			
BIO 320	Ecology (BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 102; MATH 141 or MATH 155 or MATH 160)	3		² Select from list of courses in category 3E in the AUCC.			
BZ 220	Introduction to Evolution (BZ 110 and BZ 111 or BZ 120 or LIFE 103)	3		³ Select from list of courses in category 1A in the AUCC.			
BZ 350	Molecular and General Genetics (BZ 110 or BZ 120 or LIFE 102; STAT 201 or concurrent reg. or STAT 301 or concurrent reg. or STAT 307/ERHS 307 or concurrent reg.)	4		⁴ Select from 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).			
	OR			⁵ Select from list of courses in category 3D in the AUCC.			
SOCR 330	Principles of Genetics (BZ 110 or BZ 120 or LIFE 102)	3		⁶ Select from list of courses in category 3C in the AUCC.			
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4		Chemistry Education Concentration			
CHEM 246	Fundamentals of Organic Chemistry Laboratory (CHEM 108 or CHEM 112 or CHEM 114; CHEM 245 or concurrent reg.)	1		Course	Title (Prerequisite)	Cr	AUCC
	<i>Select one of the following pairs of courses:</i>			FRESHMAN			
PH 121	General Physics I (MATH 125 or concurrent reg.)	5	3A	CHEM 111	General Chemistry I (MATH 118 or MATH 121 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
PH 122	General Physics II (PH 121)	5	3A	CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
	OR			CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124 or placement)	3	
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A	CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A	LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
STAT 301	Introduction to Statistical Methods (MATH 117)	3		LIFE 103	Biology of Organisms-Animal and Plants (LIFE 102)	4	
	Biological science electives	3		<i>Select one pair of the following courses:</i>			
	TOTAL	30-31		MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
JUNIOR				MATH 255	Calculus for Biological Scientists II (concurrent reg. in MATH 126; MATH 155)	4	1B
BIO 310	Cell Biology (BZ 110 or BZ 120 or LIFE 103; CHEM 245 with a C or better or CHEM 345 with a C or better)	4			OR		
BIO 311	Developmental Biology (BIO 310)	4		MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
BMS 300	Principles of Human Anatomy and Physiology (BZ 101 or BZ 110 or LIFE 102; CHEM 103 or CHEM 107 or CHEM 111)	4		MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3C		Written communication ¹	3	1A
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2			Elective	2	
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3			TOTAL	30	
EDUC 350	Instruction I-Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3		SOPHOMORE			
EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent reg. in EDUC 350; admission to teacher licensure)	1		CHEM 261	Fundamentals of Inorganic Chemistry (CHEM 113 or concurrent reg.)	3	
	Additional communication ⁴	3	2A or 2B	CHEM 345	Organic Chemistry I (CHEM 113; CHEM 114)	4	
	Historical perspectives ⁵	3	3D	CHEM 346	Organic Chemistry II (CHEM 345)	4	
	Social/behavioral sciences ⁶	3	3C	<i>Select one pair of the following courses:</i>			
	TOTAL	33		PH 121	General Physics I (MATH 125 or concurrent reg.)	5	3A
				PH 122	General Physics II (PH 121)	5	3A
					OR		
				PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A

College of Natural Sciences

Course	Title (Prerequisite)	Cr	AUCC
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
	Additional communication ²	3	2A or 2B
	Arts/humanities ³	3	3B
	TOTAL	30	
JUNIOR			
<i>Select four credits from the following:</i>			
AA 100	Introduction to Astronomy	3	3A
AA 101	Astronomy Laboratory (AA 100 or concurrent reg.)	1	3A
OR			
GEOL 120	Exploring Earth: Physical Geology	3	3A
GEOL 121	Introductory Geology Laboratory (GEOL 120 or concurrent reg. or GEOL 122 or concurrent reg. or GEOL 124 or concurrent reg.)	1	3A
CHEM 331	Quantitative Analysis-Biological Sciences (CHEM 113)	3	
CHEM 332	Quantitative Analysis Laboratory (CHEM 114; and CHEM 335 or concurrent reg.)	2	
OR			
CHEM 334	Quantitative Analysis Laboratory (CHEM 114; CHEM 331 or concurrent reg.)	1	
CHEM 471	Physical Chemistry for Biological Sciences (CHEM 113; MATH 161 or MATH 255; PH 122 or PH 142)	4	
EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3C
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
EDUC 350	Instruction I-Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3	
EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent reg. in EDUC 350; admission to teacher licensure)	1	
	Historical perspectives ⁴	3	3D
	Social/behavioral science ⁵	3	3C
	TOTAL	30-31	
SENIOR			
BC 351	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346)	4	
EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4	
EDUC 460	Methods and Materials in Teaching Science (admission to teacher licensure)	4	
EDUC 485B	Student Teaching-Secondary (EDUC 450; EDUC 460)	11	4A, 4B, 4C
EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
EDUC 493A	Seminar-Professional Relations (EDUC 426 or EDUC 450; EDUC 460; concurrent reg. in EDUC 485B)	1	4C
	Arts/humanities ³	3	3B
	Global and cultural awareness ⁶	3	3E
	TOTAL	31	
PROGRAM TOTAL = 120-121 credits			

¹ Select from list of courses in category 1A in the All-University Core Curriculum (AUCC).

² Select from 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 list of courses in category 3B in the AUCC.

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
AA 100	Introduction to Astronomy	3	3A
OR			
NR 150	Oceanography	3	3A
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
<i>Select four credits from the following:</i>			
GEOL 120	Exploring Earth: Physical Geology	3	
GEOL 121	Introductory Geology Laboratory (GEOL 120 or concurrent reg. or GEOL 122 or concurrent reg. or GEOL 124 or concurrent reg.)	1	
OR			
GEOL 150	Physical Geology for Scientists and Engineers	4	
GEOL 154	Historical and Analytic Geology (GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150)	4	
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
OR			
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
	Arts/humanities ¹	3	3B
	Social/behavioral science ²	3	3C
	Written communication ³	3	1A
	TOTAL	29	
SOPHOMORE			
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
GEOL 232	Mineralogy (CHEM 111 or concurrent reg.; GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150; MATH 124)	3	
GEOL 454	Geomorphology (GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or GR 210; MATH 155 or MATH 160)	4	
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
	Additional communication ⁴	3	2A or 2B
	Historical perspectives ⁵	3	3D
	GEOL elective (select from list in junior year)	3-4	
	TOTAL	29-30	
JUNIOR			
EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3C
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
EDUC 350	Instruction I-Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3	
EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent reg. in EDUC 350; admission to teacher licensure)	1	
<i>Select two of the following courses:</i>			
GEOL 342	Paleontology (GEOL 154)	3	
GEOL 344	Stratigraphy and Sedimentology (GEOL 154)	4	
GEOL 364	Igneous and Metamorphic Petrology (GEOL 232)	4	
GEOL 372	Structural Geology (GEOL 154; MATH 125; PH 141 or concurrent reg.)	4	
GEOL 446	Environmental Geology (GEOL 454 or concurrent reg.)	3	

Course	Title (Prerequisite)	Cr	AUCC
LIFE 103	Biology of Organisms-Animals and Plants (LIFE 102)	4	
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
OR			
MATH 255	Calculus for Biological Scientists II (concurrent reg. in MATH 126; MATH 155)	4	1B
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
TOTAL		31-33	
SENIOR			
ATS 350	Introduction to Weather and Climate	2	
EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4	
EDUC 460	Methods and Materials in Teaching Science (admission to teacher licensure)	4	
EDUC 485B	Student-Teaching-Secondary (EDUC 450; EDUC 460)	11	4A, 4B, 4C
EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
EDUC 493A	Seminar-Professional Relations (EDUC 426 or EDUC 450; EDUC 460; concurrent reg. in EDUC 485B)	1	4C
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
	Arts/humanities ¹	3	3B
	Global and cultural awareness ⁶	3	3E
TOTAL		32	

PROGRAM TOTAL = 120-123 credits

¹ Select from list of courses in category 3B in the All-University Core Curriculum (AUCC).

² Select from list of courses in category 3C in the AUCC.

³ Select from list of courses in category 1A in the AUCC.

⁴ Select from 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 from list of courses in category 3D in the AUCC.

⁶ Select from list of courses in category 3E in the AUCC.

Physics Education Concentration

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent registration)	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
	Social/behavioral sciences ¹	3	3C
	Elective	2	
TOTAL		30	
SOPHOMORE			
AA 100	Introduction to Astronomy	3	3A
AA 101	Astronomy Laboratory (AA 100 or concurrent reg.)	1	3A
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
LIFE 103	Biology of Organisms-Animals and Plants (LIFE 102)	4	

Course	Title (Prerequisite)	Cr	AUCC
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
PH 314	Introduction to Modern Physics (MATH 261 or concurrent reg.; PH 141)	4	4A, 4B
	Additional communication ²	3	2A or 2B
	Arts/humanities ³	3	3B
TOTAL		31	
JUNIOR			
CS 150	Interactive Programming with Java (placement into MATH 117 or MATH 130)	4	
EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3C
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
PH 245	Introduction to Electronics (MATH 161; PH 142)	3	
PH 315	Modern Physics Laboratory (PH 314 or concurrent reg.)	2	4A, 4B
PH 361	Physical Thermodynamics (MATH 261; PH 142)	3	4A, 4B
	Arts/humanities ³	3	3B
	Global and cultural awareness ⁴	3	3E
	Historical perspectives ⁵	3	3D
	Electives	2	
TOTAL		31	

SENIOR

EDUC 350	Instruction I-Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3	
EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent reg. in EDUC 350; admission to teacher licensure)	1	
EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4	
EDUC 460	Methods and Materials in Teaching Science (admission to teacher licensure program)	4	
EDUC 485B	Student Teaching-Secondary (EDUC 450; EDUC 460)	11	4A, 4C
EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
EDUC 493A	Seminar-Professional Relations (EDUC 426 or EDUC 450; EDUC 460; concurrent reg. in EDUC 485B)	1	4C
PH 353	Optics and Waves (MATH 261; PH 142)	4	4A, 4B
TOTAL		29	

PROGRAM TOTAL = 121 credits

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 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 3B 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.

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 (Prerequisite)	Cr	AUCC
FRESHMAN			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
MATH 125	Numerical Trigonometry (MATH 118 or placement)	1	1B
MATH 126	Analytic Trigonometry (MATH 125 or placement)	1	1B
	Additional communication ¹	3	2A or 2B
	Minor ²	9	
	Elective	3	
	TOTAL	28	
SOPHOMORE			
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
----- <i>Select one of the following pairs of courses:</i>			
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
MATH 255	Calculus for Biological Scientists II (concurrent reg. in MATH 126; MATH 155)	4	1B
OR			
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
	Minor ²	6	
	TOTAL	31	
JUNIOR			
	Arts/humanities ³	3	3B
	Biological/physical sciences ⁴	3	3A
	Global and cultural awareness ⁵	3	3E
	Historical perspectives ⁶	3	3D
	Minor ²	15	
	Social/behavioral sciences ⁷	3	3C
	TOTAL	30	
SENIOR			
	Arts/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			

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 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.

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

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Dr. Aaron Sholders, Undergraduate Coordinator
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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:

- Demonstrate a command of the basic concepts of chemistry, biology, biochemistry, molecular biology, and cellular biology.
- 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.
- Use 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.

MATH 117, MATH 118, MATH 124, MATH 125, MATH 126, M CC 120A-B, and M CC 121 are considered review courses; credit in these courses, either by examination or completion, may not be used toward a degree in biochemistry, i.e., they do not count toward the 120 credits required for graduation.

A minimum overall grade point average of 2.000 must be earned for all required biochemistry and LIFE prefix lecture and laboratory courses. This minimum average includes the original grade for any repeated course.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BC 192	Biochemistry Freshman Seminar	2	
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent registration)	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A

Course	Title (Prerequisite)	Cr	AUCC
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
LIFE 201B	Introductory Genetics (LIFE 102)	3	
LIFE 202B	Introductory Genetics Recitation (LIFE 201B or concurrent reg.)	1	
LIFE 203	Introductory Genetics Laboratory (LIFE 201A or concurrent reg. or LIFE 201B or concurrent reg.)	1	

<i>Select one pair of the following:</i>			
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
MATH 255	Calculus for Biological Scientists II (concurrent reg. in MATH 126; MATH 155)	4	1B
OR			
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B

TOTAL			31
SOPHOMORE			
CHEM 345	Organic Chemistry I (CHEM 113; CHEM 114)	4	
CHEM 346	Organic Chemistry II (CHEM 345)	4	
LIFE 210	Introductory Eukaryotic Cell Biology (LIFE 102; CHEM 111; CHEM 112 or concurrent reg.)	3	
LIFE 211	Eukaryotic Cell Biology Recitation (LIFE 210 or concurrent reg.)	1	
LIFE 212	Introductory Cell Biology Laboratory (CHEM 112; LIFE 210 or concurrent reg.)	1	
PH 121	General Physics I (MATH 125 or concurrent reg.)	5	3A
OR			
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A

Additional communication ¹			3
Category 3 courses ²			6
Electives			2
TOTAL			29
JUNIOR			
BC 401	Comprehensive Biochemistry I (CHEM 245 or CHEM 345 or concurrent reg. in CHEM 345; MATH 155 or MATH 160)	3	4A
BC 403	Comprehensive Biochemistry II (BC 401)	3	4B
BC 404	Comprehensive Biochemistry Laboratory (BC 401 or concurrent reg.; CHEM 246 or CHEM 344; LIFE 212)	2	4B
CHEM 331	Quantitative Analysis-Biological Sciences (CHEM 113)	3	
CHEM 334	Quantitative Analysis Laboratory-Biological (CHEM 114; CHEM 331 or concurrent reg.)	1	
PH 122	General Physics II (PH 121)	5	3A
OR			
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
STAT 301	Introduction to Statistical Methods (MATH 117)	3	

OR			
STAT 307/ ERHS 307	Introduction to Biostatistics (MATH 117)	3	

Bioscience elective ³			3-4
Category 3 courses ²			3
Electives			2-3
TOTAL			29
SENIOR			
BC 463	Molecular Genetics (BC 351 or BC 401 or concurrent reg. in BC 401; LIFE 201B)	3	4C
BC 465	Molecular Regulation of Cell Function (LIFE 210; BC 351 or BC 403 or concurrent reg. in BC 403)	3	
BC 493	Senior Seminar (BC 401 or concurrent reg.)	1	4A, 4C
BC 499A	Thesis-Laboratory Research-Based	3	
OR			
BC 499B	Thesis-Literature-Based	3	

Course	Title (Prerequisite)	Cr	AUCC
CHEM 471	Physical Chemistry for Biological Sciences (CHEM 113; MATH 161 or MATH 255; PH 122 or PH 142)	4	
	Bioscience elective ³	3-4	
	Category 3 course ²	6	3B-3E
	Electives	7-8	
	TOTAL	31	

PROGRAM TOTAL = 120 credits

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.

³ Select in consultation with adviser using list approved by the department.

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 (Prerequisite)	Cr	AUCC
LOWER DIVISION			
LIFE 201B*	Introductory Genetics (LIFE 102)	3	3A
LIFE 202B	Introductory Genetics Recitation (LIFE 201B or concurrent reg.)	1	
LIFE 210*	Introductory Eukaryotic Cell Biology (LIFE 102; CHEM 111; CHEM 112 or concurrent reg.)	3	
LIFE 211	Eukaryotic Cell Biology Recitation (LIFE 210 or concurrent reg.)	1	
LIFE 212*	Introductory Cell Biology Laboratory (CHEM 112; LIFE 210 or concurrent reg.)	1	
	TOTAL	9	
UPPER DIVISION			
BC 401*	Comprehensive Biochemistry I (CHEM 245 or CHEM 345 or concurrent reg. in CHEM 345; MATH 155 or MATH 160)	3	
BC 403	Comprehensive Biochemistry II (BC 401)	3	
BC 404*	Comprehensive Biochemistry Laboratory (BC 401 or concurrent reg.; CHEM 246 or CHEM 344; LIFE 212)	2	
BC 441	3D Molecular Models for Biochemistry (BC 401 or concurrent reg.)	1	
	OR		
BC 493	Senior Seminar (BC 401 or concurrent reg.)	1	
BC 463*	Molecular Genetics (BC 401 or concurrent reg. or BC 351; LIFE 201B)	3	
	OR		
BC 465*	Molecular Regulation of Cell Function (LIFE 210; BC 403 or concurrent reg. or BC 351; LIFE 210)	3	
	TOTAL	12	

PROGRAM TOTAL = 21 credits without 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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, 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 Daniel R. Bush, 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. Biology 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, anatomy of cell and molecular biology for biomedical professions or biotechnology, aquatic biology for marine biologists, plant molecular biology for agricultural biotechnology, 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); medical or clinical laboratory technologist; Peace Corps volunteer.

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.

MATH 117, MATH 118, MATH 124, MATH 125, M CC 120A-B, and M CC 121 are considered review courses; credits in these courses may not be used toward a degree in the majors in biological science or zoology.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one of the following sets of courses:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
BZ 120	Principles of Plant Biology	4	3A
OR			
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
LIFE 103	Biology of Organisms-Animals and Plants (LIFE 102)	4	
<hr/>			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112 and CHEM 113 or concurrent reg.)	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
<hr/>			
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
OR			
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
<hr/>			
	Additional communication ¹	3	2A or 2B
	Arts/humanities ²	3	3B
	Elective	2	
	TOTAL	32	
<hr/>			
SOPHOMORE			
BIO 310	Cell Biology (BZ 110 or BZ 120 or LIFE 103; CHEM 245 with a C or better or CHEM 345 with a C or better)	4	
BIO 311	Developmental Biology (BIO 310)	4	
BZ 220	Introduction to Evolution (BZ 110 and BZ 111 or BZ 120 or LIFE 103)	3	
<hr/>			
<i>Select one of the following sets of courses:</i>			
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
CHEM 246	Fundamentals of Organic Chemistry Laboratory (CHEM 108 or CHEM 112 or CHEM 114; CHEM 245 or concurrent reg.)	1	
OR			
CHEM 345	Organic Chemistry I (CHEM 113; CHEM 114)	4	
CHEM 346	Organic Chemistry II (CHEM 345)	4	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
<hr/>			
OR			
STAT 307/ ERHS 307	Introduction to Biostatistics (MATH 117)	3	
<hr/>			
	Arts/humanities ²	3	3B
	Historical perspectives ³	3	3D
	Social/behavioral sciences ⁴	3	3C
	Elective	2	
	TOTAL	30-33	

College of Natural Sciences

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
BZ 350	Molecular and General Genetics (BZ 110 or BZ 120 or LIFE 102; STAT 201 or concurrent reg. or STAT 301 or concurrent reg. or STAT 307/ERHS 307 or concurrent reg.)	4	4A, 4B
----- <i>Select one of the following pairs of courses:</i>			
PH 121	General Physics I (MATH 125 or concurrent reg.)	5	3A
PH 122	General Physics II (PH 121)	5	3A
OR			
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A

	Selected field ⁵	6	
	Additional fields ⁶	3	
	Elective	6	
	TOTAL	29	
SENIOR			
BC 351	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346)	4	
OR			
BC 401	Comprehensive Biochemistry I (CHEM 245 or CHEM 345 or concurrent reg. in CHEM 345; MATH 155 or MATH 160)	3	
AND			
BC 403	Comprehensive Biochemistry II (BC 401)	3	
BIO 320	Ecology (BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 102; MATH 141 or MATH 155 or MATH 160)	3	4C
OR			
BZ 450	Plant Ecology (BZ 223 or BZ 325)	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

¹ Select from 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 category 3B 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 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.

MATH 117, MATH 118, MATH 124, MATH 125, M CC 120A-B, and M CC 121 are considered review courses; credits in these courses may not be used toward a degree in the majors in biological science or zoology.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
----- <i>Select one of the following sets of courses:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
BZ 120	Principles of Plant Biology	4	3A
OR			
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
LIFE 103	Biology of Organisms-Animals and Plants (LIFE 102)	4	

CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
C 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
C 114	General Chemistry Laboratory II (CHEM 112 and C 113 or concurrent reg.)	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A

MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
OR			
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126.)	4	1B

	Additional communication ¹	3	2A or 2B
	Arts/humanities ²	3	3B
	Elective	2	
	TOTAL	32	
SOPHOMORE			
----- <i>Select two of the following courses:</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	Introductory Soil Science (CHEM 107 or CHEM 111)	4	

BZ 220	Introduction to Evolution (BZ 110 and BZ 111 or BZ 120 or LIFE 103)	3	
----- <i>Select one of the following sets of courses:</i>			
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
CHEM 246	Fundamentals of Organic Chemistry Laboratory (CHEM 108 or CHEM 112 or CHEM 114; CHEM 245 or concurrent reg.)	1	
OR			
CHEM 345	Organic Chemistry I (CHEM 113; CHEM 114)	4	
CHEM 346	Organic Chemistry II (CHEM 345)	4	

Course	Title (Prerequisite)	Cr	AUCC
STAT 301	Introduction to Statistical Methods (MATH 117)	3	2B
OR			
STAT 307/ ERHS 307	Introduction to Biostatistics (MATH 117)	3	2B
	Arts/humanities ²	3	3B
	Historical perspectives ³	3	3D
	Social/behavioral sciences ⁴	3	3C
	Electives	2	
	TOTAL	<u>27-32</u>	
JUNIOR			
BIO 310	Cell Biology (BZ 110 or BZ 120 or LIFE 103; CHEM 245 with a C or better or CHEM 245 with a C or better)	4	
BZ 350	Molecular and General Genetics (BZ 110 or BZ 120 or LIFE 102; STAT 201 or concurrent reg. or STAT 301 or concurrent reg. or STAT 307/ERHS 307 or concurrent reg.)	4	4A, 4B
BZ 450	Plant Ecology (BZ 223 or BZ 325) <i>Select one of the following pairs of courses:</i>	4	4C
PH 121	General Physics I (MATH 125 or concurrent reg.)	5	3A
PH 122	General Physics II (PH 121)	5	3A
OR			
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
	Global and cultural awareness ⁵	3	3E
	Electives	3	
	TOTAL	<u>28</u>	
SENIOR			
BC 351	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346)	4	
OR			
BC 401	Comprehensive Biochemistry I (CHEM 245 or CHEM 345 or concurrent reg. in CHEM 345; MATH 155 or MATH 160)	3	
AND			
BC 403	Comprehensive Biochemistry II (BC 401)	3	
BZ 325	Plant Systematics (BZ 220)	4	
BZ 331	Developmental Plant Anatomy (BZ 120 or LIFE 103; BZ 350 or concurrent reg.; C 245 or C 346)	4	
<i>Select at least two courses from the following:</i>			
BZ 332	Introductory Phycology (BZ 120 or LIFE 102)	4	
BZ 333	Introductory Mycology (BZ 120 or LIFE 103)	4	
BZ 338	Comparative Morphology of Vascular Plants (BZ 120 or LIFE 103)	4	
BZ 440	Plant Physiology (BZ 120 or LIFE 103)	3	
BZ 441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
	Electives ⁶	3-8	
	TOTAL	<u>28-33</u>	
PROGRAM TOTAL = 120 credits			

¹ Select from 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 category 3B 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 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 calculus and statistics course 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.

College of Natural Sciences

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, 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.

MATH 117, MATH 118, MATH 124, MATH 125, M CC 120A-B, and M CC 121 are considered review courses; credits in these courses may not be used toward a degree in the majors in biological science or zoology.

Course	Title (Prerequisite)	Cr	AUCC
OR			
CHEM 345	Organic Chemistry I (CHEM 113; CHEM 114)	4	
CHEM 346	Organic Chemistry II (CHEM 345)	4	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
OR			
STAT 307/ERHS 307	Introduction to Biostatistics (MATH 117)	3	
	Arts/humanities ³	6	3B
	Global and cultural awareness ⁴	3	3E
	Historical perspectives ⁵	3	3D
	TOTAL	31-34	
JUNIOR			
BIO 310	Cell Biology (BZ 110 or BZ 120 or LIFE 103; CHEM 245 with a C or better or CHEM 345 with a C or better)	4	
BZ 350	Molecular and General Genetics (BZ 110 or BZ 120 or LIFE 102; STAT 201 or concurrent reg. or STAT 301 or concurrent reg. or STAT 307/ERHS 307 or concurrent reg.)	4	4A, 4B
<i>Select one of the following pairs of courses:</i>			
PHCC 121	General Physics I (MATH 125 or concurrent reg.)	5	3A
PHCC 122	General Physics II (PH 121)	5	3A
OR			
PHCC 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
PHCC 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
	Social/behavioral sciences ⁷	3	3C
	Upper-division zoology courses ⁶	6	
	Electives	2	
	TOTAL	29	
SENIOR			
BC 351	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346)	4	
OR			
BC 401	Comprehensive Biochemistry I (CHEM 245 or CHEM 345 or concurrent reg. in CHEM 345; MATH 155 or MATH 160)	3	
AND			
BC 403	Comprehensive Biochemistry II (BC 401)	3	
BIO 320	Ecology (BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 103; MATH 141 or MATH 155 or MATH 160)	3	4C
	Upper-division zoology courses ⁶	9	
	Electives ⁷	9-14	
	TOTAL	27-30	

PROGRAM TOTAL = 120 credits

¹ Select from 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 category 3C in the AUCC.

³ Select two courses from the list of courses in category 3B 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 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 (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one of the following sets of courses:</i>			
BZ 110	Principles of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
BZ 120	Principles of Plant Biology	4	3A
OR			
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
LIFE 103	Biology of Organisms-Animals and Plants (LIFE 102)	4	
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
OR			
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
	Additional communication ¹	3	2A or 2B
	Social/behavioral sciences ²	3	3C
	TOTAL	30	
SOPHOMORE			
BZ 212	Animal Biology-Invertebrates (BZ 110 and BZ 111 or LIFE 103)	4	
BZ 214	Animal Biology-Vertebrates (BZ 110 and BZ 111 or LIFE 103)	4	
BZ 220	Introduction to Evolution (BZ 110 and BZ 111 or BZ 120 or LIFE 103)	3	
<i>Select one of the following sets of courses:</i>			
CHEM 245	Fundamentals of Organic Chemistry (CHEM 107 or CHEM 113)	4	
CHEM 246	Fundamentals of Organic Chemistry Laboratory (CHEM 108 or CHEM 112 or CHEM 114; CHEM 245 or concurrent reg.)	1	

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
BZ 120	Principles of Plant Biology	4	3A
OR			
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
AND			
LIFE 103	Biology of Organisms-Animals and Plants (LIFE 102)	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

*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 (Prerequisite)	Cr	AUCC
LOWER DIVISION			
BZ 212	Animal Biology-Invertebrates (BZ 110 and BZ 111 or LIFE 103)	4	
BZ 214	Animal Biology-Vertebrates (BZ 110 and BZ 111 or LIFE 103)	4	
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
LIFE 103	Biology of Organisms-Animals and Plants (LIFE 102)	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

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*, <http://graduate.school.colostate.edu/index.asp?url=catalog>, and the department's website, www.colostate.edu/Depts/Biology.

DEPARTMENT OF CHEMISTRY

Office in Chemistry Building, Room B101
(970) 491-6381
www.chm.colostate.edu

Professor Anthony K. Rappé, 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, x-ray diffraction, column chromatography. 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, 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.

MATH 117, MATH 118, MATH 124, MATH 125, MATH 126 M CC 120A-B, and M CC 121 are considered review courses for chemistry majors. Credits for these courses may not be used toward the 120 credits required to graduate as a chemistry major.

Chemistry majors must achieve a minimum grade of C- in all the listed courses required for the major in chemistry.

Chemistry Core Courses

Courses	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select four credits from the following:</i>			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
OR			
CHEM 117	General Chemistry I for Chemistry Majors (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher; concurrent reg. in CHEM 192)	3	
CHEM 192	Introductory Seminar in Chemistry (concurrent reg. in CHEM 117)	1	
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
	Additional communication ¹	3	2A or 2B
	Biological sciences ²	4	3A
	Elective	4	
	TOTAL	31	
SOPHOMORE			
CHEM 261	Fundamentals of Inorganic Chemistry (CHEM 113 or concurrent reg.)	3	
CHEM 345	Organic Chemistry I (CHEM 113; CHEM 114)	4	
CHEM 346	Organic Chemistry II (CHEM 345)	4	
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A

Courses	Title (Prerequisite)	Cr	AUCC
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
	TOTAL	25	
JUNIOR			
CHEM 332	Quantitative Analysis Laboratory (CHEM 114; CHEM 335 or concurrent reg.)	2	
CHEM 335	Introduction to Analytical Chemistry (CHEM 113 with a C- or better; CHEM 332 or concurrent reg.)	3	4A
CHEM 474	Physical Chemistry I (CHEM 113; MATH 261; PH 142)	3	
CHEM 476	Physical Chemistry II (CHEM 474)	3	4B
	Global and cultural awareness ³	3	3E
	Historical perspectives ⁴	3	3D
	Social/behavioral sciences ⁵	3	3C
	TOTAL	20	
SENIOR			
CHEM 493	Seminar (CHEM 474)	2	4C
CORE TOTAL = 78 credits⁶			

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 category 3A in the AUCC with BZ or LIFE prefixes. Must include a lab.

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 To complete the B.S. in chemistry, students must also complete one of the following concentrations: ACS certified or non-ACS certified.

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 courses in inorganic chemistry, biochemistry, instrumental analysis, and statistics.

In addition to the chemistry core courses, the following must be completed:

Courses	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
OR			
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	
	Arts/humanities ¹	3	3B
	TOTAL	6	
JUNIOR			
CHEM 440	Advanced Organic Chemistry Laboratory (CHEM 344 or CHEM 346)	2	4B
CHEM 478	Physical Chemistry Laboratory (CBE 333 or CHEM 332 or CHEM 334 or CH 333; CHEM 471 or CHEM 472 or CHEM 474)	2	
	Arts/humanities ¹	3	3B
	Electives	5	
	TOTAL	12	
SENIOR			
BC 351	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346)	4	
OR			
BC 401	Comprehensive Biochemistry I (CHEM 245 or CHEM 345 or concurrent reg. in CHEM 345; MATH 155 or MATH 160)	3	
CHEM 431	Instrumental Analysis (CHEM 332 or CHEM 334; CHEM 471 or concurrent reg. or CHEM 474 or concurrent reg.)	4	
CHEM 461	Inorganic Chemistry (CHEM 261; CHEM 471 or CHEM 472 or CHEM 474)	3	

Courses	Title (Prerequisite)	Cr	AUCC
CHEM 462	Inorganic Chemistry Laboratory (CHEM 461 or concurrent reg.)	2	
	Advanced science electives ²	6-7	
	Electives	5	
	TOTAL	24	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 3B in the AUCC.

² 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

In addition to the chemistry core courses, the following must be completed:

Courses	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
	Mathematics-based requirement ¹	3	
	Electives	3	
	TOTAL	6	
JUNIOR			
CHEM 431	Instrumental Analysis (CHEM 332 or CHEM 334; CHEM 471 or concurrent reg. or CHEM 474 or concurrent reg.)	4	
	OR		
CHEM 478	Physical Chemistry Laboratory (CBE 333 or CHEM 332 or CHEM 334; CHEM 471 or CHEM 472 or CHEM 474)	2	
CHEM 440	Advanced Organic Chemistry Laboratory (CHEM 344 or CHEM 346)	2	
	OR		
CHEM 462	Inorganic Chemistry Laboratory (CHEM 461 or concurrent reg.)	2	
	Arts/humanities ²	3	3B
	TOTAL	7-9	
SENIOR			
	Advanced science electives ³	6-8	
	Arts/humanities ²	3	3B
	Electives	18	
	TOTAL	27-29	

PROGRAM TOTAL = 120 credits

¹ Additional mathematics: 300-level MATH, CS, or STAT course.

² Select from the list of courses in category 3B in the AUCC.

³ Additional advanced science courses (300+) to make a total of 10 credits when combined with the choice of CHEM 431 or CHEM 478.

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.

Courses	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
CHEM 111*	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113*	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
	TOTAL	9	

Courses	Title (Prerequisite)	Cr	AUCC
UPPER DIVISION			
CHEM 331	Quantitative Analysis-Biological Sciences (CHEM 113)	3	
CHEM 332*	Quantitative Analysis Laboratory (CHEM 114; CHEM 335 or concurrent reg.)	2	
	OR		
CHEM 334	Quantitative Analysis Laboratory-Biological (CHEM 114; CHEM 331 or concurrent reg.)	1	
CHEM 345	Organic Chemistry I (CHEM 113; CHEM 114)	4	
CHEM 346	Organic Chemistry II (CHEM 345)	4	
CHEM 471*	Physical Chemistry for Biological Sciences (CHEM 113; MATH 161 or MATH 255; PH 122 or PH 142)	4	
	OR		
CHEM 474*	Physical Chemistry I (CHEM 113; MATH 261; PH 142)	3	
	TOTAL	15-17	

PROGRAM TOTAL = 24-26 credits without 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 analytical, chemistry education, inorganic, organic, and physical chemistry. 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, www.chm.colostate.edu. A graduate program brochure is available from the department.

DEPARTMENT OF COMPUTER SCIENCE

Office in University Services Center, Room 211
(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 accomplish 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, and systems

software. An understanding of statistics is also required. Majors select senior-level courses from offerings such as graphics, artificial intelligence, operating systems, compilers, architecture, Internet programming, parallel programming, and database systems. A minor in computer science is also available.

Department of Computer Science laboratories occupy an entire floor of the University Services Center, and are open to students many hours of the day and on weekends. 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.
- 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.

MATH 117, MATH 118, MATH 124, MATH 125, MATH 126, M CC 120A-B, and M CC 121 are considered review courses; credits in these courses may not be used toward a degree in the computer science major.

Courses	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
CS 160	Foundations in Programming (MATH 118 with a C or better)	4	
CS 161	Object-Oriented Problem Solving (CS 160 with a C or better; MATH 141 or concurrent reg. or MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	4	
CS 192	First Year Seminar in Computer Science (computer science majors only)	2	
MATH 160	Calculus for Physical Scientists I ¹ (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
	Biological/physical sciences ²	7	3A
	Electives ³	3	
	TOTAL	31	
SOPHOMORE			
CS 200	Algorithms and Data Structures (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)	4	
CS 253	Problem Solving with C++ (CS 200 with a C or better; CS 270 with a C or better or ECE 251 with a C or better)	4	
CS 270	Computer Organization (CS 161 with a C or better; CS 200 or concurrent reg.; MATH 141 with a C or better or MATH 155 with a C or better or MATH 160 with a C or better)	4	
MATH 229	Matrices and Linear Equations (MATH 141 or MATH 155 or MATH 160)	2	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
OR			
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	
	Additional communication ⁴	3	2A or 2B
	Arts/humanities ⁵	3	3B
	Social/behavioral sciences ⁶	3	3C
	Electives ³	3	
	TOTAL	29	
JUNIOR			
CS 301	Foundations of Computer Science (CS 200 with a C or better; CS 253 or concurrent reg.; MATH 161 with a C or better; MATH 229 with a C or better)	4	
CS 314	Software Development Methods (CS 253 with a C or better)	4	
CS 370	System Architecture and Software (CS 200 with a C or better; CS 270 with a C or better or ECE 251 with a C or better)	4	
	Additional science ⁷	5	
	Arts/humanities ⁷	3	3B
	Global and cultural awareness ⁸	3	3E
	Historical perspectives ⁹	3	3D
	Electives ³	1	
	Upper division electives ¹⁰	2	
	TOTAL	29	
SENIOR			
<i>Select one course from the following:</i>			
CS 410	Introduction to Computer Graphics (CS 314 with a C or better; MATH 229 with a C or better)	4	4A
CS 414	Object-Oriented Design (CS 314 with a C or better)	4	4A

<u>Courses</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
CS 440	Introduction to Artificial Intelligence (CS 253 with a C or better; CS 301 with a C or better)	4	4A
CS 451	Operating Systems (CS 370 with a C or better)	4	4A
CS 454	Principles of Programming Languages (CS 253 with a C or better; CS 301 with a C or better)	4	4A
CS 475	Parallel Programming (CS 370 with a C or better)	4	4A

	Building foundations ¹¹	9	4B
	Capstone experience ¹²	12	4C
	Electives ³	6	
	TOTAL	31	

PROGRAM TOTAL = 120 credits

¹ Precalculus math (MATH 117, MATH 118, MATH 124, MATH 125, MATH 126) are considered review courses, and do not count toward a degree in computer science.

² Choose two courses totaling at least 7 credits (at least one with lab, lab is a separate course in some cases) from two different departments from the following list: BZ 110 and BZ 111, BZ 120, CHEM 107 and CHEM 108, CHEM 111 and CHEM 112, GEOL 120 and GEOL 121, LIFE 102, PH 141.

³ Any course, except IMP math (MATH 117 to MATH 126).

⁴ Select from the list of courses in category 2A or 2B of 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).

⁵ Select from the list of courses in category 3B of the AUCC.

⁶ Select from the list of courses in category 3C of the AUCC.

⁷ Choose additional science credits for a total of 12 from the approved department list for satisfying category 3A of the AUCC or from the following courses: AA 301, ATS 350, ATS 351, BZ 220, CHEM 113 and CHEM 114, CIVE 260, GEOL 154, LIFE 201A or LIFE 201B, PH 142, PSY 352, SOCR 330, SOCR 331.

⁸ Select from the list of courses in category 3E of the AUCC.

⁹ Select from the list of courses in category 3D of the AUCC.

¹⁰ Choose two credits of courses numbered 300 or above.

¹¹ Select three courses from the CS Department Group II list.

¹² Select three courses in addition to the course selected for the category 4A requirement from CS 410, CS 414, CS 420, CS 430, CS 440, CS 451, CS 453, CS 457, CS 460/ECE 460, CS 470, and CS 475.

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.

<u>Courses</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LOWER DIVISION			
CS 160*	Foundations in Programming (MATH 118 with a C or better)	4	2B
CS 161*	Object-Oriented Problem Solving (CS 160 with a C or better; MATH 141 or concurrent reg. or MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	4	
CS 200*	Algorithms and Data Structures (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)	4	
CS 270*	Computer Organization (CS 161 with a C or better; CS 200 or concurrent reg.; MATH 141 with a C or better of MATH 155 with a C or better or MATH 160 with a C or better)	4	
	TOTAL	16	
UPPER DIVISION			
CS	Courses numbered 300 or above*	12	
PROGRAM TOTAL = 28 credits without prerequisites			

*Additional course work may be required because of prerequisites; all prerequisites must be completed.

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 applied to companion subject-specific focus. At this time there are two concentrations: 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 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 of Education, College of Applied Human Sciences, section in this catalog for general information. Detailed information about the Educator Licensing Program and licensure requirements are available in the program's web site (<http://soe.cahs.colostate.edu/Licensure>) or in room 100 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

College of Natural Sciences

science courses. They will also be capable of providing expert information technology support for schools for instructional and administrative purposes.

For all concentrations of the applied computing technology major, the precalculus mathematics courses (MATH 117, MATH 118, MATH 124, MATH 125, MATH 126, M CC 120A-B, and M CC 121) are considered review courses by the department. Credits in these courses, either by examination or completion, may be used towards electives in the program.

Courses	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
CS 110	Personal Computing	4	
CS 160	Foundations in Programming (MATH 118 with a C or better)	4	
----- <i>Select one course from the following:</i>			
MATH 141	Calculus in the Management Sciences (MATH 118)	3	1B
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 125)	4	1B

SPCM 200	Public Speaking	3	2A
	Biological/physical science ²	7	3A
	Global and cultural development ³	3	3E
	Elective	3	
	TOTAL	30-31	
SOPHOMORE			
CS 161	Object-Oriented Problem Solving (CS 160 with a C or better; MATH 141 or concurrent reg. or MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	4	
CS 200	Algorithms and Data Structures (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)	4	
CS 270	Computer Organization (CS 161 with a C or better; CS 200 or concurrent reg.; MATH 141 with a C or better or MATH 155 with a C or better or MATH 160 with a C or better)	4	
EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3C
----- <i>Select one course from the following:</i>			
STAT 201	General Statistics (placement in MATH 130 or higher)	3	
STAT 204	Statistics for Business Students (MATH 117)	3	
STAT 301	Introduction to Statistical Methods (MATH 117)	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	Business Database Systems (CIS 120 or CIS 210)	3	
CS 253	Problem Solving with C++ (CS 200 with a C or better; CS 270 with a C or better or EE 251 with a C or better)	4	
CT 310	Web Development (CS 150 or CS 160)	4	
CT 320	Network and System Administration (CS 155 and CS 156 or CS 253)	4	
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
EDUC 350	Instruction I-Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3	

Courses	Title (Prerequisite)	Cr	AUCC
EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent reg. in EDUC 350; admission to teacher licensure)	1	
JTC 413	New Communication Technologies and Society	3	4B
	300-level computer science	4	
	TOTAL	31	
SENIOR			
EDCT 465	Methods and Materials in Technology Education (EDUC 350 or concurrent reg. or EDUC 450 or concurrent reg.)	3	
EDCT 485	Student Teaching (EDUC 450; EDCT 465)	11	4A, 4C
EDUC 450	Instruction II (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4	
EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
EDUC 493A	Seminar-Professional Relations (EDUC 426 or EDUC 450; EDCT 465; EDCT 485 or concurrent reg. or EDUC 485A or concurrent reg. or EDUC 485B or concurrent reg.)	1	4C
	400-level computer science ⁷	4	
	Electives	3-4	
	TOTAL	27-28	
PROGRAM TOTAL = 120 credits			

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.

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 The 400-level computer science course must be numbered less than 485.

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.

For all concentrations of the applied computing technology major, the precalculus mathematics courses (MATH 117, MATH 118, MATH 124, MATH 125, MATH 126, M CC 120A-B, and M CC 121) are considered review courses by the department. Credits in these courses, either by examination or completion, may be used towards electives in the program.

Courses	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
CS 160	Foundations in Programming (MATH 118 with a C or better)	4	2B
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
ECON 204	Principles of Macroeconomics (AREC 202 or ECON 202)	3	3F
----- <i>Select one course from the following:</i> ¹			
MATH 141	Calculus for Management Sciences (MATH 118)	3	1B
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B

	Arts and humanities ²	3	3B
	Biological/physical sciences ³	7	3A
	Electives ⁴	3-4	
	TOTAL	30	
SOPHOMORE			
ACT 205	Fundamentals of Accounting	3	
CS 161	Object-Oriented Problem Solving (CS 160 with a C or better; MATH 141 or concurrent reg. or MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	4	
CS 200	Algorithms and Data Structures (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)	4	
CT 310	Web Development (CS 150 or CS 160)	4	
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
----- <i>Select one course from the following:</i>			
STAT 201	General Statistics (placement in MATH 130 or higher)	3	
STAT 204	Statistics for Business Students (MATH 117)	3	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	

	Arts and humanities ²	3	3B
	Global and cultural awareness ⁵	3	3E
	Electives ⁴	3	
	TOTAL	30	
JUNIOR			
FIN 305	Fundamentals of Finance (ACT 205 or ACT 210; ECON 204)	3	
MKT 305	Fundamentals of Marketing (AREC 202 or ECON 101 or ECON 202)	3	
MGT 305	Fundamentals of Management	3	
CS 253	Problem Solving with C++ (CS 200 with a C or better; CS 270 with a C or better or ECE 251 with a C or better)	4	
CS 270	Computer Organization (CS 161 with a C or better; CS 200 or concurrent reg.; MATH 141 with a C or better or MATH 155 with a C or better or MATH 160 with a C or better)	4	
CT 320	Network and System Administration (CS 155 and CS 156 or CS 253)	4	
	Historical perspectives ⁶	3	3D
	Advanced technology electives ⁷	3	
	Electives ⁴	3	
	TOTAL	30	
SENIOR			
CS 314	Software Development Methods (CS 253 with a C or better)	4	4A, 4B
JTC 413	New Communication Technologies and Society	3	4A, 4B, 4C
	Advanced technology electives ⁷	9	

Courses	Title (Prerequisite)	Cr	AUCC
	Electives ^{4, 8}	14	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

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).

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.

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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, 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 Simon Tavener, 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 five 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.

MATH 117, MATH 118, MATH 124, MATH 125, MATH 126, M CC 120A-B, and M CC 121 are considered review courses by the Department of Mathematics. Credits in these courses may not be used toward a degree in mathematics.

Transfer students must complete a minimum of nine upper-division credits in mathematics at Colorado State, excluding MATH 315, MATH 340, and mathematics courses ending in -80 to -99.

Courses	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
JTC 300	Professional and Technical Communication ¹ (CO 150 or HONR 193)	3	2B
OR			
SPCM 200	Public Speaking ¹	3	2A
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	
MATH 192	First-Year Seminar in Mathematical Sciences	1	
MATH 229	Matrices and Linear Equations (MATH 141 or MATH 155 or MATH 160)	2	
STAT 192	First Year Seminar in Mathematical Sciences	1	
	Arts/humanities ²	6	3B
	Global and cultural awareness ³	3	3E
	Historical perspectives ⁴	3	3D
	TOTAL	30	
SOPHOMORE			
ACT 210	Introduction to Financial Accounting ⁵ (BUS 100)	3	
ECON 202	Principles of Microeconomics (MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	3C
ECON 204	Principles of Macroeconomics (AREC 202 or ECON 202; MATH 117 or MATH 118 or MATH 141 or MATH 155 or MATH 160)	3	
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
MATH 345	Differential Equations (MATH 161 or MATH 255; MATH 229)	4	
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	
	Biological/physical sciences ⁶	5	3A
	Introductory programming ⁷	4	
	TOTAL	29	
JUNIOR			
FIN 300	Principles of Finance (ACT 205 or ACT 210; AREC 202 or ECON 202; ECON 204; MATH 141 or MATH 155 or MATH 160)	3	
FIN 311	Debt-Securities Analysis ⁸ (FIN 300 or FIN 305; FIN 310 or ECON 315; FIN 355)	3	
FIN 370	Financial Management-Theory and Applications (FIN 300 or FIN 305)	3	
ECON 335/AREC 335	Introduction to Econometrics (ECON 204; STAT 201 or STAT 204 or STAT 301 or STAT 307/ERHS 307)	3	
MATH 369	Linear Algebra (MATH 161; MATH 229)	3	4A
STAT 321	Elementary Probabilistic-Stochastic Modeling (CS 156 or CS 160 or MATH 151 or MATH 152; MATH 155 or MATH 160)	3	
STAT 420	Probability and Mathematical Statistics I (MATH 255 or MATH 261)	3	
STAT 430	Probability and Mathematical Statistics II (STAT 420)	3	

Courses	Title (Prerequisite)	Cr	AUCC
	Electives	8	
	TOTAL	32	
SENIOR			
BUS 205	Legal and Ethical Issues in Business	3	
FIN 342	Risk Management and Insurance (FIN 300 or FIN 305)	3	
MATH 317	Advanced Calculus of One Variable (MATH 161)	4	4B
MATH 417	Advanced Analysis (MATH 261; MATH 317; MATH 369)	3	4C
MATH 495	Independent Study ⁸ (written consent of instructor)	1	
	Biological/physical sciences ⁶	5	3A
	Electives ⁹	10	
	TOTAL	29	

PROGRAM TOTAL = 120 credits

¹ First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (category 2B).

² Select two courses from the list in category 3B 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 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 Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

⁷ 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.

⁸ Preparation for Exam I.

⁹ At least one credit of electives must come from a 300- or 400- level course.

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.

MATH 117, MATH 118, MATH 124, MATH 125, MATH 126, M CC 120A-B, and M CC 121 are considered review courses by the Department of Mathematics. Credits in these courses may not be used toward a degree in mathematics.

Transfer students must complete a minimum of nine upper-division credits in mathematics at Colorado State, excluding MATH 315, MATH 340, and mathematics courses ending in -80 to -99.

Courses	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
JTC 300	Professional and Technical Communication ¹ (CO 105 or HONR 193)	3	2B
OR			
SPCM 200	Public Speaking ¹	3	2A
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B

Courses	Title (Prerequisite)	Cr	AUCC
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	
MATH 192	First Year Seminar in Mathematical Sciences	1	
MATH 229	Matrices and Linear Equations (MATH 141 or MATH 155 or MATH 160)	2	
STAT 192	First Year Seminar in Mathematical Sciences	1	
	Arts/humanities ²	6	3B
	Historical perspectives ³	3	3D
	Social/behavioral sciences ⁴	3	3C
	TOTAL	30	

SOPHOMORE

MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
MATH 301	Introduction to Combinatorial Theory (MATH 160)	3	
MATH 345	Differential Equations (MATH 161 or MATH 255; MATH 229)	4	
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	2B
----- <i>Select one course from the following:</i>			
STAT 321	Elementary Probabilistic-Stochastic Modeling (CS 156 or CS 160 or MATH 151 or MATH 152; MATH 155 or MATH 160)	3	
STAT 340	Multiple Regression Analysis (STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	
STAT 350	Design of Experiments (STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	

	Introductory programming ⁷	4	
	TOTAL	31	

JUNIOR

MATH 369	Linear Algebra (MATH 161; MATH 229)	3	4A
MATH 450	Introduction to Numerical Analysis I (CS 156 or CS 160 or CS 253 or MATH 151; MATH 255 or MATH 260)	4	
MATH 451	Introduction to Numerical Analysis II (CS 156 or CS 160 or CS 253 or MATH 151; MATH 340 or MATH 345)	4	
	Biological/physical sciences ⁶	3	3A
	Global and cultural awareness ⁷	3	3E
	Mathematics sciences ⁸	3	
	Related area ⁹	6	
	Electives ¹⁰	5	
	TOTAL	31	

SENIOR

MATH 317	Advanced Calculus of One Variable (MATH 161)	4	4B
----- <i>Select one of the following pairs of courses:</i>			
MATH 332	Partial Differential Equations (MATH 340 or MATH 345)	3	
MATH 417	Advanced Analysis (MATH 261; MATH 317; MATH 369)	3	
OR			
MATH 360	Mathematics of Information Security (MATH 229)	3	
MATH 460	Information and Coding Theory (MATH 360; MATH 369; STAT 321)	3	

MATH 435	Projects in Applied Mathematics (CS 156 or CS 160 or CS 253 or MATH 151; MATH 229; MATH 340 or MATH 345)	3	4C
	Mathematical sciences ⁸	3	
	Related area ⁹	6	
	Electives ¹⁰	6	
	TOTAL	28	

PROGRAM TOTAL = 120 credits

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, 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.

MATH 117, MATH 118, MATH 124, MATH 125, MATH 126, M CC 120A-B, and M CC 121 are considered review courses by the Department of Mathematics. Credits in these courses may not be used toward a degree in mathematics.

Transfer students must complete a minimum of nine upper-division credits in mathematics at Colorado State, excluding MATH 315, MATH 340, and mathematics courses ending in -80 to -99.

Courses	Title (Prerequisite)	Cr	AUCC
CS 200	Algorithms and Data Structures (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)	4	
MATH 332	Partial Differential Equations (MATH 340 or MATH 345)	3	
MATH 369	Linear Algebra (MATH 161; MATH 229)	3	4A
MATH 450	Introduction to Numerical Analysis I (CS 156 or CS 160 or CS 253 or MATH 151; MATH 255 or MATH 261)	3	
MATH 451	Introduction to Numerical Analysis II (CS 156 or CS 160 or CS 253 or MATH 151; MATH 340 or MATH 345)	3	
STAT 321	Elementary Probabilistic-Stochastic Modeling (CS 156 or CS 160 or MATH 151 or MATH 152; MATH 155 or MATH 160)	3	
	Biological/physical sciences ⁵	3-5	3A
	Global and cultural awareness ⁶	3	3E
	Electives ⁷	3	
	TOTAL	28-30	
SENIOR			
MATH 317	Advanced Calculus of One Variable (MATH 161)	4	4B
----- <i>Select one of the following courses:</i>			
MATH 417	Advanced Analysis (MATH 261; MATH 317; MATH 369)	3	
MATH 419	Introduction to Complex Variables (MATH 261)	3	
MATH 460	Information and Coding Theory (MATH 360; MATH 369; STAT 321)	3	
MATH 435	Projects in Applied Mathematics (CS 156 or CS 160 or CS 253 or MATH 155; MATH 229; MATH 340 or MATH 345)	3	4C
	Electives ⁷	18-20	
	TOTAL	28-30	
PROGRAM TOTAL = 120 credits			

¹ First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (category 2B).
² Select two courses from the list in category 3B in the All-University Core Curriculum (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 from the list of courses in category 3A in the AUCC.
⁶ Select from the list of courses in category 3E in the AUCC.
⁷ Enough elective credits need to be selected to bring program total to 120 credits with a minimum of 42 upper-division credits. MATH 117, MATH 118, MATH 124, MATH 125, and MATH 126 cannot be used as elective credits for a mathematics degree.

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.

MATH 117, MATH 118, MATH 124, MATH 125, MATH 126, M CC 120A-B, and M CC 121 are considered review courses by the Department of Mathematics. Credits in these courses may not be used toward a degree in mathematics.

Transfer students must complete a minimum of nine upper-division credits in mathematics at Colorado State, excluding MATH 315, MATH 340, and mathematics courses ending in -80 to -99.

Courses	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
JTC 300	Professional and Technical Communication ¹ (CO 150 or HONR 193)	3	2B
OR			
SPCM 200	Public Speaking ¹	3	2A
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.: MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	
MATH 192	First Year Seminar in Mathematical Sciences	1	
MATH 229	Matrices and Linear Equations (MATH 141 or MATH 155 or MATH 160)	2	
STAT 192	First Year Seminar in Mathematical Sciences	1	
	Arts/humanities ²	6	3B
	Historical perspectives ³	3	3D
	Social/behavioral sciences ⁴	3	3C
	TOTAL	30	
SOPHOMORE			
CS 160	Foundations in Programming (MATH 118 with a C or better)	4	
CS 161	Object-Oriented Problem Solving (CS 160 with a C or better; MATH 141 or concurrent reg. or MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	4	
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
MATH 331	Introduction to Mathematical Modeling (MATH 161 or concurrent reg.; MATH 229 or concurrent reg.)	3	
MATH 345	Differential Equations (MATH 161 or MATH 255; MATH 229)	4	
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	2B
	TOTAL	32	
JUNIOR			

<u>Courses</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	
MATH 192	First Year Seminar in Mathematical Sciences	1	
MATH 229	Matrices and Linear Equations (MATH 141 or MATH 155 or MATH 160)	2	
STAT 192	First Year Seminar in Mathematical Sciences	1	
	Arts/humanities ¹	6	3B
	Global and cultural awareness ²	3	3E
	Historical perspectives ³	3	3D
	Social/behavioral sciences ⁴	3	3C
	TOTAL	30	
SOPHOMORE			
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
MATH 369	Linear Algebra (MATH 161; MATH 229)	3	4A
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	2B
	Additional communication ⁵	3	2A or 2B
	Introductory programming ⁶	4	
	Elective ⁷	3	
	TOTAL	30	
JUNIOR			
MATH 360	Mathematics of Information Security (MATH 229)	3	
OR			
MATH 366	Introduction to Abstract Algebra (MATH 161)	3	
	Biological/physical sciences ⁸	3	3A
	Mathematical sciences ⁹	7	
	Electives ⁷	17	
	TOTAL	30	
SENIOR			
MATH 317	Advanced Calculus of One Variable (MATH 161)	4	4B
<i>Select one of the following:</i>			
MATH 417	Advanced Analysis (MATH 261; MATH 317; MATH 369)	3	
MATH 419	Introduction to Complex Variables (MATH 261)	3	
MATH 460	Information and Coding Theory (MATH 360; MATH 369; STAT 321)	3	
MATH 466	Groups, Rings, and Fields (MATH 366; MATH 369)	3	
MATH 417	Advanced Analysis ¹⁰ (MATH 261; MATH 317; MATH 369)	3	4C
OR			
MATH 466	Groups, Rings, and Fields ¹⁰ (MATH 366; MATH 369)	3	4C
	Mathematical sciences ⁹	5	
	Electives ⁷	15	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

¹ Select two courses from the list in category 3B in the All-University Core Curriculum (AUCC).

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 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).

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 Enough elective credits must be selected to bring the program total to 120 credits with a minimum of 42 upper-division credits. MATH 117, MATH 118, MATH 124,

MATH 125, and MATH 126 cannot be used as elective credits for a mathematics degree.

⁸ Select a non-physics course from category 3A in the AUCC.

⁹ Select a total of 15 credits from the following, with 6 or more from (a). (a) Upper-division mathematics courses except MATH 315 and those ending in -80 to -99. (b) Upper-division MATH, CS, or STAT courses, except those ending in -80 to -99.

¹⁰ Whichever course is chosen as the capstone course cannot be used to satisfy other upper-division mathematics requirements.

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 of Education, 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 (<http://soe.cahs.colostate.edu/Licensure>) or in room 100 of the Education Building.

A minimum grade of C is required in all mathematics, statistics, and computer science courses which are required for graduation.

MATH 117, MATH 118, MATH 124, MATH 125, MATH 126, M CC 120A-B, and M CC 121 are considered review courses by the Department of Mathematics. Credits in these courses may not be used toward a degree in mathematics.

Transfer students must complete a minimum of nine upper-division credits in mathematics at Colorado State, excluding MATH 315, MATH 340, and mathematics courses ending in -80 to -99.

<u>Courses</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
MATH 192	First Year Seminar in Mathematical Sciences	1	
MATH 229	Matrices and Linear Equations (MATH 141 or MATH 155 or MATH 160)	2	
STAT 192	First Year Seminar in Mathematical Sciences	1	
	Arts/humanities ¹	6	3B
	Global and cultural awareness ²	3	3E
	Historical perspectives ³	3	3D
	Social/behavioral sciences ⁴	3	3C
	TOTAL	30	
SOPHOMORE			
<i>Select nine to ten credits from the following set of courses:</i>			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124 or placement)	3	

College of Natural Sciences

Courses	Title (Prerequisite)	Cr	AUCC
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
	OR		
PH 121	General Physics I (MATH 125 or concurrent reg.)	5	3A
PH 122	General Physics II (PH 121)	5	3A
	OR		
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
PH 142	Physics for Scientists and Engineers II (MATH 111 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
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EDUC 275	Schooling in the United States (completion of 30 credits of course work)	3	3C
EDUC 331	Educational Technology and Assessment (EDUC 275; EDUC 340; admission to teacher licensure)	2	
EDUC 340	Literacy and the Learner (completion of 30 credits of course work)	3	
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
MATH 369	Linear Algebra (MATH 161; MATH 229)	3	4A
SPCM 200	Public Speaking	3	2A
	Introductory programming ⁵	4	
	TOTAL	31-32	
JUNIOR			
EDUC 350	Instruction I-Individualization/Management (EDUC 275; EDUC 340; concurrent reg. in EDUC 386; admission to teacher licensure)	3	
EDUC 386	Practicum-Instruction I (EDUC 275; EDUC 340; concurrent reg. in EDUC 350; admission to teacher licensure)	1	
EDUC 450	Instruction II-Standards and Assessment (EDUC 331; EDUC 350; EDUC 386; concurrent reg. in EDUC 486J)	4	
EDUC 464	Methods and Materials in Teaching Mathematics (18 credits in mathematics; admission to teacher licensure)	4	
EDUC 486J	Practicum-Instruction II (admission to teacher licensure)	1	
MATH 317	Advanced Calculus of One Variable (MATH 161)	4	4B
MATH 330	Discrete Mathematics for Educators (MATH 161; EDUC 331)	3	
MATH 366	Introduction to Abstract Algebra (MATH 161)	3	
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	2B
	Mathematical sciences elective ⁶	3	
	TOTAL	29	
SENIOR			
EDUC 485B	Student Teaching-Secondary (EDUC 450; EDUC 464)	11	
EDUC 493A	Seminar-Professional Relations (EDUC 426 or EDUC 450; EDUC 464; concurrent reg. in EDUC 485B)	1	
MATH 425	History of Mathematics (EDUC 331; 2 of the following courses: MATH 317; MATH 366; MATH 369)	3	4C
MATH 470	Euclidean and Non-Euclidean Geometry (MATH 229; MATH 261)	3	
	Natural sciences ⁷	3-4	
	Electives ⁸	7-9	
	TOTAL	29-30	

PROGRAM TOTAL = 120 credits

¹ Select two courses from the list in category 3B in the All-University Core Curriculum (AUCC).

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 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 from STAT 420, STAT 430, or upper-division mathematics courses except MATH 315 and those ending in -80 to -99.

⁷ With sequence chosen above, must total at least 13 credits from AUCC category 3A and include courses with at last two different prefixes.

⁸ Enough elective credits need to be selected to bring program total to 120 credits with a minimum of 42 upper-division credits. (MATH 117, MATH 118, MATH 124,

MATH 125, and MATH 126 cannot be used as elective credits for a mathematics degree.)

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.

MATH 117, MATH 118, MATH 124, MATH 125, MATH 126, M CC 120A-B, and M CC 121 are considered review courses by the Department of Mathematics. Credits in these courses may not be used toward a degree in mathematics.

Transfer students must complete a minimum of nine upper-division credits in mathematics at Colorado State, excluding MATH 315, MATH 340, and mathematics courses ending in -80 to -99.

Courses	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ECE 102	Digital Circuit Logic	4	
JTC 300	Professional and Technical Communication (CO 150 or HONR 193)	3	2B
	OR		
-----	-----	-----	-----
SPCM 200	Public Speaking ¹	3	2A
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	
MATH 192	First-Year Seminar in Mathematical Sciences	1	
MATH 229	Matrices and Linear Equations (MATH 141 or MATH 155 or MATH 160)	2	
STAT 192	First-Year Seminar in Mathematical Sciences	1	
	Arts/humanities ²	3	3B
	Historical perspectives ³	3	3D
	Social/behavioral sciences ⁴	3	3C
	TOTAL	31	
SOPHOMORE			
ECE 251	Introduction to Microprocessors (ECE 102 with a C- or better)	4	
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
MATH 345	Differential Equations (MATH 161 or MATH 255; MATH 229)	4	
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	2B
STAT 340	Multiple Regression Analysis (STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	
	Arts/humanities ²	3	3B
	Global and cultural awareness ⁵	3	3E
	Introductory programming ⁶	4	
	Electives ⁷	3	
	TOTAL	31	
JUNIOR			
CS 200	Algorithms and Data Structures (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)	4	

Courses	Title (Prerequisite)	Cr	AUCC
ECE 311	Linear System Analysis I ⁸ (ECE 202 with grade of C- or better; MATH 340 or MATH 345)	3	
MATH 301	Introduction to Combinatorial Theory (MATH 160)	3	
MATH 317	Advanced Calculus of One Variable (MATH 161)	4	4B
MATH 369	Linear Algebra (MATH 161; MATH 229)	3	4A
STAT 321	Elementary Probabilistic-Stochastic Modeling (CS 156 or CS 160 or MATH 151 or MATH 152; MATH 155 or MATH 160)	3	
	Biological/physical science ⁹	7	3A
	Electrical engineering/mathematical science elective ¹⁰	3	
	TOTAL	30	

SENIOR

ECE 421	Telecommunications I ⁸ (ECE 303/STAT 303 with a C- or better; ECE 312 with a C- or better)	3	
MATH 360	Mathematics of Information Security (MATH 229)	3	
MATH 460	Information and Coding Theory (MATH 360; MATH 369; and STAT 321)	3	4C
	Electrical engineering/mathematical science electives ¹⁰	9	
	Electives ⁷	10	
	TOTAL	28	

PROGRAM TOTAL = 120 credits

¹ First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (JTC 300).

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 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 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 Enough elective credits need to be selected to bring the program total to 120 credits with a minimum of 42 upper-division credits (MATH 117, MATH 118, MATH 124, MATH 125 and MATH 126 cannot be used as elective credits for a mathematics degree).

⁸ Students in this concentration may need to obtain a prerequisite override from the appropriate department to enroll in this course.

⁹ 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.

¹⁰ Select a total of 12 credits from (A) and (B), with 6 or more coming from (A): (A) upper-division mathematics courses except MATH 315 and 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.

MATH 117, MATH 118, MATH 124, MATH 125, MATH 126, M CC 120A-B, and M CC 121 are considered review courses by the Department of Mathematics. Credits in these courses may not be used toward a degree in mathematics.

Transfer students must complete a minimum of nine upper-division credits in mathematics at Colorado State, excluding MATH 315, MATH 340, and mathematics courses ending in -80 to -99.

Courses	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
JTC 300	Professional and Technical Communication ¹ (CO 150 or HONR 193)	3	2B
OR			
SPCM 200	Public Speaking ¹	3	2A
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
MATH 192	First Year Seminar in Mathematical Sciences	1	
STAT 192	First Year Seminar in Mathematical Sciences	1	
	Global and cultural awareness ²	3	3E
	Historical perspectives ³	3	3D
	Electives ⁴	6	
	TOTAL	28	
SOPHOMORE			
MATH 229	Matrices and Linear Equations (MATH 141 or MATH 155 or MATH 160)	2	
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
<i>Select one of the following:</i>			
STAT 301	Introduction to Statistical Methods (MATH 117)	3	2B
STAT 307/ERHS 307	Introduction to Biostatistics (MATH 117)	3	2B
STAT 315	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	2B
	Biological/physical sciences ⁵	7	3A
	Introductory programming ⁶	4	
	Electives ⁴	10	
	TOTAL	30	
JUNIOR			
MATH 317	Advanced Calculus of One Variable (MATH 161)	4	
<i>Select one of the following:</i>			
STAT 305	Sampling Techniques (STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	
STAT 321	Elementary Probabilistic-Stochastic Modeling (CS 156 or CS 160 or MATH 151 or MATH 152; MATH 155 or MATH 160)	3	
STAT 460	Applied Multivariate Analysis (STAT 340)	3	
STAT 340	Multiple Regression Analysis (STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	
STAT 350	Design of Experiments (STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	
	Arts/humanities ⁷	6	3B
	Social/behavioral sciences ⁸	3	3C
	Upper division CS/MATH/STAT electives ⁹	6	
	Electives ⁴	3	
	TOTAL	31	
SENIOR			
MATH 369	Linear Algebra (MATH 161; MATH 229)	3	
STAT 372	Data Analysis and Database Management Tools (STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	
STAT 420	Probability and Mathematical Statistics I (MATH 255 or MATH 261)	3	

Courses	Title (Prerequisite)	Cr	AUCC
STAT 430	Probability and Mathematical Statistics II (STAT 420)	3	4A
STAT 472	Statistical Consulting (STAT 372 or concurrent reg.)	3	4A,4B,4C
	Upper division CS/MATH/STAT elective ⁹	3	
	Electives ⁴	13	
	TOTAL	31	

PROGRAM TOTAL = 120 credits

¹ First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course (JTC 300).

² Select from the list of courses in category 3E in the All-University Core Curriculum (AUCC).

³ Select from the list of courses in category 3D in the AUCC.

⁴ Enough elective credits must be selected to bring the program total to 120 credits with a minimum of 42 upper-division credits. MATH 117, MATH 118, MATH 124, MATH 125, and MATH 126 cannot be used as elective credits for a mathematics degree.

⁵ Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

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 two courses from the list in category 3B in the AUCC.

⁸ Select from the list of course in category 3C in the AUCC.

⁹ 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.

Courses	Title (Prerequisite)	Cr	AUCC
Select one of the following pairs of courses:			
MATH 141*	Calculus in Management Sciences (MATH 118)	3	1B
MATH 315	Mathematics for Economists (MATH 141)	4	1B
OR			
MATH 155*	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
MATH 255*	Calculus for Biological Scientists II (concurrent reg. in MATH 126; MATH 155)	4	1B
OR			
MATH 160*	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
MATH 161*	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B

	Upper-division mathematics*	9	
	Electives in computer science, mathematics, or statistics ^{2*}	6-7	

PROGRAM TOTAL = 23 credits minimum without prerequisites

*Additional course work may be required because of prerequisites.

¹ MATH 315 and 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. MATH 315 may not be used as an upper-division course.

Graduate Programs in Mathematics

The department offers the master of science and doctor of philosophy degrees with programs in pure and applied mathematics. 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, www.math.colostate.edu/.

DEPARTMENT OF PHYSICS

Office in Engineering Building, Room 124
(970) 491-6206
www.physics.colostate.edu/

Professor Hans D. Hochheimer, Chair

Major in Physics

Physics is the study of the structure and interaction of matter and energy. Physics has practical application to a wide variety of tasks such as fabricating microcircuits, nanotechnology, developing energy sources, conserving water and soil, controlling smog, positioning communication satellites, and developing body-scanning devices. Physicists date fossils by using techniques to measure the radioactive decay of atoms. Physicists detect the existence of subatomic particles, measure the distances among stars and galaxies, and study the origin and destiny of the universe.

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. A strong liberal arts program rounds out the major and provides educational breadth. Two concentrations are possible – 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 to professional school.
- Be able to apply a range of physical and mathematical tools to a diverse set of physical problems in the practical world as presented to them in either employment or in the pursuit of further education. They will understand and be able to use a variety of laboratory techniques, be able to critically interpret experimental results, and be able to design appropriate new experiments.
- With regard to physical problems upon which they work, organize, evaluate critically, and present their thinking, methods of approach, and results to colleagues in both written and oral form.

Potential Occupations

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 pursuing graduate degrees can work in college teaching and research for industry, government, and education. Participation in internships, undergraduate research, or cooperative education opportunities enhances 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.

Career opportunities include, but are not limited to: research physicist; hydrologist; health physicist; nuclear medical technologist; pollution control technician; environmental health technician; air pollution analyst; laser technician; high school physics/computer science teacher; photogrammetrist; medical and scientific illustrator; crime laboratory analyst; patent examiner; calibration laboratory technician; quality control technician; spectroscopist; photo-optics technician; data processing systems analyst; motors and controls tester; architectural and engineering supplies sales representative; electronics/communications equipment representative; precision instruments sales representative; technical writer.

MATH 117, MATH 118, MATH 124, MATH 125, MATH 126 M CC 120A-B, and M CC 121 are considered review courses by the Department of Physics. Credits in these courses, either by examination or completion, may not be used toward a degree in physics.

Majors must achieve a minimum grade of C- in all specific courses listed in the Core Program for freshman and sophomore years, in CO 301A-D or JTC 300, in all Colorado State physics, mathematics, and biological science courses, and in all technical elective courses which are used to meet requirements for the degree.

Physics Core Courses

Courses	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
CS 155	Introduction to Unix	1	
CS 156	Introduction to C Programming I (CS 155 or concurrent reg.; MATH 118)	1	
CS 157	Introduction to C Programming II (CS 156 or concurrent reg.; MATH 118)	1	
MATH 160	Calculus for Physical Scientists I ¹ (concurrent reg. in MATH 124; MATH 126)	4	1B
MATH 161	Calculus for Physical Scientists II (MATH 124; MATH 160)	4	1B
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
	Elective	6	
	TOTAL	30	

Courses	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
MATH 261	Calculus for Physical Scientists III (MATH 161)	4	
MATH 340	Introduction to Ordinary Differential Equations (MATH 255 or MATH 261)	4	
PH 245	Introduction to Electronics (MATH 161; PH 142)	3	
PH 314	Introduction to Modern Physics (MATH 261 or concurrent reg.; PH 142)	4	
PH 315	Modern Physics Laboratory (PH 314 or concurrent reg.)	2	
	Arts/humanities ²	3	3B
	Social/behavioral sciences ³	3	3C
	Elective	2	
	TOTAL	30	
JUNIOR			
CO 301B	Writing in the Sciences (CO 150 or HONR 193)	3	2B
PH 341	Mechanics (MATH 340; PH 141)	4	
PH 351	Electricity and Magnetism (MATH 340; PH 142)	4	
PH 353	Optics and Waves (MATH 261; PH 142)	4	
PH 361	Physical Thermodynamics (MATH 261; PH 142)	3	
	Arts/humanities ²	3	3B
	Global and cultural awareness ⁴	3	3E
	Historical perspectives ⁵	3	3D
	Electives	3	
	TOTAL	30	
SENIOR			
PH 425	Advanced Physics Laboratory (PH 315; PH 451)	2	4C
PH 451	Introductory Quantum Mechanics I (MATH 340; PH 314)	3	4A, 4B
PH 492	Seminar (written consent of instructor)	1	4C
	Electives	6	
	TOTAL	12	
PROGRAM TOTAL = 102 credits⁶			

NOTE: Majors must achieve a minimum grade of C- in each specific course listed in the Core Program with prefixes PH, MATH, CHEM, CO, CS, or JTC. Majors must also achieve a minimum grade of C- in the biological science courses used to satisfy AUCC category 3A.

¹ MATH 117, MATH 118, MATH 124, MATH 125, and MATH 126 are considered review courses by the Department of Physics. Credits in these courses, either by examination or completion, may not be used toward a degree in physics.

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 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 In order to complete the major in physics, a student must select one of the following concentrations-applied physics or physics. A minimum of 120 (42 upper division) credits is required to graduate.

Applied Physics Concentration

Applied physics combines fundamental course work in physics with a selection of courses in a related disciplinary field. Seven options are available: The electronics, semiconductors, and optics option, and the materials and fluid 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 and the development of new types of computers. 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 theoretical advances are applied to medical research and practice. The geophysics option prepares students for fields such as geothermal energy and vulcanology.

In addition to the physics core courses, the following must be completed:

Courses	Title (Prerequisite)	Cr	AUCC
SENIOR	Technical electives ¹	18	
PROGRAM TOTAL = 120 credits			

¹ For this concentration, 18 credits of technical electives must be selected from the departmental list. Majors must achieve a minimum grade of C- in each course used to satisfy the technical elective requirement.

Physics Concentration

The undergraduate concentration in physics provides a broad background in science that serves as a base for later specialization, either in graduate school or on the job. Students with a physics degree have the education necessary for a career in industry, government, or for advanced study at the graduate level.

In addition to the physics core courses, the following must be completed:

Courses	Title (Prerequisite)	Cr	AUCC
SENIOR			
PH 452	Introductory Quantum Mechanics II ¹ (PH 451)	3	
PH 462	Statistical Physics ¹ (MATH 340; PH 314; PH 361)	3	
	Technical electives ¹	12	
	TOTAL	18	
PROGRAM TOTAL = 120 credits			

¹ Majors must achieve a minimum grade of C- in PH 452, PH 462, and the technical electives selected from the departmental list.

Minor in Physics

Most technical fields require some background in physics. A minor in physics could provide students with a stronger theoretical foundation for their chosen major. For students majoring in the mathematical sciences, such as computer science and mathematics, a minor in physics will provide experience in more practical problems.

A minimum grade of C- is required in all physics courses required for the minor in physics.

Courses	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
PH 141*	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A

Courses	Title (Prerequisite)	Cr	AUCC
PH 142*	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
	TOTAL	10	
UPPER DIVISION			
PH 314*	Introduction to Modern Physics (MATH 261 or concurrent reg.; PH 142)	4	
----- <i>Select a minimum of 8 credits from the following, including at least five credits of PH courses:</i>			
AA 301*	Astrophysics I (MATH 124; MATH 126; PH 110 or PH 121 or PH 141)	5	
AA 302*	Astrophysics II (MATH 124; MATH 126; PH 110 or PH 121 or PH 141)	5	
AA 303*	Astrophysics III (MATH 124; MATH 126; PH 110 or PH 121 or PH 141)	5	
PH 315	Modern Physics Laboratory (PH 314 or concurrent reg.)	2	
PH 341*	Mechanics (MATH 340; PH 141)	4	
PH 351*	Electricity and Magnetism (MATH 340; PH 142)	4	
PH 353*	Optics and Waves (MATH 261; PH 142)	4	
PH 451*	Introductory Quantum Mechanics I (MATH 340; PH 314)	3	
PH 452*	Introductory Quantum Mechanics II (PH 451)	3	
	TOTAL	12	
PROGRAM TOTAL = 22 credits without prerequisites			

Any substitutions need approval of the key adviser.
*Additional course work may be required because of prerequisites.

Graduate Programs in Physics

Graduate programs 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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, and the department's website, www.physics.colostate.edu.

DEPARTMENT OF PSYCHOLOGY

Office in Clark Building, Room B219
(970) 491-6364
www.colostate.edu/Depts/Psychology

Professor Ernest L. Chavez, Chair

Major in Psychology

Psychology is one of the most popular and versatile majors and provides a preprofessional education in the social science tradition. The major emphasizes a strong background in the natural sciences, including mathematics, biology, chemistry, human anatomy, the arts and humanities, and social sciences including anthropology, sociology, philosophy, technical writing, 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 graduate with 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 with an emphasis on psychological research methods, measurement, and testing.
- 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 an exceptional variety of career options. Because of the strong science and liberal arts orientation, students develop a number of important skills required in a broad range of occupations. Many opportunities exist for graduates with a bachelor degree in psychology, including working in mental health and other human service fields; or as a background for careers in law enforcement or positions in industry, public service, business, government, and other professions.

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 voluntary work, internships, and cooperative education opportunities is highly recommended, as it will enhance a student's chance for employment.

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); physician (with advanced degree).

<u>Courses</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
CHEM 107	Fundamentals of Chemistry (MATH 117 or placement in MATH 118 or higher)	4	3A
CHEM 108	Fundamentals of Chemistry Laboratory (CHEM 107 or concurrent reg.)	1	3A
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
CS 110	Personal Computing	4	
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
MATH 117	College Algebra in Context I (math placement exam)	1	1B
MATH 118	College Algebra in Context II (MATH 117)	1	1B
MATH 124	Logarithmic and Exponential Function (MATH 118 or placement)	1	1B
PSY 100	General Psychology	3	3C
PSY 192	Psychology Freshman Seminar	1	
PSY 252	Mind, Brain, and Behavior (PSY 100)	3	
	Arts/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 112	Reasoning and Problem Solving	3	
PHIL 120	History and Philosophy of Scientific Thought	3	
PHIL 210	Introduction to Formal Logic (sophomore standing or higher)	3	
PSY 210	Psychology of Differences (PSY 100)	3	
PSY 250	Experimental Psychology (PSY 100)	4	
SPCM 200	Public Speaking	3	2A
	Arts/humanities ¹	3	3B
	Global and cultural awareness ²	3	3E
	Historical perspectives ³	3	3D
	Social/behavioral sciences ⁴	3	3C
	Electives	5	
	TOTAL	30	
JUNIOR			
<i>Select two of the following pairs of courses:</i>			
PSY 315	Social Psychology (PSY 100)	3	4B
PSY 317	Social Psychology Laboratory (PSY 250; concurrent reg. in PSY 315)	2	4A
OR			
PSY 340	Organizational Psychology (PSY 100; STAT 201; concurrent reg. in PSY 341)	3	4B
PSY 341	Organizational Psychology Laboratory (PSY 250; concurrent reg. in PSY 340; departmental statistics requirement)	1	4A
OR			
PSY 370	Psychological Measurement and Testing (PSY 100; STAT 301 or STAT 311; concurrent reg. in PSY 371)	3	4B
PSY 371	Psychological Measurement and Testing Laboratory (concurrent reg. in PSY 370)	1	4A
OR			
PSY 440	Industrial Psychology (PSY 100; STAT 201; concurrent reg. in PSY 441)	3	4B
PSY 441	Industrial Psychology Laboratory (PSY 250; concurrent reg. in PSY 440; departmental statistics requirement)	1	4A
OR			
PSY 452	Cognitive Psychology (PSY 250)	3	4B
PSY 453	Cognitive Psychology Laboratory (PSY 250; PSY 452 or concurrent reg.)	2	4A
OR			
PSY 454	Physiological Psychology (PSY 250)	3	4B
PSY 455	Physiological Psychology Laboratory (PSY 454 or concurrent reg.)	2	4A
OR			
PSY 456	Sensation and Perception (PSY 250)	3	4B
PSY 457	Sensation and Perception Laboratory (PSY 250; PSY 456 or concurrent reg.)	2	4A
<i>Select one course from the following:</i>			

College of Natural Sciences

Courses	Title (Prerequisite)	Cr	AUCC
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
STAT 307/ ERHS 307	Introduction to Biostatistics (MATH 117)	3	
STAT 311	Statistics for Behavioral Sciences I (MATH 117)	3	
----- <i>Select one course from the following:</i>			
STAT 305	Sampling Techniques (STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	
STAT 312	Statistics for Behavioral Sciences II (STAT 311)	3	
STAT 340	Multiple Regression Analysis (STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	
STAT 350	Design of Experiments (STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	
STAT 372	Data Analysis Tools (STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	

	Psychology elective	3	
	Electives	11-13	
	TOTAL	30	
SENIOR			
BMS 300	Principles of Human Physiology (BZ 101 or BZ 110 or LIFE 102; CHEM 103 or CHEM 107 or CHEM 111)	4	
CO 300	Writing Arguments (CO 150 or HONR 193)	3	2B
PSY 401	History and Systems of Psychology (junior or senior standing)	3	4C
	Psychology lecture-lab pair ⁵	4-5	
	Psychology elective	3	
	Electives	13-14	
	TOTAL	31	
PROGRAM TOTAL = 120 credits			

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 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 JTC 100, SOWK 110, and HDFS 101.

⁵ Select one lecture-lab pair not already taken from list in the junior year.

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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, and the department's website, www.colostate.edu/Depts/Psychology

DEPARTMENT OF STATISTICS

Office in Statistics Building, Room 102

(970) 491-5269 or 491-7277

www.stat.colostate.edu

Professor F. Jay Breidt, Chair

Associate Professor Jennifer A. Hoeting, Undergraduate Coordinator

Professor Jan Hannig, Graduate Coordinator

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 Statistics

Students must select at least 21 credits from the list of required courses below and elective courses from a list provided in the Statistics Department. 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 Statistics Department Chair.

A minimum grade of C must be achieved in all statistics courses required for the minor in statistics.

Courses	Title (Prerequisite)	Cr	AUCC
STAT 321*	Elementary Probabilistic-Stochastic Modeling (CS 156 or CS 160 or MATH 151 or MATH 152; MATH 155 or MATH 160)	3	
OR			
STAT 420*	Probability and Mathematical Statistics I (MATH 255 or MATH 261)	3	
----- <i>Select one of the following courses:</i>			
STAT 301*	Introduction to Statistical Methods (MATH 117)	3	
STAT 307/ ERHS 307*	Introduction to Biostatistics (MATH 117)	3	
STAT 311*	Statistics for Behavioral Sciences I (MATH 118)	3	
STAT 315*	Statistics for Engineers and Scientists (MATH 161 or MATH 255)	3	
----- <i>Select one of the following courses:</i>			
STAT 305	Sampling Techniques (STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	
STAT 430	Probability and Mathematical Statistics II (STAT 420)	3	
STAT 460	Applied Multivariate Analysis (STAT 340)	3	
STAT 340*	Multiple Regression Analysis (STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	
STAT 350	Design of Experiments (STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315)	3	
	Electives*	6	
	TOTAL	21	
PROGRAM TOTAL = 21 credits without prerequisites			

*Additional course work may be required because of prerequisites.

Graduate Programs in Statistics

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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, and the department's website, www.stat.colostate.edu.

College of Veterinary Medicine and Biomedical Sciences

Office in Anatomy-Zoology Building, Room W102
(970) 491-7051
www.cvmb.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 Torrance Nett, Associate Dean for Graduate Education and Research
Associate Professor Sherry Stewart, Assistant Dean for PVM Admissions and Student Affairs

UNDERGRADUATE MAJORS

Biomedical Sciences
Environmental Health
Microbiology

UNDERGRADUATE MINORS

Biomedical Sciences
Microbiology

COLLEGE PROGRAMS

Doctor of Veterinary Medicine

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 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 as part of their preparation. Graduate studies in each of the four departments of the college lead to master of science and doctor of philosophy degrees.

Veterinary Medicine and Biomedical Sciences Open Option

Veterinary Medicine and Biomedical Sciences Open Option is a student classification within the College of Veterinary Medicine and Biomedical Sciences for students who are in their first two years of undergraduate work at Colorado State. The status is especially designed for students who have an interest in a career or advanced studies in any of a number of fields which require training in biomedical sciences and who have not made a specific choice of major for the bachelor's degree. Open option allows students to explore programs and majors in the College by fulfilling course work requirements common to all undergraduate degree programs as well as the preveterinary medicine requirements.

After completion of the courses that support the open option classification, or at any time during the first 60 credits of study, students will select a major leading to the bachelor's degree. Those who select the biomedical sciences, environmental health, or microbiology majors can complete degree requirements in two additional years, as described by the departments. The students studying under the open option classification will also qualify for most other majors that draw heavily upon the biological sciences. Upon completion of one of the College's baccalaureate degree programs, students are prepared to enter a career directly or to continue graduate studies in biomedical sciences or professional studies in veterinary medical, medical, or dental schools. Students who intend to apply to veterinary school may complete all Colorado State pre-veterinary requirements within the open option program with

appropriate course selection and credit loads in consultation with the Biomedical Sciences Open Option/Preveterinary adviser.

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 (PVM) 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 PVM 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 PVM 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 PVM 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 PVM training (years 6 and 7).

For detailed information about graduate programs, refer to the individual departments or write to the department concerned. See also the *Graduate and Professional Bulletin*, <http://graduateschool.colostate.edu/index.asp?url=catalog>.

INTERDEPARTMENTAL PROGRAM

Doctor of Veterinary Medicine

A four-year professional program in veterinary medicine (Professional Veterinary Medicine or PVM) is offered annually to approximately 134 students. Because the number of applicants exceeds the number of students who can be admitted to any class, 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/cvmbbs/prospectiveprevet.htm. 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.

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. (Agricultural or business courses and the required credits for English composition 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 is a minimum of 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 that is finished prior to the start of the professional veterinary medicine program. Exceptional students may apply for admission to the Professional Veterinary Medicine program when only the pre-veterinary requirements are met, however, the number of such students competitively admitted is a very small part of each class.

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 the following URL: www.cvmb.colostate.edu/cvmb/PrevetCurriculum.pdf.

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.

Undergraduate students with a strong interest in pursuing veterinary careers in a food animal 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.cvmb.colostate.edu/cvmb/FoodAnimalVetCareerIncentiveProgram.pdf).

DEPARTMENT OF BIOMEDICAL SCIENCES

Office in Physiology Building, Room 102
www.cvmb.colostate.edu/bms

Professor Barbara Sanborn, 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 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; and
- Think critically and logically.

Potential Occupations

A bachelor's 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 such areas as specialty areas of physiology such as neuroscience, reproductive endocrinology, cardiopulmonary and pathophysiology. Employment opportunities include, but are not limited to a variety of laboratory research opportunities such as laboratory coordinators/managers in the biotechnology, pharmaceuticals, medical devices, and related industries.

MATH 117, MATH 118, MATH 124, MATH 125, MATH 126, M CC 120A-B, and M CC 121 are considered review courses. Credits in these courses do not count in the 120 credit program of study for the major in biomedical sciences.

<u>Courses</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124 or placement)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
OR			
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B
	Arts/humanities ¹	6	3B
	Additional communication ²	3	2A or 2B
	TOTAL	29	
SOPHOMORE			
BMS 302	Laboratory in Principles of Physiology (BMS 300 or concurrent reg. or BMS 360 or concurrent reg.)	2	
BMS 360	Fundamentals of Physiology (BZ 110 or LIFE 102; CHEM 245 or concurrent reg. or CHEM 345 or concurrent reg.)	4	
<i>Select one of the following sets of courses:</i>			
CHEM 341	Modern Organic Chemistry I (CHEM 113; CHEM 114)	3	
CHEM 343	Modern Organic Chemistry II (CHEM 245 or CHEM 341 or CHEM 345)	3	
CHEM 344	Modern Organic Chemistry Laboratory (CHEM 343 or concurrent reg. or CHEM 346 or concurrent reg.)	2	
OR			
CHEM 345	Organic Chemistry I (CHEM 113; CHEM 114)	4	
CHEM 346	Organic Chemistry II (CHEM 345)	4	
LIFE 201B	Introductory Genetics (LIFE 102)	3	
LIFE 210	Introductory Eukaryotic Cell Biology (LIFE 102; CHEM 111; CHEM 112 or concurrent reg.)	3	
LIFE 211	Eukaryotic Cell Biology Recitation (LIFE 210 or concurrent reg.)	1	
LIFE 212	Introductory Cell Biology Laboratory (CHEM 112; LIFE 210 or concurrent reg.)	1	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
OR			

Courses	Title (Prerequisite)	Cr	AUCC
STAT 307/ ERHS 307	Introduction to Biostatistics (MATH 117) Social/behavioral sciences ³	3 3	3C
TOTAL		28	
JUNIOR			
BC 351	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346) <i>Select one course from the following:</i>	4	
BMS 301	Human Gross Anatomy (BZ 110 or LIFE 102)	5	
BMS 305	Domestic Animal Gross Anatomy (BZ 110 or LIFE 102)	4	
BMS 330	Microscopic Anatomy (BMS 300 or BMS 360)	4	
MIP 300	General Microbiology (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or concurrent reg. or CHEM 341 or concurrent reg. or CHEM 345 or concurrent reg.)	3	
MIP 302	General Microbiology Laboratory (MIP 300 or concurrent reg.)	2	
PH 121	General Physics I (MATH 125 or concurrent reg.)	5	
PH 122	General Physics II (PH 121) Global and cultural awareness ⁴ Historical perspectives ⁵ Electives ⁶	5 3 3 2	3E 3D
TOTAL		31-32	
SENIOR			
BMS 460	Essentials of Pathophysiology (BMS 300 or BMS 360; concurrent reg. in BMS 492; biomedical science majors only)	3	4A, 4B, 4C
BMS 492	Seminar-Pathophysiology of Disease (concurrent reg. in BMS 460) Major related electives ⁷ Free electives ⁸	2 15 11-12	4A, 4C
TOTAL		31-32	
PROGRAM TOTAL = 120 credits			

¹ Select two courses from the list in category 3B in the All-University Core Curriculum (AUCC).

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 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 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.

A minimum grade of C (2.000) in either BMS 300 or BMS 360 will be required for those students who are seeking to graduate with a minor in biomedical sciences and who take one of these courses as fulfillment of the requirements.

Courses	Title (Prerequisite)	Cr	AUCC
REQUIRED COURSES			
BMS 300*	Principles of Human Physiology (BZ 101 or BZ 110 or LIFE 102; CHEM 103 or CHEM 107 or CHEM 111)	4	
OR			
BMS 360*	Fundamentals of Physiology (BZ 110 or LIFE 102; CHEM 245 or concurrent reg. or CHEM 345 or concurrent reg.)	4	
<i>Select one of the following courses:</i>			
BMS 301*	Human Gross Anatomy ¹ (BZ 110 or LIFE 102)	5	
BMS 305*	Domestic Animal Gross Anatomy ¹ (BZ 110 or LIFE 102)	4	
BMS 330	Microscopic Anatomy ¹ (BMS 300 or BMS 360)	4	
<i>Select one of the following courses:</i>			
BMS 325	Cellular Neurobiology ¹ (BMS 300 or BMS 360)	3	
BMS 345	Functional Neuroanatomy ¹ (BMS 300 or BMS 360)	4	
BMS 365	Nerve and Muscle-Toxins, Trauma, and Disease ¹ (BIO 310 or BMS 300 or BMS 360)	3	
TOTAL		11-13	
ELECTIVE COURSES			
BIO 310	Cell Biology (BZ 110 or BZ 120 or LIFE 103; CHEM 245 with a C or better or CHEM 345 with a C or better)	4	
BIO 311	Developmental Biology (BIO 310)	4	
BMS 200	Concepts in Human Anatomy and Physiology (concurrent reg. in BMS 300)	1	
BMS 301	Human Gross Anatomy (BZ 110 or LIFE 102)	5	
BMS 302	Laboratory in Principles of Physiology (BMS 300 or concurrent reg. or BMS 360 or concurrent reg.)	2	
BMS 305*	Domestic Animal Gross Anatomy (BZ 110 or LIFE 102)	4	
BMS 325	Cellular Neurobiology (BMS 300 or BMS 360)	3	
BMS 330	Microscopic Anatomy (BMS 300 or BMS 360)	4	
BMS 345	Functional Neuroanatomy (BMS 300 or BMS 360)	4	
BMS 365	Nerve and Muscle-Toxins, Trauma, and Disease (BIO 310 or BMS 300 or BMS 360)	3	
BMS 384	Supervised College Teaching (BMS 300 or BMS 360)	Var	
BMS 420	Cardiopulmonary Physiology (BMS 300 or BMS 360)	3	
BMS 430	Endocrinology (BMS 300 or BMS 360)	3	
BMS 450	Pharmacology (BMS 300 or BMS 360)	3	
BMS 495	Independent Study	Var	
BMS 531	Domestic Animal Dissection (BMS 305)	3	
BMS 575	Human Anatomy Dissection	4	
TOTAL		8-10	
PROGRAM TOTAL = 21 credits without 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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, 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 primarily involved with teaching veterinary students in the professional veterinary medicine program 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. Elective courses provide students the opportunity to select areas such as large animal reproduction, zoological medicine, imaging, and a wide variety of other veterinary specialties.

No undergraduate major is offered.

Graduate Programs in Clinical Sciences

Graduate programs in medicine, surgery, epidemiology, and integrated livestock management lead to a master of science or a doctor of philosophy degree. The department also offers a three-year combined master's degree and residency program in large and small animal surgery, dermatology, anesthesiology, cardiology, internal medicine, neurology, oncology, ophthalmology, and emergency and critical care medicine, which partially fulfills requirements for board certification. 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, www.cvmb.colostate.edu/clinsci.

DEPARTMENT OF ENVIRONMENTAL AND RADIOLOGICAL HEALTH SCIENCES

*Office in Environmental Health Building, Room 122
(97) 491-7038
www.cvmb.colostate.edu/erhs/*

Professor John D. Zimbrick, 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 – using all these basic sciences as tools to solve problems. Students are involved in actual and simulated field projects for data gathering and analysis, problems solution, and presentation of results in written and oral formats. Many undergraduates will spend summers working in a variety of environmental health professions or research projects. Additionally, many 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; health and safety specialist.

MATH 117, MATH 118, MATH 124, MATH 125, MATH 126, M CC 120A-B, and M CC 121 are considered review courses in the major. The courses do not count as part of the 120 credit program of study for the major in environmental health.

Courses	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one of the following sets of courses:</i>			
BZ 110	Principle of Animal Biology	3	3A
BZ 111	Animal Biology Laboratory (BZ 110 or concurrent reg.)	1	3A
OR			
LIFE 210	Introductory Eukaryotic Cell Biology (LIFE 102; CHEM 111; CHEM 112 or concurrent reg.)	3	
LIFE 211	Eukaryotic Cell Biology Recitation (LIFE 210 or concurrent reg.)	1	
LIFE 212	Introductory Cell Biology Laboratory (CHEM 112; LIFE 210 or concurrent reg.)	1	
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
ERHS 220	Environmental Health (BZ 101 or concurrent reg. or BZ 104 or concurrent reg. or BZ 110 or concurrent reg. or BZ 120 or concurrent reg. or LIFE 102 or concurrent reg.)	3	
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
	Arts/humanities ¹	3	3B
	Social/behavioral sciences ²	3	3C
	Historical perspectives ³	3	3D
	TOTAL	32-33	
SOPHOMORE			
ERHS 230	Environmental Health Field Methods (ERHS 220; environmental health majors only)	3	
ERHS 307/ STAT 307	Introduction to Biostatistics (MATH 117)	3	
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
PH 121	General Physics I (MATH 125 or concurrent reg.)	5	3A
PH 122	General Physics II (PH 121)	5	3A
	Additional communication ⁴	3	2A or 2B
	Arts/humanities ¹	3	3B
	Global and cultural awareness ⁵	3	3E
	TOTAL	29	
JUNIOR			
BMS 300	Principles of Human Physiology (BZ 101 or BZ 110 or LIFE 102; CHEM 103 or CHEM 107 or CHEM 111)	4	
<i>Select one of the following sets of courses:</i>			
CHEM 341	Modern Organic Chemistry I (CHEM 113; CHEM 114)	3	
CHEM 343	Modern Organic Chemistry II (CHEM 245 or CHEM 341 or CHEM 345)	3	

Courses	Title (Prerequisite)	Cr	AUCC
CHEM 344	Modern Organic Chemistry Laboratory (CHEM 343 or concurrent reg. or CHEM 346 or concurrent reg.)	2	
OR			
CHEM 345	Organic Chemistry I (CHEM 113; CHEM 114)	4	
CHEM 346	Organic Chemistry II (CHEM 345)	4	
ERHS 300	Introduction to Radiation Biology (LIFE 102; PH 121)	3	
ERHS 320	Environmental Health Water Quality (MIP 300 or concurrent reg.)	3	4A
ERHS 332	Principles of Epidemiology (ERHS 307/STAT 307; MIP 149 or MIP 300)	3	
ERHS 350	Industrial Hygiene and Air (BMS 300; ERHS 230)	3	
ERHS 492	Environmental Health Seminar	1	
MIP 300	General Microbiology (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or concurrent reg. or CHEM 341 or concurrent reg. or CHEM 345 or concurrent reg.)	3	
MIP 302	General Microbiology Laboratory (MIP 300 or concurrent reg.)	2	
	TOTAL	30	
SENIOR			
BC 351	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346)	4	
ERHS 410	Environmental Health Waste Management (CHEM 245 or concurrent reg. or CHEM 341 or concurrent reg. or CHEM 346 or concurrent reg.; ERHS 230)	3	4B
ERHS 446	Environmental Toxicology (CHEM 245 or CHEM 343 or CHEM 346)	3	
ERHS 487	Internship-Environmental Health Program electives ⁶	7	4C
	TOTAL	11-12	
	PROGRAM TOTAL = 120 credits	28-29	

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 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 advisor.

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, 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*, <http://graduateschool.colostate.edu/index.asp?url=catalog>, 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 Carol Blair, Interim Head
Assistant Professor Susan M. Deines, Associate Head for
Undergraduate Education
Professor Herbert P. Schweizer, Associate Head for
Graduate Education and Research

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 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. Specialties are in human and animal infectious diseases, immunology, bacteriology, virology, molecular genetics, and environmental and industrial processes. Microbiology is an ideal major for students who are preparing for professional veterinary or human medical programs or graduate studies in various biological sciences, as well as direct entry into a career. Students may also elect to complete course work in several interdisciplinary programs, including biotechnology, food science/safety, and molecular biology.

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 due to expansion of industrial biotechnology, greater public demand for improved medical care, increasing public dependence on new products of microbiological systems, an increasing concern for the impact of industrial and accidental pollution of soil and water, and a renewed awareness of the potential threat of microbes as weapons of mass destruction and bioterrorism agents.

Academic programs in microbiology prepare students for employment in research and production laboratories operated by government agencies (such as the CDC, FDA, public health departments, and the military), industry (such as biotechnology, pharmaceutical, food, beverage, and medical device manufacturers), or private foundations. Additional opportunities are in technical sales and in university research and teaching. 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. Available career opportunities exist in many areas, including: basic research in bacteriology, virology, mycology (study of fungi), immunology, microbial genetics, microbial physiology, environmental microbiology, bioremediation, and biodefense; product research and development, quality control and bioprocess development; and diagnostic microbiology.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CHEM 111	General Chemistry I (MATH 118 or placement in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher)	4	3A
CHEM 112	General Chemistry Laboratory I (CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.)	1	3A
CHEM 113	General Chemistry II (CHEM 107 or CHEM 111 or CHEM 117; MATH 124)	3	
CHEM 114	General Chemistry Laboratory II (CHEM 112; CHEM 113 or concurrent reg.)	1	
CO 150	College Composition (SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge exam or CO 130)	3	1A
----- <i>Select one course from the following:</i> ¹			
CO 300	Writing Arguments (CO 150 or HONR 193)	3	2B
CO 301B	Writing in the Disciplines-Science (CO 150 or HONR 193)	3	2B
SPCM 200	Public Speaking	3	2A
LIFE 102	Attributes of Living Systems (high school chemistry)	4	3A
MATH 155	Calculus for Biological Scientists I (MATH 124; MATH 125)	4	1B
OR			
MATH 160	Calculus for Physical Scientists I (MATH 124 or concurrent reg.; MATH 126)	4	1B

	Biology elective ²	3-5	
	Microbiology elective ³	2	
	TOTAL	28-30	
SOPHOMORE			
CHEM 341	Modern Organic Chemistry I (CHEM 113; CHEM 114)	3	

Course	Title (Prerequisite)	Cr	AUCC
CHEM 343	Modern Organic Chemistry II (CHEM 245 or CHEM 341 or CHEM 345)	3	
CHEM 344	Modern Organic Chemistry Laboratory (CHEM 343 or concurrent reg. or CHEM 346 or concurrent reg.)	2	
MIP 300	General Microbiology (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or concurrent reg. or CHEM 341 or concurrent reg. or CHEM 345 or concurrent reg.)	3	
MIP 302	General Microbiology Laboratory (MIP 300 or concurrent reg.)	2	
MIP 342	Immunology (CHEM 245 or concurrent reg. or CHEM 341 or concurrent reg. or CHEM 345 or concurrent reg.; LIFE 201B or LIFE 210 or MIP 300)	4	
STAT 301	Introduction to Statistical Methods (MATH 117)	3	
OR			
STAT 307/	Introduction to Biostatistics (MATH 117)	3	
ERHS 307	Arts/humanities ⁴	3	3B
	Electives	6	
	TOTAL	29	
JUNIOR			
BC 351	Principles of Biochemistry (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 346 or concurrent reg. in CHEM 346)	4	
MIP 351	Medical Bacteriology (MIP 342)	3	4B
<i>Select one pair of the following courses:</i>			
PH 121	General Physics I (MATH 125 or concurrent reg.)	5	3A
PH 122	General Physics II (PH 121)	5	3A
OR			
PH 141	Physics for Scientists and Engineers I (MATH 126; MATH 155 or concurrent reg. or MATH 160 or concurrent reg.)	5	3A
PH 142	Physics for Scientists and Engineers II (MATH 161 or concurrent reg. or MATH 255 or concurrent reg.; PH 141)	5	3A
<i>Historical perspectives⁵</i>			
	Microbiology electives ³	5	3D
	Electives	4	
	TOTAL	29	
SENIOR			
<i>Select one course from the following:</i>			
MIP 400A	Capstone in Microbiology-Medical Microbiology (MIP 342; MIP 351 or concurrent reg.)	2	4C
MIP 400B	Capstone in Microbiology-Biotechnology (BC 351 or BC 401; MIP 300)	2	4C
MIP 400C	Capstone in Microbiology-Immunology (MIP 342; MIP 351 or concurrent reg. or MIP 420 or concurrent reg.)	2	4C
MIP 400D	Capstone in Microbiology-Microbial Diversity/Ecology (MIP 342; MIP 351 or concurrent reg. or MIP 420 or concurrent reg.)	2	4C
MIP 400E	Capstone in Microbiology-Microbial Genetics (MIP 342; MIP 351 or concurrent reg. or MIP 420 or concurrent reg.)	2	4C
MIP 400F	Capstone in Microbiology-Virology (MIP 342; MIP 352 or concurrent reg. or MIP 420 or concurrent reg.)	2	4C
MIP 400G	Capstone in Microbiology-Service Learning (MIP 342; MIP 351 or concurrent reg.)	2	4C
MIP 498	Research (MIP 301 or MIP 302; written consent of instructor)	2-3	4C
MIP 420	Medical and Molecular Virology (BC 351 or concurrent reg. or BC 401 or concurrent reg.; MIP 342)	4	4A
MIP 443	Microbial Physiology (BC 351 or BC 401; MIP 300)	4	4A
MIP 450	Microbial Genetics (BC 351 or concurrent reg. or BC 401 or concurrent reg.; MIP 300)	3	
	Arts/humanities ⁴	3	3B

Course	Title (Prerequisite)	Cr	AUCC
	Global and cultural awareness ⁶	3	3E
	Social/behavioral sciences ⁷	3	3C
	Microbiology electives ³	5	
	Electives ⁸	5-7	
	TOTAL	32-34	

PROGRAM TOTAL = 120 credits

¹ First-time students entering a college or university on or after July 1, 2008, must take CO 300 or CO 301B (advanced writing).

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.

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.

Medical Technology Program

Students who complete the B.S. degree in microbiology are eligible to enter a 12-month medical technology internship at any hospital accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). Students are awarded a certificate in medical technology by the hospital at the conclusion of the internship and, upon successful completion of a national board examination, are certified to practice as professional clinical laboratory scientists.

Students who wish to enter a medical technology program should consult the key adviser in the Department of Microbiology, Immunology, and Pathology for assistance in selection of elective courses, and in selecting and applying to an internship 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. Microbiology courses can be selected on the basis of students' specialized interest in biomedical, environment, industrial (biotechnology), or food microbiology.

Course	Title (Prerequisite)	Cr	AUCC
UPPER DIVISION			
MIP 300*	General Microbiology (BZ 110 or BZ 120 or LIFE 102; CHEM 245 or concurrent reg. or CHEM 341 or concurrent reg. or CHEM 345 or concurrent reg.)	3	
MIP 302	General Microbiology Laboratory (MIP 300 or concurrent reg.)	2	
MIP 342	Immunology (CHEM 245 or concurrent reg. or CHEM 341 or concurrent reg. or CHEM 345 or concurrent reg.; LIFE 201B or LIFE 210 or MIP 300)	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	Medical Bacteriology (MIP 342)	3	
OR			
MIP 420	Medical and Molecular Virology (BC 351 or concurrent reg. or BC 401 or concurrent reg.; MIP 342)	4	

College of Veterinary Medicine and Biomedical Sciences

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>	<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
MIP 443*	Microbial Physiology (BC 351 or BC 401; MIP 300)	4		MIP 450*	Microbial Genetics (BC 351 or concurrent reg. or BC 401 or concurrent reg.; MIP 300)	3	
OR				MIP 462/	Parasitology and Vector Biology (BZ 110	5	
MIP 450*	Microbial Genetics (BC 351 or BC 401 or concurrent reg.; MIP 300)	3		BZ 462/	or LIFE 103; BZ 212 or LIFE 206 or MIP		
----- <i>Select four to six credits, including one laboratory course, from the following:</i>				BI 462*	301 or MIP 302)		
MIP 275	Microcomputing Applications in Microbiology	2		MIP 498	Research (MIP 301 or MIP 302; written consent of instructor)	Var	
MIP 334	Food Microbiology (MIP 300)	3		----- PROGRAM TOTAL = 21 credits without prerequisites			
MIP 343	Immunology Laboratory (MIP 301 or MIP 302; MIP 342 or concurrent reg.)	2		*Additional course work may be required because of prerequisites.			
MIP 350	Microbial Diversity (MIP 300)	3		Graduate Programs in Microbiology, Immunology and Pathology			
MIP 351	Medical Bacteriology (MIP 342)	3		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 <i>Graduate and Professional Bulletin</i> , http://graduateschool.colostate.edu/index.asp?url=catalog .			
MIP 352	Medical Bacteriology Laboratory (MIP 301 or MIP 302; MIP 351 or concurrent reg.)	3					
MIP 420	Medical and Molecular Virology (BC 351 or concurrent reg. or BC 401 or concurrent reg.; MIP 342)	4					
MIP 425	Virology and Cell Culture Laboratory (MIP 301 or MIP 302; MIP 420 or concurrent reg.)	2					
MIP 432	Microbial Ecology (MIP 300)	4					
MIP 436	Industrial Microbiology (LIFE 206 or MIP 301 or MIP 302)	4					
MIP 443*	Microbial Physiology (BC 351 or BC 401; MIP 300)	4					

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).

Courses of Instruction

The University reserves the right to change courses in this section without notice. There is no assurance that a given course will be offered in complete accordance with the current listing.

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.
 8

Prerequisite: SAT verbal score of 500 or above or ACT verbal score of 20 or above or composition challenge examination or CO 130.

Understanding and writing for rhetorical situation, critical reading and response, writing source-based argument for academic and public audiences. (\$, 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 2007 and alternate years thereafter.
- * Offered in 2008 and alternate years thereafter.
- + Certain field trips are a required part of this course and incur additional expense to the student. See also the Financial Services for Students chapter.

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
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
Arabic	LARA
Art.....	ART
Astronomy	AA
Atmospheric Science.....	ATS
Bioagricultural Science and Pest Management.....	BSPM
Biochemistry and Molecular Biology	BC
Biological Science (see also Life Science-LIFE)	BIO

Biomedical Engineering.....	BIOM
Biomedical Sciences	BMS
Biotechnology.....	BTEC
Botany	BZ
Business	
Accounting.....	ACT
Computer Information Systems	CIS
Finance.....	FIN
General.....	BUS
Management	MGT
Management Science.....	QNT
Marketing.....	MKT
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
Composition	CO
Computer Engineering (see Electrical and Computer Engineering)	ECE
Computer Science	CS
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
Dance.....	D
Design and Merchandising	DM
Ecology.....	ECOL
Economics	ECON
Education.....	EDUC
Adult	EDAE
Career and Technical.....	EDCT
Community College.....	EDCL
Counseling and Career Development.....	EDCO
Higher	EDHE
Licensure	EDUC
Organization Performance and Change	EDOD
Research Methods	EDRM
Vocational (see Career and Technical Education).....	EDCT
Electrical and Computer Engineering.....	ECE
Engineering	ENGR
Engineering Science.....	EGSC
English.....	E
Entomology (see Bioagricultural Sciences and Pest Management).....	BSPM
Environmental and Radiological Health Sciences.....	ERHS
Environmental Engineering	ENVE
Environmental Health (see Environmental and Radiological Health Sciences)	ERHS
Equine Science (see Animal Science)	ANEQ
Ethnic Studies.....	ETST
Exercise Science, Health and.....	HES
Family and Consumer Sciences	FACS
Family Studies.....	HDFS
Fire and Emergency Services Administration	FESA
Fish, Wildlife, and Conservation Biology	FW
Food Science and Human Nutrition.....	FSHN
Food Technology	FTEC
Foreign Languages and Literatures	
American Sign Language	LSGN
Arabic	LARA
Chinese	LCHI
French	LFRE
General courses.....	LGEN

German.....	LGER	Spanish	LSPA
Greek.....	LGRK	Speech Communication.....	SPCM
Italian	LITA	Statistics	STAT
Japanese	LJPN	Study Abroad	SA
Korean.....	LKOR	Technical Journalism.....	JTC
Latin.....	LLAT	Theatre	TH
Russian.....	LRUS	Veterinary Medicine	VM
Spanish.....	LSPA	Vocational Education (see Career and Technical Education).....	EDCT
Forest Sciences	F	Watershed Science	WR
French.....	LFRE	Weed Science (see Bioagricultural Sciences and Pest Management).....	BSPM
Geography	GR	Wildlife Biology (see Fish, Wildlife, and Conservation Biology).....	FW
Geology (see Geosciences).....	GEOL	Women's Studies	WS
Geosciences.....	GEOL	Zoology.....	BZ
German.....	LGER		
Graduate School.....	GRAD		
Greek.....	LGRK		
Health and Exercise Science.....	HES		
Higher Education.....	EDHE		
History.....	HIST		
Home Economics (see Family and Consumer Sciences).....	FACS		
Honors	HONR		
Horticulture	HORT		
Human Development and Family Studies	HDFS		
Human Sciences (see Applied Human Sciences).....	AHS		
Interior Design.....	INTD		
International Education.....	IE		
International Studies.....	INST		
Intra-University.....	IU		
Italian.....	LITA		
Japanese.....	LJPN		
Journalism, Technical	JTC		
Key Academic Community.....	KEY		
Korean.....	LKOR		
Landscape Architecture.....	LAND		
Languages and Literatures, Foreign (see individual language listings).....	LGEN		
Latin.....	LLAT		
Liberal Arts.....	LB		
Library Information.....	LI		
Life Science.....	LIFE		
Management.....	MGT		
Management Science	QNT		
Marketing	MKT		
Mathematics.....	MATH		
Mechanical Engineering.....	MECH		
Microbiology, Immunology, and Pathology.....	MIP		
Military Science (Army ROTC)	MLSC		
Music.....	MU		
Natural Resource Recreation and Tourism.....	NRRT		
Natural Resources	NR		
Natural Sciences.....	NSCI		
Neurobiology.....	NB		
Nutrition	FSHN		
Occupational Therapy.....	OT		
Pathology (see Microbiology, Immunology, and Pathology).....	MIP		
Performing Arts.....	PF		
Philosophy.....	PHIL		
Physical Education (see Health and Exercise Science).....	HES		
Physics.....	PH		
Physiology (see Biomedical Sciences).....	BMS		
Plant Disease (see Bioagricultural Sciences and Pest Management).....	BSPM		
Political Science	POLS		
Psychology	PSY		
Radiological Health Sciences (see Environmental and Radiological Health Sciences).....	ERHS		
Rangeland Ecosystem Science.....	RS		
Real Estate	REL		
Restaurant/Resort Management.....	RRM		
Russian	LRUS		
Social Work.....	SOWK		
Sociology.....	SOC		
Soil and Crop Sciences.....	SOCR		

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. Undergraduate 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. Undergraduate 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 or recitation each week.

VARIABLE CREDIT COURSES

VAR indicates variable credit with no minimum credit or no maximum credit indicated.

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 (CDHE) 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 web site at www.state.co.us/cche/gened/gtpathways/transfer.pdf

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 *Additional Communication*
 - 2A Oral Communication
 - 2B 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

7. TERM

- F Taught fall semester
- S Taught spring semester
- SS Taught summer session

The term(s) listed is/are those which the course could be scheduled to be offered. 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

The class schedule for each term is the best source for determining current prerequisites.

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 this 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/index.asp?url=ug_studies

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 students and/or by term within the fee range specified at www.provost.colostate.edu/index.asp?url=ug_studies.

**10. NONTRADITIONAL COURSE
OFFERING (NT-O, C, T, and/or V)**

NT indicates the course has been approved to be offered in a nontraditional format, usually as a distance course (online, correspondence, telecourse, or videotape) through

the Division of Continuing Education or other distance learning venue on campus. Students are encouraged to contact the department offering the course or the Division of Continuing Education about course availability for a particular term.

ASTRONOMY COURSES

Department of Physics College of Natural Sciences

AA 100 03(3-0-0). Introduction to Astronomy. (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. (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.

^o**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.

^o**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. 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; CIS 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.
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 435 03(3-0-0). Multi-Jurisdictional Tax. F. Prerequisite: ACT 330.
Tax planning and compliance issues for entities doing business in multi-state and multi-nation locales.

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 550 03(3-0-0). Electronic Commerce Accounting Issues. S. Prerequisite: ACT 350; ACT 421.

Electronic commerce resources available and tools required of today's professional accountant.

ACT 561 03(3-0-0). Legal and Regulatory Issues in Accounting. F, S. Prerequisite: BUS 205 or BUS 260.

Contracts, ownership, bankruptcy (debtor/creditor relationship), formation of business entities, regulation of accounting profession. (NT-V)

ACT 570 03(3-0-0). Governmental Accounting and Assurance Services. S. Prerequisite: ACT 441.

Accounting for, and financial reporting by, local governmental units and related assurance services. (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. (NT-O) **B)** Financial accounting. 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.

ACT 641 03(3-0-0). Contemporary Auditing. S. 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 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. **B)** Financial accounting. Prerequisite: ACT 601B. (NT-O)

ACT 695 Var. Independent Study.

ACT 696 Var. Group Study.

AGRICULTURE COURSES

College of Agricultural Sciences

AGRI 116/IE 116 03(3-0-0). Plants and Civilizations. (AUCC 3E). F, S. Credit not allowed for both AGRI 116 and IE 116.

Worldwide origin of plants and products as basis for food, spices, perfumes, medicine, art, mythology, religion, wars, exploration, slavery.

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 enquiry course in agriculture. Information and skills necessary to succeed in majors in the agricultural sciences.

AGRI 224/NR 224 03(2-0-1). Integrated Resource Management I. F. Prerequisite: AGRI 192. Credit not allowed for both AGRI 224 and NR 224.

Introduction to integrated ranch system concepts through describing complex organizations and building decisions support systems.

AGRI 244E 02(1-2-0). Small Gas Engine Repair and Maintenance. F, S, SS. Offered only off-campus. (NT)

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)

Courses of Instruction

AGRI 320A-F 01(0-2-0). Computer Applications in Agriculture. S. Prerequisite: AGRI 140 or CIS 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. (\$)

AGRI 424/NR 424 03(2-0-1). Integrated Resource Management II. S. Prerequisite: AGRI 224/NR 224. Credit not allowed for both AGRI 424 and NR 424.

Application of enterprise planning analysis for use in ranch resource management. Continued emphasis on interdisciplinary systems analysis.

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 487 Var [1-12]. Internship. Prerequisite: AGRI 546.

AGRI 492 Var [1-3]. Seminar.

AGRI 495 Var [1-12]. Independent Study.

AGRI 496A-C Var [1-12]. Group Study.

A) General. B) Agricultural ambassadors. C) Agricultural education.

AGRI 500 03(2-0-1). 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 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 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 587 Var [1-12]. Internship.

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.

AGRI 631 03(3-0-0). Building the Business. F. Prerequisite: AGRI 630.

Skills required to organize and implement a modern business enterprise with focus on land-based operations.

AGRI 632 03(2-2-0). Understanding and Managing the Land. F. Prerequisite: AGRI 631.

Impacts of ecological processes, use of mechanism-based understanding, and tools used to manage the ecosystem for sustainability.

AGRI 633 03(2-2-0). Understanding and Managing Animal Resource. F. Prerequisite: AGRI 632.

Evaluating nutritional requirements of a variety of animals, how and why requirements vary according to level of production.

AGRI 634 03(2-2-0). Animal Production Systems. F. Prerequisite: AGRI 633.

Developing animal management systems for a variety of animal species in a forage-based environment.

AGRI 635 03(2-2-0). Integrated Grazing Management. S. Prerequisite: AGRI 634.

Understanding plant growth, animal foraging and the plant-animal interface; and using these factors to create management protocols.

AGRI 636 03(3-0-0). Analyzing and Managing the Business. S. Prerequisite: AGRI 635.

Assimilating, preparing, and analyzing records; reading financial statements to manage a land-based business.

AGRI 637 03(3-0-0). Understanding Policy and Emerging Issues. S. Prerequisite: AGRI 636.

Origination, purpose, and policy effects of policy on land-based enterprises; policy effects on management decisions.

AGRI 638 03(2-2-0). Monitoring for Success. S. Prerequisite: AGRI 637.

Process of effectively gathering management information meeting operational goals and objectives.

AGRI 639 03(3-0-0). Products to Profit. S. Prerequisite: AGRI 638.

Marketing all aspects of the enterprise, beginning with land and forage resource and tracking all revenue generation.

AGRI 640 03(3-0-0). Integrated Resource Management Plan. S. Prerequisite: AGRI 639.

Formulation of an optimal land management plan for a specific site based on specific goals and objectives.

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.

AGRI 698 Var [1-6]. Research. (NT-O)

APPLIED HUMAN SCIENCES COURSES

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. 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-T)

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 484 02(0-0-2). Supervised College Teaching. F, S, SS.

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 559 01(1-0-0). Foundations of Youth Development. F, S, SS. Offered only as online course as part of the Great Plains Interactive Distance Education Alliance.

Fundamentals of youth development and the youth development professions. (NT-O)

AHS 590 Var [1-5]. Workshop.

AHS 660 03(3-0-0). Community Youth Development. F, S. Offered only as online course as part of the Great Plains Interactive Distance Education Alliance.

Study of youth development within communities with emphasis on a strength-based or assets approach to community youth development. (NT-O)

AHS 661 03(3-0-0). Adolescents and Families: Implications. F, S. Offered only as online course as part of the Great Plains Interactive Distance Education Alliance.

Adolescent development in the context of the family; implications for professionals working with youth and families. (NT-O)

AHS 662 03(3-0-0). Contemporary Youth Issues and Life Skills. F, S. Offered only as online course as part of the Great Plains Interactive Distance Education Alliance.

Issues faced by youth today and associated risks and resiliency factors; life skills for youth; helping skills for youth professionals. (NT-O)

AHS 663 03(3-0-0). Youth Policy. F, S.

Youth policies and programs that impact youth services. (NT-O)

AHS 664 03(3-0-0). Youth Program Administration and Management. F, S. Offered only as online course as part of the Great Plains Interactive Distance Education Alliance.

Youth program administration and management concepts, models and challenges in program implementation. (NT-O)

AHS 665 03(3-0-0). Youth Development. F, S. Offered only as online course as part of the Great Plains Interactive Distance Education Alliance.

Developmental periods of adolescence; how tasks of this life stage influence family/home life, school, peers, and other factors. (NT-O)

AHS 666 03(3-0-0). Youth in Cultural Contexts. F, S. Offered only as online course as part of the Great Plains Interactive Distance Education Alliance.

Examination of diverse youth and families for youth work professionals. (NT-O)

AHS 667 03(3-0-0). Youth Professionals as Consumers of Research. F, S. Offered only as online course as part of the Great Plains Interactive Distance Education Alliance.

Understanding and evaluating research for practice with youth. (NT-O)

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 only as an online course. (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 130 03(3-0-0). Design Appreciation-Apparel and Merchandising. F, S.

Impact of elements and principles of design on apparel and merchandising. (NT-O)

AM 143 04(0-8-0). Introduction to Apparel Design. F.

Apparel and garment-pattern development, construction, quality; skill development in technical drawing and rendering. (\$)

AM 240 03(0-6-0). Computer-Aided Apparel Design. F. 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; 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 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.

Courses of Instruction

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 240; 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. S. Prerequisite: AM 240.

Computer-aided technology and multicultural research used to create repeat fabric designs; fabric printing using silkscreen. (\$)

AM 343 03(1-4-0). Fashion Illustration. F. Prerequisite: AM 143; AM 270; DM 272; portfolio review.

Techniques of fashion illustration and sketching as practiced in apparel design and production.

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 371 04(3-2-0). Merchandising Systems. F, S. Prerequisite: ACT 205 or ACT 210; AM 270.

Business mathematics and current practices related to acquisition, negotiation, distribution, and sale of merchandise.

AM 384 Var [1-3]. Supervised College Teaching.

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 240; AM 341.

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.

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

College of Liberal Arts

AMST 100 03(3-0-0). Self/Community in American Culture, 1600-1877. (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. (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 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, S.

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 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 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 concurrent registration or ANEQ 102 or concurrent registration.

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. F. Prerequisite: ANEQ 102.

Overview of the equine industry and industry careers.

ANEQ 300A-W. Topics in Animal Sciences. F, S.

A) Livestock handling 01(1-0-0). Prerequisite: ANEQ 101 or ANEQ 102. **B)** /BSPM 300. Livestock entomology 01(1-0-0). Prerequisite: ANEQ 101 or ANEQ 102. Credit not allowed for both ANEQ 300B and BSPM 300. **E)** Family ranching 01(1-0-0). Prerequisite: ANEQ 101 or ANEQ 102. **L)** Health programs/quality assurance 02(2-0-0). Prerequisite: ANEQ 101 or ANEQ 102. **N)** Seed-stock merchandising 02(2-0-0). Prerequisite: Written consent of instructor. **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. 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.

Courses of Instruction

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 03(3-0-0). Principles of Animal Nutrition. F, S. Prerequisite: ANEQ 230 or BMS 300; 3 credits 100-level chemistry.

Understanding of nutrients and nutrient function required to support animal life through all physiological states.

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 only as correspondence course or online course.

Unique nutritional requirements of mammalian, avian, and reptile captive wild animals; management protocols needed. (NT-C/O)

ANEQ 330 03(3-0-0). Principles of Animal Breeding. S. Prerequisite: BZ 350 or LIFE 201 or SOCR 330; 3 credits in statistics.

Genetic principles underlying animal improvement; elementary population genetics; heritability; systems of mating; selection.

ANEQ 340 03(0-6-0). Horse Training Laboratory 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 Laboratory II. S. Prerequisite: ANEQ 340.

Skills in training for specific riding maneuvers, conditioning, fitting for sale, and stable management. (\$)

ANEQ 344 04(3-2-0). Principles of Equine Reproduction. F. Prerequisite: ANEQ 102; ANEQ 230 or ANEQ 310 or BMS 300 or BMS 305 or VS 333;

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 ANEQ 320 or BMS 300 or BMS 305 or VS 333; 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.

ANEQ 346 03(3-0-0). Equine Disease Management. F. Prerequisite: ANEQ 230 or BMS 230 or BMS 300 or BMS 305 or VS 333.

Lameness and common diseases of horses.

ANEQ 347 02(2-0-0). Equine Event Management. F, S, SS. Prerequisite: ANEQ 102.

Production and management of equine related events.

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 350A-E Var. Animal and Product Judging. F, S. Maximum 5 credits for any subtopic with a maximum of 3 credits in any one semester. Maximum of 5 credits allowed in course. Maximum of 12 credits allowed for any combination of the following courses: ANEQ 350A-E, ANEQ 384, ANEQ 487, ANEQ 495, ANEQ 496.

A) Meat animal. B) Meats. C) Dairy. D) Horses. E) Wool.

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. (\$)

ANEQ 358 01(1-0-0). Equine Sale Management. F. Prerequisite: Written consent of instructor. Credit not allowed for both ANEQ 358 and ANEQ 300T.

Skills necessary to organize, promote, and host an equine sale.

ANEQ 359 02(0-4-0). Equine Sale Preparation. S. Prerequisite: ANEQ 358; written consent of instructor.

Preparation of horses for sale and horse sale management.

ANEQ 360 03(3-0-0). Principles of Meat Science. F, S. 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.

ANEQ 384 Var [1-5]. Supervised College Teaching. F, S, SS. Prerequisite: Written consent of instructor. Maximum of 6 credits allowed in course. Maximum of 12 credits allowed for any combination of the following courses: ANEQ 350A-E, ANEQ 384, ANEQ 487, ANEQ 495, ANEQ 496.

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 Production and Industry. F, S. Prerequisite: 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 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 445 02(1-3-0). Foaling Management. S. Prerequisite: ANEQ 344.

Management of the foaling mare and newborn foal; monitoring techniques, preventative and emergency care procedures.

***ANEQ 448/*SOCR 448 03(2-2-0). Manure Management and the 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 03(2-2-0). Meat Systems. S. Prerequisite: Senior status.

Current issues in U.S. meat production, processing, marketing, and consumption. (\$)

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

ANEQ 472 03(2-2-0). Sheep Systems. F. Prerequisite: Senior status.

Sheep production under farm and ranch conditions; products, breeds, breeding, nutrition, reproduction, and management systems.

ANEQ 473 03(2-3-0). Dairy Systems. F. Prerequisite: 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.

ANEQ 487 Var. Internship. Prerequisite: Written consent of instructor.

Maximum of 6 credits allowed in course. Maximum of 12 credits allowed for any combination of the following courses: ANEQ 350A-E, ANEQ 384, ANEQ 487, ANEQ 495, ANEQ 496.

ANEQ 495 Var. Independent Study. Prerequisite: Written consent of instructor.

Maximum of 6 credits allowed in course. Maximum of 12 credits allowed for any combination of the following courses: ANEQ 350A-E, ANEQ 384, ANEQ 487, ANEQ 495, ANEQ 496.

ANEQ 496 Var [1-5]. Group Study. Prerequisite: Written consent of instructor.

Maximum of 6 credits allowed in course. Maximum of 12 credits allowed for any combination of the following courses: ANEQ 350A-E, ANEQ 384, ANEQ 487, ANEQ 495, ANEQ 496.

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. A) F. B) S. Prerequisite: ANEQ 230 or BMS 230 or BMS 300 or BMS 305 or VS 333.

Basic principles and techniques of animal surgery to meet ACUC requirements for experimental procedures. A) Farm animal. (\$) B) Rodent. (\$)

ANEQ 551 02(1-2-0). Field Necropsy. F, S. Prerequisite: ANEQ 230 or BMS 230 or BMS 300 or BMS 305 or VS 333; graduate 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.

°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.

°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 62103(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.

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(2-0-1). Parameter Estimation for Genetic Prediction.**

F. Prerequisite: Graduate status.

Models used in analysis of livestock data and restricted maximum likelihood procedures for mixed models.

Courses of Instruction

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) Management.

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.

ANTH 120 03(3-0-0). Human Origins and Variation. (AUCC 3A). F, S.

Mechanisms of evolution; genetics. Living primate biology, behavior, and history. Human evolutionary history. Human variation and adaptation.

ANTH 121 01(0-2-0). Human Origins and Variation Laboratory. (AUCC 3A). F, S. Prerequisite: ANTH 120 or concurrent registration.

Labs demonstrating genetic and evolutionary processes, comparative skeletal anatomy, human evolution through fossil casts, and modern human variation. (\$)

ANTH 140 03(3-0-0). Introduction to Prehistory. (AUCC 3D). F, S, SS.

Origins of human society from the Stone Age to urban civilization using architecture, art, tools, and other material remains.

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.

ANTH 252 03(2-2-0). Archaeological Investigation. S.

Investigation of the archaeological record, how the record is formed, and how archaeological data are analyzed and interpreted.

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 315 03(3-0-0). Psychological Anthropology. F. Prerequisite: ANTH 100; PSY 100.

Cross-cultural studies of socialization, sex roles, perception, cognition, ethnopsychiatry, altered states of consciousness, cultural change.

***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 03(2-0-1). Latin American Peasantries.** S. Prerequisite: ANTH 100.

Sociocultural, economic, and political responses of Latin American peasantries to poverty and global processes.

°ANTH 322 03(3-0-0). Religion and Society. F. Prerequisite: ANTH 100 or ANTH 200.

Major anthropological theories and descriptions of religious beliefs and practices in traditional and modern societies.

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.

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; ANTH 120 or BZ 101 or LAND 220/SOCR 220.

Roles of technology, economics, social organization, and ideology in human adaptations to and survival in natural and cultural environments.

***ANTH 332 03(3-0-0). Peoples of the Caribbean.** F. Prerequisite: ANTH 100 or ANTH 200.

Postcolonial ethnic, class, and gender identities, varying colonial legacies and contemporary economic pressures.

ANTH 334 03(3-0-0) 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.

ANTH 340 03(3-0-0). Medical Anthropology. F. Prerequisite: ANTH 100.

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. F. Prerequisite: ANTH 140.

Indian 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 359 03(2-0-1). Colorado Prehistory. F.

Human behavioral responses to environmental diversity, cultural adaptation, Pleistocene and Recent climates, anthropogenic environmental change.

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.

Anthropological theory from its beginnings in 19th century through recent developments in the latter half of the 20th century.

***ANTH 412 03(3-0-0). Indians of North America.** F. 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.

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.

Impact of the modern world on indigenous peoples' relationship to their environments and natural resources.

***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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

°ANTH 440 03(3-0-0). Theory in Cultural Anthropology. F, S. Prerequisite: ANTH 100.

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.

Methodological orientations and research techniques. Ethnographic and cross-cultural approaches including quantitative and formal models.

ANTH 442 08(8-0-0). Ethnographic Field School. SS. Prerequisite: ANTH 100; ETST 100.

Directed fieldwork with American Indian communities; methodology, protocols, and social relations of ethnographic field research.

ANTH 443 03(0-6-0). Ethnographic Field Preparation. S. Prerequisite: ANTH 100 or ANTH 200.

Directed experiential preparation for applied ethnographic field methods and research questions.

ANTH 445 03(3-0-0). Psychological Anthropology. S. Prerequisite: ANTH 100; PSY 100.

Cross-cultural exploration of the human mind by studying the ideas, desires, and practices of peoples in various settings.

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.

***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 457 03(2-2-0). Lithic Technology. S. 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.

Courses of Instruction

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 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 484 Var [1-5]. Supervised College Teaching. F, S. Prerequisite: Written consent of instructor.

ANTH 486 Var [1-6]. Practicum.

Application of anthropological methods under actual project conditions.

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 one of the following: ANTH 329, ANTH 330, ANTH 332, ANTH 334, ANTH 374, ANTH 412, ANTH 450, ANTH 451, ANTH 455, ANTH 461.

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 04(3-0-1). Development of Anthropological Theory. F. Prerequisite: Undergraduates must have written consent of instructor.

Contemporary development of anthropological thought.

°ANTH 510 03(3-0-0). Contemporary Issues and Ethics in Anthropology. S. Prerequisite: ANTH 500.

Contemporary anthropological theory and ethical issues in cultural anthropology, archaeology, and biological anthropology.

ANTH 515 03(3-0-0). Culture and Environment. F. Prerequisite: Six credits in anthropology.

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). Anthropology, Gender, and Sexuality.** S. Prerequisite: Graduate standing.

Gender and sexuality in anthropology; 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 Development. F. Prerequisite: Nine credits in anthropology.

Process of socioeconomic development intervention and the evolving role of anthropologists.

°ANTH 530 03(3-0-0). Humans in Ecosystems. F. Prerequisite: ANTH 100.

Links between people and environments including human causes of land use change and adaptations people make to their environments.

***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: Method and Theory. S. Prerequisite: Nine credits in anthropology.

Anthropological contributions to the cross-cultural study of mental functioning and health.

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 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

***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). Advanced Human Evolution. S. Prerequisite: Graduate standing.

Major trends in human evolution through use of detailed case studies and regionally focused primary research.

ANTH 643 03(0-6-0). Advanced Ethnographic Field Preparation. 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 684 Var. Supervised College Teaching. F, S, SS.

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. 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. (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 CIS 150; AREC 202 or ECON 202.

Use of records in agricultural and resource enterprise management; analytical methods, budgets, and planning techniques for improved decision making.

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, S. 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; STAT 201 or STAT 204 or STAT 301 or STAT 307/ERHS 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 to Economics of Natural Resources. F. 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). Economic Analysis-Water Resource Development. S. Prerequisite: AREC 202 or ECON 202.

Water resource evaluation; concepts, issues, and problems; techniques employed in analyzing and evaluating water use in alternative situations.

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. F. 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. S. Prerequisite: AREC 310.

Agricultural marketing and agribusiness principles applied to current marketing problems relating to livestock and field and horticultural crops. (\$)

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.

Courses of Instruction

AREC 428 03(3-0-0). Agricultural Business Management. 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.

AREC 460 03(3-0-0). Economics of World Agriculture. F. Prerequisite: AREC 202 or ECON 202.

Relationships between nations affecting agricultural growth and productivity, food security, and human welfare.

AREC 475 03(3-0-0). Water Law. F, S. Prerequisite: AREC 375.

Law as it governs acquisition of water rights under riparian and appropriations systems; interstate waters and agencies of distribution.

AREC 478 03(3-0-0). Agricultural Policy. 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.

AREC 484 Var [1-5]. Supervised College Teaching. F, S. Maximum of 10 credits allowed in course.

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 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, S. Prerequisite: AREC 335/ECON 335; ECON 304; ECON 306; ECON 501 or concurrent registration or MATH 315. 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 03(3-0-0). Economics of Water Resource Planning. S. Prerequisite: ECON 306; MATH 141.

Benefit-cost analysis of public water development programs; economic analysis of selected water allocation issues; groundwater, pollution, pricing.

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 or MATH 315 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. S. Prerequisite: AREC 535/ECON 535. 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. F. 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 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

AREC 799 Var. Dissertation.

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; 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.

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 history. I) Art education. J) Pottery. K) Photo image making.

ART 305 03(0-6-0). Paper Making I. F, S, SS. Prerequisite: ART 101 or ART 160.

Basic techniques and processes of handmade paper; emphasis on flat design.

ART 306 03(0-6-0). Paper Making II. F, S, SS. Prerequisite: ART 305.

Exploration of handmade paper as medium for personal expression; emphasis on sculptural form and pulp dyeing.

***ART 310 03(3-0-0). History of American Art to 1945.** F. Prerequisite: 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 Since 1945. 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

°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.

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 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 03(0-6-0). Intermediate Drawing II. F, S, SS. Prerequisite: ART 235. Maximum of 9 credits allowed in course.

Assigned and independent drawing projects; use of traditional and non-traditional materials. (\$)

ART 336 03(0-6-0). 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.

Beginning wheel throwing; investigation of the expressive potential of throwing technique. (\$)

ART 341 04(0-8-0). Pottery III. S. Prerequisite: ART 340.

Exploration of form for expression of personal content; supportive technology; 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 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. Maximum of 10 credits allowed in course.

Supervised assistance in instruction.

ART 405 03(0-6-0). Paper Making III. F, S, SS. Prerequisite: ART 305.

Further use of paper as a media for personal expression; emphasis on controlled serial editions.

°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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape.

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: 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 03(0-6-0). Advanced Drawing I. F, S, SS. Prerequisite: ART 336.
Independent projects and identification of personal artistic direction; research in art-related topics. (\$)

ART 436 03(0-6-0). 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 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. B) Prerequisite: Concurrent registration in ART 326.
A) Art history. B) Art education.

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. (\$) L) Papermaking.

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. I) Art education. J) Pottery. (\$) K) Photo image making. (\$) L) Papermaking.

ART 510A-P 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.

***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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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.

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 696AH Var. Group Study.

A) Painting. B) Printmaking. C) Sculpture. D) Fibers. E) Metalsmithing and jewelry. F) Drawing. G) Graphic design. H) Art history.

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/Senior Vice President

AS 101 01(1-0-0). Foundations of the Air Force I. F. Prerequisite: Concurrent registration in AS 196.

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 Var [1-3]. Aerospace Studies Group Study I. F, S.

AS 201 01(1-0-0). Evolution of Air and Space Power I. F. Prerequisite: Concurrent registration in AS 296.

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. Prerequisite: Concurrent registration in AS 296.

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 250 03(3-0-0). Introduction to Aeronautics and Aviation. S.

Basic concepts about aeronautics and aviation. Provides student with basic understanding of aeronautics and flying.

AS 296 Var [1-3]. Aerospace Studies Group Study II. F, S.

AS 301 03(3-0-0). Air Force Leadership Studies I. F. Prerequisite: Concurrent registration in AS 396.

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. Prerequisite: Concurrent registration in AS 396.

Officer professional development, emphasizing total quality management (TQM) in the Air Force environment; emphasis on communication skills.

AS 396 01(0-2-0). Aerospace Studies Group Study III. F, S. Prerequisite: AS 296; concurrent registration in AS 301 or AS 302.

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. Prerequisite: Concurrent registration in AS 496.

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. Prerequisite: Concurrent registration in AS 496.

Professionalism, military justice system, military ethics, commissioning essentials, and emphasis on communication skills.

AS 496 01(0-2-0). Aerospace Studies Group Study IV. F, S. Prerequisite: AS 396; concurrent registration in AS 401 or AS 402.

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 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 531.

Momentum, continuity equations; circulation, vorticity, thermodynamics; boundary layer; synoptic scale motions in midlatitudes.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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: Concurrent registration in ATS 602.

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 531.

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.

Description and theory of the wind-driven and thermohaline ocean circulation. Emphasis on dynamical understanding.

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; concurrent registration in ATS 602.

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 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 531.

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) Climatology. D) Cloud physics. E) Remote sensing. F) Tropical meteorology. 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) Cloud chemistry. S) Climate dynamics. T) Physical 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: AT 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: ATS 605.

Atmospheric wave motions and embedded vortices spanning mountain waves to large-scale Rossby waves and critical layers.

***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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

°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 03(2-2-0). **Tropical Atmosphere.** F. Prerequisite: ATS 605; ATS 623; ATS 655.

Climatology and general circulation of the tropics; air-sea, cumulus energy, and momentum exchanges; tropical storm dynamics.

*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 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 602.

Model design to simulate large-scale ocean circulation. Applications to real world problems; the Gulf Stream and the Antarctic Circumpolar Current.

°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) Climatology. D) Cloud physics. E) Remote sensing. F) Tropical meteorology. 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) Cloud chemistry. S) Climate dynamics. T) Physical oceanography.

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 346 or concurrent registration in CHEM 346. 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.

BC 352 01(0-3-0). Principles of Biochemistry Laboratory. F, S. Prerequisite: BC 351 or concurrent registration or BC 401 or concurrent registration; CHEM 112; CHEM 114.

Introduction to laboratory techniques in biochemistry.

BC 401 03(3-0-0). Comprehensive Biochemistry I. F. Prerequisite: CHEM 245 or CHEM 345 or concurrent registration in CHEM 345; MATH 155 or MATH 160.

Macromolecular structure and dynamics; membranes; enzymes; bioenergetics.

BC 403 03(3-0-0). Comprehensive Biochemistry II. S. Prerequisite: BC 401.

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; LIFE 212.

Experimental approaches to studying macromolecules, metabolism, and gene expression.

BC 406A-C 02(1-3-0). Investigative Biochemistry. F, S. Prerequisite: BC 404.

Advanced biochemical and molecular biological techniques and a problem-solving approach to: A) Protein biochemistry. B) Molecular genetics. C) Cellular biochemistry.

BC 408 02(1-3-0). Techniques in Structural Biology. S. Prerequisite: BC 404; CHEM 471 or CHEM 474.

Structural biological methods used to elucidate macromolecular structure and function.

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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

BC 463 03(3-0-0). Molecular Genetics. F. Prerequisite: BC 401 or concurrent registration or BC 351; LIFE 201B. 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; BC 463.

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.

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-B 03(0-0-3). Thesis.

A) Laboratory research-based thesis. B) Literature-based thesis.

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 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. (Ω)

***BC 601 01(1-0-0). Responsible Conduct in Biochemistry.** F.

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 665 02(2-0-0). Advanced Topics in Cellular Regulation. S. Prerequisite: BC 565.

Designing research approaches and utilizing advanced methods for answering questions 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.

Courses of Instruction

BC 795 Var. Independent Study.

BC 796 Var [1-5]. Group Study.

BC 798 Var. Research.

BC 799 Var. Dissertation.

BIOLOGICAL SCIENCE COURSES

Department of Biology

+BIO 221 01(0-3-0). Introductory Ecology Field Laboratory. F, S. Prerequisite: LAND 220/SOCR 220 or concurrent registration.

Field and laboratory exercises where students learn and apply methods in ecology.

BIO 310 04(3-3-0). Cell Biology. F, S. 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. (\$)

BIO 311 04(3-2-0). Developmental Biology. S, SS. Prerequisite: BIO 310.

Developmental aspects of growth and differentiation stressed in higher plants and animals. (\$)

BIO 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 not allowed for both BIO 320 and LAND 220/SOCR 220.

Interrelationships among organisms and their environments using conceptual models and quantitative approaches.

BIO 384 Var [1-3]. Supervised College Teaching. Prerequisite: 3.000 overall GPA; written consent of instructor; grade of A in course with which student assists. Maximum of 6 credits allowed in course.

Students assist faculty with various aspects of BIO courses.

BIOMEDICAL ENGINEERING COURSES

College of 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 470 03(3-0-0). Biomedical Engineering. F. Prerequisite: MATH 155 or MATH 160; PH 141.

Engineering application in human/animal physiology, diagnosis of disease, treatment, rehabilitation, human genome manipulation.

BIOM 486A-B. Biomedical Clinical Practicum. F, S, SS. Prerequisite: BMS 300; BIOM 470. A) 02(1-3-0). B) 04(1-6-0).

Biomedical lab work or exposure to the hospital/clinical environment.

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/CBE 525 03(3-0-0). Cell and Tissue Engineering. S. Prerequisite: BC 351 or BIO 310 or BMS 300 or BMS 500/NB 501. Credit not allowed for both BIOM 525 and CBE 525.

Cell and tissue engineering concepts and techniques with emphasis on cellular response, cell adhesion kinetics, and tissue engineering design.

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.

BIOM 535/CIVE 535 03(2-3-0). Biomolecular Tools for Engineers. F. Prerequisite: BMS 300 or MIP 300. Credit not allowed for both BIOM 535 and CIVE 535.

Theoretical and practical aspects of biomolecular laboratory techniques—PCR, cloning, FISH, and community profiling—in an engineering context.

***BIOM 570/*MECH 570 03(3-0-0). Bioengineering.** F. 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.

BIOM 571/MECH 571 03(3-0-0). Biomechanics. S. Prerequisite: BIOM 470 or BIOM 570/MECH 570. Credit not allowed for both BIOM 571 and MECH 571.

Mathematical approach to analysis of living systems, their function, diseases, and replaceable parts. (NT-T)

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.

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.

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 786 Var. Practicum-Laboratory Rotations.

BIOM 795 Var. Independent Study.

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 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.

BMS 301 05(3-2-1). Human Gross Anatomy. F. 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(0-3-1). 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 365 03(3-0-0). Nerve and Muscle-Toxins, Trauma, and Disease. S. Prerequisite: BIO 310 or BMS 300 or BMS 360.

Understanding cellular and molecular basis of nerve and muscle activities in health and disease.

BMS 384 Var [1-5]. Supervised College Teaching. Prerequisite: BMS 300 or BMS 360.

Supervision by and work with graduate teaching assistants in small group learning sessions involving students enrolled in BMS 300.

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 03(3-0-0). Essentials of Pathophysiology. S. 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 492 02(2-0-0). Seminar-Pathophysiology of Disease. S. Prerequisite: Concurrent enrollment in BMS 460.

Capstone seminar in biomedical sciences.

BMS 495 Var. Independent Study.

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.

Membrane function and electrical activity of cells, neurophysiology, blood and immune, muscle physiology, and cellular endocrinology.

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 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. (\$)

Courses of Instruction

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 05(5-0-0). 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 epilepsies.

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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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.

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. (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: ANEQ 101 or ANEQ 102. 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 04(2-2-1). Ecology and Management of Weeds. F. Prerequisite: BZ 120 or LIFE 103; CHEM 107 or CHEM 111.

Classification, characteristics, reproduction, identification, ecology of weeds; weed control by cultural, biological, and chemical means; herbicides. (\$)

BSPM 310 02(2-0-0). Fundamentals of Pesticides. F. Prerequisite: Three credits 100-level BZ or CHEM.

Identification, properties, use, labeling, environmental interactions, and application of major classes of pesticides.

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.

°BSPM 402B-F 01(.5-1-0). Plant Health Practica. F, S. Prerequisite: One course in plant pathology, weed science, or entomology.

Application of plant health principles to: **B)** Greenhouse and foliar plants **E)** Household and structural. **F)** Pest management techniques and safety issues.

°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 MIP 301 or MIP 302 or LIFE 206. 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. ***C)** Fungal plant pathogens 01(1-0-0). F. Prerequisite: BSPM 361. **°E)** Molecular plant-microbe interactions 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. ***G)** Plant disease management 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: BZ 325 or BZ 424/BSPM 424. Credit not allowed for both BSPM 520 and BZ 520.

Theory and practice of modern systematics.

***BSPM 521 02(0-0-2). 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 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: BIO 320 or LAND 220/SOCR 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: BIO 320 or LAND 220/SOCR 220 or LIFE 230; BZ 120; LIFE 102 or LIFE 103.

Contributions of disciplines of weed science and invasion ecology to understanding the biology, ecology and control of "problem plants."

***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.

Courses of Instruction

°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 Pests.** F. Prerequisite: BIO 320 or LAND 220/SOCR 220; BZ 120 or LIFE 103.

Management of insect pests of plants, plant pathogens, 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 576/MIP 576 03(3-0-0). **Bioinformatics.** F, S. Prerequisite: BC 451 or BC 463 or BIO 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/ERHS 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 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.**

BIOTECHNOLOGY COURSES

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 450 02(2-0-0). **Topics in Biotechnology.** S. Prerequisite: BC 351 or BC 401; MIP 300.

Developments, trends in biotechnology; products from genetically engineered microorganisms, plant or animal cell cultures; advances in bioengineering.

BTEC 499 Var [1-3]. **Biotechnology Thesis.** Prerequisite: Twelve credits from biotechnology core; approval of program coordinator.

BUSINESS COURSES – GENERAL

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 200 03(3-0-0). **Business Communication Processes.** F, S, SS. Prerequisite: BUS 100; CO 150 or HONR 193.

Theory and principles of business communication with emphasis on written communication and presentation of reports.

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. 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 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. 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 320 or MGT 305; 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). Business Decision Making. 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.

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, Ethics, and Motivation. S.

Ethical leadership and team dynamics; basic models of motivation utilized by leaders.

BUS 621 02(2-0-0). Tools for Decision Making. F.

Key decision areas and tools that help managers make better decisions based on data and structured analysis.

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 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 0 2(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. SS. Prerequisite: BUS 625; 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). Strategic Management. S. Prerequisite: BUS 625; BUS 641; BUS 650; BUS 656.

Integrates skills and concepts through analysis and discussion of cases and articles based on actual business problems. (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 690 Var [1-3]. Workshop-Contemporary Issues in Business. F, S. Prerequisite: Admission to the Denver Executive Program. May be taken more than once.

Current issues in business featuring business and community leaders.

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, SS. 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.

BZ 104 03(3-0-0). Basic Concepts of Plant Life. (GT-SC1, AUCC 3A). F, S, SS. 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-SC1, 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. S. Prerequisite: BZ 110 and BZ 111 or LIFE 103.

General biology of invertebrates; their characteristics, classification, and adaptations. (\$)

+BZ 214 04(3-3-0). Animal Biology-Vertebrates. F. Prerequisite: BZ 110 and BZ 111 or LIFE 103.

General biology of vertebrates; their characteristics, classification, and adaptations. (\$)

BZ 220 03(3-0-0). Introduction to Evolution. F, S. Prerequisite: BZ 110 and 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. 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 315 03(2-0-1). Marine Ecology. F. Prerequisite: BZ 110 and BZ 111 and 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 and 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 and 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/ERHS 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 350 04(3-0-1). Molecular and General Genetics. F, S. Prerequisite: BZ 110 or BZ 120 or LIFE 102; STAT 201 or concurrent registration or STAT 301 or concurrent registration or STAT 307/ERHS 307 or concurrent registration. Primarily for students in biological sciences.

Mendelian, molecular, and population genetics emphasizing the molecular basis of genetics.

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. Maximum of 10 credits allowed in course.

***BZ 401 03(3-0-0). Comparative Animal Physiology.** F. 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: BIO 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: BIO 310.

Comparison of endocrine molecules, responses, and control mechanisms in vertebrates and invertebrates emphasizing molecular aspects.

***BZ 424/*BSPM 424 03(3-0-0). Principles of Systematic Zoology.** S. Prerequisite: BZ 110 and 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 433 03(3-0-0). Behavioral Genetics. F. Prerequisite: BZ 350 or LIFE 201A or LIFE 201B or SOCR 330.

Genetics of behavioral characteristics in human and infrahuman species.

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. F. Prerequisite: BZ 223 or BZ 325.

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 301 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: BIO 320 or LAND 220/SOCR 220.

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: BIO 320 or LAND 220/SOCR 220.

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 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 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.

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 510 03(3-0-0). Zoophysiological Ecology. S. Prerequisite: BIO 320 or LAND 220/SOCR 220; BMS 300 or BMS 360 or BZ 401.

Concepts, principles, and examples of adaptive physiological strategies used by animals.

°BZ 520°/BSPM 520 03 (3-0-0). Advanced Systematics. S. Prerequisite: BZ 325 or BZ 424/BSPM 424. Credit not allowed for both BZ 520 and BSPM 520.

Theory and practice of modern systematics.

°BZ 526°/BSPM 526 03(3-0-0). Evolutionary Ecology. F. Prerequisite: BIO 320 or LAND 220/SOCR 220. 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: BIO 320 or BZ 450; BZ 220.

Adaptive significance and evolution of plant form and structure.

BZ 535 03(3-0-0). Behavioral Ecology. S. Prerequisite: BIO 320 or LAND 220/SOCR 220; BZ 110 and BZ 111 or LIFE 103; BZ 300; MATH 155.

Integrative approach to ecology, animal behavior, evolution; emphasis on foraging, social organization, communication in birds and mammals.

***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.

Courses of Instruction

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.** F. Prerequisite: BIO 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: BIO 320; STAT 301 or STAT 307/ERHS 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. F. Prerequisite: BC 463 or BZ 350 or MIP 450 or SOCR 330.

Various aspects of plant development at the molecular level.

BZ 571 03(3-0-0). Molecular and Developmental Evolution. S. Prerequisite: BZ 220; MATH 155; STAT 301 or STAT 307/ERHS 307.

Biological mechanisms of evolutionary change in populations and results of their operation.

°BZ 572 03(3-0-0). Phytoremediation. S. Prerequisite: BZ 120 or LIFE 103.

Environmental cleanup using plants.

BZ 577/MIP 577 01(0-2-0). Computer Analysis in Population Genetics. F. Prerequisite: MIP 578/BZ 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/ERHS 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.

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: CHEM 111; MATH 160; PH 141; one course in computer programming.

Principles of chemistry, physics, and mathematics applied to development of material and energy balances; illustration of concepts.

CBE 202 03(3-0-0). Thermodynamic Process Analysis. S. Prerequisite: CBE 201.

Thermodynamic fundamentals and applications to ideal and non-ideal mixtures, power cycles, and chemical equilibria.

CBE 320 03(3-0-0). Chemical and Biological Reactor Design. S. Prerequisite: CBE 201; LIFE 102; MATH 340.

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 202; MATH 340.

Analysis of chemical engineering problems by numerical simulation.

CBE 331 03(3-0-0). Momentum Transfer and Mechanical Separations. F. Prerequisite: CBE 201; CBE 202 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 331; MATH 340.

Thermal processes; steady and unsteady conduction; convective heat transfer; radiation; heat exchanger design; mass transfer by diffusion and convection.

CBE 333 02(0-6-0). Momentum and Heat Transfer Laboratory. S. Prerequisite: CBE 332 or concurrent registration.

Momentum and heat transfer experimentation; rheology, heat exchangers, steam condensation, drying.

CBE 406 03(3-0-0). Introduction to Transport Phenomena. F. Prerequisite: CBE 332; CHEM 474.

Fundamental treatment of momentum and mass transport processes; dimensional analysis for parameter identification and order of magnitude estimation.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O = online, T = telecourse, V = videotape).

CBE 430 03(3-0-0). Process Control and Instrumentation. S. Prerequisite: CBE 320; CBE 330; CBE 442/ENVE 442.

Measurement and control of process variables; transient behavior of chemical 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/ENVE 442 03(3-0-0). Separation Processes. F. Prerequisite: CBE 332; one course in physical chemistry. Credit not allowed for both CBE 442 and ENVE 442.

Analysis of chemical separations based on phase equilibrium thermodynamics, diffusion, and convective mass transfer; design of separations equipment.

CBE 443 02(0-6-0). Mass Transfer and Separation Laboratory. F. Prerequisite: CBE 442/ENVE 442 or concurrent registration.

Mass transfer experimentation: evaporation, distillation, solvent extraction, ion exchange, gas absorption, humidification.

CBE 451 03(3-0-0). Chemical Engineering Design I. F. CBE 320; CBE 330; CBE 442/ENVE 442 or concurrent registration.

Process synthesis and simulation; engineering economics principles.

CBE 452 03(2-2-0). Chemical Engineering Design II. S. Prerequisite: CBE 451.

Design projects requiring students to complete a process design with cost estimation; technical progress and final reports.

CBE 493 01(0-0-1). Seminar.

CBE 495 Var. Independent Study.

CBE 496 Var. Group Study.

CBE 501 03(3-0-0). Chemical Engineering Thermodynamics. F.

Definition, correlation, and estimation of thermodynamic properties; nonideal chemical and physical equilibria.

CBE 502 03(3-0-0). Advanced Reactor Design. F.

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 420 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. F. Prerequisite: CHEM 346; CHEM 474.

Fundamentals of polymer science: synthesis, characterization, processing of polymers. Physical properties of polymers; rheology of melts and solutions.

CBE 521 03(3-0-0). Mathematical Modeling for Chemical Engineers. F. Prerequisite: CBE 320; CBE 442/ENVE 442; one course in computer programming.

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 525/BIOM 525 03(3-0-0). Cell and Tissue Engineering. S. Prerequisite: BC 351 or BIO 310 or BMS 300 or BMS 500 or NB 501. Credit not allowed for both CBE 525 and BIOM 525.

Cell and tissue engineering concepts and techniques with emphasis on cellular response, cell adhesion kinetics, and tissue engineering design.

CBE 540/CIVE 540 02(2-0-0). Fundamentals of Environmental Biotechnology. S. Credit not allowed for both CBE 540 and CIVE 540.

Fundamentals of environmental biotechnology: environmental microbiology, microbial kinetics, basic reactor design.

°CBE 613 03(3-0-0). Advanced Transport Phenomena. F. Prerequisite: ATS 601 or CIVE 502 or CBE 503; MATH 531.

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-SC1, 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.

CHEM 104 01(0-3-0). 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-SC1, AUCC 3A). F, S, SS. Prerequisite: MATH 117 or placement in MATH 118 or higher. 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(0-3-0). Fundamentals of Chemistry Laboratory. (GT-SC1, 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 in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher. Intended for science majors. Students should complete the sequence: CHEM 111, CHEM 112, CHEM 113 and CHEM 114. Credit not allowed for both CHEM 111 and CHEM 107. Credit allowed for only one of the following: CHEM 107, CHEM 111, and 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.

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 in MATH 124 or MATH 125 or MATH 126 or MATH 141 or higher.. Credit allowed for only one of the following: CHEM 107, CHEM 111, and 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 331 03(3-0-0). Quantitative Analysis-Biological Sciences. S. Prerequisite: CHEM 113.

Volumetric, spectrophotometric, electrochemical methods of analysis; analytical applications of acid-base, solubility, redox, and complex ion equilibria.

CHEM 332 02(0-6-0). Quantitative Analysis Laboratory. F. Prerequisite: CHEM 114; CHEM 335 or concurrent registration.

Laboratory applications of principles presented in CHEM 335. (\$)

CHEM 334 01(0-3-0). Quantitative Analysis Laboratory-Biological. S. Prerequisite: CHEM 114; CHEM 331 or concurrent registration.

Laboratory applications of principles presented in CHEM 331. (\$)

CHEM 335 03(3-0-0). Quantitative Analysis. F. Prerequisite: CHEM 113 with a C- or better; CHEM 332 or concurrent registration.

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; CHEM 114. 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 246 and CHEM 344.

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. (\$)

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. Maximum of 10 credits allowed in course. 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 332 or CHEM 334; CHEM 471 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 245 or CHEM 332 or CHEM 334; one semester of biochemistry.

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 471 or 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 471 04(4-0-0). Physical Chemistry for Biological Sciences. F. Prerequisite: CHEM 113; MATH 161 or MATH 255; PH 122 or PH 142. Credit allowed for only one of the following: CHEM 471, CHEM 472, or CHEM 474.

Thermodynamics; transport phenomena; kinetics, quantum theory, molecular spectroscopy, statistical dynamics with applications to biological sciences.

CHEM 472 04(4-0-0). Physical Chemistry for Engineers. F. Prerequisite: CHEM 113, MATH 261, PH 142. Credit allowed for only one of the following: CHEM 471, CHEM 472, or CHEM 474.

Methods and applications of physical chemistry including quantum chemistry, statistical mechanics, thermodynamics, and kinetics.

CHEM 474 03(3-0-0). Physical Chemistry I. F. Prerequisite: CHEM 113; MATH 261; PH 142. 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 476 03(3-0-0). Physical Chemistry II. S. Prerequisite: CHEM 474.

Statistical thermodynamics; applications to phase and chemical equilibria; kinetics.

CHEM 478 02(0-6-0). Physical Chemistry Laboratory. S. Prerequisite: CBE 333 or CHEM 332 or CHEM 334; CHEM 471 or CHEM 472 or CHEM 474.

Planning and execution of physicochemical experiments; interpretation and presentation of experimental data; formal laboratory 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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.

Reactions and synthesis in organic chemistry.

CHEM 547 03(3-0-0). Physical Organic Chemistry. S. Prerequisite: CHEM 543.

Mechanisms, theory, kinetics, and thermodynamics.

Courses of Instruction

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 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 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 472 or CHEM 474.

Electronic structure methods; chemical bonding models; intermolecular interactions.

°**CHEM 571 03(3-0-0). Quantum Chemistry.** F. Prerequisite: CHEM 472 or CHEM 474.

Simple systems; symmetry; approximate methods; time dependent methods; molecular structures.

***CHEM 575 03(3-0-0). Chemical Thermodynamics.** F. Prerequisite: CHEM 472 or CHEM 476.

Thermodynamic concepts and their applications to chemical problems.

°**CHEM 576 03(3-0-0). Statistical Mechanics.** S. Prerequisite: CHEM 472 or CHEM 476.

Principles of statistical mechanics with application in the chemical sciences.

°**CHEM 577 03(3-0-0). Surface Chemistry.** S. Prerequisite: CHEM 472 or CHEM 476.

Capillarity; interfacial thermodynamics, electrical aspects of surface chemistry, adsorbed layers.

°**CHEM 579 03(3-0-0). Chemical Kinetics.** F. Prerequisite: CHEM 472 or CHEM 476.

Elementary reactions, unimolecular reactions, reactions in solution, gas phase ion chemistry, photochemistry, and kinetic modeling.

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 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.

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 150 03(3-0-0). Business Computing Concepts and Applications. F, S, SS.

System hardware, operating environments, and software applications. (NT-O)

CIS 210 03(3-0-0). Information Technology in Business. F, S, SS. 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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 240.

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 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. Credit not allowed for both CIS 410 and CT 310.

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 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. Prerequisite: CIS 355; CIS 360.

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 M.S. program.

Strategic role and management of information technology and software development projects.

CIS 601/MGT 601 03(3-0-0). Enterprise Computing and Systems Integration. F. Prerequisite: Admission to the M.S. program. 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.

CIS 605 03(3-0-0). Business Visual Application Development. F. Prerequisite: Admission to M.S. program.

Design, construction, and testing of business application systems including leading-edge visual, E-commerce languages and tools.

CIS 606 03(3-0-0). Application Software Infrastructure. F.

Design, construction, and testing of business application software infrastructure including hardware, operating software, and communications network.

CIS 610 03(3-0-0). Software Development Methodology. F. Prerequisite: Admission to M.S. program.

Methods for all phases of software development focusing upon the establishment of economical software that is reliable and cross platform.

CIS 611 03(3-0-0). Object-Oriented Systems. S. Prerequisite: CIS 610.

Object-oriented and web-based software; object model describing classes; relationships to other objects, attributes, and operations.

CIS 620 03(3-0-0). IT Communications Infrastructure. S. Prerequisite: CIS 606.

Technical aspects of information communications, business considerations; wireless technology, architecture, and applications.

CIS 655 03(3-0-0). Business Database Systems. S. Prerequisite: CIS 605.

Database analysis, design, administration; data modeling; data sublanguages, query facilities; distributed database systems.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

CIS 665 03(3-0-0). E-Business Application Technologies. S.
Prerequisite: CIS 605; CIS 606; CIS 610.
Developing E-business (B2B and B2C) through construction and deployment.

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 106 02(2-0-0). Introduction to Engineering Computer Graphics. F, S. Prerequisite: MATH 125.

Creation and production of engineering drawings using AutoCad, including layering, annotated, and three-dimensional drawings.

CIVE 108 03(2-3-0). Civil Engineering Principles I. F.

Civil engineering profession, computer applications and programming related to civil engineering; introduction to surveying.

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 or CIVE 262; MECH 237.

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 350 03(2-3-0). Soil Engineering for Nonengineers. F, S.
Prerequisite: CIVE 359.

Concepts of soil mechanics and soil behavior, elementary application to compaction, seepage, earth pressure, foundations, and slopes.

CIVE 359 03(3-0-0). Basics of Statics and Strength of Materials. F, S. Prerequisite: MATH 125; MATH 141 or MATH 155 or MATH 160; PH 110 or PH 121 or PH 141.

Forces and their components; static equilibrium; friction; section properties; stresses and deformations of elastic solids, combined stresses.

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 370 03(2-2-0). Introductory Structural Engineering. F, S.
Prerequisite: CIVE 359; CON 432.

Behavior, design basics and construction concerns for structural members and systems of steel, reinforced or prestressed concrete, or masonry.

+CIVE 377/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: CIVE 377, SOCR 377, SOCR 577.

Introduction to geographic information systems and global positioning systems with applications to agriculture. (\$)

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 303 (civil engineering majors only) or CIVE 322/ENVE 322 (environmental engineering majors only).

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 438/ENVE 438 04(4-0-0). Pollution Control Engineering. 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.

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 450 04(3-3-0). Introduction to Geotechnical Engineering. S. Prerequisite: CIVE 360.

Soil behavior, stress-strain and strength properties, application to earth pressure, slope and foundation problems.

CIVE 466 03(2-3-0). 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 471 01(0-0-1). Engineering Design I. S. Prerequisite: CBE 201 or CIVE 204/ENVE 204.

Selection of engineering design project; development of project proposal.

CIVE 472 03(2-2-0). Engineering Design II. F. Prerequisite: CIVE 471.

Engineering project requiring each student to work on an individual basis with adviser; technical progress reports, final project report.

CIVE 474 03(3-0-0). Engineering Planning and Management. S. Prerequisite: CIVE 360.

Planning, organizing, and managing engineering projects, including engineering estimating, engineering economy, and CPM scheduling.

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(2-3-0). 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 505 03(2-3-0). Experimental Methods and Measurements. S. Prerequisite: CIVE 300 or CIVE 360.

Design experiments; instrumentation and experimental techniques; data acquisition and processing; error analysis.

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 Design and Management. F. Prerequisite: CIVE 322/ENVE 322 or CIVE 425.

Irrigation performance criteria. Design, management and evaluation of surface, sprinkler and trickle irrigation. Selection of irrigation systems.

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 515 03(3-0-0). Hydropower. F. Prerequisite: CIVE 322/ENVE 322; CIVE 401.

Operation of hydrogenerating and pump storage stations, characteristics of systems loads, hydrology, storage of water, optimum power production.

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 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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 04(3-0-1). Modeling Watershed Hydrology.** S. Prerequisite: CIVE 322/ENVE 322 or WR 416; STAT 315 or STAT 340. 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 535/BIOM 535 03(2-3-0). Biomolecular Tools for Engineers. F. Prerequisite: BMS 300 or MIP 300. Credit not allowed for both CIVE 535 and BIOM 535.

Theoretical and practical aspects of biomolecular laboratory techniques—PCR, cloning, FISH, and community profiling—in an engineering context.

CIVE 536 01(1-0-0). Wastewater Treatment. F. Prerequisite: Concurrent registration in CIVE 540/CBE 540.

Application of environmental biotechnology to wastewater treatment engineering and design.

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 02(2-0-0). Fundamentals of Environmental Biotechnology. S. Credit not allowed for both CIVE 540 and CBE 540.

Fundamentals of environmental biotechnology: environmental microbiology, microbial kinetics, basic reactor design.

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/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 450.

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 450.

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 450.

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 450.

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 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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 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 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 575 03(2-2-0). Expert System Applications in Engineering. F. Prerequisite: MATH 340.

Construction of expert systems and decision aids for practical applications in typical engineering domains.

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 engineering.

CIVE 578 03(3-0-0). Infrastructure Management and Security. S. Prerequisite: Ten credits of engineering, economics, public administration, or planning courses.

Infrastructure planning, management, and security. Systems approach to life cycle management. Problems, analysis, decision support systems. (NT-O/V)

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 603 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 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 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 617 02(0-0-2). Irrigation Field Trip. SS. Prerequisite: CIVE 300 or SOCR 370.

Site visitations to observe various irrigation methods, practices, and water diversions in Colorado.

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). Solutions to Groundwater Problems. S. Prerequisite: CIVE 531; MATH 340.

Numerical flow models; finite difference and finite element methods; parameter identification, stochastic modeling and advanced analytical solutions.

CIVE 633 03(3-0-0). Groundwater Contaminant Transport Modeling. F. Prerequisite: CIVE 300; concurrent registration in CIVE 423 or CIVE 531; MATH 340.

Numerical modeling, transport, control and cleanup, applied to complex groundwater contamination problems found in the field.

CIVE 635 03(3-0-0). Quantitative Hydrogeology. F. Prerequisite: CIVE 300; concurrent registration in CIVE 423 or CIVE 531; MATH 340.

Geostatistics; modeling fracture flow; saltwater intrusion, heat transfer; conjunctive use, optimal groundwater management; solution nonlinear problems.

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: CIVE 544 or 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 450.

Experimental design; data acquisition; soil fabric; isotropic/ K_0 condensation; swelling; stiffness; shear wave velocity; triaxial; hollow cylinder; partial saturation.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

CIVE 655 03(3-0-0). Advanced Soil Mechanics. F. Prerequisite: CIVE 450.

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; MATH 531.

Analysis of stress and strain in solids emphasizing linear elasticity and plasticity; introductions to creep, viscoelasticity, and finite deformations.

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 693 Var. Seminar I.

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.

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 733 03(3-0-0). Flow in Porous Media. S. Prerequisite: CIVE 300; CIVE 531 or SOCR 470.

Mechanics of single and two-phase fluids in soils and porous rocks with application to infiltration, drainage, and petroleum production.

CIVE 742 03(2-3-0). Advanced Topics in Environmental Engineering. S. Prerequisite: CIVE 540.

Selected topics from current environmental engineering research including molecular methods, water/wastewater treatment, hazardous waste remediation.

CIVE 751 03(3-0-0). Soil Dynamics. S. Prerequisite: CIVE 450.

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). Plate, Shell, and Bridge Structures. F. Prerequisite: CIVE 560.

Classical plate, shell, and membrane theory. Finite difference, element, and strip methods. Application to layered systems, domes, and bridges.

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 793 Var. Seminar II.

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

Office of Provost/Senior Vice President

CM 501 04(4-0-0). Advanced Cell Biology. F. Prerequisite: BIO 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O = online, T = telecourse, V = videotape).

***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 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.

CM 795 Var. Independent Study.

CM 799 Var. Dissertation.

COMPOSITION COURSES

Department of English

College of Liberal Arts

CO 130 03(3-0-0). Academic Writing. (GT-CO1). F, S. Prerequisite: Composition Challenge 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 verbal score of 500 or above or ACT verbal score of 20 and above or Composition Challenge Examination or CO 130.

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 2B). F, S, SS. Prerequisite: CO 150 or HONR 193.

Reading, analyzing, researching, and writing arguments.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape.

CO 301A-D 03(3-0-0). Writing in the Disciplines. (AUCC 2B). 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 2B). 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: CIS 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 234 03. Advanced Computer-Aided Design (CAD). F, S, SS. Prerequisite: Knowledge of CAD fundamentals. Offered as correspondence course only.

Advanced computer-aided drafting and design software utilization. (NT-C)

CON 235 03(2-2-0). Construction Graphics. S. Prerequisite: CON 151; INTD 166.

Principles and procedures required in interpreting and producing building site plans, floor plans, elevations, sections, and interior details. (\$)

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 260 03(3-0-0). Mechanical and Plumbing Systems. F, S. Prerequisite: CON 101 or INTD 276 or concurrent registration in INTD 276.

Heating, ventilation, air conditioning, plumbing, and fire suppression with emphasis on design, operation, and interaction.

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. (\$)

Courses of Instruction

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 260 or concurrent registration.

Electrical and control systems and their application in the construction industry. (\$)

CON 362 02(2-0-0). Construction Contracts. F, S. Prerequisite: CON 363 or concurrent registration.

Commercial construction planning, bidding, and contract administration.

CON 363 03(1-4-0). Plan Reading for Estimating. F, S. Prerequisite: CON 131; CON 151; CON 261 or concurrent registration.

Fundamentals of architectural plan reading and quantity surveying based upon examples from the different CSI divisions. (\$)

CON 364 03(2-2-0). Advanced Construction Systems. F, S. Prerequisite: CON 151; CON 261 or concurrent registration or CON 363 or concurrent registration.

Commercial construction field procedures: sitework, foundations, concrete, steel, wood, enclosures, finishes. (\$)

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. S.

Constituents of asphalt pavements; manufacture of asphalt cement, emulsions, and cutbacks; material properties and behavior. (\$)

CON 384 Var [1-5]. Supervised College Teaching. Maximum of 10 credits allowed in course.

CON 386 Var [1-3]. Practicum-Construction Management.

CON 431 03(3-0-0). Fire Department Response-Community Violence. F, S, SS. Prerequisite: Admission to fire service emphasis. Offered only through the Division of Continuing Education.

Case histories of local, national, and international violent occurrences. Academic training and participation in simulated events. (NT-O/V)

CON 432 03(3-0-0). Design of Wood Structures. F, S. Prerequisite: CIVE 359 or CIVE 360. Credit not allowed for both CON 432 and F 432.

Design of structural components and systems constructed of wood and wood-based products.

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 or CIVE 359; CIVE 370.

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 464 02(1-2-0). Construction Project Administration. F, S. Prerequisite: CON 362; CON 461 or concurrent registration.

Administrative procedures, planning processes, and coordination required to successfully complete construction projects on time and budget.

CON 465 03(1-0-2). Construction Management Professional Practice. F, S. Prerequisite: CON 461 or concurrent registration; CON 487A or CON 487E. Construction management majors only.

Professional practice using an understanding of the contractual and working relationships among all participants in the design/construction process.

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-E Internship.

A) Construction management. 06(0-18-0). Prerequisite: CON 267; CON 367. **D)** Construction management I. 03(0-9-0). Prerequisite: CON 267; CON 367. **E)** Construction management II 03(0-9-0). Prerequisite: CON 267; CON 367; 500 hours documented work experience.

CON 495 Var. Independent Study-Construction.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

CON 496 Var. Group Study-Construction. Maximum of 9 credits allowed per subtopic.

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 501B-C Var [1-3]. Special Problems in Technology Education. F, S, SS.

B) Manufacturing. C) Energy and transportation.

CON 530 03(2-2-0). Computer-Aided Design Applications. F, SS. Prerequisite: Admission to master's program.

Advanced CAD techniques: 3-D modeling, I/O devices, design, and analysis.

CON 540 03(3-0-0). Computerized Industrial Electronics. S, SS. Prerequisite: Admission to master's program.

Recent innovations in industrial electronics.

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 563 03(1-4-0). Parametric Building Production Modeling. F, S, SS. Offered only as an online course.

Advanced 3D parametric modeling and its use within the construction industry. (NT-O)

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 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 570 03. Grantsmanship and Proposal Writing. F, S, SS. Offered as correspondence or video course only.

Mechanics of proposal writing, including intangibles of the grant-seeker's art. (NT-C/V)

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 574 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 600 03(3-0-0). Research Methods. F. Prerequisite: Admission to master's program.

Identification, analysis of research problems in applications of technology.

CON 610 03(3-0-0). Technology Change Management. S. Prerequisite: CON 562.

Methods of planning and implementing change within institutional settings.

CON 672 02(2-0-0). Technology Curriculum Development. S, SS.

Curriculum development and organization, task analysis, accountability, and evaluation utilizing interdisciplinary and clustering approach.

CON 677 02(2-0-0). Leadership in Technology Studies. F, SS. Prerequisite: Admission to master's program.

Administration, supervision, management, and planning techniques necessary for successful education and training environments.

CON 684 Var. Supervised College Teaching.

CON 687 Var [1-6]. Internship. Maximum of 6 credits allowed in course.

CON 695A-B Var. Independent Study.

A) Construction management. B) Technology education and training.

CON 696A-C Var. Group Study. Prerequisite: Admission to master's program.

A) Construction management. C) Technology education and training.

CON 698 Var. Research in MTCM.

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)

Courses of Instruction

CS 122/MATH 122 01(0-0-1). Theory for Introductory Programming. F, S, SS. Prerequisite: MATH 118. 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(3-0-1). Foundations in Programming. 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..

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..

Data representation, arithmetic, assembly and C languages, digital logic and systems, Boolean algebra, circuits, CPU and memory models, state machines. (NT-V)

CS 295 Var [1-4]. Independent Study.

Investigation of special topics under direction of computer science faculty.

CS 301 04(4-0-0). Foundations of Computer Science. F, S. Prerequisite: CS 200 with a C or better; CS 253 or concurrent registration; MATH 161 with a C or better; MATH 229 with a C or better.

Finite state machines, regular expressions, push down automata, context free grammars, Turing machines, the halting problem. (NT-V)

CS 314 04(3-3-0). 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 370 04(3-3-0). 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 314 with a C or better; MATH 229 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.

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(3-3-0). Introduction to Analysis of Algorithms. F. Prerequisite: CS 301 with a C or better.

Orders of magnitude, upper and lower bounds, recurrence relations; P, NP completeness; approximate algorithms and search.

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 301 with a C or better.

Symbolic computation through programming languages LISP and PROLOG; applications of symbolic computing in artificial intelligence.

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 operating systems, case studies.

CS 453 04(3-0-1). Introduction to Compiler Construction. S. Prerequisite: CS 253 with a C or better; CS 301 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 301 with a C or better.

Language design concepts; functional programming; interpreter support for environments, procedures, recursion, types, objects; language paradigms.

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/ERHS 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). Computer Graphics. S. Prerequisite: CS 410.

Displaying 3D objects with realistic shading and lighting calculations. Hidden surface removal, Gourand and Phong shading, and ray tracing.

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.

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 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 420; CS 453.

Compiler construction; lexical scanner generators, parser generators, dataflow analysis, optimization.

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.

LAN/WAN technologies, congestion/flow control, traffic analysis, intra-/inter-domain routing, multicast, overlays, P2P systems and quality of service.

CS 560/ECE 560 04(3-2-0). Reconfigurable Computing. S.

Prerequisite: CS 460/ECE 460. Credit not allowed for both CS 560 and ECE 560.

Custom computing on FPGA's; silicon compilation; models of fine grain application specific parallelism; dataflow; Kahn processes; systolic arrays.

CS 570 04(3-3-0). Advanced Computer Architecture. F. Prerequisite: CS 470.

Pipelined CPU design. Superscalar architectures and instruction-level 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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 653 04(3-3-0). Topics in Programming-Language Implementation. S. Prerequisite: CS 553.

Data dependence analysis; code generation.

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 658/ECE 658 04(3-3-0). Internet Engineering. F. Prerequisite: ECE 456 or CS 457. 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. Prerequisite: CS 150 or CS 160. Credit not allowed for both CT 310 and CIS 410.

Core web development techniques; popular languages to develop a fully functional web site; database access, security issues, domain names, hosting.

CT 320 04(3-3-0). Network and System Administration. F, S. Prerequisite: CS 155 and CS 156 or CS 253. Credit not allowed for both CT 320 and CIS 350.

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. (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 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

- 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.

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.

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-C)

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 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)

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 470 02(2-0-0). Latin American Design and Markets. S.
Prerequisite: AM 130 or INTD 129; DM 120.

Apparel and textile design, production, and markets within a Latin American cultural context.

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 343; AM 446; 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 01(0-0-1). Preinternship Seminar. F, S. Prerequisite: Minimum GPA of 2.50; minimum of 75 credits completed..

Background information necessary to apply for and complete an internship experience.

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.

Theory and various approaches and philosophies of research in design and merchandising. Critical evaluation and synthesis of scholarly literature.

°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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

DM 520 03(3-0-0). Professional Advancement in Merchandising. SS. Offered only as an online course.

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 only as an online course.

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. F. Prerequisite: AM 342.

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 only as an online course.

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.

DM 563 Care and Exhibit of Museum Collections. S. Prerequisite: Three credits of ART, HIST, and/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 only as an online course.

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 only as an online course.

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 only as an online course.

Research process used in social science, including survey and analysis of research methodologies; review of merchandising literature. (NT-O)

DM 640 03(3-0-0). Merchandising Finance. F. Offered only as an online course.

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 only as an online course.

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.

DM 698 Var. Research.

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 160 03(3-0-0). Mythical and Biblical Backgrounds. F, S, SS.

Central myths and stories of classical and Biblical traditions necessary to understanding Western culture.

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 233 03(3-0-0). Introduction to Humanities. F, S.

Interrelationships of literature, art, music, and society.

E 234/ETST 234 03(3-0-0). Native American Literature. S. Credit not allowed for both E 234 and ETST 234.

Native American writings and their significance in American culture.

E 235 03(3-0-0). Introduction to Folklore. F.

Folklore and its relationship to anthropology and literature.

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.

E 239/ETST 239 03(3-0-0). Introduction to Chicano Literature. F, S. Credit not allowed for both E 239 and ETST 239.

Contemporary 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 247 03(3-0-0). Vietnam War in Fiction.** F.
Novels selected by internal chronology to show origins, development, and effects of Vietnam War.
- 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 330 03(3-0-0). Images of Women in Literature.** S.
Selected world literature ranging from ancient world to present, considered in light of various complexities of gender relations.
- 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 334 03(3-0-0). Twentieth-Century Gay and Lesbian Fiction.** S.
Twentieth-century fiction by gay and lesbian authors on gay and lesbian themes.
- E 335 03(3-0-0). American Folklore.** S.
Regional, ethnic, and urban folklore in America.
- E 336 03(3-0-0). Goddess Religions.** F.
Ancient goddess religions and their uses and reinterpretations by the contemporary women's spirituality movement.
- E 337 03(3-0-0). Western Mythology.** S.
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 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.
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.
Shakespeare's development as a poet and dramatist after *Hamlet*.
- E 345 03(3-0-0). American Drama.** F.
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 353 03(3-0-0). Russian and Soviet Literature in Translation.** S. Prerequisite: One course in literature or HIST 235.
Russian and Soviet literature from Pushkin to present.
- 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.
Supervised assistance in instruction. **A)** Classroom. May be taken for maximum of 6 credits. **B)** Writing Center.

Courses of Instruction

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). Nature Writing. S. Prerequisite: One course in literature or CO 301A-D or E 311A-C.

American and English writers who interpret nature and the landscape; critical analysis and application of their techniques to current interpretive problems.

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 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 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: One course in literature.

British Romantic era literature (1780-1830) with emphasis on the social and cultural context.

E 427 03(3-0-0). Victorian Age. F. Prerequisite: One course in literature.

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). Colonial and Postcolonial Textuality. F, S. Prerequisite: One course in literature.

Selected readings in imperial and 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: One course in literature.

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 438/ETST 438 03(3-0-0). Contemporary Native American Literature. F. Credit not allowed for both E 438 and ETST 438.

Contemporary fiction, poetry 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: One course in literature.

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.

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.

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). 20th-Century European Literature. S. Prerequisite: Two courses in literature.

20th-century fiction and poetry of continental Europe in translation.

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 341; one other upper-division E prefix course.

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: 2.500 GPA; written consent of department head. 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).
- 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 enquiry into oral and written literacy practices.
- 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. Prerequisite: Written consent of instructor.
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.
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 600 03(3-0-0). Research Methods and Theory.** F.
Materials and methods of literary scholarship: bibliography, documentation, textual criticism, editing, and literary criticism.
- 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. Prerequisite: Written consent of instructor.
A) Composition and rhetoric. **B)** Creative writing.
- E 615 03(3-0-0). Reading Literature-Recent Theories.** F, S, SS.
Recent developments in structuralist/poststructuralist 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 640A-C Var [1-5]. Graduate Writing Workshop.** F, S. Prerequisite: Written consent of instructor. 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. Prerequisite: Written consent of instructor.
Writing workshop exploring development of literacy texts (poetry, fiction, nonfiction) in electronic formats.

Courses of Instruction

E 679 01(1-0-0). Community Service Learning in TESOL. F, S.

Opportunities to learn, practice, and develop skills by serving the community teaching English as a second language.

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). Communication Development Seminar. S.

Forum for faculty and student work in progress.

E 695 Var. Independent Study.

E 699 Var. Thesis.

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 201 03(2-2-0). Circuit Theory. F. Prerequisite: ECE 192 with a C- or better; concurrent registration in MATH 161 and PH 142.

Basic circuit analysis techniques and applications to engineering design problems.

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.

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 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). Principles of Digital Computing and Networking. S. Prerequisite: ECE 251 with a C- or better.

Introduction to digital computing and networking: basic organizations of computers, networks, and computer arithmetics.

ECE 453 03(3-0-0). Digital Systems Testing I. F. Prerequisite: ECE 251 with a C- or better.

Fault modeling, test generation algorithms, fault simulation, functional testing, design for testability, built-in self-testing.

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. F. Prerequisite: CIVE 451.

Circuit/packet switching, protocols, LAN/MAN, TCP/IP, error correction, ATM, wireless LANS, mobile networks.

ECE 457 03(3-0-0). Fourier Optics. F. Prerequisite: ECE 312 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.

Multi-phase power systems; power generation, transformer design, power distribution, power costs.

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.

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 503 03(3-0-0). Ultrafast Optics.** S. Prerequisite: ECE 341; ECE 342.

Principles and theory behind ultrashort pulse generation, amplification, and manipulation.

EE 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.

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.

ECE 507 03(3-0-0). Plasma Physics and Applications. S. Prerequisite: ECE 342.

Fundamental principles and industrial applications of plasmas.

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 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 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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.

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.

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 553 03(3-0-0). Digital Systems Testing II. S. Prerequisite: ECE 453.

Fault modeling for CMOS, test generation for static and dynamic CMOS, design for robust testability, self-checking circuits.

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-V)

ECE 555 03(3-0-0). Robot Motion Planning. F. Prerequisite: ECE 312 with a C- or better.

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) Reconfigurable Computing. S. Prerequisite: CS 460/ECE 460. Credit not allowed for both ECE 560 and CS 560.

Custom computing on FPGA's; silicon compilation; models of fine grain application specific parallelism; dataflow; Kahn processes; systolic arrays.

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.

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-V)

***ECE 564 03(3-0-0). Resonant Converters.** S. Prerequisite: ECE 562.

Analysis and design of resonant converters.

***ECE 569*/MECH 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 ECE 569 and MECH 569.

Micro-electro-mechanical processes and applications in sensors, optics, and structures.

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. F. Prerequisite: ECE 451.

Design of integrated circuits at the system level including cell design, digital systems, parallel architecture, systolic arrays. (NT-V)

°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. F. 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 611 03(3-0-0). Nonlinear Control Systems. F. Prerequisite: ECE 412.

Controller analysis and design for nonlinear systems.

°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 641 03(3-0-0). Electromagnetics.** F. Prerequisite: ECE 342 with a C- or better; MATH 532.

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 652 03(3-0-0). Estimation and Filtering Theory. S. Prerequisite: ECE 411 or ECE 421; STAT 525.

Optimal Kalman filter estimators; smoothing and prediction; applications to communications and controls.

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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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: ECE 456 or CS 457. 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 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 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 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

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 04(3-0-1). Population and Community Ecology. F. Prerequisite: One course each in general ecology, calculus, and statistics.

Current theories on the dynamics and regulation of populations and communities of organisms.

***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.

Courses of Instruction

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.

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.

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.

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. (AUCC 3C). F, S. 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)

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)

ECON 306 03(3-0-0). Intermediate Microeconomics. F, S, SS. Prerequisite: ECON 204; MATH 141 or MATH 155 or MATH 160.

Analysis of competitive and noncompetitive markets in terms of efficiency of resource utilization.

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 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 PO 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; STAT 201 or STAT 204 or STAT 301 or STAT 307/ERHS 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.

ECON 340/AREC 340 03(3-0-0). Introduction to Economics of Natural Resources. F. 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. 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 306.

Theory of international trade; payments, commercial policies, and economic integration.

ECON 442 03(3-0-0). International Economics II. S. Prerequisite: ECON 304.

Balance of payments, adjustment mechanisms, and international monetary systems.

ECON 451 03(3-0-0). Economics of Regulation. S. Prerequisite: ECON 306.

U.S. regulatory history, institutions, and environment; economic justifications for and effects of regulation; evaluation of deregulation movement.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

ECON 460 03(3-0-0). Economic Development. F. Prerequisite: ECON 304.

Economic problems of underdeveloped nations.

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: ECON 304; ECON 306; written consent of instructor.

Assistance in teaching introductory economics courses.

ECON 487 Var [1-3]. Internship.

ECON 492 03(0-0-3). Seminar.

Summarizes, debates, and applies issues and policies chosen by the instructor. Emphasis on student participation, debate, and research.

ECON 495 Var. Independent Study.

EC 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. F, 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). Political Economy I. F, S. Prerequisite: ECON 372 or ECON 376 or ECON 474.

Classical, liberal, conservative, modern liberal, and radical paradigms on relationship of the state to the market system.

ECON 506 03(3-0-0). Microeconomic Analysis I. F, S. Prerequisite: ECON 306; ECON 501 or MATH 315.

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). Economics of Taxation. S. Prerequisite: ECON 320.

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, S. Prerequisite: AREC 335/ECON 335; ECON 304; ECON 306; ECON 501 or concurrent registration or MATH 315. 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 550 03(3-0-0). Market Structure Analysis.** S. Prerequisite: ECON 306.

Neoclassical and institutional evaluation of structure-conduct-performance in markets and industries. Use of economic theory in antitrust.

ECON 563/AREC 563 03(3-0-0). Regional Economics-Theory, Methods, and Issues. F. Prerequisite: ECON 306; ECON 501 or concurrent registration or MATH 315 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 579 03(3-0-0). U.S. Economic History. F. Prerequisite: ECON 304 or ECON 379/HIST 379; ECON 306.

History and economic analysis of growth, transformation, and institutional change.

ECON 635/AREC 635 03(3-0-0). Econometric Theory I. S. Prerequisite: AREC 535/ECON 535. 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 699 Var. Thesis.

ECON 704 03(3-0-0). Macroeconomic Analysis II. S. Prerequisite: ECON 504; MATH 315.

Theoretical framework for analyzing flows of aggregate income and expenditure; relationship between these flows and other dimensions of economic activity.

Courses of Instruction

ECON 705 03(3-0-0). Political Economy II. S. Prerequisite: ECON 505.

Methodology of institutional economics, theory of institutional change, and policy evaluation from institutionalist viewpoint.

ECON 706 03(3-0-0). Microeconomic Analysis II. F. Prerequisite: ECON 506; MATH 315.

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). Economics of Public Expenditure. F. Prerequisite: ECON 320; ECON 506.

Analysis of welfare foundations of public expenditure, including cost-benefit analysis.

***ECON 725 03(3-0-0). Capital Theory, Risk and Uncertainty.** F. Prerequisite: Written consent of instructor.

Preference orderings; models of asset valuation and general equilibrium in models with securities markets.

ECON 735/AREC 735 03(3-0-0). Econometric Theory II. F. 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 784 Var. Supervised College Teaching.

ECON 792A-E Var. Seminar.

A) Theory. C) Social and political. D) Quantitative analysis. E) Development.

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.

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.

EDAE 618 03(3-0-0). Analyzing Education Literature. S. Prerequisite: EDAE 520; EDAE 624.

Analyze, critique, and interpret scholarly literature in the discipline.

EDAE 620 03(0-0-3). Processes and Methods. F.

Processes and methods including helping theories used by adult learning facilitators.

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.

EDAE 629 03(0-0-3). Program Development. S.

Models for planning, implementing, and evaluating programs for adult learners.

EDAE 687 Var. Internship.

Career or job fieldwork experience with an adult education institution, agency, or program.

EDAE 692 Var. Seminar-Adult Education.

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. F. Prerequisite: Concurrent registration in EDCL 702.

Role and scope of community college: history, philosophy, organization, administration.

EDCL 687 Var. Internship.

EDCL 701 03(0-0-3). Higher Education Law. S. Prerequisite: EDCL 675.

Legal theory, analysis, and review of cases relevant to higher education.

EDCL 702 03(2-0-1). Community College Curriculum. F. Prerequisite: Concurrent registration in EDCL 675.

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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

EDCL 710 03(0-0-3). Community College Finance. S. Prerequisite: EDCL 675.

Federal, state, and local revenue distribution, budget preparation and controls, accounting options, audit preparation.

EDCL 750 03(0-0-3). Simulated Presidential Cabinet I. SS. Prerequisite: EDCL 701; EDCL 702; EDCL 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; EDCL 702; EDCL 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, SS. Prerequisite: Bachelor's degree.

Career and lifestyle studies that provide an understanding of career development, employment concepts, and career counseling resources.

EDCO 550 03(3-0-0). Professional School Counseling. SS.

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(3-0-0). Tests and Assessment. S.

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.

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 402 02(0-0-2). Student Organizations-Career/Technical Education F, S, SS. Offered only through Continuing Education, School of Education.

Skills and techniques necessary for advising career and technical student organizations. (NT)

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: EDUC 350 or concurrent registration or EDUC 450 or concurrent registration; concurrent registration in EDCT 492.

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: EDUC 350 or concurrent registration or EDUC 450 or concurrent registration; concurrent registration in EDCT 492.

Methods for teaching business education. (NT-O)

Courses of Instruction

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 590 Var. Workshop.

EDCT 612 03(0-0-3). Vocational Administrative Strategies. 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.

HIGHER EDUCATION COURSES

School of Education

College of Applied Human Sciences

EDHE 590A-I Var [1-3]. 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. I) Advising student groups. F.

EDHE 660 02(2-0-0). Financial Management in Student Affairs. F. Prerequisite: Enrollment in SAHE program.

Budgeting, fiscal planning, and financial administration in student affairs.

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. F. Prerequisite: Enrollment in SAHE program.

Assessment and research involving students in collegiate settings.

EDHE 670 03(0-0-3). College Student Personnel Administration. F. Prerequisite: Enrollment in SAHE program.

Historical, philosophical, and professional development in student affairs functions; analysis of role of student affairs in higher education.

EDHE 671 03(3-0-0). Higher Education Administration. F. Prerequisite: Enrollment in SAHE program..

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. Prerequisite: Enrollment in SAHE program.

Ethical principles and standards used in student affairs.

EDHE 673 03(0-0-3). Student Development Theory. F. Prerequisite: Enrollment in SAHE program..

Strategies for application of student development theories in practice of student affairs.

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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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.

Prerequisite: Enrollment in SAHE program.

Capstone analyzing current issues and leadership in transition to professional roles.

EDHE 692A-D Var. Seminar. Prerequisite: Enrollment in SAHE program.

A) Current trends and issues. B) Working with student groups. C) Service learning. D) International programs.

EDHE 694 Var. Independent Field Studies.

EDHE 695 Var. Independent Study.

EDHE 725/EDUC 725 03(3-0-0). Professionalism in Education and Leadership. F. Prerequisite: Admitted into doctoral program. Credit not allowed for both EDHE 725 and EDUC 725.

Professional choices and ethical decision making in education and leadership, with emphasis on higher education.

ORGANIZATION PERFORMANCE AND CHANGE COURSES

School of Education

College of Applied Human Sciences

EDOD 506 03(3-0-0). Human Resource Development. F. Prerequisite: Admission to OPC specialization.

Human resource development foundations and techniques related to vocational training and development for industry, business, education, and government.

***EDOD 665 03(3-0-0). HRD Consultation and Analysis of Organizations.** S. Prerequisite: Admission to OPC specialization.

Identify and evaluate human resource development and organization change needs and strategies in response to organization performance issues.

***EDOD 667 03(3-0-0). Power-Politics-Influence in Organizations.** SS. Prerequisite: Admission to OPC specialization.

Creation and execution of power relationships, political engagements, and communications in organizations.

***EDOD 668 03(3-0-0). Learning Transfer.** F. Prerequisite: Admission to OPC specialization.

Sixteen factors affecting learning transfer and their application in organizations.

***EDOD 669 03(3-0-0). Performance Management.** S. Prerequisite: Admission to OPC specialization.

Performance improvement and change process, with special attention to the roles and responsibilities of employees and managers.

***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 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.** S. Prerequisite: Admission to OPC specialization.

Theory, history, characteristics, nature, levels, and types of change and modern conceptual and integrated models of change.

EDOD 786 Var. Practicum. Prerequisite: Admission to OPC specialization.

EDOD 792 Var. Seminar-Human Resource Development. Prerequisite: Admission to OPC specialization.

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.

EDRM 602 03(3-0-0). Action Research. SS. Prerequisite: EDRM 600.

Provide educators with knowledge and skills to plan and implement school-based research to improve teaching and learning.

EDRM 606 03(3-0-0). Measurement Concepts. F, S, SS. Prerequisite: EDRM 600; STAT 201.

Concepts of measurement and descriptive data analysis.

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.

EDRM 692 Var. Seminar-Research Methods and Proposal Design.

EDRM 698 Var. Research.

EDRM 699 Var. Thesis.

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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

EDRM 701 03(3-0-0). Applied Linear Models-Educational Research. F, 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.

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 Relationships. S, SS. Prerequisite: EDRM 700 or concurrent registration.

Inferential and correlational data analysis.

EDRM 707 03(0-0-3). Quantitative Data Collection Methods/Analysis. F. Prerequisite: EDRM 700.

Selection or development of questionnaires, tests, structured interviews, and observations. Reliability and validity. Reporting educational studies.

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.

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 792A-B Var. Seminar.

A) Research methodology. B) Proposal development.

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.

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. Prerequisite: Completion of 30 credits of course work; intent to apply to the Teacher Licensure Program. Offered only as an online or correspondence course.

Psychological conditions of classroom learning and teaching including understanding needs of exceptional children in the classroom. (NT-O, C)

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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. (\$) **C)** Early childhood. Prerequisite: EDUC 426. (\$)

EDUC 486A-J Var. Practicum. Prerequisite: Admission to teacher licensure.

A) K-12 classroom. **B)** Reading. **D)** Mathematics. **I)** Literacy. **J)** Instruction II.

EDUC 493A-B Var [1-3]. Seminar.

A) Professional relations. Prerequisite: EDUC 426 or EDUC 450; appropriate special methods course(s); EDUC 485A or concurrent registration or EDUC 485B or concurrent registration or EDCT 485 or concurrent registration. Collegial and professional discussions, support, and assistance. **B)** Assessment of learning. EDUC 426 or EDUC 450; appropriate special methods courses; concurrent registration in EDUC 485A or EDUC 485B or EDUC 485C or EDCT 485. 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.

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. 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape.

EDUC 525B-E 02(0-0-2). Expert Teaching. Prerequisite: Bachelor's degree; admission to teacher licensure.

Theories related to effective classroom instruction. **B)** Inclusion, special needs. **S.** **C)** Thinking and learning. **F.** **D)** Reading, literacy. **S.** **E)** Standards, assessment. **F.**

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 551 03(3-0-0). 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.

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 571 03(0-0-3). Vocational Assessment for Special Needs. S, SS.

Information and techniques regarding vocational assessment of special needs students including traditional and curriculum-based strategies.

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 591B-H Var. Workshop.

B) Instruction. **D)** Community partnerships. **E)** Annenberg/CPB science instruction. Var [1-3]. (NT-T) **F)** Annenberg/CPB mathematics instruction. Var [1-3]. (NT-T) **G)** Annenberg/CPB educational theory and issues. Var [1-3]. (NT-T) **H)** Annenberg/CPB humanities instruction. Var[1-3]. (NT-T)

EDUC 601 03(3-0-0). Philosophy/Organization of Workforce Education. SS.

Principles, philosophy, practices, and innovations of workforce education and human resources.

EDUC 610 03(2-0-1). Principles of Supervision and Evaluation. F,S.

Supervision and evaluation of instruction including required Colorado evaluation training.

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.

Courses of Instruction

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 628 03(3-0-0). Models of Teaching. F.

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)** Capstone 01(1-0-0). SS. Prerequisite: EDUC 687B.

EDUC 684 Var. Supervised College Teaching.

EDUC 686A-B Var. Practicum.

A) Administration. **B)** Urban teaching.

EDUC 687A-C Var. Internship.

A) Administration. **B)** Principal. **C)** Guidance and counseling.

EDUC 693A-EBVar. Seminar.

A) Administrator. **B)** Instruction.

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.

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. 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/EDHE 725 03(3-0-0). Professionalism in Education and Leadership. F. 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.

EDUC 793 Var. Seminar.

EDUC 795 Var. Independent Study.

ENGINEERING SCIENCE COURSES

College of Engineering

EGSC 492 01(0-0-1). Seminar. F, S.

EGSC 495 Var. Independent Study.

ENGINEERING COURSES

College of Engineering

ENGR 298 Var [1-3]. Undergraduate Research. Prerequisite: Written consent of research mentor and department head.

Directed undergraduate research with a faculty mentor.

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 510/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 ENGR 510 and MATH 510.

Optimization methods; linear programming, simplex algorithm, duality, sensitivity analysis, minimal cost network flows, transportation problem. (NT-O/V)

ENGR 610 03(3-0-0). Engineering Decision Support/Expert Systems. S. Prerequisite: ENGR 510/MATH 510.

Decision support systems for complex engineering problems; multicriteria decision making and optimization; hybrid knowledge-based/algorithmic methods. (NT-O/V)

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 438/CIVE 438 04(4-0-0). Pollution Control Engineering. 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 01(0-3-0). Water and Wastewater Characterization. S. Prerequisite: CIVE 440 or concurrent registration or CIVE 438/ENVE 438 or concurrent registration.

Physical, chemical and biological methods for the characterization of waters and wastewaters.

ENVE 442/CBE 442 03(3-0-0). Separation Processes. F. Prerequisite: CBE 332; one course in physical chemistry. Credit not allowed for both ENVE 442 and CBE 442.

Analysis of chemical separations based on phase equilibrium thermodynamics, diffusion, and convective mass transfer; design of separations equipment.

ENVE 448/MECH 448 03(3-0-0). Pollution Prevention. F. Prerequisite: CBE 331 or CIVE 300 or MECH 342. Credit not allowed for both ENVE 448 and MECH 448.

Prevention of environmental problems by modification of industrial processes.

ENVIRONMENTAL AND RADIOLOGICAL HEALTH SCIENCE 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. S. Prerequisite: ERHS 220; environmental health majors only.

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 307/STAT 307 03(3-0-0). Introduction to Biostatistics. (AUCC 2B). F, S, SS. Prerequisite: MATH 117. Credit allowed for only one of the following: ERHS 307/STAT 307, STAT 301, STAT 311, STAT 315.

Biostatistical methods: confidence intervals, hypothesis tests, simple correlation and regression, one-way analysis of variance.

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: ERHS 307/STAT 307; MIP 149 or MIP 300.

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. F, S, SS. Prerequisite: One college-level animal biology or anatomy/physiology or engineering design course or concurrent registration. Offered only as an online course.

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.

Courses of Instruction

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 455 03(2-2-0). Interactive Information Processing in Biology. F. Prerequisite: STAT 201.

Data management and analysis for biologists via interactive terminals.

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. F, S, SS. 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 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 530 03(3-0-0). Radiological Physics and Dosimetry I. F. Prerequisite: MATH 155 or MATH 160; PH 122.

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: ERHS 307/STAT 307.

Method of epidemiologic investigation and study design. Applications to disease control with literature examples.

***ERHS 533/*MIP 533 03(2-0-1). Epidemiology of Infectious Diseases/ Zoonoses.** S. Prerequisite: MIP 300. Credit not allowed for both ERHS 533 and MIP 533.

Epidemiologic features of infectious and parasitic diseases that have a major impact on community medicine.

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: ERHS 307/STAT 307 or STAT 301.

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: ERHS 307/STAT 307 or STAT 301. 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. (\$)

ERHS 550 05(5-0-0). Principles of Radiation Biology. S. Prerequisite: BIO 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. F. Prerequisite: CHEM 245 or CHEM 346.

Current understanding of chemical and biological agents used in asymmetric warfare.

ERHS 566 03(3-0-0). Forensic Toxicology. S. 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. S. Prerequisite: MIP 301 or MIP 302.

Hands-on techniques exposure to molecular toxicology.

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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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. S. Prerequisite: ERHS 502.

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. F. Prerequisite: ERHS 502.

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 640 03(3-0-0). Advanced Epidemiology.** S. Prerequisite: ERHS 532.

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 648 03(3-0-0). Environmental Health Risk Assessment.** S. Prerequisite: ERHS 446; ERHS 520.

Environmental contamination and health effects of chemicals using risk assessment, management, and communication approaches.

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 662/*VS 662 03(2-0-1). Applied Research-Planning/Design/Analysis.** S. Credit not allowed for both ERHS 662 and VS 662.

Training to conceptualize and execute an independent research project.

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 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. Prerequisite: A-C) ERHS 520. D) ERHS 530.

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 Var. Radiographic Technique. F, S, SS. Prerequisite: VM 786A or VM 786B.

Radiographic techniques and special procedures.

***ERHS 711 Var. Radiographic Interpretation.** F, S, SS. Prerequisite: VM 786A or VM 786B.

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

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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 Occupational Health. F. Prerequisite: PH 141.

Properties and behavior of industrial aerosols, emphasizing measurement and control of dust related to disease.

°ERHS 733 03(3-0-0). Environmental Carcinogenesis. F. 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.

ETHNIC STUDIES COURSES

Center for Applied Studies in American Ethnicity 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 the interdisciplinary area of comparative American ethnicity.

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). 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.

Contemporary 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. (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 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 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 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 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 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 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). Contemporary Native American Literature. F. Credit not allowed for both ETST 438 and E 438.

Contemporary fiction, poetry 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.

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 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 540/SPCM 540 03(3-0-0). Rhetoric, Race and Identity. F. Prerequisite: Graduate status or SPCM 412 and 12 additional 300-300 SPCM credits. Credit not allowed for both ETST 540 and SPCM 540.

Critical race theory and its relevance to rhetorical studies.

ETST 695 Var. Independent Study.

ETST 698 Var. Research in Ethnicity.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

FOREST SCIENCES COURSES

Department of Forest, Rangeland, and Watershed Stewardship Warner College of Natural Resources

F 210 03(2-2-0). Forest Ecogeography. F, S. Prerequisite: BZ 120.

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 311 03(3-0-0). Forest Ecology. F, S. Prerequisite: BIO 320 or LAND 220/SOCR 220.

Relationships of ecological concepts to the dynamics of forest ecosystems.

+F 321 03(2-2-0). Forest Biometry. F. Prerequisite: NR 220; STAT 201 or STAT 301.

Measurement and estimation of timber in logs, trees, and stands. Sampling with varying probabilities. (\$)

F 322 03(3-0-0). Economics of the Forest Environment. S. Prerequisite: AREC 202 or ECON 202 or ECON 240/AREC 240.

Economic principles and techniques applied to forested environments.

F 324 03(3-0-0). Fire Effects and Adaptations. F. Prerequisite: BIO 320 or LAND 220/SOCR 220.

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(3-2-0). Timber Management. F. Prerequisite: F 230; F 321; F 322; F 325.

Growth and yield of trees and forest stands; financial aspects of stand management; harvest scheduling and regulation of forests.

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: BIO 320 or LAND 220/SOCR 220.

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 489A-F 03(3-0-0). Technical Fire Management. F, S, SS. Offered only through Division of Continuing Education.

A) Numerical analysis for fire managers. Prerequisite: STAT 201; five years professional, full-time forestry management. (NT) **B)** Economics and management for fire specialists. Prerequisite: Five years professional, full-time forestry management. (NT) **C)** Fuels and fuel management. Prerequisite: Five years professional, full-time forestry management. (NT) **D)** Fire effects. Prerequisite: Five years professional, full-time forestry management. (NT) **E)** Fire and land management. Prerequisite: Five years professional, full-time forestry management. (NT) **F)** Technical fire management project. Prerequisite: Five years professional, full-time forestry management. (NT)

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.** S. Prerequisite: ATS 350.

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 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

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 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

Department of Construction Management College of Applied Human Sciences

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 and 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 Legal Foundations. 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)

Courses of Instruction

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 three model building codes centering on the Uniform Building Code, how the codes are influenced by and influence the fire service. (NT-O/V)

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)

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. 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 or FIN 305; FIN 355.

Analysis of corporate, government, and mortgage-based debt securities. Emphasis on securitization of asset-backed obligations.

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 350 03(3-0-0). Professional Financial Planning. S. Prerequisite: FIN 300 or FIN 305; FIN 310.

Comprehensive financial planning for clients, including taxes, credit, investments, retirement, and estate planning.

FIN 355 03(3-0-0). Principles of Investments. F, S, SS. Prerequisite: FIN 300 or FIN 305; FIN 310.

Modern investment theory with applications in the debt and equity markets, with introduction to portfolio management.

FIN 356 03(3-0-0). Equity Research. F, S. Prerequisite: FIN 355.

Researching companies and stocks using databases and other resources used by professional analysts and money managers.

FIN 370 03(3-0-0). Financial Management-Theory and Application. F, S, SS. Prerequisite: FIN 300 or FIN 305.

Theory and application of financial management to business firms; case problems used for illustration.

FIN 450 03(3-0-0). Management of Financial Institutions. F. Prerequisite: FIN 300 or FIN 305; FIN 310.

Financial management of financial intermediaries such as banks, credit unions, insurance companies, investment banks, mutual funds.

FIN 455 03(3-0-0). Advanced Portfolio Management. S. Prerequisite: FIN 311; FIN 355.

Advanced hedging and portfolio management theory and techniques.

FIN 470 03(3-0-0). Financial Risk Management. 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 or FIN 305.

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 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 610 03(3-0-0). Financial Markets. F.

Overview of financial instruments, markets, and institutions emphasizing fixed income securities. (NT-V)

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 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 assumptions and implications for financial decisions.

FIN 695 Var. Independent Study.

FIN 696 Var. Group Study.

FIN 699 Var. Thesis.

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.

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.

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.

FSHN 486B-C Var [1-3]. Practicum.

Supervised off-campus experience. **B)** Nutrition. Prerequisite: FSHN 350. **C)** Food service management. Prerequisite: FSHN 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 520 03(3-0-0). Advanced Medical Nutrition Therapy. SS. Prerequisite: FSHN 550 or FSHN 551.

Role of nutrition in etiology and treatment of selected disorders.

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 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.

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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

FSHN 560/HES 560 03(3-0-0). Exercise and Nutrition. S Prerequisite: FSHN 350; HES 403; 3 credits of biochemistry. Credit not allowed for both FSHN 560 and HES 560.

Interaction of nutrition and physical fitness in exercise performance and promotion of health.

FSHN 575 01(1-0-0). Nutrition Education for a Healthy Heart. F, S, SS. Offered only as a correspondence course.

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). Advanced Community Nutrition. S. Prerequisite: FSHN 350.

Community nutrition assessment; nutrition program planning and evaluation, nutrition policy analysis.

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 650A-B 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 686 Var. Practicum.

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 698B-C Var. Research.

B) Nutrition. C) Food service management.

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.

FSHN 795 Var. Independent Study.

FSHN 796 01(0-0-1). Group Study.

FSHN 799 Var. Dissertation-Nutrition.

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 02(1-2-0). Brewing Science and Technology. F. 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 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(2-2-0). Nutraceuticals.** S. Prerequisite: CHEM 245 or CHEM 345 or FTEC 447.

Bioactive food components and other phytochemicals as related to health promotion and disease prevention.

FTEC 698 Var. Research.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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 100 02(2-0-0). Wildlife Fundamentals. F, S. Prerequisite: Concurrent registration in FW 192 for freshmen. Credit not allowed for FW 100 and FW 200.

Conservation, ecology, laws, and history of wildlife and fisheries resources. Biology and management of representative species of wild vertebrates.

FW 104 03(3-0-0). Wildlife Ecology and Conservation. (AUCC 3A). F, S.

Essentials of wildlife ecology as a foundation for understanding issues on the origins, management and conservation of biodiversity.

+FW 192 01(1-0-0). Wildlife Inquiries. F.

Discussions in fishery and wildlife ecology and conservation. (\$)

FW 200 03(3-0-0). Wildlife Conservation. S. Prerequisite: MATH 118. Credit not allowed for both FW 100 and FW 200.

Conservation of fish and wildlife with emphasis on biology, ecology, and management of wild populations.

+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.

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 02(1-2-0). Ichthyology Laboratory. F, S. Prerequisite: FW 300 or concurrent registration.

Anatomy, taxonomy, evolution, and ecology of North American freshwater fishes. (\$)

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. Hunter Education for Instructors. F, S, SS. Offered only as a correspondence course.

Principles of learning and teaching for instructors of state hunter education courses. (NT-C)

FW 356 03. Leopold's Ethic for Wildlife and Land. F, S, SS. Offered only as a correspondence course.

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 only as a correspondence course.

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: BIO 320 or LAND 220/SOCR 220; FW 260 or FW 360; MATH 155 or MATH 160; NR 220; STAT 301 or STAT 307/ERHS 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: BIO 320 or LAND 220/SOCR 220.

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.

Instruction and practice in laboratory instruction in lower-division departmental courses.

FW 400 03(3-0-0). Fish Ecology. F. Prerequisite: BIO 320 or LAND 220/SOCR 220; FW 300; FW 370.

Interactions between fishes and their environments; applications of ecological principles to fishery management, research.

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/ERHS 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 420 03(2-0-1). Water Quality for Fish and Wildlife. S. Prerequisite: CHEM 108 or CHEM 112; LAND 220/SOCR 220.

Relationships among ecological distributions of fish and wildlife and water quality.

°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 04(2-2-1). Conservation in Management of Large Mammals. S. Prerequisite: BZ 330; FW 260; STAT 301 or STAT 307/ERHS 307.

Ecology and management of large wild mammals with emphasis on North American species both hunted and nonhunted. (\$)

+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 474 03(2-0-1). Wildlife Ecology. S. Prerequisite: LAND 220/SOCR 220; STAT 301 or STAT 307/ERHS 307.

Analysis of wildlife communities; distribution, abundance, adaptations; wildlife ethology; human impacts on wildlife.

Courses of Instruction

+FW 477 03(1-3-1). Habitat for Wildlife. F. Prerequisite: FW 260. Credit not allowed for both FW 477 and FW 677.

Wildlife habitat evaluation, classification, and improvement; management of natural and altered environments for wildlife; wildlife indicator species. (\$)

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 512/V5 512 03(3-0-0). Epidemiology/Management of Wildlife Disease. F. Prerequisite: Graduate student or junior/senior in a biological field. Credit not allowed for both FW 512 and VS 512.

Interpretation of epidemiological findings and incorporation of new information into management procedures for free-ranging wildlife populations.

FW 513/V5 513 01(0-1-0). Wildlife Disease Laboratory. F. Prerequisite: Concurrent registration in FW 512/V5 512. Credit not allowed for both FW 513 and VS 513.

Skills needed to investigate diseases of free-ranging wildlife populations.

FW 521 03(3-0-0). Fish Habitat Management. S. Prerequisite: FW 400.

Critical fish habitat problems in lotic, lentic, marine, artificial environments; survey techniques; legal constraints; technologies for mitigation.

***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: BIO 320 or LAND 220/SOCR 220; ERHS 307/STAT 307 or STAT 301.

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/ERHS 307.

Principles, types of studies and philosophy of science in design of experimental, observational, and sampling studies for wildlife investigations.

FW 555 03(2-0-1). Conservation Biology. S. Prerequisite: BIO 320 or LAND 220/SOCR 220; STAT 307/ERHS 307.

Ecological factors in conservation of biological diversity; distribution of wild vertebrates.

***FW 560 03(2-3-0). Management of Fish in Ponds and Reservoirs.** F. Prerequisite: FW 300.

Life histories, special requirements, management of fishes adaptable to artificial impoundments.

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 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. Wildlife Habitat Evaluation for Educators. F, S, SS. Prerequisite: B.A., B.S. degree. Offered only as a correspondence course.

Teachers or leaders implement wildlife habitat evaluation procedures in classroom or community programs and evaluate performance of students. (NT-C)

FW 576 03. Wildlife Policy, Administration, and Law. F, S, SS. Prerequisite: Political science, introductory course to natural resources management fields. Offered only as a correspondence course. (NT-C)

Evolution of policy affecting wildlife and humans using historical, current, philosophical, legal, and administrative constructs. (NT-C)

***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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

GEOSCIENCE COURSES

Department of Geosciences Warner College of Natural Resources

+GEOL 120 03(3-0-0). Exploring Earth: Physical Geology. (AUCC 3A). F, S, SS. Credit allowed for only one of the following: GEOL 130, GEOL 140, GEOL 150, GEOL 120, GEOL 122, GEOL 124.

Develops scientific understanding through introduction to earth processes, materials, resources, and hazards.

GEOL 121 01(0-2-0). Introductory Geology Laboratory. (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: GEOL 140, GEOL 150, GEOL 121.

Laboratory applications of introductory geology. (\$)

GEOL 122 03(3-0-0). The Blue Planet: Geology of Our Environment. (AUCC 3A). F, S, SS. Credit allowed for only one of the following: GEOL 130, GEOL 140, GEOL 150, GEOL 120, GEOL 122, GEOL 124.

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. (AUCC 3A). S. Credit allowed for only one of the following: GEOL 130, GEOL 140, GEOL 150, GEOL 120, GEOL 122, GEOL 124.

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: GEOL 130, GEOL 140, GEOL 150, GEOL 120, GEOL 122, GEOL 124.

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: GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150; CHEM 111 or concurrent registration; MATH 124; concurrent registration in GEOL 332;.

Crystal structures, crystal chemistry, rock-forming and economically important minerals, crystal growth and defects, physical properties of minerals. (\$)

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. (\$)

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

+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. F, S, SS. Prerequisite: Written consent of instructor.

Instruction and practice in laboratory instruction in lower-division departmental courses.

+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: MATH 161; PH 142; GEOL 372.

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; MATH 155 or MATH 160.

Origin of landforms; morphology and processes. (\$)

+GEOL 492 Var. Seminar. F, S. (\$)

GEOL 494A-H Var. Independent Study.

A) Environmental-engineering geology. B) Geomorphology. C) Mineralogy-petrology. E) Paleontology-stratigraphy. F) Sedimentology. G) Structural geology. H) Oceanography.

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.

Courses of Instruction

+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 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 302; STAT 304.

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 372; GEOL 364.

Evidence, environments, and consequences of tectonic theories.

***GEOL 575 04(3-2-0). Subsurface Geophysical Mapping.** S. Prerequisite: MATH 161; PH 142; GEOL 344; GEOL 372.

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: MATH 161; PH 142; GEOL 344; GEOL 372.

Seismic exploration methods, including theory, data acquisition, and data processing.

+GEOL 601 02(1-0-1). Earth Resources Analysis. F. Prerequisite: GEOL 372 or WR 416.

Analytical techniques and their applications in the geology and watershed programs. (\$)

+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.

GEOGRAPHY COURSES

Department of Forest, Rangeland, and Watershed Stewardship Warner College of Natural Resources

GR 100 03(3-0-0). Introduction to Geography. F, S.

Major geographic themes applied to selected regions; physical environment, human-land relationships, regional analysis.

GR 210 03(3-0-0). Physical Geography. S.

Energy, mass budget, and human impacts on atmosphere, hydrosphere, and continental land surfaces.

°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 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 495 Var. Independent Study. F, S.

GRADUATE SCHOOL COURSES

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.

Iterative methods for linear systems; Monte Carlo methods; visualization and image processing.

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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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 286. Credit not allowed for both HDFS 217 and HDFS 218.

Theories of play; art, music, literature as related to child development.

HDFS 218 03. Creative Experiences for Preschool Children. F, S, SS. Credit not allowed for both HDFS 218 and HDFS 217. Offered as correspondence course only.

Role of art, music, and literature in development; emphasis on planning and conducting creative experiences for preschool children. (NT-C)

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 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.

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.

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.

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. Children with Special Needs in Child Care. F, S, SS. Prerequisite: HDFS 276. Offered as correspondence course only.

Exploration of characteristics, services, and issues affecting exceptional individuals. (NT-C)

HDFS 320 03(3-0-0). Cognitive and Language Development. S, SS. Prerequisite: HDFS 310 or PSY 260.

Cognitive and language development from birth to adulthood; including biological, social, and cultural influences.

HDFS 332 03(2-0-1). Death, Dying, and Grief. F, S, SS. Prerequisite: HDFS 101.

Developmental processes of death and dying related to the dying individual and family; applied to dealing with grief, death in human service agencies.

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 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 286 or concurrent registration; 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.

HDFS 402 03(3-0-0). Family Studies. F, S, SS. Prerequisite: HDFS 101 or SOC 100.

Theory and research concerning relationships within families; interaction between family and other social institutions.

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.

HDFS 430 03. Play Behavior. F, S, SS. Prerequisite: HDFS 310 or PSY 260. Offered as correspondence course only.

Theories and research of play behavior and play environments. (NT-C)

HDFS 439 03. Administration of Child Care Centers. F, S, SS. Prerequisite: Any two of the six courses meeting state child care certification requirements. Offered as correspondence course only.

Center administration related to program development and operations, budgeting, state regulations and licensing, and personnel issues. (NT-C)

HDFS 477 01(1-0-0). Professional Skills Development. F, S, SS. Prerequisite: HDFS 286.

Applications and integration of human development and family background within professional settings.

HDFS 484 Var [1-3]. Supervised College Teaching.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

HDFS 488A-D Var [1-14]. Field Placement. Prerequisite: HDFS 286; HDFS 477 or concurrent registration.

Application of human development skills in a professional setting. **A)** Childhood education. **B)** Programming for youth and families. **C)** Child life allied health. **D)** Programming for adults and later life families.

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.

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 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. F, SS. 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 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. (NT-O)

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.

Statistical concepts and analysis.

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 678 Var [1-3]. Applications of Marriage and Family Therapy. F, S, SS. Prerequisite: HDFS 677 or concurrent registration; admission to MFT Program.

Applications of family therapy theory to clinical cases.

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 688 Var [1-5]. Field Placement. Prerequisite: Admission to MFT Program; concurrent registration in HDFS 678.

Application of knowledge, skills, and methods to therapy and intervention.

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 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. (\$) **M)** Basketball. **N)** Racquetball. **O)** Weight training. **P)** Ice skating. (\$)

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. (\$) **F)** Soccer. **G)** Basketball. **H)** Racquetball. **I)** Aerobics. **J)** Ice skating. (\$)

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. (\$)

HES 119 02(1-2-0). Games and Rhythmic Activities. F, S.

Methods and materials of movement education; rhythmic activities for all age groups.

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. (\$)

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. (\$)

HES 260 02(2-0-0). History and Principles of Physical Education. F, S.

Emerging philosophies and principles.

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.

Preparation to coach in an interscholastic athletic situation.

HES 319 03(3-0-0). Neuromuscular Aspects of Human Movement. F, S. Prerequisite: BMS 300; 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape.

Courses of Instruction

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.

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.

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 386A-B. Practicum.

A) Adult fitness. 02(1-3-0). Prerequisite: FSHN 150; HES 145; HES 207; HES 240; HES 332F; HES 332H; concurrent registration in HES 340. **B)** Wellness program management. 03(1-6-0). Prerequisite: BMS 300 with a C or better; FSHN with a C or better; HES 145 with a C or better; HES 207 with a C or better; HES 386A; 2.500 GPA.

HES 403 04(3-2-0). Physiology of Exercise. F, S, SS. Prerequisite: BMS 300; LIFE 102.

Effects of exercise on tissues, organs, and systems of the body. (\$)

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. (\$)

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. Prerequisite: HES 403.

Interaction of physical activity with pathophysiology and treatment of chronic diseases and conditions.

HES 479 03(3-0-0). Psychology and Sport. F, S. Prerequisite: PSY 100.

Psychological and social implications involved in teaching of physical education and coaching of athletics.

HES 484 Var [1-5]. Supervised College Teaching. Maximum of 10 credits allowed in course.

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 Var. 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 495B-G Var. Independent Study.

B) Health. **D)** Biomechanics. **E)** Exercise science. **F)** Neuromuscular physiology. **G)** Honors.

HES 496B-F Var. Group Study.

B) Health. **C)** Athletics. **D)** Biomechanics. **E)** Exercise science. **F)** 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 560/FSHN 560 03(3-0-0). Exercise and Nutrition. S. Prerequisite: FSHN 350; HES 403; 3 credits of biochemistry. Credit not allowed for both HES 560 and FSHN 560.

Interaction of nutrition and physical fitness in exercise performance and promotion of health.

HES 600 03(3-0-0). Data Analysis for Research Designs. F. Prerequisite: One course in statistics.

Methods of research applied to health and exercise science including quantitative techniques of analysis and research design.

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 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 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.

HES 693 01(0-0-1). Seminar.

Maximum of 2 credits allowed in course.

Current topics and issues in health and exercise science.

HES 695B-E Var. Independent Study.

B) Health. D) Exercise science. E) Biomechanics. F) Neuromuscular physiology.

HES 696B-G Var. Group Study.

B) Health. C) Exercise and nutrition. E) Exercise science. F) Biomechanics. G) 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 3E). 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 3E). 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 3E). 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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 3E). 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 235 03(3-0-0). Slavic and East Central European Civilizations. F.

Political, cultural, socioeconomic development of Slavic and East Central Europe emphasizing similarity and diversity of the peoples of the region.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

Causes and consequences of industrialization and its impact on European societies between 1871 and 1989.

HIST 323 03(3-0-0). Russia Before 1700. F. Prerequisite: HIST 100 or HIST 101 or HIST 171.

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.

Tsarist Russia from its beginnings to November 1917 Revolution with emphasis on modern period. (NT-C)

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

HIST 326 03(3-0-0). European Biography. F, S. Prerequisite: HIST 101 or HIST 171.

Historical enquiry into European social, intellectual, political, and economic development through study of leading personalities.

°**HIST 327 03(3-0-0). Habsburg Empire.** F. Prerequisite: HIST 101 or HIST 171.

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.

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.

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.

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.

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.

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.

Political, economic, social, and cultural history of major European nations since World War II.

HIST 334 03(3-0-0). European Culture in the 20th Century. S. Prerequisite: HIST 101 or HIST 171.

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.

Political, economic, and social developments emphasizing role of Britain in world affairs and internal changes that led to welfare state.

HIST 340 03(3-0-0). Colonial and Provincial America to 1740. F, SS. Prerequisite: HIST 101 or HIST 150 or HIST 171.

English colonies and their maturation to the Great Awakening.

HIST 341 03(3-0-0). Era of the American Revolution. S, SS. Prerequisite: HIST 101 or HIST 150 or HIST 171.

Imperial relations and American society during revolutionary period.

°**HIST 343 03(3-0-0). Early U.S. Republic.** F, SS. Prerequisite: HIST 101 or HIST 150 or HIST 171.

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.

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.

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: HIST 101 or HIST 150 or HIST 171.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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 Intellectual History. S, SS. Prerequisite: HIST 101 or HIST 150 or HIST 151 or HIST 171.

Ideas and institutions that have molded American character from earliest times to present.

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. Credit not allowed for both HIST 357 and MLSC 357.

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.

History of Indian, African, and European women in North America from early colonial contact through the American Revolution and into Early Republic.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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.

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.

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.

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.

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.

History of Colorado from pre-history to present.

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. 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.

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.

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.

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.

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.

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.

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.

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.

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.

South African history from human origins to the end of Apartheid.

***HIST 430 03(3-0-0). Ancient Near East.** S. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170.

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.

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.

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.

Emergence of Islam and growth of the Islamic community from time of Muhammad to decline of the Arab Caliphate.

HIST 434 03(3-0-0). Crusades in the Near East. S. Prerequisite: HIST 100 or HIST 115 or HIST 120 or HIST 170.

The Crusades, emphasizing religion, politics, and warfare in Western Europe, Byzantium, the Near East, and the Mongol world empire, c. 1050-1300.

HIST 438 03(3-0-0). The Modern Middle East. S. Prerequisite: HIST 101 or HIST 115 or HIST 171.

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.

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.

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.

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 170.

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 171.

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.

Historical developments in Japan since 1600.

HIST 460 03(3-0-0). Slavery in the Americas. F. Prerequisite: HIST 101 or HIST 150 or HIST 171 or HIST 250.

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 171.

Beginnings of globalization; its origins in the spread of the British Empire; major causes of expansion, forms of control, long-term effects.

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 150 or HIST 151 or HIST 170 or HIST 171.

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 150 or HIST 151 or HIST 171.

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.

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.

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.

United States-China relations as represented in travel narratives, memoirs, journalistic and diplomatic writing, biography, and autobiography.

HIST 467 03(3-0-0). Nature of European Empires, 1492-1800. F. Prerequisite: HIST 100 or HIST 101 or HIST 170 or HIST 171 or HIST 150 or HIST 151.

Nature of European empires, emphasizing trade, ecological exchange, plantation agriculture, conservation ecology, scientific expertise.

°**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.

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.

Public history methodology.

HIST 484 Var. Supervised College Teaching.

Assisting the instructor in teaching introductory history courses; relevant readings and discussions.

HIST 487 Var [1-3]. Internship.

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.

HIST 497 Var [1-3]. Group Study.

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). Archival Records Management.** S. Prerequisite: HIST 501.

Historical context of records management and instruction in techniques for controlling, creation, use, and disposition of 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.

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 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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

University Honors Program

Office of Provost/Senior Vice President

HONR 100 01(0-0-1). Honors Western Civilization I. F. Prerequisite: Concurrent registration in HIST 100; participation in University Honors Program.
Selected readings complementing "Western Civilizations" material.

HONR 101 01(0-0-1). Honors Western Civilization II. S. Prerequisite: Concurrent registration in HIST 101; participation in University Honors Program.
Selected readings complementing "Western Civilizations" material.

HONR 103 02(1-0-1). Honors Biology of Organisms. S. Prerequisite: Concurrent registration in LIFE 103; participation in University Honors Program.
Selected readings complementing "Biology of Organisms" material.

HONR 170 01(0-0-1). Honors World Civilizations, Ancient-1500. F. Prerequisite: Concurrent registration in HIST 170; participation in University Honors Program.
Selected readings complementing "World Civilizations, Ancient-1500" material.

HONR 171 01(0-0-1). Honors World Civilizations, 1500-Present. S. Prerequisite: Concurrent registration in HIST 171; participation in University Honors Program.
Selected readings complementing "World Civilizations, 1500-Present" material.

HONR 192 04(0-0-4). 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). 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. 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.

HONR 392 03(0-0-3). 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. 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: HONR 193; participation in University Honors Program.
Preparation for Honors senior thesis.

HONR 492 03(0-0-3). 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.

Individual projects developed by the student and the major adviser at the upper-division level but which transcends basic course content.

HONR 499 03. Senior Honors Thesis. Prerequisite: HONR 399. Maximum of 6 credits allowed in course.

HORTICULTURE COURSES

Department of Horticulture and Landscape

Architecture

College of Agricultural Sciences

HORT 100 04(3-2-0). Horticultural Science. (AUCC 3A). F, S.

Principles of plant science and related disciplines as the base and context for the introduction of horticulture practices. (\$)

HORT 170 02(2-0-0). Introduction to Horticultural Therapy. F. Offered only off campus.

Theory and practice of horticultural therapy in health care and human services; applications, settings, and professional career topics. (NT)

HORT 171/SOCR 171 03(2-0-01). 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 277 01(1-0-0). Introduction to Enology. S.

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. Prerequisite: CON 131.

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 232; 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 371 02(2-0-0). Horticultural Therapy Techniques. S. Prerequisite: HORT 170.

Clinical skills in horticultural therapy; communication, safety, and adaptation of tools, activities, and gardens. (NT)

HORT 373 02(2-0-0). Horticultural Therapy Programming. SS. Prerequisite: HORT 170.

Methods for individual treatment planning, intervention, documentation, and reporting within therapy, social, and vocational HT programs. (NT)

HORT 377 02(2-0-0). Horticultural Methods for Therapy Programs. F. Prerequisite: HORT 170; HORT 371 or HORT 373.

Horticultural therapy methods including indoor and outdoor garden design, management of site, tools and other modifications. (NT)

HORT 384 Var [1-5]. Supervised College Teaching. F, S. Maximum of 10 credits allowed in course.

°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 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 431 04(2-4-0). Planting Design Studio. F. Prerequisite: HORT 221; HORT 231; HORT 232; HORT 322.

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 336; HORT 431.

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. F. 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 I-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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

***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 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.

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: F 210 or HORT 221.

Policies and management of public and privately owned community forests in urbanized areas.

HORT 471 02(2-0-0). Horticultural Therapy Management. S. Prerequisite: HORT 170; HORT 371; HORT 373; HORT 377. Offered only off campus.

Horticultural therapy program development, site planning and management, program proposals. (NT)

***HORT 475 03(3-0-0). Environmental Requirements of Horticultural Plants.** S. Prerequisite: BZ 120 or HORT 100 or LIFE 103.

Impact of environmental factors and global climatic change on production of horticultural crops, plant distribution, and species biodiversity.

***HORT 477 03(3-0-0). Enology-History and Winemaking.** S. 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 486 Var [1-6]. Practicum.

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 or HORT 475.

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 588 Var. Supervised Extension Practices.

Field experiences in extension practices in horticulture.

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.

HORT 795 Var. Independent Study.

HORT 799 Var. Dissertation.

INTERNATIONAL EDUCATION COURSES

Office of Provost/Senior Vice President

IE 116/AGRI 116 03(3-0-0). Plants and Civilizations. (AUCC 3E). F, S. Credit not allowed for both IE 116 and AGRI 116.

Worldwide origin of plants and products as basis for food, spices, perfumes, medicine, art, mythology, religion, wars, exploration, slavery.

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. S.

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.

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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

IE 492 03(0-0-3). International Development Seminar. S.

Key aspects of international development and current and emerging issues.

***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 692 03(0-0-3). International Development Seminar. S.

Exploration of contemporary issues in international development from interdisciplinary perspectives.

INTERNATIONAL STUDIES COURSES

College of Liberal Arts

INST 300 03(0-0-3). Approaches to International Studies. F. Prerequisite: GR 100; junior or senior standing.

Interdisciplinary and comparative analytical approaches to the field of international studies.

INST 492A-D 03(0-0-3). Seminar. S.

A) Asia. Prerequisite: INST 300. **B)** Latin America. Prerequisite: INST 300. **C)** Europe. Prerequisite: INST 300. **D)** Middle East and North Africa. Prerequisite: HIST 115; HIST 438; INST 300.

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 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 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 only as an online course.

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 260; 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 357 03(3-0-0). History of International Interiors. F. Prerequisite: INTD 276 with a C or better.

Major international interior periods/styles from Middle Ages through 19th century.

INTD 358 03(3-0-0). History of American and 20th Century Interiors. S. Prerequisite: INTD 357.

Historical interiors in the United States through the 20th century.

INTD 376 03(0-6-0). Interior Design II. S. Prerequisite: CON 260; 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. Maximum of 10 credits allowed in course.

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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape.

Courses of Instruction

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. Prerequisite: INTD 376 with a C or better.

INTD 578 03(2-0-1). Trends/Issues in Interior Design. F. Prerequisite: INTD 376 with a C or better.

INTD 675 Var [1-8]. Problems-Interior Design. F, S. Prerequisite: Four credits of INTD 575.

INTRA-UNIVERSITY COURSES

Office of Provost/Senior Vice President

IU 170 02(1-0-1). A Call to Lead I: Theories and Skills. F. Prerequisite: 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: 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 270 02(1-0-1). Leadership Styles I: Personal Application. F. Prerequisite: Written consent of instructor.

Leadership styles and contexts for personal application.

IU 271 02(1-0-1). Leadership Styles II: Prominent Leaders. S. Prerequisite: 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: IU 271; 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: 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 250 03(3-0-0). Advertising. F, S.

Advertising principles and techniques used to develop effective advertising campaigns.

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(1-4-0). 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.

Media development, growth, trends within context of political, social, and economic change.

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.

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 Photojournalism. F, S. Prerequisite: JTC 211.

Basic photojournalistic theory and practice using analog and digital cameras, and digital image processing technology. Access to 35mm camera required. (\$)

+JTC 340 03(2-2-0). Video Editing. F, S. Prerequisite: JTC 210.

Theory and technique of editing picture and sound on analog and digital platforms. (\$)

JTC 341 03(2-2-0). Broadcast News. F, S. Prerequisite: JTC 210.

Practical application of principles, theory, and methods used in broadcast 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. Prerequisite: JTC 341.

Advanced theory and practice of reporting and producing television news; basics of broadcast 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; JTC 211; JTC 350.

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 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: Junior or senior journalism majors.

Issues and research in computer mediated communication relating to individuals, groups, community, and society.

JTC 371 03(1-4-0). 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.

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 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.

Professional ethics, issues of media performance and of the relation of media systems to the social systems.

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.

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: Senior standing. Credit not allowed for both JTC 456 and LB 456.

Documentary film and its role in human history, culture, and social interaction.

Courses of Instruction

***JTC 460 03(3-0-0). Media Development.** S. Prerequisite: JTC 211; JTC 310; JTC 371 or JTC 372.

Creation, design, production, and management of media.

JTC 461 03(2-2-0). Writing about Science, Health, and Environment. F. Prerequisite: JTC 210.

Writing about science, health, and the environment for lay audiences from a journalistic perspective.

JTC 464 03(2-2-0). Technical Writing. F, S. Prerequisite: JTC 310; JTC 361.

Writing technical information for a variety of media.

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.

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 03(3-0-0). Communication Research and Evaluation Methods. F. Prerequisite: Three credits of statistics. 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 03(3-0-0). Process and Effects of Technical Communication. F. Prerequisite: Concurrent registration in JTC 500.

Examination of technical communication 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 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.

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). Telecommunication. S. Prerequisite: JTC 501.

Theory and application of telecommunication in information age.

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.

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.

LAND 220/SOCR 220 03(3-0-0). Fundamentals of Ecology. (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 320, LAND 220, SOCR 220.

Interrelationships among organisms and their environments.

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. S. 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. (\$)

KEY ACADEMIC COMMUNITY COURSES

Office of Provost/Senior Vice President

KEY 192 03(0-0-3). Key Academic Community Seminar. F. Concurrent registration in companion courses in the Key Course Cluster.

Examination of an intellectual problem or theme through the lenses of two disciplines linked in a Course Cluster.

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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

LAND 384 Var [1-5]. Supervised College Teaching. Maximum of ten credits allowed in course.

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 360; one course in biology.

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.** S.

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.

ARABIC LANGUAGE COURSES

Department of Foreign Languages and Literatures

College of Liberal Arts

LARA 105 05(5-2-0). 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(5-2-0). 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(4-2-0). Second-Year Arabic I. (AUCC 3B). F, S. Prerequisite: LARA 107 or placement exam. Credit not allowed for both LARA 200 and LARA 228A.

Grammar review and extensive practice in conversation, reading, and writing.

LARA 201 04(4-2-0). Second-Year Arabic II. (AUCC 3B). F, S. Prerequisite: LARA 200 or LARA 228A or placement exam. Credit not allowed for both LARA 201 and LARA 228B.

Grammar review and extensive practice in conversation, reading, and writing.

LARA 228A 05(5-0-0). Second Year Arabic I-Abroad. SS. Prerequisite: LARA 107 or placement exam. Credit not allowed for both LARA 228A and LARA 200.

Grammar review and extensive practice in conversation, reading, and writing done abroad.

LARA 228B 05(5-0-0). Second Year Arabic II-Abroad. SS. Prerequisite: LARA 200 or LARA 228A or placement exam. Credit not allowed for both LARA 228B and LARA 201.

Grammar review and extensive practice in conversation, reading, and writing done abroad.

LARA 250 03(3-0-0). Arabic Language, Literature, Culture in Translation. (AUCC 3E). F, S.

Selected works in translation from different periods and genres which represent the interrelationship of language, literature, and culture.

LARA 328A 03(3-0-0). Arabic Oral and Written Communication-Abroad. SS. Prerequisite: LARA 201 or LARA 228B.

In-depth language study to improve proficiency in written and oral skills abroad.

LARA 328B 03(3-0-0). Approaches to Arabic Literature-Abroad. SS. Prerequisite: Placement exam or written consent of instructor.

Appreciation and critical readings of representative works in prose, drama, and poetry done abroad.

LARA 328C 03(3-0-0). Issues in Arabic Culture-Abroad. SS. Prerequisite: Written consent of instructor.

Historical context of contemporary issues in the culture studied abroad.

LARA 428A 03(3-0-0). Advanced Arabic Communication Skills-Abroad. SS. Prerequisite: Written consent of instructor.

Development of speaking, reading, and writing proficiency through in-depth use of local resources abroad.

LARA 428B 03(3-0-0). Arabic Literary Studies-Abroad. SS. Prerequisite: Written consent of instructor.

Study in selected literary movements, genres, or interdisciplinary subjects in literature done abroad.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

LIBERAL ARTS COURSES

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 300 01(1-0-0). Liberal Arts Research Methods. F, S.

Research methods for liberal arts majors.

LB 455/SPCM 455 03(2-2-0). 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: 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 487 01(0-0-1). Internship.

LB 492 02(0-0-2). Liberal Arts Capstone Seminar. F, S.

Capstone course for liberal arts majors. (NT-O)

LB 495 Var. Independent Study.

CHINESE LANGUAGE COURSES

Department of Foreign Languages and Literatures

College of Liberal Arts

LCHI 105 05(5-2-0). 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(5-2-0). 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 (5-2-0). Second-Year Chinese I. (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(5-2-0). Second-Year Chinese II. (AUCC 3B). F, S. Prerequisite: LCHI 200 or LCHI 228A or placement exam. Credit not allowed for both LCHI 201 and LCHI 228B.

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 228A 05(5-0-0). Second Year Chinese I-Abroad. SS. Prerequisite: LCHI 107 or placement exam. Credit not allowed for both LCHI 228A and LCHI 200.

Grammar review and extensive practice in conversation, reading, and writing done abroad.

LCHI 228B 05(5-0-0). Second Year Chinese II-Abroad. SS. Prerequisite: LCHI 200 or LCHI 228A or placement exam. Credit not allowed for both LCHI 228B and LCHI 201.

Grammar review and extensive practice in conversation, reading, and writing done abroad.

LCHI 250 03(3-0-0). Chinese Language, Literature, Culture in Translation-Chinese. (AUCC 3E). 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. Prerequisite: LCHI 107.

LCHI 304 03(3-0-0). Third-Year Chinese I. F. Prerequisite: LCHI 201 or LCHI 228B 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 LCHI 328A 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 328A 03(3-0-0). Chinese Oral and Written Communication-Abroad. SS. Prerequisite: LCHI 201 or LCHI 228B.

In-depth language study to improve proficiency in written and oral skills abroad.

LCHI 328B 03(3-0-0). Approaches to Chinese Literature-Abroad. SS. Prerequisite: Placement exam or written consent of instructor.

Appreciation and critical readings of representative works in prose, drama, and poetry done abroad.

LCHI 328C 03(3-0-0). Issues in Chinese Culture-Abroad. SS. Prerequisite: Written consent of instructor.

Historical context of contemporary issues in the culture studied abroad.

LCHI 365 03(3-0-0). Studies in Foreign Film-Chinese. F, S. Prerequisite: LCHI 305.

Representation of Chinese society through film. Taught in Chinese.

LCHI 428A 03(3-0-0). Advanced Chinese Communication Skills-Abroad. SS. Prerequisite: Written consent of instructor.

Development of speaking, reading, and writing proficiency through in-depth use of local resources abroad.

LCHI 428B 03(3-0-0). Chinese Literary Studies-Abroad. SS. Prerequisite: Written consent of instructor.

Study in selected literary movements, genres, or interdisciplinary subjects in literature done abroad.

LCHI 495 Var [1-6]. Independent Study-Chinese. Prerequisite: Three years of college-level Chinese.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

FRENCH LANGUAGE COURSES

Department of Foreign Languages and Literatures College of Liberal Arts

LFRE 105 05(5-2-0). 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(3-2-0). 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(5-2-0). 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(5-2-0). 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(3-2-0). 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(3-2-0). Second-Year French II. (AUCC 3B). F, S. Prerequisite: LFRE 200 or LFRE 228A or placement exam. Credit not allowed for both LFRE 201 and LFRE 228B.

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 228A 05(5-0-0). Second Year French I-Abroad. SS. Prerequisite: LFRE 107 or LFRE 108 or placement exam. Credit not allowed for both LFRE 228A and LFRE 200.

Grammar review and extensive practice in conversation, reading, and writing done abroad.

LFRE 228B 05(5-0-0). Second Year French II-Abroad. SS. Prerequisite: LFRE 200 or LFRE 228A or placement exam. Credit not allowed for both LFRE 228B and LFRE 201.

Grammar review and extensive practice in conversation, reading, and writing done abroad.

LFRE 250 03(3-0-0). French Language, Literature, Culture in Translation-French. (AUCC 3E). F, S.

Selected works in translation from different periods and genres which represent the interrelationship of language, literature, and culture.

LFRE 300 03(3-0-0). Reading and Writing for Communication-French. F, S, SS. Prerequisite: LFRE 201 or LFRE 208 or LFRE 228B or placement. Credit not allowed for both LFRE 300 or LFRE 301 and LFRE 328A.

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 or LFRE 228B. Credit not allowed for both LFRE 301 or LFRE 300 and LFRE 328A.

In-depth language study to improve proficiency in all language skills emphasizing oral.

LFRE 310 03(3-0-0). Approaches to French Literature-French. F, S. Prerequisite: LFRE 300 or LFRE 228A. Credit not allowed for both LFRE 310 and LFRE 328B.

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 or LFRE 328A.

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 or LFRE 328A.

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 or LFRE 328A.

Phonetic principles and their application to language sound system; intensive practice in pronunciation, intonation.

LFRE 328A 03(3-0-0). French Oral and Written Communication-Abroad. SS. Prerequisite: LFRE 201 or LFRE 208 or LFRE 228B. Credit not allowed for both LFRE 328 A and LFRE 300 or LFRE 301.

In-depth language study to improve proficiency in written and oral skills abroad.

LFRE 328B 03(3-0-0). Approaches to French Literature-Abroad. SS. Prerequisite: LFRE 300 or placement exam. Credit not allowed for both LFRE 328B and LFRE 310.

Appreciation and critical readings of representative works in prose, drama, and poetry done abroad.

LFRE 328C 03(3-0-0). Issues in French Culture-Abroad. SS. Prerequisite: LFRE 300. Credit not allowed for both LFRE 328C and LFRE 335.

Historical context of contemporary issues in the culture studied abroad.

LFRE 335 03(3-0-0). Issues in Francophone Culture. S. Prerequisite: LFRE 300 or LFRE 328A. Credit not allowed for both LFRE 335 and LFRE 328C.

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 or LFRE 328A.

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 or LFRE 328B.

Representative literary works from the 20th century.

LFRE 365 03(3-0-0). Studies in Foreign Film-French. F, S. Prerequisite: LFRE 310 or LFRE 335.

Representation of French society through film. Taught in French.

LFRE 400 03(3-0-0). Advanced French Communication Skills. F. Prerequisite: LFRE 300 or LFRE 328A. Credit not allowed for both LFRE 400 and LFRE 428A.

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 428A 03(3-0-0). Advanced French Communication Skills-Abroad. SS. Prerequisite: LFRE 300. Credit not allowed for both LFRE 428A and LFRE 400.

Development of speaking, reading, and writing proficiency through in-depth use of local resources abroad.

LFRE 428B 03(3-0-0). French Literary Studies-Abroad. SS. Prerequisite: LFRE 300; LFRE 310.

Study in selected literary movements, genres, or interdisciplinary subjects in literature done abroad.

LFRE 428C 03(3-0-0). Advanced French Culture and Society-Abroad. SS. Prerequisite: LFRE 335

Selected topics in the history of the target culture and society studied abroad.

LFRE 433A-B 03(3-0-0). Advanced French/Francophone Culture. F. Prerequisite: LFRE 328C or 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 or LFRE 328A; LFRE 310 or LFRE 328B. 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 or LFRE 328A; LFRE 310 or LFRE 328B. 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 or LFRE 328A; LFRE 310 or LFRE 328B. 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 or LFRE 328A; LFRE 310 or LFRE 328B. May be taken up to 3 times for credit.

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 or LFRE 328A; LFRE 310 or LFRE 328B.

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-French. F S. Prerequisite: LFRE 310 or LFRE 328B; two 400-level 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: L FRE 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.

LFRE 695 Var [1-6]. Independent Study-French.

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. Prerequisite: LARA 107 or LCHI 107 or LFRE 107 or LFRE 108 or LGER 107 or LGER 108 or LITA 107 or LJPJ 107 or LKOR 107 or LRUS 107 or LSPA 107 or LSPA 108.

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). Studies in Foreign Film-General. 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.

Representation of foreign societies through film.

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 428C 03(3-0-0). General Advanced Culture and Society-Abroad. SS. Prerequisite: LFRE 335 or LGER 335 or LSPA 335.

Selected topics in the history of the target culture and society studied abroad.

LGEN 465A-C 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.

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 or LFRE 328B or LGER 328B or LSPA 328B; two 400-level 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 Theory and Criticism. F. Prerequisite: Written consent of instructor.

Theoretical and critical approaches to foreign literatures.

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 699 Var [1-6]. Thesis.

GERMAN LANGUAGE COURSES

Department of Foreign Languages and Literatures College of Liberal Arts

LGER 105 05(5-2-0). First-Year German I. F, S, SS. Prerequisite: Nfo previous study in German.

Essentials of German for the beginner: aural comprehension, speaking, reading, writing.

LGER 107 05(5-2-0). 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(5-2-0). 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(3-2-0). Second-Year German I. (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(3-2-0). Second-Year German II. (AUCC 3B). F, S. Prerequisite: LGER 200 or LGER 228A or placement exam. Credit not allowed for both LGER 201 and LGER 228B.

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 228A 05(5-0-0). Second Year German I-Abroad. SS. Prerequisite: LGER 107 or LGER 108 or placement exam. Credit not allowed for both LGER 228A and LGER 200.

Grammar review and extensive practice in conversation, reading, and writing done abroad.

LGER 228B 05(5-0-0). Second Year German II-Abroad. SS. Prerequisite: LGER 200 or LGER 228A or placement exam. Credit not allowed for both LGER 228 B and LGER 201.

Grammar review and extensive practice in conversation, reading, and writing done abroad.

LGER 250 03(3-0-0). German Language, Literature, Culture in Translation. (AUCC 3E). 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. Prerequisite: LGER 107 or LGER 108.

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 LGER 228B or placement. Credit not allowed for both LGER 300 or LGER 301 and LGER 328A.

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 LGER 228B. Credit not allowed for both LGER 301 or LGER 300 and LGER 328A.

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 or LGER 228B. Credit not allowed for both LGER 310 and LGER 328B.

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 or LGER 328A.

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 or concurrent registration or LGER 328A.

Phonetic principles and their application to language sound system; intensive practice in pronunciation, intonation.

LGER 328A 03(3-0-0). German Oral and Written Communication-Abroad. SS. Prerequisite: LGER 201 or LGER 208 or LGER 228B. Credit not allowed for both LGER 328A and LGER 300 or LGER 301.

In-depth language study to improve proficiency in written and oral skills abroad.

LGER 328B 03(3-0-0). Approaches to German Literature-Abroad. SS. Prerequisite: LGER 300 or placement exam. Credit not allowed for both LGER 328B and L 310.

Appreciation and critical readings of representative works in prose, drama, and poetry done abroad.

LGER 328C 03(3-0-0). Issues in German Culture-Abroad. SS. Prerequisite: LGER 300. Credit not allowed for both LGER 328C and LGER 335.

Historical context of contemporary issues in the culture studied abroad.

LGER 335 03(3-0-0). Issues in German Culture. S. Prerequisite: LGER 300 or LGER 328A. Credit not allowed for both LGER 335 and LGER 328C.

Historical context of contemporary issues in the culture of German-speaking countries.

LGER 345 03(3-0-0). Business German. F, S, SS. Prerequisite: LGER 300 or LGER 328A.

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 or LGER 328B.

Representative literary works from the 20th century.

LGER 365 03(3-0-0). Studies in Foreign Film-German. F, S. Prerequisite: LGER 310 or LGER 335.

Representation of German society through film. Taught in German.

LGER 400 03(3-0-0). Advanced German Communication Skills. F. Prerequisite: LGER 300 or LGER 328A. Credit not allowed for both LGER 400 and LGER 428A.

Development of speaking, reading, and writing proficiency through an in-depth examination of representative writings and media communications.

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 428A 03(3-0-0). Advanced German Communication Skills-Abroad. SS. Prerequisite: LGER 300. Credit not allowed for both LGER 428A and LGER 400.

Development of speaking, reading, and writing proficiency through in-depth use of local resources abroad.

LGER 428B 03(3-0-0). German Literary Studies-Abroad. SS. Prerequisite: LGER 300; LGER 310.

Study in selected literary movements, genres, or interdisciplinary subjects in literature done abroad.

LGER 428C 03(3-0-0). Advanced German Culture and Society-Abroad. SS. Prerequisite: LGER 335.

Selected topics in the history of the German culture and society studied abroad.

Courses of Instruction

LGER 434 03(3-0-0). Advanced German Culture. F, S. Prerequisite: LGER 335 or LGER 328C.

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 or LGER 328A; LGER 310 or LGER 328B. 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 or LGER 328A; LGER 310 or LGER 328B. 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 or LGER 328A; LGER 310 or LGER 328B. 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: LGER 300 or LGER 328A; LGER 310 or LGER 328B. May be taken up to 3 times for credit.

Selected topic studies such as themes, topoi, and interdisciplinary subjects in literature.

LGER 492 03(0-0-3). Seminar-German Language, Literature, and Society. F, S. Prerequisite: LGER 310 or LGER 328B; two 400-level 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

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

Department of Biology

College of Natural Sciences

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) Molecular genetics. Prerequisite: LIFE 201B or concurrent registration.

LIFE 203 01(0-3-0). 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. F, 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). Eukaryotic Cell Biology Recitation. F, S. Prerequisite: LIFE 210 or concurrent registration.

Molecular aspects of cellular and subcellular biology and introductory biochemistry recitation.

LIFE 212 01(0-3-0). Introductory Cell Biology Laboratory. F, S. Prerequisite: CHEM 112; LIFE 210 or concurrent registration.

Molecular aspects of cellular and subcellular biology and introductory biochemistry laboratory.

LIFE 230 03(3-0-0). Ecology. F, S. Prerequisite: LIFE 102; LIFE 103; MATH 141 or MATH 155 or MATH 160.

Interrelationships between organisms and the environment, with emphasis on quantitative thought.

ITALIAN LANGUAGE COURSES

Department of Foreign Languages and Literatures

College of Liberal Arts

LITA 105 05(5-2-0). 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(5-2-0). 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(3-2-0). Second-Year Italian I. (AUCC 3B). 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(3-2-0). Second-Year Italian II. (AUCC 3B). F, S. Prerequisite: LITA 200 or LITA 228A or placement exam. Credit not allowed for both LITA 201 and LITA 228B.

Grammar review and extensive practice in conversation, reading, and writing.

LITA 228A 05(5-0-0). Second Year Italian I-Abroad. SS. Prerequisite: LITA 107 or placement exam. Credit not allowed for both LITA 228A and LITA 200.

Grammar review and extensive practice in conversation, reading, and writing done abroad.

LITA 228B 05(5-0-0). Second Year Italian II-Abroad. SS. Prerequisite: LITA 200 or LITA 228A or placement exam. Credit not allowed for both LITA 228B and LITA 201.

Grammar review and extensive practice in conversation, reading, and writing done abroad.

LITA 296 Var [1-5]. Group Study-Italian. Prerequisite: LITA 107.

Group study in language/literature/culture.

LITA 328A 03(3-0-0). Italian Oral and Written Communication-Abroad. SS. Prerequisite: LITA 201 or LITA 228B.

In-depth language study to improve proficiency in written and oral skills abroad.

LITA 328B 03(3-0-0). Approaches to Italian Literature-Abroad. SS. Prerequisite: Placement exam.

Appreciation and critical readings of representative works in prose, drama, and poetry done abroad.

LITA 328C 03(3-0-0). Issues in Italian Culture-Abroad. SS. Prerequisite: Written consent of instructor.

Historical context of contemporary issues in the culture studied abroad.

LITA 365 03(3-0-0). Studies in Foreign Film-Italian. F, S.

Representation of Italian society through film. Taught in Italian.

LITA 428A 03(3-0-0). Advanced Italian Communication Skills-Abroad. SS. Prerequisite: Written consent of instructor.

Development of speaking, reading, and writing proficiency through in-depth use of local resources abroad.

LITA 428B 03(3-0-0). Italian Literary Studies-Abroad. SS. Prerequisite: Written consent of instructor.

Study in selected literary movements, genres, or interdisciplinary subjects in literature done abroad.

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(5-2-0). 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(5-2-0). 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(5-2-0). Second-Year Japanese I. (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(5-2-0). Second-Year Japanese II. (AUCC 3B). F, S. Prerequisite: LJPN 200 or LJPN 228A or placement exam. Credit not allowed for both LJPN 201 and LJPN 228B.

Grammar review and extensive practice in conversation, reading, and writing.

LJPN 208 01(1-0-0). Kanji Study. F, S. Prerequisite: LJPN 107.

Kanji (Chinese characters) learning strategies, through examination and analysis of Kanji characters.

LJPN 228A 05(5-0-0). Second Year Japanese I-Abroad. SS. Prerequisite: LJPN 107 or placement exam. Credit not allowed for both LJPN 228A and LJPN 200.

Grammar review and extensive practice in conversation, reading, and writing done abroad.

LJPN 228B 05(5-0-0). Second Year Japanese II-Abroad. SS. Prerequisite: LJPN 200 or LJPN 228A or placement exam. Credit not allowed for both LJPN 228B and LJPN 201.

Grammar review and extensive practice in conversation, reading, and writing done abroad.

LJPN 250 03(3-0-0). Japanese Language, Literature, Culture in Translation. (AUCC 3E). 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. Prerequisite: LJPN 107.

Group study in language/literature/culture.

LJPN 304 03(3-0-0). Third-Year Japanese I. F. Prerequisite: LJPN 201 or LJPN 228B or placement exam. Credit not allowed for both LJPN 304 and LJPN328A.

Development of reading comprehension, communicative competence, and cultural understanding.

LJPN 305 03(3-0-0). Third-Year Japanese II. S. Prerequisite: LJPN 304 or LJPN 328A or placement exam. Credit not allowed for both LJPN 305 and LJPN 328A.

Enhanced development of reading comprehension, communicative competence, and cultural sensitivity.

LJPN 328A 03(3-0-0). Japanese Oral and Written Communication-Abroad. SS. Prerequisite: LJPN 201 or LJPN 228B. Credit not allowed for both LJPN 328A and LJPN 304 or LJPN 305.

In-depth language study to improve proficiency in written and oral skills abroad.

LJPN 328B 03(3-0-0). Approaches to Japanese Literature-Abroad. SS. Prerequisite: Placement exam or written consent of instructor.

Appreciation and critical readings of representative works in prose, drama, and poetry done abroad.

LJPN 328C 03(3-0-0). Issues in Japanese Culture-Abroad. SS. Prerequisite: LJPN 304.

Historical context of contemporary issues in the culture studied abroad.

LJPN 365 03(3-0-0). Studies in Foreign Film-Japanese. F, S. Prerequisite: LJPN 305.

Representation of Japanese society through film. Taught in Japanese.

LJPN 408 01(1-0-0). Advanced Kanji Study. F, S. Prerequisite: LJPN 305.

Kanji learning strategies and acquisition of advanced Kanji characters.

LJPN 428A 03(3-0-0). Advanced Japanese Communication Skills-Abroad. SS. Prerequisite: Written consent of instructor.

Development of speaking, reading, and writing proficiency through in-depth use of local resources abroad.

LJPN 428B 03(3-0-0). Japanese Literary Studies-Abroad. SS. Prerequisite: Written consent of instructor.

Study in selected literary movements, genres, or interdisciplinary subjects in literature done abroad.

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 or LJPN 328A.

Group study in language/literature/culture.

KOREAN LANGUAGE COURSES

Department of Foreign Languages and Literatures

College of Liberal Arts

LKOR 105 05(5-2-0). 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(5-2-0). 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(3-2-0). Intermediate Korean and Culture I. F, S, SS. Prerequisite: Prerequisite: LKOR 107.

LKOR 203 03(3-2-0). Intermediate Korean and Culture II. F, S, SS. Prerequisite: LKOR 202.

LATIN LANGUAGE COURSE

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(5-2-0). 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.

RUSSIAN LANGUAGE COURSES

Department of Foreign Languages and Literatures *College of Liberal Arts*

LRUS 105 05(5-2-0). 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(5-2-0). 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(3-2-0). Second-Year Russian I. (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(3-2-0). Second-Year Russian II. F, S. (AUCC 3B). Prerequisite: LRUS 200 or LRUS 228A or placement exam. Credit not allowed for both LRUS 201 and LRUS 228B.

Grammar review and extensive practice in conversation, reading, and writing.

LRUS 228A 05(5-0-0). Second Year Russian I-Abroad. SS. Prerequisite: LRUS 107 or placement exam. Credit not allowed for both LRUS 228A and LRUS 200.

Grammar review and extensive practice in conversation, reading, and writing done abroad.

LRUS 228B 05(5-0-0). Second Year Russian II-Abroad. SS. Prerequisite: LRUS 200 or LRUS 228A or placement exam. Credit not allowed for both LRUS 228B and LRUS 201.

Grammar review and extensive practice in conversation, reading, and writing done abroad.

LRUS 250 03(3-0-0). Russian Literature, Culture in Translation. (AUCC 3E). 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. Prerequisite: LRUS 107.

Group study in language/literature/culture.

LRUS 304 03(3-0-0). Third-Year Russian I. F. Prerequisite: LRUS 201 or LRUS 228B or placement exam. Credit not allowed for both LRUS 304 and LRUS 328A.

Development of reading comprehension, communicative competence, and cultural understanding.

LRUS 305 03(3-0-0). Third-Year Russian II. S. Prerequisite: LRUS 304 or LRUS 328A or placement exam.

Enhanced development of reading comprehension, communicative competence, and cultural sensitivity.

LRUS 328A 03(3-0-0). Russian Oral and Written Communication-Abroad. SS. Prerequisite: LRUS 201 or LRUS 228B. Credit not allowed for both LRUS 328A and LRUS 304.

In-depth language study to improve proficiency in written and oral skills abroad.

LRUS 328B 03(3-0-0). Approaches to Russian Literature-Abroad. SS. Prerequisite: Placement exam or written consent of instructor.

Appreciation and critical readings of representative works in prose, drama, and poetry done abroad.

LRUS 328C 03(3-0-0). Issues in Russian Culture-Abroad. SS. Prerequisite: LRUS 304.

Historical context of contemporary issues in the culture studied abroad.

LRUS 365 03(3-0-0). Studies in Foreign Film-Russian. F, S. Prerequisite: LRUS 305.

Representation of Russian society through film. Taught in Russian.

LRUS 428A 03(3-0-0). Advanced Russian Communication Skills-Abroad. SS. Prerequisite: Written consent of instructor.

Development of speaking, reading, and writing proficiency through in-depth use of local resources abroad.

LRUS 428B 03(3-0-0). Russian Literary Studies-Abroad. SS. Prerequisite: Written consent of instructor.

Study in selected literary movements, genres, or interdisciplinary subjects in literature done abroad.

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 LRUS 328A.

Group study in language/literature/culture.

AMERICAN SIGN LANGUAGE COURSES

Department of Foreign Languages and Literatures *College of Liberal Arts*

LSGN 109 05(5-2-0). 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.

SPANISH LANGUAGE COURSES

Department of Foreign Languages and

Literatures

College of Liberal Arts

LSPA 105 05(5-2-0). 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(3-2-0). 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(5-2-0). 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(5-2-0). 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(3-2-0). Second-Year Spanish I. (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(3-2-0). Second-Year Spanish II. (GT-AH4, AUCC 3B). F, S. Prerequisite: LSPA 200 or LSPA 228A or placement exam. Credit not allowed for both LSPA 201 and LSPA 228B.

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 228A 05(5-0-0). Second Year Spanish I-Abroad. SS. Prerequisite: LSPA 107 or LSPA 108 or placement exam. Credit not allowed for both LSPA 228A and LSPA 200.

Grammar review and extensive practice in conversation, reading, and writing done abroad.

LSPA 228B 05(5-0-0). Second Year Spanish II-Abroad. SS. Prerequisite: LSPA 200 or LSPA 228A or placement exam. Credit not allowed for both LSPA 228B and LSPA 201.

Grammar review and extensive practice in conversation, reading, and writing done abroad.

LSPA 250 03(3-0-0). Spanish Language, Literature, Culture in Translation. (AUCC 3E). 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. Prerequisite: LSPA 107 or LSPA 108.

Group study in language/literature/culture.

LSPA 300 03(3-0-0). Reading and Writing for Communication. F, S, SS. Prerequisite: LSPA 201 or LSPA 208 or LSPA 228B or placement. Credit not allowed for both LSPA 300 or LSPA 301 and LSPA 328A.

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 LSPA 228B. Credit not allowed for both LSPA 301 or LSPA 300 and LSPA 328A.

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 LSPA 328A. Credit not allowed for both LSPA 310 and LSPA 328B.

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 or LSPA 328A.

Phonetics, phonology, morphology, syntax, semantics, and pragmatics.

LSPA 313 03(3-0-0). Introduction to Spanish Translation and Interpreting. F, S. Prerequisite: LSPA 300 or LSPA 328A.

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 or LSPA 328A.

Phonetic principles and their application to Spanish sound system; intensive practice in pronunciation, intonation.

LSPA 328A 03(3-0-0). Spanish Oral and Written Communication-Abroad. SS. Prerequisite: LSPA 201 or LSPA 208 or LSPA 228B. Credit not allowed for both LSPA 328A and LSPA 300 or LSPA 301.

In-depth language study to improve proficiency in written and oral skills abroad.

LSPA 328B 03(3-0-0). Approaches to Spanish Literature-Abroad. SS. Prerequisite: LSPA 300 or placement exam. Credit not allowed for both LSPA 328B and LSPA 310.

Appreciation and critical readings of representative works in prose, drama, and poetry done abroad.

LSPA 328C 03(3-0-0). Issues in Spanish Culture-Abroad. SS. Prerequisite: LSPA 300. Credit not allowed for both LSPA 328C and LSPA 335.

Historical context of contemporary issues in the culture studied abroad.

LSPA 335 03(3-0-0). Issues in Hispanic Culture. F. Prerequisite: LSPA 300 or LSPA 328A. Credit not allowed for both LSPA 335 and LSPA 328C.

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 or LSPA 328A.

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 or LSPA 328A.

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 or LSPA 335.

Representation of Spanish society through film. Taught in Spanish.

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. Prerequisite: LSPA 300 or LSPA 328A. Credit not allowed for both LSPA 400 and LSPA 428A.

Development of speaking, reading, and writing proficiency through an in-depth examination of representative writings and media communications.

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 428A 03(3-0-0). Advanced Spanish Communication Skills-Abroad. SS. Prerequisite: LSPA 300. Credit not allowed for both LSPA 428A and LSPA 400.

Development of speaking, reading, and writing proficiency through in-depth use of local resources abroad.

LSPA 428B 03(3-0-0). Spanish Literary Studies-Abroad. SS. Prerequisite: LSPA 300; LSPA 310.

Study in selected literary movements, genres, or interdisciplinary subjects in literature done abroad.

LSPA 428C 03(3-0-0). Advanced Spanish Culture and Society-Abroad. SS. Prerequisite: LSPA 335.

Selected topics in the history of the target culture and society studied abroad.

°LSPA 435 03(3-0-0). Caribbean Culture in Hispanic Literature. S. Prerequisite: LSPA 335 or LSPA 328C.

Hispanic-Caribbean cultures with emphasis on African heritage and cultural identity.

LSPA 436 03(3-0-0). Advanced Latin American Culture. F, S. Prerequisite: LSPA 335 or LSPA 328C.

Latin American cultural identities and their history.

LSPA 437 03(3-0-0). Advanced Spanish Culture. F, S. Prerequisite: LSPA 335 or LSPA 328C.

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 443 03(3-0-0). Spanish Theatre. F, S. Prerequisite: LSPA 300 or LSPA 328A; LSPA 310 or LSPA 328B.

Major authors and works of Spanish theatre.

LSPA 445 03(3-0-0). Women Writers in the Hispanic Worlds. F. Prerequisite: LSPA 300 or LSPA 328A; LSPA 310 or LSPA 328B.

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 or LSPA 328A; LSPA 310 or LSPA 328B.

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 or LSPA 328A; LSPA 310 or LSPA 328B. May be taken up to 3 times for credit.

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 or LSPA 328A; LSPA 310 or LSPA 328B. 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 or LSPA 328A; LSPA 310 or LSPA 328B. 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 or LSPA 328A; LSPA 310 or LSPA 328B. May be taken up to 3 times for credit.

Selected topic studies such as themes, topoi, and interdisciplinary subjects in literature.

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 479S 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 or LSPA 328B; two 400-level 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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.

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, S, SS. 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). F. 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 MatlabI. 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 or concurrent registration; 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.

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. 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 Function. (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 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 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 315 04(4-0-0). Mathematics for Economists. (AUCC 1B). F. Prerequisite: MATH 141.

Functions of several variables, matrix algebra, optimization, and applications to economics.

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 330 03(2-2-0). Discrete Mathematics for Educators. F. Prerequisite: EDUC 331; MATH 161. Credit not allowed for both MATH 330 and MATH 301.

Voting theory, power, fair division, graph theory, scheduling, digraphs, linear programming, probability, teaching and learning in small groups.

MATH 331 03(3-0-0). Introduction to Mathematical Modeling. F. Prerequisite: MATH 161 or concurrent registration; MATH 229 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. 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.

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.

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; MATH 229.

Vector spaces, linear transformations, matrices, similarity, eigenvalues and eigenvectors, canonical forms.

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 Analysis. S. Prerequisite: MATH 261; MATH 317; MATH 369.

Limits, continuity, differentiation, integration of functions of several variables, transformations and maps, improper integrals, Stieltjes integrals.

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 435 03(1-4-0). Projects in Applied Mathematics. F. Prerequisite: CS 156 or CS 160 or CS 156 or MATH 151; MATH 229; 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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: CS 156 or CS 160 or CS 253 or MATH 151; MATH 229; 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). Groups, Rings, and Fields. F. Prerequisite: MATH 366; MATH 369.

Groups, rings, fields, isomorphism theorems, finite fields, Galois theory.

MATH 470 03(3-0-0). Euclidian and Non-Euclidian Geometry. S. Prerequisite: MATH 229; 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 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.

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/ENGR 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.

MATH 517 03(3-0-0). Introduction to Mathematical Analysis I. F. Prerequisite: MATH 417.

Euclidean spaces, metric spaces, sequences, series, limits, continuity, differentiability, Reimann-Stieltjes integral.

MATH 518 03(3-0-0). Introduction to Mathematical Analysis II. S. Prerequisite: MATH 369; MATH 517.

Sequences and series of functions. Differential and integral calculus of functions of several variables.

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: ENGR 510/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 531 03(3-0-0). Discrete Models of Physical Systems. F. Prerequisite: MATH 340 or MATH 345.

Discrete models for physical systems; systems of ordinary differential equations, applied linear algebra; introduction to finite elements.

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 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.

Laplace's equation, Green's functions, complex variable methods, eigenfunction expansions.

MATH 550 03(3-0-0). Difference Methods-Partial Differential Equations. S. Prerequisite: MATH 530 or MATH 545.

Explicit, implicit methods for second order equations, higher-dimensional problems, stability analysis, method of characteristics.

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, strongly regular graphs, association schemes.

MATH 617 04(4-0-0). Real Analysis I. S. Prerequisite: MATH 517.

Measure and integration, Fubini's theorem, Lp spaces, differentiation theory.

MATH 618 03(3-0-0). Real Analysis II. 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 518; 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 04(4-0-0). Finite Element Methods.** S. Prerequisite: MATH 545; MATH 560.

Rayleigh-Ritz, Galerkin, and collocation methods, variational inequalities approximations over rectangles and triangles, applications and computing.

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 518; MATH 560.

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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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.

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: MECH 202 with a C or better; MECH 307 with a C or better or concurrent registration; MECH 324 with a C or better or concurrent registration; MECH 325 with a C or better or concurrent registration; MECH 331 with a C or better or concurrent registration; MECH 342 with a C or better; MECH 344 with a grade of C or better or concurrent registration.

Design fundamentals, including design processes, project planning, creativity, manufacturing, and human factors.

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: MECH 337 with a C or better; MECH 342 with a C or better; MECH 344 with a C or better or concurrent registration.

Experimental methods in heat transfer, fluid flow, and thermodynamics.

MECH 342 03(3-0-0). **Mechanics and Thermodynamics of Flow Processes.** F, S. 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.** F, S. Prerequisite: MECH 342 with a C or better.

Transport and rate processes, conduction, convection, and radiation.

MECH 410 01(0-0-1). **Engineering Economy Principles/Calculations.** F, S, SS. Prerequisite: MATH 161. Offered only as an online course.

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)

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 101 03(2-2-0). **Introduction to Manufacturing Processes.** F. Prerequisite: Mechanical engineering freshman majors only.

Engineering drawings, materials, manufacturing, and safety. Hand tools, cutting, drilling, the lathe, mill and numerical control. (\$)

MECH 102 03(3-0-0). **Mechanical Engineering Problem Solving.** S. Prerequisite: MATH 160 or concurrent registration; PH 141 or concurrent registration.

Matlab programming and engineering problem solving techniques, algorithms and processes from physics and calculus first principles.

MECH 201 03(2-2-0). **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 101 with a C or better; 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

MECH 417 03(2-2-0). Control Systems. F. Prerequisite: MATH 340; MECH 302.

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 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 448/ENVE 448 03(3-0-0). Pollution Prevention. F. Prerequisite: CBE 3331 or CIVE 300 or MECH 342. Credit not allowed for both MECH 448 and ENVE 448.

Prevention of environmental problems by modification of industrial processes. (NT-V)

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(2-2-0). Building Energy Systems. S. Prerequisite: MECH 344. Credit not allowed for both MECH 463 and MECH 676.

Comfort, psychrometrics, loads, solar radiation, heating and cooling 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 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: CIVE 363 or concurrent registration; MECH 302 with a C or better; MECH 338 or concurrent registration. **B) Practicum II.** S. Prerequisite: MECH 486A with a C or better.

MECH 495 Var. Independent Study.

***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). Manufacturing Quality Design and Control. S. Prerequisite: MATH 340; STAT 315.

Design of decision-making models for industrial engineering. (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 309; STAT 315.

Models to predict time to failure of mechanical or electronic devices, reliability data analysis and case studies. (NT-O/V)

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

MECH 513 03(3-0-0) Simulation Fundamentals. F. Prerequisite: STAT 315.

Theoretically-based and commercial simulation languages, input processes, statistics, interdependencies, manufacturing and service operations. (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 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 526 04(2-2-0). 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 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 03(3-0-0). Materials Engineering. S. Prerequisite: MECH 331 or MECH 431.

Structural engineering materials and their selection on basis of property, processing, and economic considerations.

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)

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, exergy, and lost work analysis.

°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 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.

Courses of Instruction

***MECH 563 03(3-0-0). Air Pollution Control.** S. Prerequisite: MECH 337.

Abatement of emissions from mobile and stationary sources; monitoring, dispersion, air quality standards, electrostatic precipitation, energy consumption. (NT-V)

***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.

***MECH 570/*BIOM 570 03(3-0-0). Bioengineering.** F. 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.

MECH 571/BIOM 571 03(3-0-0). Biomechanics. S. Prerequisite: BIOM 470 or BIOM 570/MECH 570. Credit not allowed for both MECH 571 and BIOM 571.

Mathematical approach to analysis of living systems, their function, diseases, and replaceable parts. (NT-T)

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)

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 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)

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

°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 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 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.

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; STAT 204 or STAT 301 or STAT 307/ERHS 307 or STAT 311 or STAT 315.

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 200; 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 200.

Interpersonal communication for leaders and managers in organizational settings.

MGT 330 03(3-0-0). Designing Organizations-Innovation and Change. F, S. Prerequisite: MGT 305 or MGT 320.

Organizational design to improve performance and support a culture of innovation and change.

MGT 340 03(3-0-0). Entrepreneurship in the Contemporary World. S.

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 375 03(3-0-0). Advanced Supply Chain Management. F, S. Prerequisite: MGT 301.

Design and management of supply chains.

MGT 410 03(3-0-0). 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). Leadership and Teams Management. 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. F. 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 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). Sustainable Supply Chain Management. F. Prerequisite: MGT 301.

Sustainable supply chain management practices examined through the lens of triple bottom line performance (financial, social, and environmental).

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.

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 the M.S. program. 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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. (AUCC 3A). S.

Survey of human systems and diseases.

MIP 149 03(3-0-0). The Microbial World. F, S.

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 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. 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.

MIP 301 01(0-3-0). Fundamental Microbiology Laboratory Techniques. F. Prerequisite: MIP 300 or concurrent registration.

Microbiological techniques for students in the physical sciences and engineering. (\$)

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 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 301 or MIP 302; MIP 334 or concurrent registration.

Laboratory skills and techniques related to the presence of microorganisms in food, production, and preservation.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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 301 or 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. F. Prerequisite: MIP 300.

Physiological, taxonomic, and phylogenic 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 301 or 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. Maximum of 10 credits allowed in course.

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 301 or 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 301 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 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 301 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. Research. Prerequisite: MIP 301 or MIP 302; written consent of department.

***MIP 530 03(3-0-0). Advanced Molecular Virology.** S. Prerequisite: BC 351 or BC 401; MIP 450.

Animal virus structure, replication; viral latency, oncogenicity, and genetics. Comparative virology.

***MIP 533/*ERHS 533 03(2-0-1). Epidemiology of Infectious Diseases/Zoonoses.** S. Prerequisite: MIP 300. Credit not allowed for both MIP 533 and ERHS 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 550 04(2-6-0). Microbial and Molecular Genetics Laboratory. S. Prerequisite: MIP 301 or 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 576/BSPM 576 03(3-0-0). Bioinformatics. F, S. Prerequisite: BC 451 or BC 463 or BIO 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/ERHS 307. Credit not allowed for both MIP 576 and BSPM 576.

Technical computing across platforms using bioinformatics tools in molecular analyses.

Courses of Instruction

MIP 577/BZ 577 01(0-2-0). 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/ERHS 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 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 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 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.

°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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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.

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/Senior Vice President

+MLSC 110 02(2-0-0). Military Skills I. F, S. Prerequisite: Concurrent registration in MLSC 196.

Leadership principles and techniques; first aid; weapons common to U.S. forces; rifle marksmanship; branches of the Army; physical fitness training. (\$)

+MLSC 121 02(2-0-0). Military Skills II. S. Prerequisite: Concurrent registration in MLSC 196.

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, S. Prerequisite: concurrent registration in MLSC 110 or MLSC 121.

+MLSC 210 02(2-0-0). Contemporary Management Principles. F. Prerequisite: Concurrent registration in MLSC 296.

Leadership assessment; principles of war; small unit operations; basic management skills; oral communication; counseling/ behavioral evaluation techniques. (\$)

+MLSC 221 02(2-0-0). Dynamics of Military Operations. S. Prerequisite: Concurrent registration in MLSC 296.

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 110; MLSC 121.

MLSC 295 Var [1-2]. Independent Study.

MLSC 296 01(0-2-0). Military Science Group Study II. Prerequisite: Concurrent registration in MLSC 210 or MLSC 221.

+MLSC 310 03(3-0-0). Leadership Assessment. F. Prerequisite: Concurrent registration in MLSC 396.

Leadership theory review; leadership assessment program to further develop leadership and management skills; physical fitness training. (\$)

+MLSC 320 03(3-0-0). Applied Leadership. S. Prerequisite: MLSC 310; concurrent registration in MLSC 396.

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. Credit not allowed for both MLSC 357 and HIST 357.

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 320.

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 III. F, S. Prerequisite: Concurrent registration in MLSC 310 or MLSC 320.

Courses of Instruction

+MLSC 420 03(3-0-0). Role and Ethics of the Officer. S. Prerequisite: MLSC 320; MLSC 357/HIST 357; concurrent registration in MLSC 496.

Role of the officer; ethics and professionalism; military justice; law of land warfare; preparation for active duty; physical fitness training. (\$)

+MLSC 492 03(3-0-0). Seminar-Leadership and Management. F. Prerequisite: MLSC 310; MLSC 320; concurrent registration in MLSC 496.

Military staff functions and issues in leadership. (\$)

MLSC 495 Var [1-3]. Independent Study.

Role of the Army officer, ethics, professionalism, military justice, and law of land warfare.

MLSC 496 01(0-2-0). Military Science Group Study IV. F, S.

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 nonmusic 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(3-3-0). Music Theory I. F. Prerequisite: MU 111 or satisfactory completion of placement examination.

Introduction to diatonic harmony and part-writing; basic sight singing, ear training, and keyboard harmony skills. (\$)

MU 118 04(3-3-0). 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. (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 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 172 01(0-2-0). Freshman Voice Studio. F, S. Prerequisite: Concurrent registration in any music ensemble.

Applied voice study in a group setting for freshman voice majors. (\$)

MU 200 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 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 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(3-3-0). Music Theory III. F. Prerequisite: MU 118.

Harmonic language of the 18th and early 19th centuries; diatonic and chromatic sight singing, ear training, and keyboard harmony skills. (\$)

MU 218 04(3-3-0). Music Theory IV. S. Prerequisite: MU 217.

19th- and 20th-century systems of composition and analysis; chromatic, modal, and atonal sight singing, ear training, and keyboard harmony skills. (\$)

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 02(2-0-0). 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-G 01(0-2-0). Instrumental Techniques. F, S.

Tone production, tuning, fingerings, care, materials, and teaching methods for brass, percussion, string, and woodwind instruments. **A)** Low brass. **B)** High brass. **C)** Clarinet and saxophone. **D)** Double reeds and flute. **E)** Strings. **G)** Percussion. (\$)

MU 254 02(2-0-0). Beginning Conducting. S. Prerequisite: MU 117.

Basic conducting patterns and techniques.

MU 265A-B 01(0-2-0). Singers Diction.

Pronunciation of each language for singing; basic vocabulary from song poetry of each language; use of the International Phonetic Alphabet. ***A)** German/English. S. **°B)** French/Italian. S. Prerequisite: MU 265A.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape.

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.

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 273 Var [1-2]. Composition Instruction. F, S. Prerequisite: MU 118; MU 131.

One or two half-hour lessons per week.

MU 286 01(0-2-0). Practicum-Music Education. (\$)

MU 301 01(0-3-0). University Chorus. F, S.

Rehearsal and performance of a variety of types and styles of music for mixed voices.

MU 302 01(0-5-0). University Orchestra. F, S.

Rehearsal and performance of standard orchestral literature. (\$)

MU 304 01(0-3-0). Symphonic Band. F, S, SS. Prerequisite: Written consent of instructor.

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: Written consent of instructor.

Rehearsal and performance of choral literature emphasizing extended works with orchestral accompaniment. (\$)

MU 309 01(0-3-0). Jazz Ensemble. F, S. Prerequisite: Written consent of instructor.

Rehearsal and performance of jazz ensemble literature of standard and experimental types. (\$)

MU 310 01(0-2-0). Jazz Combo. F, S. Prerequisite: Written consent of instructor.

Small group jazz performance practice and standard jazz repertoire.

°**MU 311 02(2-0-0). Counterpoint I.** S. Prerequisite: MU 217.

16th-century polyphonic style; analysis of compositions by Josquin, Palestrina, Lassus. (\$)

***MU 312 02(2-0-0). Counterpoint II.** S. Prerequisite: MU 217.

18th-century polyphonic style; analysis of works by Bach. (\$)

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 332 03(3-0-0). History of Jazz. S, SS.

Jazz since the 1880s emphasizing its various influences and developments.

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.

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 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 355 02(1-2-0). Choral Conducting and Literature. F.

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.

Essentials of instrumental conducting and analysis of selected works.

MU 400 01(0-5-0). Colorado State University Chamber Choir. F, S. Prerequisite: Written consent of instructor.

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: Written consent of instructor.

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: Written consent of instructor.

Performance of selected operas, musicals, oratorio, orchestral accompaniments, and chamber music. (\$)

MU 404 01(0-5-0). Symphonic Wind Ensemble. F, S. Prerequisite: Written consent of instructor.

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 411 03(3-0-0). Orchestration. S. Prerequisite: MU 218.

Unique characteristics of each orchestral instrument; arranging for variety of types of ensembles. (\$)

MU 416 03(3-0-0). Stylistic Analysis. F. Prerequisite: MU 218.

Harmonic and formal analysis of representative works from the baroque to the present.

MU 420 02(2-0-0). Marching Band Techniques. S. Prerequisite: MU 204.

Marching band conducting, design, and performance 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.

Courses of Instruction

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 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.

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 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 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.

Cultural, philosophical, psychological, and historical applications of music education.

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.

MU 519 03(3-0-0). History of Music Theory. S. Prerequisite: MU 416.

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 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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. SS. Prerequisite: MU 335.
Musical works, philosophies, and related arts of 19th century.

°**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 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.
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 630 03(3-0-0). Methods of Music Research. F. Prerequisite: MU 416.
Research, documentation, and bibliography for music history, literature, performance, theory, acoustics, music education, and quantitative testing.

MU 644 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 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.

MU 648 03(3-0-0). Neuroscience/Music Foundations in Therapy. S. Prerequisite: MU 644.
Historical and scientific foundations of neurologic music therapy.

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. (\$)

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

Office of Provost/Senior 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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 03(3-0-0). Developmental Neurobiology. S. Prerequisite: One college-level course in each: biology, biochemistry, physics, calculus.

Molecular mechanisms involved in development of nervous system including differentiation, growth, pathfinding, and synaptogenesis.

NB 505 03(3-0-0). Neuronal Circuits, Systems and Behavior. S. Prerequisite: BMS 325 or BMS 500 or NB 501.

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.

+NR 130 03(3-0-0). Global Environmental Systems. (AUCC 3A) F, S.

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 224/AGRI 224 03(2-0-1). Integrated Resource Management I. F. Prerequisite: AGRI 192. Credit not allowed for both NR 224 and AGRI 224.

Introduction to integrated ranch system concepts through describing complex organizations and building decisions support systems.

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 03(2-2-0). Remote Sensing of Natural Resources. F.

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 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.

NATURAL RESOURCES COURSES

Warner College of Natural Resources

NR 120A 03(3-0-0). Environmental Conservation. F, S. (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 120A.

Overview of natural resources environmental concerns including population, pesticides, energy, and pollution.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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: BIO 320 or LAND 220/SOCR 220; 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. F, 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 424/AGRI 424 03(2-0-1). Integrated Resource Management II. S. Prerequisite: NR 224/AGRI 224. Credit not allowed for both NR 424 and AGRI 424.

Application of enterprise planning analysis for use in ranch resource management. Continued emphasis on interdisciplinary systems analysis.

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.

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/SOCR 220; NRRT 231.

Management of wilderness in the U.S. National Wilderness Preservation System and equivalent international wildlands. (\$)

NR 484 Var [1-5]. Supervised College Teaching. Prerequisite: Written consent of instructor.

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.

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)

NR 503 04(3-3-0). Remote Sensing of Natural Resources. F.

Interpretation and analysis of photographic, multispectral scanner, and radar data; sensor systems; applications to resource management.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

NR 504 04(2-6-0). Computer Analysis of Remote Sensing Data. S.

Prerequisite: NR 323 or 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(2-2-0). Spatial Statistical Modeling-Natural Resources. F.

Prerequisites: NR 322; NR 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)

NR 520 03(3-0-0). Optimizations-Forest Ecosystem Management. S.

Prerequisite: One course in each of the following subjects: calculus and economics.

Design and analysis of optimization models to integrate economic, economic, ecology and social concerns faced by forest ecosystem management decision makers.

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/ERHS 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 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 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; STAT 340.

Modeling and computer simulation for describing and integrating ecosystem concepts.

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 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 684 Var [1-5]. Supervised College Teaching. Prerequisite:

Written consent of instructor.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

NR 687 Var [1-8]. Natural Resources Internship. Prerequisite: Written consent of instructor.

Field experience and exercises in international natural resources management.

NR 793 01(0-0-1). Seminar on Remote Sensing and GIS. Prerequisite: NR 322 or NR 323 or NR 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.

Tourism and private commercial outdoor recreation industry in America.

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.

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 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). Recreation Measurements. F, S. Prerequisite: STAT 201.

Recreation measurement techniques.

NRRT 384 Var. Supervised College Teaching.

+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: 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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 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 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. Offered only as a correspondence course.

History and theories, planning and instruction; outcomes; historical events; ecological literacy, experiential learning models. (NT-C)

NRRT 506 03(3-0-0). Methods in Environmental Education Research. F, S, SS. Prerequisite: Upper-division course in natural resources. Offered only as a correspondence course.

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. Offered only as a correspondence course.

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. Offered only as a correspondence course.

Impact of current events, legislation, demographic changes, and other events on informal environmental education. (NT-C)

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 605 03(3-0-0). Recreation Behavior Theory. S.

Application of theories and conceptual approaches from social sciences to study of recreation behavior and natural resource issues.

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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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.

NATURAL SCIENCES COURSES

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 384 Var [1-3]. Supervised College Teaching. F, S. Prerequisite: Written consent of instructor.

Supervised experience in computer lab.

NSCI 590A-H. 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 696 Var. Group Study-Science and Mathematics Education. Prerequisite: Bachelor's degree.

Activity-based research using context-based curriculum in science, mathematics, and technology.

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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape.

OT 590 Var [1-9]. Workshop.

OT 597 Var. Group Study.

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 603 01(0-0-1). Graduate Professional Seminar. S. Prerequisite: Written consent of instructor.

Guidance and discussion of fieldwork and classwork with emphasis on team building and system analysis.

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 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 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. (\$)

Courses of Instruction

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 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, 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 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(0-0-3). Leadership and Management in OT. F. Prerequisite: OTR, admission to M.S. program.

Leadership and management processes as applied to occupational therapy settings.

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-B Occupational Therapy Fieldwork.

A) Var [1-2]. Level I. Prerequisite: OT 606; OT 608; OT 609; OT 622; OT 623; OT 650; evidence of professional liability insurance. Supervised OT experience with variety of clients in OT related settings. (\$) B) 03(0-2-2). Seminar. Prerequisite: Completion of first year of MSOT coursework; evidence of professional liability insurance. Community-based practice in conjunction with faculty facilitated seminar. (\$)

OT 688I-Z [1-24]. Field Placement. Prerequisite: OT 686A; OT 686B; completion MSOT coursework or degree in occupational therapy; evidence of professional liability insurance.

I) Acute physical medicine-adult. (\$) J) Rehabilitation physical medicine-adult. (\$) K) Geriatric practice. (\$) L) Acute behavioral health. (\$) M) Community-behavioral health. (\$) N) Community-school. (\$) O) Community-early intervention. (\$) P) Community-transition. (\$) Q) Pediatric practice. (\$) R) Home based. (\$) S) Specialty-hand rehabilitation. (\$) T) Specialty-burn rehabilitation. (\$) U) Specialty-industrial rehabilitation. (\$) V) Specialty-technology. (\$) W) Specialty-research. (\$) X) Specialty-administration. (\$) Y) Combined practice. (\$) Z) International. (\$)

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.

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-SC1, 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. (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. (AUCC 3A). F, S, SS. Prerequisite: MATH 126; 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-SC2, 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. Maximum of 10 credits allowed in course.

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.

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.

Wavefunctions, 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.

Courses of Instruction

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 101 03. Practical Thinking. S. Credit not allowed for both PHIL 101 and PHIL 110. Offered as correspondence course only.

Analyzing and judging passages of argument; identifying tacit assumptions; recognizing necessary/sufficient conditions. (NT-C)

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.

PHIL 105 03(3-0-0). Introduction to Philosophy. F, S.

Major philosophical issues from differing perspectives; their bearing upon education, science, religion, art, personal conduct, social policy.

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-A3, 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(2-0-1). World Philosophies. (GT-AH3, AUCC 3E). F.

Philosophies of North America, Mesoamerica, West Africa, South Asia, and East Asia.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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 204 03. Ethics in America. F, S, SS. Offered as telecourse only.

Ethical problems in contemporary society. (NT-T)

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 309 03(3-0-0). Ideas in Oriental Art and Literature. F.

Prevalent philosophical ideas in the Chinese-Indian and Japanese-Korean art, literature selected from representative classics and modern works.

PHIL 315 03(3-0-0). Philosophy of Language. S. Prerequisite: PHIL 105 or 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 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 105 or 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.

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). Philosophy of Tao and Zen. S. Prerequisite: Sophomore standing or higher.

Philosophical view of China and Japan.

PHIL 350 03(3-0-0). Social and Political Philosophy. F, S. Prerequisite: PHIL 105 or 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 352 03(3-0-0). Philosophy of History. S. Prerequisite: PHIL 105 or PHIL 205 or PHIL 206 or any upper-division course in philosophy.

Conceptions of human existence in its historical, social, cultural dimensions.

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 Humans. F. Prerequisite: PHIL 105 or PHIL 205 or PHIL 206 or any upper-division course in philosophy.

Contrasting views of role of humans in the universe as drawn from science, literature, philosophy of modern period.

PHIL 360 03(3-0-0). Topics in Oriental 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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. Maximum of 10 credits allowed in course.
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). Topics in Philosophical Problems. S. Prerequisite: PHIL 300 or PHIL 301 or PHIL 302.
Thorough examination of a major philosophical problem.

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). Comparative Religions-Suffering and Evil. F. Prerequisite: PHIL 171 or PHIL 172 or PHIL 270; 300-level religious studies course.
Comparative study of experiences and concepts of suffering and evil in several world religions.

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.
Intensive study of one or two major works in the history of philosophy.

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 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 Ethical Theory. S. Prerequisite: PHIL 447.
Systematic and historical overview of 20th-century 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 enquiry 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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 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.

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.

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 enquiry.

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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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. S.
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.
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). American Security Policy. F, S.
Formulation and execution of U.S. security policy. (NT-O)

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.

PO 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 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 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 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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 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-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(1-0-0). Psychology Freshman Seminar. F, S.

Special topics in psychology.

PSY 210 03(3-0-0). Psychology of Differences. 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.

¹**PSY 295 Var [1-3]. Independent Study.**

Individual investigation of a special topic in psychology under direction of faculty.

¹**PSY 296 Var [1-3]. Group Study.**

Collective investigation of a special topic in psychology under direction of faculty.

PSY 305 03(3-0-0). Psychology of Religion. SS. Prerequisite: PSY 100.

Survey of research on religion from a psychological perspective.

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 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.

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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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.

PSY 327 03(2-0-1). Psychological Perspectives on Female Experience. S. 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 340 03(3-0-0). Organizational Psychology. F. Prerequisite: PSY 100; concurrent registration in PSY 341; STAT 201.

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: PSY 250; concurrent registration in PSY 340; departmental statistics requirement.

Application of organizational psychology through simulations and field involvements.

PSY 352 03(3-0-0). Psychology of Learning. F, S, SS. Prerequisite: PSY 250.

Current research and theoretical issues on reinforcement, punishment, extinction, generalization, discrimination learning, transfer, and retention.

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 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. Maximum of 10 credits allowed in course.

Supervised teaching, training, and discussion leadership in undergraduate courses.

⁰PSY 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: Junior or senior standing..

Philosophical and scientific underpinnings of psychology; major historical developments in psychology; schools of psychological thought.

PSY 437 03(3-0-0). Psychology of Gender. F.

Psychology of gender in cultural context.

PSY 440 03(3-0-0). Industrial Psychology. S. Prerequisite: PSY 100; concurrent registration in PSY 441; STAT 201.

Problems and procedures in selection and classification of personnel; work motivation; job satisfaction; leadership.

PSY 441 01(0-2-0). Industrial Psychology Laboratory. F. Prerequisite: PSY 250; concurrent registration in PSY 440; departmental statistics requirement.

Laboratory and field experiences in job analysis, selection strategies, performance appraisal, and criterion development.

PSY 452 03(3-0-0). Cognitive Psychology. F, S, SS. Prerequisite: PSY 250.

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). Physiological Psychology. F, S, SS. Prerequisite: PSY 250.

Research and theory on the neuroanatomical and neurophysiological basis of behavior.

PSY 455 02(0-4-0). Physiological Psychology Laboratory. F, S, SS. Prerequisite: PSY 454 or concurrent registration.

Laboratory exercises in human physiological psychology.

PSY 456 03(3-0-0). Sensation and Perception. F, S, SS. Prerequisite: PSY 250.

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 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.

Supervised work experience in approved psychological setting with periodic consultation of faculty.

¹PSY 488 Var [1-3]. Field Placement.

Supervised affiliation with and/or service work in approved psychological setting.

PSY 492 Var [1-3]. Seminar. Prerequisite: Psychology majors only.

Special topics in psychology; may include psychology of women, psychology of religion, and clinical psychology.

¹PSY 495 Var [1-3]. Independent Study.

Individual investigation of a special topic in psychology under direction of faculty.

¹PSY 496 Var [1-3]. Group Study.

Collective investigation of a special topic in psychology under direction of faculty.

¹PSY 498 Var [1-3]. Research.

Independent research project culminating in formal research paper.

¹PSY 499 Var [1-6]. Thesis.

Independent research project culminating in a thesis presented to a faculty committee.

^oPSY 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 595 Var. Independent Study.

Individual investigation of a special topic in psychology under direction of faculty.

PSY 596 Var. Group Study.

Collective investigation of a special topic in psychology under direction of faculty.

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) Developmental. I) Personality. K) Measurement. L) Human performance: motor and intellectual capacities. M) Cognitive processes.

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 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-C 03(3-0-0). Research Issues and Models in Psychology. S.

Generation and development of research ideas, evaluating approaches, interpreting and reporting findings. A) Counseling. B) General-experimental. C) Industrial-organizational.

PSY 670 03(3-0-0). Psychological Measurement-Personality. F.

Construction, administration, interpretation of objectional 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 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-I Var. Seminar.

A) Counseling. B) General-experimental. D) Applied social. E) Developmental. F) Perceptual and brain sciences. G) Cognitive. H) Industrial-organizational. I) Sensation and perception.

PSY 699A-F Var. Thesis.

A) Counseling. C) Industrial-organizational. D) Applied social. E) Perceptual and brain sciences. F) Cognitive.

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.

^oAlternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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 721; 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.

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-I Var. Advanced Practicum.

A) Counseling and diagnosis II. Prerequisite: Appropriate subtopic of PSY 686A-G. **B)** Experimental II. Prerequisite: Appropriate subtopic of PSY 686A-G. **C)** Industrial-organizational II. Prerequisite: Appropriate subtopic of PSY 686A-G. **D)** School II. Prerequisite: Appropriate subtopic of PSY 686A-G. **E)** Clinical. Prerequisite: Any subtopic PSY 686A-G. **F)** Supervision. Prerequisite: Any subtopic PSY 686A-G. **G)** Applied social II. Prerequisite: Appropriate subtopic of PSY 686A-G. **H)** Perceptual and brain sciences II. Prerequisite: Appropriate subtopic of PSY 686A-G. **I)** Cognitive II. Prerequisite: Appropriate subtopic of PSY 686A-G.

PSY 787 Var. Internship.

Supervised work experience under departmental guidelines in approved psychological agency or setting.

PSY 792A-J Var. Advanced Seminar. Prerequisite: Appropriate subtopic of PSY 692A-I.

A) Counseling. **B)** General-experimental. **C)** Industrial-organizational. **F)** Applied social. **G)** Sensation and perception. **H)** Perceptual and brain sciences. **I)** Cognitive. **J)** Developmental.

PSY 795 Var. Independent Study. Primarily for doctoral candidates in psychology.

Individual investigation of a special topic under direction of faculty.

PSY 799A-F Var. Dissertation.

A) Counseling. **C)** Industrial-organizational. **D)** Applied social. **E)** Perceptual and brain sciences. **F)** Cognitive.

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. F. 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. F. Prerequisite: REL 360.

Examination of 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; REL 367.

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. F. Prerequisite: REL 367; REL 430; 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.

RESTAURANT AND RESORT MANAGEMENT

Department of Food Science and Human Nutrition College of Applied Human Sciences

RRM 101 03(3-0-0). Hospitality Industry. F, SS.

Food service, lodging, and tourism industries; exploration of various industry segments and career opportunities.

RRM 200 03(3-0-0). Resort Operations. S. Prerequisite: RRM 101.

Front office and housekeeping 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. S.

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. S. 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.

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 492 03(3-0-0). Seminar on Restaurant and Resort Management. Prerequisite: RRM 350.

Capstone seminar in strategic restaurant and resort management using case studies, term papers, group presentations, and strategic planning proposals.

+RS 332 02(1-3-0). Range Measurements. F. Prerequisite: NR 220 or RS 331; RS 300 or concurrent registration; STAT 201 or STAT 301 or STAT 307/ERHS 307.

Field measurements of rangelands emphasizing vegetation sampling. (\$)

RS 351 03(3-0-0). Range Plant Production and Decomposition. F. Prerequisite: BIO 320 or LAND 220/SOCR 220; SOCR 240.

Biotic and abiotic factors affecting primary production, decomposition, and biogeochemical cycling in rangeland ecosystems.

RS 400 02(2-0-0). Rangeland Improvements. F. Prerequisite: RS 300 or RS 320/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 452 02(2-0-0). Range Animal-Habitat Interactions. F, S, SS. Prerequisite: NR 367; RS 300 or RS 320/SOCR 320.

Secondary productivity and consumer functions at the organismal and ecosystem level. (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 RS 320/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). Restoration Ecology. S. Prerequisite: BZ 450 or F 311 or LAND 220/SOCR 220; SOCR 240.

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 RS 320/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; RS 320/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(3-0-0). Range Ecosystem Sampling. F. Prerequisite: STAT 301; ecology course.

Measurement, analysis techniques for rangeland vegetation. Applications to management emphasized. (\$)

RANGELAND ECOSYSTEM SCIENCE COURSES

Department of Forest Rangeland Watershed Stewardship

Warner College of Natural Resources

RS 300 03(3-0-0). Principles of Range Management. F, S, SS. Prerequisite: BZ 120 or LIFE 103.

Conservation and management of rangeland-ecosystem values using sustainable practices. (NT-O)

RS 320/SOCR 320 03(3-0-0). Forage and Range Management. S. Credit not allowed for both RS 320 and SOCR 320.

Biology and management of introduced and native forage crops including production, preservation, and utilization.

RS 331 03(2-2-0). Rangeland Ecogeography. F. Prerequisite: BZ 223 or F 210 or NR 220; RS 300.

Production characteristics and ecological niches of important plants and their rangeland communities.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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 578 03(3-0-0). Ecology of Disturbed Lands. S. Prerequisite: LAND 220/SOCR 220; SOCR 240.

Analysis of basic and applied ecological principles involved in reclamation of drastically disturbed western lands.

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

Office of International Programs

Office of Provost/Senior 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.

SOC 105 03(3-0-0). Social Problems. (GT-SS3, AUCC 3C). F, S.

Analysis of global and domestic social problems.

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.

SOC 210 03(3-0-0). Quantitative Sociological Analysis. F, S. Prerequisite: MATH 118.

Application of quantitative concepts and methodology to investigation of social problems.

SOC 253 03(3-0-0). Introduction to Criminal Justice. F, S, SS. Prerequisite: SOC 100 or SOC 105.

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.

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.

Application of sociological concepts to sociological problems including problem formulation, data gathering, and research design.

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.

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 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.

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 354 03(3-0-0). Law Enforcement and Society. F, S. Prerequisite: SOC 253.

Rise and development of law enforcement as a societal reaction to crime.

SOC 355 03(3-0-0). Sociology of Law. F. Prerequisite: SOC 253.

Social origins, functions, and procedures of law in society.

SOC 358 03(3-0-0). Correctional Organizations. S. Prerequisite: 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.

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 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). Sociology of Water Resources.** S. Prerequisite: SOC 100 or SOC 105.

Social aspects of water resource utilization; interface of social organization with physical environment.

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 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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 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: S 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 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.

Social, economic, and technological factors in developing countries.

***SOC 602 03(3-0-0). Contemporary Sociological Theory.** S. Prerequisite: SOC 502.

Contributions of major sociological theorists since mid-20th century.

***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). Development Theories and Issues.** 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(1-0-2). 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

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.

SOCR 240 04(3-2-0). Introductory Soil Science. F, S, SS. 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 200.

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.

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/RS 320 03(3-0-0). Forage and Range Management. S. Credit not allowed for both SOCR 320 and RS 320.

Biology and management of introduced and native forage crops including production, preservation, and utilization.

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). Soil Ecology.** 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 341; SOCR 342; 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.

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 220/LAND 220 03(3-0-0). Fundamentals of Ecology. (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 320, LAND 220, SOCR 220.

Interrelationships among organisms and their environments.

*Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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 03(3-0-0). Irrigation Principles and Management. S. Prerequisite: HORT 100 or SOCR 100; SOCR 240.

Application and measurement of irrigation water, measurement of soil water, soil-water-plant and irrigation efficiency-environment relationships.

+SOCR 377/CIVE 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. Maximum of 10 credits allowed in course.

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 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). Manure Management and the 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 350 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 331.

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.

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). Tropical Soils, Crops, and Farming Systems. S.

Relationship of soils and crops to farming systems that will sustain production in the tropics.

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 offering (C = correspondence, O= online, T = telecourse, V = videotape).

SOCR 498 Var. [1-6]. Undergraduate Research. Prerequisite: Written consent of instructor.

Research in soil and crop sciences.

SOCR 514/ST 514 04(3-3-0). Agricultural Experimental Design and Analysis. S. Prerequisites: STAT 201 or STAT 301. Credit allowed for only one of the following: SOCR 414, SOCR 514, STAT 302, or STAT 514.

Design and implementation of agricultural experiments and statistical analysis of resulting data.

SOCR 522 03(3-0-0). Plant Canopy Meteorology. S. Prerequisite: Three credits in PH.

Principles of microclimatology including energy balance concepts for soil and crop surfaces and methods of estimating evapotranspiration.

***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 331; SOCR 240.

Theory and applications of soil testing. Total and available nutrients, CEC, salinity, isotopes, and instrumentation.

+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: SOCR 377 or CIVE 377 or SOCR 577.

Principles and components of precision agriculture, including GPS, GIS, remote sensing, and their applications in soil and crop management. (\$)

***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 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 720 04(4-0-0). Advanced Plant Breeding.** F.. Prerequisite: SOCR 460/HORT 460; three credits in STAT.

Systems of mating and selection in plants to maximize genetic gain. Evaluation of heterosis, germplasm diversity, strategies, and new technologies.

***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 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.

SOCR 799 Var. Dissertation.

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.

Historical development of social welfare. Knowledge, values, intervention skills, settings, and groups served by social workers. (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.

Knowledge of human behavior and the social environment; knowledge building for social work practice from a systems perspective.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

SOWK 286A-B 03(0-3-2). Practicum. Prerequisite: SOWK 233 or concurrent registration. SOWK 286A and SOWK 286B must be taken in sequence. Maximum of 6 credits allowed in course.

Development of beginning helping relationships. Communication and applied helping skills used in social work. Point for progression to the major. **A)** Communication skills. **B)** Applied helping skills.

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.

Problem-solving approach applied to individuals and families within a generalist practice framework.

SOWK 341 03(0-0-3). Generalist Practice-Small Groups. F, S. Prerequisite: SOWK 340 or concurrent registration.

Problem-solving approach applied to small groups within a generalist practice framework.

SOWK 342 03(0-0-3). Generalist Practice-Organizations/Communities. F, S. Prerequisite: SOWK 340 or concurrent registration.

Problem-solving approach applied to organizations and communities within a generalist practice framework.

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.

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 370C-D 03(3-0-0). Social Work Practice. S. Prerequisite: SOWK 233; SOWK 340 or concurrent registration.

Application of practice processes in various settings. **C)** Schools. **D)** Community mental health.

SOWK 371A-F 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. **E)** Substance abusers. S. **F)** Social gerontology. F, S.

SOWK 384 Var [1-5]. Supervised College Teaching. Maximum of 10 credits allowed in course.

Assist instructor in teaching selected classes, group training, or discussion group leadership.

SOWK 410 03(3-0-0). 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. Prerequisite: AHS 300 or concurrent registration; SOWK 341; SOWK 342. Maximum of 10 credits allowed in course.

Application of knowledge, values, skills, methods, and processes of practice with individuals, families, groups, organizations, and communities. (\$)

SOWK 490 Var [1-3]. Workshop.

SOWK 492 03(3-0-0). Seminar. Prerequisite: Concurrent registration in SOWK 488.

Integrative seminar for field experience and social work knowledge, values, skills, methods, and processes.

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 510 03(0-0-3). Theoretical Analysis of Small Client Systems. F. Prerequisite: SOWK 500 or concurrent registration in SOWK 511.

Socio-behavioral principles relevant to generalist social work with individuals and families.

SOWK 511 03(0-0-3). Generalist Practice-Small Client Systems. F. Prerequisite: SOWK 500 or concurrent registration; concurrent registration in SOWK 510.

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: Concurrent registration in SOWK 511.

Application of communication and relationship skills for professional practice.

SOWK 520 03(3-0-0). Social Welfare Policy Analysis. F. Prerequisite: Admission to the MSW program.

Historical concept 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). Core Mediation and Conflict Resolution. F, S, SS.

Theories of conflict and power, differing styles of human interaction; Moore's stages of mediation; core skill sets necessary for mediation. (NT-O)

SOWK 552 03(1-0-2). Health and Elder Care Mediation. F, S, SS. Prerequisite: SOWK 551. Offered only as an online course.

Knowledge, values, and skills necessary for the practice of mediation in health care and elder care settings. (NT-O)

SOWK 554 03(1-0-2). Workplace Mediation. F, S, SS. Prerequisite: SOWK 551. Offered only as an online course.

Knowledge, values, and skills necessary for the practice of mediation in the workplace. (NT-O)

SOWK 556 03(1-0-2). Divorce and Child Custody Mediation. F, S, SS. Prerequisite: SOWK 551.

Practice in the family mediation field including divorce and child custody mediation. (NT-O)

SOWK 558 03(1-0-2). Arbitration. F, S, SS. Prerequisite: SOWK 551. Offered only as an online course.

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 588 Var [1-6]. Field Placement. Prerequisite: SOWK 511.
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 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 Service Assessment and Evaluation. A) F. B) S. Prerequisite: Concurrent registration in SOWK 688. A) SOWK 601. B) SOWK 603A.
Selection and application of techniques for assessment and evaluation of direct practice activities.

SOWK 610 03(0-0-3). Theoretical Analysis of Large Client Systems. S. Prerequisite: SOWK 510.
Socio-behavioral principles relevant to generalist social work with groups, organizations, and communities.

SOWK 611 03(0-0-3). Generalist Practice-Large Client Systems. S. Prerequisite: SOWK 511.
Practice knowledge and skills to intervention with groups, organizations, and communities.

SOWK 630A-C 02(1-0-1). Advanced Generalist Practice.
A) Individuals. F. Prerequisite: SOWK 611. B) Groups and families. S. Prerequisite: SOWK 630A. C) Groups. F. Prerequisite: SOWK 630A.

SOWK 631 02(1-0-1). Advanced Community Practice. F. Prerequisite: SOWK 611.
Models for advanced generalist practice in rural/transitional communities and urban neighborhoods.

SOWK 632 02(0-0-2). Advanced Organizational Practice. S. Prerequisite: SOWK 611.
Models for advanced generalist practice in and with organizations.

SOWK 633 02(0-0-2). Advanced Social Welfare Policy Analysis. S. Prerequisite: SOWK 520.
Application of social welfare policy analysis models; normative aspects of policy analysis and assessment skills.

SOWK 684 Var [1-5]. Supervised College Teaching. Maximum of 10 credits allowed.

SOWK 688 Var [1-8]. Field Placement. F, S. Prerequisite: SOWK 588; SOWK 601; SOWK 610; SOWK 611. Maximum of 15 credits allowed in course.
Supervised professional practice. (\$)

SOWK 695 Var. Independent Study.

SOWK 696 Var. Group Study.

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 784 Var [1-3]. Supervised College Teaching.

SOWK 795 Var. Independent Study.

SOWK 799 Var. Dissertation.

SPEECH COMMUNICATION COURSES

Department of Speech Communication

College of Liberal Arts

SPCM 100 03(3-0-0). Communication and Popular Culture. (GT-AH3, AUCC 3B). F, S, SS.
Classical tradition of speech communication, its extension to broadcasting, and integration of both in contemporary culture.

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). Rhetoric and Argumentation. F, S.
Principles of logical reasoning in speeches of advocacy including analysis, use of evidence, inductive and deductive reasoning.

SPCM 231 03(3-0-0). Oral Reading. 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 300 03(0-0-3). Advanced Public Speaking. F, S, SS. Prerequisite: SPCM 200.
Advanced technique in public speaking; emphasis on argument construction and refutation, style, and manuscript delivery.

SPCM 302 03(3-0-0). Parliamentary Procedure. SS.
History, principles, and effective practice of parliamentary procedure and law.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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). Women and Communication. F.
Analysis and exploration of communication as it relates to women, their roles, and their identities.

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.

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(2-2-0). Visual Rhetoric. F, S. Prerequisite: SPCM 100 or SPCM 342.
Rhetorical theory applied to planning, producing, and evaluating video messages and using video technology.

SPCM 349 03(3-0-0). Freedom of Speech. F.
Historical and philosophical precedents to freedom of speech; development of free speech principles in the U.S.; ethical obligations of speakers.

SPCM 354 03(2-2-0). 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 355 03(2-2-0). Evaluating Contemporary Film. S. Prerequisite: SPCM 354.
Theory and development of film criticism; application of critical approaches to modern fiction and nonfiction film. (NT-O)

SPCM 384 Var [1-3]. Supervised College Teaching. Maximum of 10 credits allowed in course.
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 Contemporary 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.
Principles and practice of communication in contemporary public policy decision-making, emphasizing oral performance and local civic engagement.

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: SPCM 201; SPCM 207.
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 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 in Organizations. F.
Communication theory and strategy for empowerment of nonsupervisory 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 443 03(3-0-0). Radio-Television Writing. S.
Application of rhetorical principles to commercial and noncommercial spot-writing formats; political campaign writing; feature writing.

SPCM 447 03(3-0-0). Television-Radio Programming and Management. F. Prerequisite: SPCM 342.
Management of electronic media in contemporary American culture; emphasis on factors influencing program decision making.

SPCM 449 03(3-0-0). Law and Policy of Communication Technologies. F.
Constitutional guarantees; statutory and administrative law; policy relating to existing and emerging communication technologies. (NT-O)

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(2-2-0). 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 speech communication only.

Issues of communication with postmodernity.

SPCM 495 Var. Independent Study.

SPCM 496 Var. Group Study.

SPCM 503 03(3-0-0). Transformations in Rhetorical Theory. S. Prerequisite: SPCM 201 or graduate status.

Changes in rhetorical theory from 1450 to 1950, including psychological, dramatic, literary, historical, and political influences.

SPCM 504 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 511 03(3-0-0). Topics in Public Address.** F. Prerequisite: Graduate standing or either SPCM 311 or SPCM 411 with 12 additional 300- and 400-level credits in speech, 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 520 03(3-0-0). Rhetoric and Public Affairs. F. Prerequisite: Graduate standing or 15 additional 300- and 400 level credits in speech.

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 speech.

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 speech.

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 speech.

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 speech.

Ethnographic approach to communication issues and concerns in a global context.

SPCM 539 03(3-0-0). Communication Theory. F. Prerequisite: Graduate standing or fifteen 300- and 400-level credits in speech and/or English.

Examination of communication philosophies and perspectives; analysis of modern theories of face-to-face communication.

SPCM 540/ETST 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 speech 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 speech 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 speech 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 speech or English.

Ever-changing media culture and landscape and how it affects personal, professional, and public lives.

SPCM 601 03(3-0-0). History of Rhetorical Theory. F. Prerequisite: Fifteen 300- and 400-level credits in speech and/or English.

Rhetorical theories and theorists from the classical period to the present.

SPCM 612 03(3-0-0). Rhetorical Criticism. F. Prerequisite: Fifteen 300-400 level credits in speech 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 speech communication, 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 speech communication 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.

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.

Courses of Instruction

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: Placement in MATH 130 or better. Intended as a one-semester terminal course. Credit not allowed for both STAT 201 and STAT 204.

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: MATH 117. 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. Credit allowed for only one course: STAT 301, STAT 307/ERHS 307, STAT 311, STAT 315.

Techniques in statistical inference; confidence intervals, hypothesis tests, correlation and regression, analysis of variance, chi-square tests.

STAT 303/ECE 303 03(3-0-0). Introduction to Communications Principles. F. Prerequisite: MATH 261; ECE 311 or concurrent registration. 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/ERHS 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/ERHS 307 03(3-0-0). Introduction to Biostatistics. F, S, SS. Prerequisite: MATH 117. Credit allowed for only one course: STAT 301, STAT 307/ERHS 307, STAT 311, 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. Prerequisite: MATH 117. Credit allowed for only one course: STAT 301, STAT 307/ERHS 307, STAT 311, STAT 315.

Classification, descriptive statistics; inference, testing, estimation; categorical data analysis; odds ratio.

STAT 312 03(3-0-0). Statistics for Behavioral Sciences II. 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. (AUCC 2B). F, S, SS. Prerequisite: MATH 161 or MATH 255. Credit allowed for only one course: STAT 301, STAT 307/ERHS 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/ERHS 307 or STAT 311 or STAT 315.

Estimation and testing for linear, polynormal, 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/ERHS 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/ERHS 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.

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. F, S, SS. 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, 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/ERHS 307 or STAT 311 or STAT 315.

Statistical methods for experimenters and researchers emphasizing design and analysis of experiments.

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/ERHS 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 340.

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/ERHS 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 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/ERHS 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 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.

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.

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/ERHS 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: 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)** Computer intensive methods. **F)** Robustness and nonparametric methods. **I)** Industrial statistical methods. **J)** Reliability. **K)** Bayesian statistics. (NT-O) **L)** Medical/pharmaceutical statistical methods.

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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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.

THEATRE COURSES

Department of Music, Theatre, and Dance College of Liberal Arts

+TH 141 03(3-0-0). Introduction to Theatre. (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 151 03(1-5-0). Beginning Acting. F, S.

Basic theories and techniques; practical experience through classroom performance.

TH 160 03(2-2-0). Graphic Expression for the Theatre. F, S.

Techniques of graphic communication for the theatre.

TH 161 03(2-2-0). Technical Theatre I. F, S. Prerequisite: TH 160.

Basic theory and techniques of executing settings, lighting, properties for stage.

+TH 192 03(0-0-3). 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 251 03(1-5-0). Intermediate Acting. S. Prerequisite: TH 151.

Scene work and other appropriate training for actors at the intermediate level.

TH 260 03(3-0-0). Analyzing Drama Texts for Performance. F, S.

Reading, researching, and discussing representative play types to foster an understanding of concepts used in theatrical staging.

TH 263 03(2-2-0). Costume and Makeup I. F. Prerequisite: TH 160.

Basic theory and technique for visualization of theatrical characters through costume and makeup.

TH 265 03(2-2-0). Design I. S. Prerequisite: TH 160; TH 161.

Theory and techniques of designing scenery and lighting for stage.

TH 286 01(0-3-0). Practicum. F, S, SS. Maximum of 4 credits allowed in course.

Practical experience in mounting theatrical productions.

TH 341 03(3-0-0). History of Theatre I. F.

History of theatre: origins through French neoclassicism.

TH 342 03(3-0-0). History of Theatre II. S. Prerequisite: TH 341.

History of theatre, Restoration to present.

TH 351 03(1-5-0). Advanced Acting. F. Prerequisite: TH 251.

Scene work and other appropriate training for acting students.

TH 355 03(1-5-0). Directing. S. Prerequisite: TH 251; junior status.

Intensive practical experience in direction of scenes focusing on specific directorial problems posed by various types of plays.

°TH 361 03(1-4-0). Technical Theatre II. F. Prerequisite: TH 161.

Theory and methods in advanced technical production.

***TH 363 03(1-4-0). Costume and Makeup II.** S. Prerequisite: TH 263.

Theory and practice of advanced costume design and makeup techniques.

***TH 365 03(1-4-0). Design II.** F. Prerequisite: TH 265.

Theory and practice of scenic design and lighting emphasizing individual projects and readings.

°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 470A-D 02(0-6-0). Applied Theatre Production. F, S. Prerequisite: Written consent of instructor.

A) Acting, directing, stage managing. B) Lighting, sound, technical production. C) Costume, makeup, wardrobe. D) Scenic design, painting, props.

TH 475 03(2-0-1). Playwriting. S. Prerequisite: E 210 or TH 355.

Special techniques of writing for the stage.

TH 484 Var. [1-3]. Supervised College Teaching.

TH 486 01(0-3-0). Practicum. F, S, SS. 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. F, S, SS.

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 03. 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

College of Veterinary Medicine and Biomedical Sciences

VM 601 01(1-0-0). Perspectives in Veterinary Medicine. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program

Identification and development of personal, professional, and leadership skills and orientation to PVM program and veterinary profession.

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 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). Organ Systems-Anatomy and Physiology. 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 639 03(3-0-0). Veterinary Virology and Parasitology. S. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Biology of helminth, arthropod, protozoan, and viral pathogens of animals with emphasis on common infectious diseases encountered in veterinary practice.

VM 640 06(5-0-1). 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.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

VM 650 01(0-2-0). Veterinary Microbiology Laboratory Techniques. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Microbiological laboratory techniques using immunology, bacteriology, and virology for diagnosis of animal diseases.

VM 704 01(1-0-0). Veterinary Ethics. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Moral and ethical issues affecting the veterinary profession.

VM 705 01(1-0-0). Veterinary Jurisprudence. F. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

Legal and professional issues affecting the practice of veterinary medicine.

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 712 03(3-0-0). 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 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 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 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 04(4-0-0). 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 778A-D. Special Animal Medicine. 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 selected species of animals. **A)** Non-mammalian vertebrate medicine. 02(0-0-2). Prerequisite: VM 621. **B)** Biology and diseases of small mammals. 02(2-0-0). Prerequisite: VM 778A. **D)** Small ruminants and camelids. 02(2-0-0).

VM 786A-B Var [1-22]. Practicum. 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 796F-R. Group Study. Prerequisite: Admission to professional curriculum in veterinary medicine. All courses must be taken in prescribed sequence in the PVM program.

F) Problem-based learning 01(1-0-0). **J)** Swine medicine 01(1-0-0). **R)** Food animal clinical problems 03(3-0-0).

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.

VS 495 Var. Independent Study.

VS 512/FW 512 03(3-0-0). Epidemiology/Management of Wildlife Disease. F. Prerequisite: Graduate student or junior/senior in a biological field. Credit not allowed for both VS 512 and FW 512.

Interpretation of epidemiological findings and incorporation of new information into management procedures for free-ranging wildlife populations.

VS 513/FW 513 01(0-1-0). Wildlife Disease Laboratory. F. Prerequisite: Concurrent registration in FW 512/VS 512. Credit not allowed for both VS 513 and FW 513.

Skills needed to investigate diseases of free-ranging wildlife populations.

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 602 02(1-0-1). Critical Evaluation of Scientific Literature. F.

Method of evaluating scientific literature. Students present critiques of papers they have chosen.

²**VS 605 02(2-0-0). Comparative Anesthesiology.** S.

Techniques in anesthesia for large and small animals.

¹**VS 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.

¹**VS 626 02(2-0-0). Infertility and Genital Disease.** F.

Infectious and noninfectious causes of reproductive failure in food animals.

¹**VS 630 03(3-0-0). Orthopedic Surgery.** F.

Techniques, devices, and prosthetic materials in rehabilitating musculoskeletal problems.

¹**VS 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.

¹**VS 645 03(2-3-0). Surgery of the Eye.** S.

Techniques, indications, and complications.

²Offered every third year.

°Alternate year offering (odd); *Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional offering (C = correspondence, O= online, T = telecourse, V = videotape).

Courses of Instruction

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.

⁰VS 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 662/ERHS 662 03(2-0-1). Applied Research-Planning/Design/Analysis. S. Credit not allowed for both VS 662 and ERHS 662.
Training to conceptualize and execute an independent research project.

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.

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 784 Var. Supervised College Teaching.

VS 792 Var. Seminar.

VS 795A-S 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.

VS 796 Var. Group Study-Medicine.

VS 798 Var. Research.

VS 799 Var. Dissertation.

WATERSHED SCIENCE COURSES

Department of Forest, Rangeland, and

Watershed Stewardship

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.

+⁰WR 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: SOCR 240; STAT 201.

Analysis of hydrologic processes, erosion, and slope stability, and effect of land use management activities; watershed restoration.

+WR 417 02(1-2-0). 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 107; WR 416.

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 420 02(0-6-0). Watershed Field Practicum. F. Prerequisite: Concurrent registration in WR 416 and WR 417.

Field visits to watershed management projects and sites of significant field studies. (\$)

+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. Prerequisite: CIVE 322/ENVER 322 or WR 416.

Snowfall, accumulation, distribution, physical processes in the snowpack, energy balance, ablation and runoff, measurement methods, runoff forecasting.

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 04(3-0-1). **Modeling Watershed Hydrology.** S. Prerequisite: CIVE 322/ENVE 322 or WR 416; STAT 315 or STAT 340. 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/Enver 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

Office of Women's Programs and Studies

Office of Provost/Senior Vice President

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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In recognition of a tradition of excellence at Colorado State University, here is a guide to the University's official logo, which was designed to unify all those who are, and who will be, associated with the University. Identification with the logos below is facilitated by the images, feelings, and memories they invoke. In identifying with these trademarks, the spirit of Colorado State University is perpetuated through generations of students, alumni, administrators, and personnel! For guidelines on use of these logos, please visit www.graphicstandards.colostate.edu.

The University Logo

Our name says it all! Our logo communicates immediately that we are Colorado State University to any audience, anywhere. The University's name distinguishes it as a historical institution dedicated to excellence and innovation. The name has changed at three different junctures to accommodate the changes in educational needs paralleled by developments in society. The University's name identifies the institution as the first authorized college and the only land-grant institution in Colorado.

Initially, Colorado State was referred to as Colorado Agricultural College. This name was deemed appropriate for the purposes of the University until the 1930s, when the curricula expanded beyond an agricultural education. At that point, the institution was renamed Colorado State College of Agricultural and Mechanic Arts (Colorado A&M). The final name change, Colorado State University, coincided with the University's implementation of an institutional focus on research.

The University's logo, and name in any form, is protected from unauthorized use by federal trademark regulation.

Colorado State University

Colorado
State
University

Colorado
State
University

The Ram's Head Mark

The Ram's head mark was created primarily for Athletics, not for scholarly or academic use. The primary users of the Ram's head mark are Athletics, Alumni, and student organizations; however, the Ram's head mark may be used by other organizations on spirit-related, student-focused, or celebratory materials with short shelf life.

The Ram's head mark may never be used on Primary Identification Elements such as stationery items (business cards, letterhead, etc.) with two exceptions: Athletics and Alumni. However, even with these exceptions, the Colorado State University logo must be the dominant visual.



Secondary Logos and Graphics

Secondary graphics may be used as artwork or design elements on printed and electronic material, but not as identification. Only an official Colorado State University logo may be used to identify the University. No other marks or graphics may replace the official logo.

In retrospect ... exactly what Colorado State University means to us will be different for everyone. Through all the experiences, the University's name and symbols remind us of a time and a place, of fond memories, of living, learning, and growing that result from our Colorado State experience.