



General Catalog

2004-2006

Colorado State University

Knowledge to Go Places

**Colorado State University
General Catalog
2004-2006**

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, and civic symphony. 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 Provost/Academic Vice President's Office.

PRESIDENT’S MESSAGE

Welcome to Colorado State University!

Our University is committed to excellence in learning. We aim to provide learning opportunities that are accessible beyond the walls of the campus and to ensure all students enjoy the special benefits of studying at a major research university – in labs or in field experiences – working in close collaboration with faculty.

This general catalog can offer insight into the breadth and depth of the educational offerings at our University, but descriptions of courses and majors only tell part of the story. Colorado State offers the kind of educational experience rarely found at major international research institutions. Here, we strive to create a challenging hands-on learning environment, where students have the opportunity to learn from top scholars and then put their classroom knowledge to work in unique and interesting ways.

Whenever I meet with our students, I marvel at the stories they tell about their experiences inside and outside the classroom – running a real investment fund through our College of Business, traveling to Antarctica to conduct environmental research with faculty in the natural resources, supervising the operations of our Emmy-winning campus television station, working in a laboratory in the biomedical sciences, studying at our Pingree Park mountain campus, and much more. Their affection for this university and their pride in the work they’re doing here are the real testament to the quality of a Colorado State education.

This catalog is one of the best and most useful tools to aid you in determining your own path of excellence at Colorado State University. Again, welcome!

Sincerely,

*Larry Edward Penley
President*

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Directory

The Web address for Colorado State University is:
<http://www.colostate.edu>

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

Academic Advancement Center www.aac.colostate.edu	491-6129	Athletics, Intercollegiate www.csurams.com	491-5300
Academic Computing and Networking Services www.colostate.edu/services/acns	491-5133	Atmospheric Science Department http://www.atmos.colostate.edu/	491-8360
Academic Vice President's Office www.provost.colostate.edu	491-6614	Bioagricultural Sciences and Pest Management Department	491-5261
Accounting Department http://www2.biz.colostate.edu/depts/Accounting/acct.htm	491-5102	www.colostate.edu/Depts/bspm	
Accounts/Loans Receivable www.aroweb.colostate.edu	491-6466	Biochemistry and Molecular Biology Department www.bmb.colostate.edu	491-5602
Activities Center, Campus www.whatsup.colostate.edu	491-6444	Biology Department www.colostate.edu/Depts/Biology	491-7011
Administrative Services Vice President's Office www.colostate.edu/Admin/vpa	491-5257	Biomedical Engineering (Undergraduate and Graduate) Interdisciplinary Studies Program http://www.engr.colostate.edu/bep/	491-1055
Admissions Office www.admissions.colostate.edu	491-6909	Biomedical Sciences Department http://www.cvmb.colostate.edu/bms/	491-6187
Adult Learners, Resources for	491-2248	Biotechnology Interdisciplinary Studies Program http://www.cvmb.colostate.edu/cvmb/bisp_page.htm	491-7051
Aerospace Studies Department (Air Force ROTC) www.colostate.edu/Depts/AFROTC	491-6476	Black Student Services http://www.colostate.edu/Orgs/BSS/	491-5781
Agricultural and Resource Economics Department http://dare.agsci.colostate.edu	491-6325	Board of Governors http://welcome.colostate.edu/index.asp?url=stbdag	491-7707
Agricultural Experiment Station www.colostate.edu/Depts/AES	491-5371	Bookstore www.bookstore.colostate.edu	491-6692
Agricultural Sciences College www.agsci.colostate.edu	491-6274	Business College www.biz.colostate.edu	491-6471
Alumni Relations www.ar.colostate.edu	491-6533	Campus Media (see Student Media)	491-1683
American Ethnicity Interdisciplinary Studies Program (see Ethnic Studies Interdisciplinary Studies Program)	491-2418	Career Center http://career.colostate.edu	491-5707
Animal Sciences Department http://ansci.colostate.edu	491-6672	Cashier's Office http://bursar.colostate.edu/	491-6413
Anthropology Department www.colostate.edu/Depts/Anthropology	491-5447	Cell and Molecular Biology Graduate Degree Program http://www.colostate.edu/Depts/CMB/	491-0241
Applied Human Sciences College www.cahs.colostate.edu	491-6331	Center for Advising and Student Achievement (CASA) www.casa.colostate.edu	491-3658
Art Department www.colostate.edu/Depts/Art	491-6774	Chemical Engineering Department www.engr.colostate.edu/cheme	491-5252
ASCSU (Associated Students of Colorado State University) www.ascsu.colostate.edu	491-5931	Chemistry Department www.chm.colostate.edu	491-6381
Asian/Pacific American Student Services http://niwot.colostate.edu/cwis165/PortalCSVS/PortalCSVS/DesktopDefault.aspx	491-6154	Civil Engineering Department www.engr.colostate.edu/depts/ce	491-5048
Asian Interdisciplinary Studies Program http://www.international.colostate.edu/intled/areastudies/asianstudies.htm	491-5917	Clinical Sciences Department www.cvmb.colostate.edu/clinsci	491-1274
Association for Student Activity Programming (ASAP) http://www.sc.colostate.edu/studentorg/	491-2727	Colorado Cooperative Fish and Wildlife Research Unit http://www.colostate.edu/depts/coopunit/	491-5396
		Colorado Institute for Irrigation Management http://www.engr.colostate.edu/ce/centers/ciim/index.shtml	491-5247
		Colorado State Forest Service http://www.colostate.edu/Depts/CSFS/	491-6303
		Colorado State University Alumni Association www.advancement.colostate.edu	491-6533

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Colorado State University Foundation www.giving.colostate.edu	491-7135	Environmental and Radiological Health Sciences Department	491-7038
Colorado State University System http://welcome.colostate.edu/index.asp?url=stbdag	303-534-6290	www.cvmb.colostate.edu/erhs	
Colorado Water Resources Research Institute http://cwrr.colostate.edu	491-6308	Equal Opportunity Office www.colostate.edu/Depts/OEO	491-5836
Computer Information Systems Department www.biz.colostate.edu	491-6203	Ethnic Studies Interdisciplinary Studies Program http://www.colostate.edu/Depts/CASAE/	491-2418
Computer Science Department www.cs.colostate.edu	491-5792	Exercise Science and Nutrition Interdisciplinary Graduate Program	491-5081/6535
Conference Services www.conferences.colostate.edu	491-6222	http://www.cahs.colostate.edu/fshn/programs2.asp	
Conflict Resolution and Student Conduct Services	491-7165	Facilities	491-0099
http://www.colostate.edu/Depts/DSA/judicial.html		www.colostate.edu/Depts/Facilities	
Conservation Biology Interdisciplinary Studies Program	491-1620/6519	Finance and Real Estate Department http://www.biz.colostate.edu/depts/Finance/finance.htm	491-5062
Construction Management Department www.cahs.colostate.edu/MTCM	491-7353	Financial Aid (see Student Financial Services) www.sfs.colostate.edu	491-6321
Consumer and Family Studies www.cahs.colostate.edu/cfs/program.htm	491-5141	Fishery and Wildlife Biology Department www.cnr.colostate.edu/FWB	491-5020
Continuing Education, Division of www.learn.colostate.edu	491-5288	Food Science and Human Nutrition Department www.cahs.colostate.edu/fshn	491-6535
Cooperative Extension www.ext.colostate.edu	491-6281	Food Science/Safety (Undergraduate and Graduate) Interdisciplinary Studies Programs http://www.cahs.colostate.edu/fshn/isp-foodsciencesafety/program.asp	491-6535
Cooperative Institute for Research in the Atmosphere http://www.cira.colostate.edu/index.html	491-8448	Foreign Languages and Literatures Department www.colostate.edu/Depts/FLL	491-6141
Counseling Center, University www.counseling.colostate.edu	491-6053	Forest, Rangeland, and Watershed Stewardship Department www.cnr.colostate.edu/frws	491-6911
Degree Requirements www.registrar.colostate.edu	491-7159	Geosciences Department www.cnr.colostate.edu/geo	491-5661
Design and Merchandising Department www.cahs.colostate.edu	491-1629	Geospatial Science Graduate Interdisciplinary Studies Program http://www.cnr.colostate.edu/frws/forestry/graduate/geospatial/	491-6911
Disabled Students, Resources for www.colostate.edu/Depts/RDS	491-6385	Gerontology Interdisciplinary Studies Programs http://www.learn.colostate.edu/GPIDEA/degree_gerontology.html	491-6365
Diversity in Law Interdisciplinary Studies Program	491-5421	Graduate School www.colostate.edu/Depts/Grad	491-6817
Ecology Graduate Degree Program http://www.colostate.edu/Depts/GDPE/Homepage.html	491-4373	Graduation Requirements www.registrar.colostate.edu	491-7159
Economics Department www.colostate.edu/Depts/Econ	491-6324	Health and Exercise Science Department www.cahs.colostate.edu/hes	491-5081
Education, School of http://soe.cahs.colostate.edu	491-6316	Health Service, Hartshorn www.colostate.edu/Depts/HHS	491-7121
Educational Outreach (see Continuing Education)	491-5288	History Department www.colostate.edu/Depts/Hist	491-6335
El Centro Student Services http://www.colostate.edu/depts/elcentro/	491-5722	Honors Program www.honors.colostate.edu	491-5679
Electrical and Computer Engineering Department www.engr.colostate.edu/ece	491-6600	Horticulture and Landscape Architecture Department www.colostate.edu/Depts/HLA	491-7019
Employment Services, Student www.ses.colostate.edu	491-5714	Housing and Food Services www.housing.colostate.edu	491-6511
Engineering College www.engr.colostate.edu	491-6603	Human Development and Family Studies Department www.colostate.edu/Depts/HDFS	491-5558
English Department www.colostate.edu/Depts/English	491-6428		
Enrollment Services www.es.colostate.edu	491-2127		
Environmental Affairs Interdisciplinary Studies Program http://www.colostate.edu/Programs/EAP/	491-6468		

Immunization Information <i>www.colostate.edu/Depts/HHS</i>	491-6548	Molecular, Cellular and Integrative Neurosciences Interdisciplinary Graduate Program <i>http://www.cvmb.colostate.edu/mcin/</i>	491-0425
Information Desk, Student Center <i>www.whatsup.colostate.edu</i>	491-6444	Music, Theatre, and Dance Department <i>www.colostate.edu/Depts/Music</i>	491-5529
Information Science and Technology Interdisciplinary Studies Program <i>http://istec.colostate.edu/education/</i>	491-6310	Native American Student Services <i>www.sc.colostate.edu/nass</i>	491-1332
Information Systems <i>www.colostate.edu/Depts/IS</i>	491-5491	Natural Resource Recreation and Tourism Department <i>www.cnr.colostate.edu/NRRT</i>	491-6591
Instructional Services <i>www.ois.colostate.edu</i>	491-1325	Natural Resources College <i>www.cnr.colostate.edu</i>	491-6675
Insurance, Student Health <i>http://www.colostate.edu/Depts/HHS/Insurance.htm</i>	491-5118	Natural Sciences College <i>www.colostate.edu/Depts/NatSci</i>	491-1300
Integrated Resource Management Interdisciplinary Studies Program <i>http://www.wcirm.colostate.edu/undergraduate_curr.htm</i>	491-6928	Occupational Therapy Department <i>www.cahs.colostate.edu/ot</i>	491-6253
International Development Interdisciplinary Studies Program (Undergraduate and Graduate) <i>http://www.international.colostate.edu/intled/areastudies/internationaldvpstudies_index.htm</i>	491-5917	Orientation Services/PREVIEW <i>www.casa.colostate.edu</i>	491-6011
International Programs <i>http://www.international.colostate.edu/oip_index.html</i>	491-5917	Parking Services, University <i>www.colostate.edu/Depts/parking</i>	491-7041
Journalism and Technical Communication Department <i>www.colostate.edu/Depts/TJ</i>	491-6310	Pathology (see Microbiology, Immunology, and Pathology Department) <i>www.cvmb.colostate.edu/mip</i>	491-6136
Languages and Literatures Department, Foreign <i>www.colostate.edu/Depts/FLL</i>	491-6141	Philosophy Department <i>http://www.colostate.edu/Depts/Philosophy/</i>	491-6315
Latin American Interdisciplinary Studies Program <i>http://www.international.colostate.edu/intled/areastudies/latinamericanstudies.htm</i>	491-6043	Physics Department <i>www.physics.colostate.edu</i>	491-6206
Legal Services, Student <i>http://sls.colostate.edu/default.cfm?menu=1&lvl=1</i>	491-1482	Physiology (see Biomedical Sciences Department) <i>www.cvmb.colostate.edu/bms</i>	491-6188
Liberal Arts College <i>www.colostate.edu/Colleges/LibArts</i>	491-5421	Pingree Park <i>http://www.housing.colostate.edu/pingree/index.htm</i>	491-7377
Libraries, University <i>http://lib.colostate.edu</i>	491-1841	Police Department <i>www.colostate.edu/Depts/CSUPD</i>	491-6425/911
Lory Student Center <i>www.whatsup.colostate.edu</i>	491-6444	Political Science Department <i>http://www.colostate.edu/Depts/PoliSci/</i>	491-5157
Management Department <i>www.biz.colostate.edu/Depts/Management/Mgt.htm</i>	491-5323	President's Office <i>www.colostate.edu/Depts/President</i>	491-6211
Manufacturing Technology and Construction Management (see Construction Management Department)	491-7353	Provost/Academic Vice President's Office <i>www.provost.colostate.edu</i>	491-6614
Marketing Department <i>www.marketing.colostate.edu</i>	491-5063	Psychology Department <i>www.colostate.edu/Depts/Psychology</i>	491-6363
Mathematics Department <i>www.math.colostate.edu</i>	491-1303	Radiological Health Sciences (see Environmental and Radiological Health Sciences Department) <i>www.cvmb.colostate.edu/erhs</i>	491-7038
Mechanical Engineering Department <i>http://www.engr.colostate.edu/me/</i>	491-6558	Rangeland Ecosystem Science (see Forest, Rangeland, and Watershed Stewardship Department) <i>www.cnr.colostate.edu/frws</i>	491-6911
Microbiology, Immunology, and Pathology Department <i>www.cvmb.colostate.edu/mip</i>	491-6136	Records, Student <i>www.es.colostate.edu</i>	491-7148
Military Science Department (Army ROTC) <i>www.colostate.edu/Depts/ArmyROTC</i>	491-6506	Recreation Center <i>www.campusrec.colostate.edu</i>	491-6359
Molecular Biology Interdisciplinary Studies Program	491-5602	Registration <i>www.es.colostate.edu</i>	491-7148
		Religious Studies Interdisciplinary Studies Program	491-5421
		Research and Information Technology Vice President's Office <i>http://vpri.colostate.edu</i>	491-7194

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Residency for Tuition Classification http://sfs.colostate.edu/	491-6321	Student Financial Services www.sfs.colostate.edu	491-6321
Russian, Eastern, and Central European Interdisciplinary Studies Program http://www.international.colostate.edu/intled/ areastudies/reces.htm	491-5917	Student Media http://campusmedia.colostate.edu/	491-1683
Scholastic Standards http://www.casa.colostate.edu/Advising/ Standards.cfm	491-7095	Summer Session www.summer.colostate.edu	491-1590
Social Work, School of www.caahs.colostate.edu/sw	491-6612	Teacher/Educator Licensure http://soe.caahs.colostate.edu	491-5292
Sociology Department www.colostate.edu/Depts/sociology	491-6044	Testing Service, University www.counseling.colostate.edu	491-6498
Soil and Crop Sciences Department www.colostate.edu/Depts/SoilCrop	491-6517	Transcripts www.es.colostate.edu	491-7148
Speech Communication Department www.colostate.edu/Depts/Speech	491-6140	Transfer Evaluation www.es.colostate.edu	491-7147
Sports, Recreational www.campusrec.colostate.edu	491-6359	University Advancement, Vice President of www.advancement.colostate.edu	491-7328
State Board of Agriculture (see Board of Governors)	491-7707	Veterans Certification www.es.colostate.edu	491-7148
Statistics Department www.stat.colostate.edu	491-7277	Veterinary Medicine and Biomedical Sciences College www.cvmbms.colostate.edu	491-7051
Student Accounts/Loans Receivable www.sfs.colostate.edu	491-6466	Water Resources Interdisciplinary Studies Program http://watercenter.colostate.edu/waterminor.PDF	491-6308
Student Affairs Vice President's Office www.colostate.edu/Depts/DSA/VP/SA	491-5312	Women's Programs and Interdisciplinary Studies Program (Undergraduate and Graduate) http://www.colostate.edu/programs/WPS/	491-6384
Student Center, Charles A. Lory www.whatsup.colostate.edu	491-6444		

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

<http://www.colostate.edu/cgi-bin/webevent/webevent.cgi?cmd=open&cal=cal5&>

Fall Semester - 2004

Aug. 19-20 Thursday, Friday. Orientation, advising, and registration for new students.
Aug. 23 Monday. Classes begin. Late registration fee assessed for adding first class.
Aug. 26 Thursday. End of Special B drop period.
Aug. 29 Sunday. End of Special A and Special B add period.
Sept. 6 Monday. Holiday – University offices closed.
Sept. 8 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. 18 Monday. End of course withdrawal period.
Nov. 20 Saturday. Fall recess begins; no classes next week.
Nov. 25-26 Thursday, Friday. Holiday – University offices closed.
Nov. 29 Monday. Classes resume.
Dec. 10 Friday. Classes end.
Dec. 13-17 Monday through Friday. Final examinations.
Dec. 17-18 Friday, Saturday. Commencement ceremonies.
Dec. 22-24 Wednesday through Friday. Holiday – University offices closed.
Dec. 31 Friday. Holiday – University offices closed.

Spring Semester - 2005

Jan. 13-14 Thursday, Friday. Orientation, advising, and registration for new students.
Jan. 17 Monday. Holiday – University offices closed.
Jan. 18 Tuesday. Classes begin. Late registration fee assessed for adding first class.
Jan. 23 Sunday. End of Special B drop period.
Jan. 24 Monday. End of Special A and Special B add period.
Feb. 2 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 12 Saturday. Spring recess begins.
March 21 Monday. Classes resume.
March 21 Monday. End of course withdrawal period.
May 6 Friday. Classes end.
May 9-13 Monday through Friday. Final examinations.
May 13-14 Friday, Saturday. Commencement ceremonies.

Summer Session - 2005

May 16 Monday. First 4- and 12-week terms begin.
May 30 Monday. Holiday – University offices closed; no classes.
June 10 Friday. First 4-week term ends.
June 13 Monday. 8-week term and second 4-week term begin.
July 4 Monday. Holiday - University offices closed; no classes.
July 8 Friday. Second 4-week term ends.
July 11 Monday. Third 4-week term begins.
August 5 Friday. Last day of classes for all terms.

Fall Semester – 2005

Aug. 18-19 Thursday, Friday. Orientation, advising, and registration for new students.
Aug. 22 Monday. Classes begin. Late registration fee assessed for adding first class.
Aug. 25 Thursday. End of Special B drop period.
Aug. 28 Sunday. End of Special A and Special B add period.
Sept. 5 Monday. Holiday – University offices closed.
Sept. 7 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. 17 Monday. End of course withdrawal period.
Nov. 19 Saturday. Fall recess begins; no classes next week.
Nov. 24-25 Thursday, Friday. Holiday – University offices closed.
Nov. 28 Monday. Classes resume.
Dec. 9 Friday. Classes end.
Dec. 12-16 Monday through Friday. Final examinations.
Dec. 16-17 Friday, Saturday. Commencement ceremonies.
Dec. 26-28 Monday through Wednesday. Holiday – University offices closed.

Spring Semester - 2006

Jan. 2 Monday. Holiday – University offices closed.
Jan. 12-13 Thursday, Friday. Orientation, advising, and registration for new students.
Jan. 16 Monday. Holiday – University offices closed.
Jan. 17 Tuesday. Classes begin. Late registration fee assessed for adding first class.
Jan. 22 Sunday. End of Special B drop period.
Jan. 23 Monday. End of Special A and Special B add period.
Feb. 1 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 11 Saturday. Spring recess begins.
March 20 Monday. Classes resume.
March 20 Monday. End of course withdrawal period.
May 5 Friday. Classes end.
May 8-12 Monday through Friday. Final examinations.
May 12-13 Friday, Saturday. Commencement ceremonies.

Summer Session - 2006

May 15 Monday. First 4- and 12-week terms begin.
May 29 Monday. Holiday – University offices closed; no classes.
June 9 Friday. First 4-week term ends.
June 12 Monday. 8-week term and second 4-week term begin.
July 4 Tuesday. Holiday - University offices closed; no classes.
July 7 Friday. Second 4-week term ends.
July 10 Monday. Third 4-week term begins.
August 4 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 at Colorado State University (CSU) 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 since World War II has been rapid; the University awarded its first doctorate 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.

Colorado State, as a 21st century land-grant university, has a fundamental mission to uphold. A 21st century land grant is a place where

- Scholarly discovery addresses real, felt needs of society;
- There are tangible benefits to citizens, business, and government from the blending of the discovery process with learning opportunities;

- In the great land-grant tradition, the intellectual resources of the university are brought to bear on the great, practical challenges of our time; and
- We recognize that the great challenges of the 21st century are challenges that demand an integration of many different perspectives.

Today, Colorado State is one of the leading public research universities in the United States, expending approximately \$157M from externally funded contracts, grants and governmental sources in FY03, 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 25,000 plus regular, on-campus students. In 2002-2003, CSU granted 3,998 bachelor's degrees, 182 PhD degrees in 37 fields, and 1027 master's degrees in 63 fields. The Professional Veterinary Medicine (PVM) program awarded 132 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

The Board of Governors adopted, as guidelines for the institution's overall efforts, the seven aims described below.

Provide a High-Quality Undergraduate Experience

The University will continue to review and enhance the educational opportunities available to undergraduate students. Programs will be designed to meet the contemporary and future needs of students by developing critical thinking, communication skills, problem-solving capabilities, technical expertise, and an awareness and appreciation of varying perspectives. Excellent teaching and advising are necessary to assure a high-quality undergraduate experience.

Provide High-Quality Graduate Education Programs

The University will continue to review and enhance the educational opportunities available to graduate students. Graduate students will be provided with the necessary means to reach the highest levels of learning in their field, to make scholarly contributions directed toward the well-being of humanity, and to develop their abilities as professional leaders.

Provide an Environment Conducive to Excellent Faculty and Student Research, Scholarship, and Artistry

The University will provide an atmosphere supportive of scholarly inquiry and accomplishment. Free expression and pursuit of ideas in the search for truth will be assured. Colorado State University will strive to disseminate the results of its research, scholarship, and artistry through its own classrooms and throughout the world for the benefit of all.

Provide Outreach Programs Responsive to the Educational and Developmental Needs of All University Constituencies

The University will provide learning experiences, both on- and off-campus, to meet the evolving needs of the widest range of clientele. Colorado State University accepts its land-grant responsibility to serve the needs of the people of the state, nation, and the world by developing and sharing knowledge within its areas of capability.

Assure the Growth and Development of University Students, Staff, and Faculty

The University will ensure an environment that is supportive of the needs and aspirations of its students, staff, and faculty. This includes providing the necessary support and atmosphere to allow competent individual and collective performance of professional responsibilities and opportunities to pursue professional growth.

Assure Full Participation of Individuals from the Pluralistic Society in Which We Live as Equal Partners in the Life of the University

The University will recruit, retain, and support staff, students, and faculty from the diverse culture which the University serves with particular emphasis on those which have been historically underrepresented. The University will assure participatory decision making by soliciting and respecting the contributions of the diverse segments of the community.

Assure the Material and Financial Resources Needed To Achieve All of the University's Aims

The University will develop effective strategies for securing from varied sources the necessary resources to achieve competitive salaries, modern facilities, and other services required to perform its educational, research, and service missions.

ASSESSMENT AND IMPROVEMENT OF PROGRAM QUALITY

The University uses a process for continuous and systematic improvement of programs in academic and student/administrative support 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 on Social Work Education
Foundation for Interior Design Education Research
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

National Recreation and Park Association/American
Association for Leisure and Recreation
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
Peter J. Nicholls, Provost/Academic Vice President
*Gerard J. Bomotti, Vice President for Administrative
Services*
*Anthony A. Frank, Vice President for Research and
Information Technology*
*Donald Fry, Vice President of Development and
Advancement*
Linda S. Kuk, Vice President for Student Affairs

Donna Aurand, Interim General Counsel
Mark Driscoll, Athletic Director

COLORADO STATE UNIVERSITY SYSTEM

*410 Seventeenth Street, Suite 1415
Denver, CO 80202
(303) 534-6290
welcome.colostate.edu/index.asp?url=stbdag*

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 Board of
Governors of the Colorado State University System
administrative offices are located in Denver.

Members of the Board of Governors as of April 2004 included:

Connie L. Calaway
Phyllis "Diane" Evans
Patrick A. Grant
Donald A. Hamstra
A. Fred Kerst
Chad C. McWhinney
Jeff Shoemaker
Charles W. Smith (Jan)
Reginald L. Washington

Dr. Paul Kugrens, CSU Faculty Representative
President of ASCSU, CSU Student Representative
Dr. Roy Sonnema, CSU-Pueblo Faculty Representative
Tyson Valenzuela, CSU-Pueblo Student Representative

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 Newsom Residence Hall, Room E203

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 interdisciplinary seminar-style courses taught by some of the University's best teachers, individualized academic advising, faculty-mentored research opportunities, an optional residential living and learning community in Newsom Hall, first priority registration for classes (after the first semester), co-curricular activities, and assistance on applications for prestigious post-graduate awards. The Honors experience emphasizes educational and cultural enrichment. Approximately 850 students participate in the program where they receive a "public ivy" education because they are able to receive a world class education, enjoy the personalized attention typically found at a small college, and benefit from the resources and diversity of an outstanding national university.

Main Features

1. *University Honors Core Curriculum*

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. 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. The Honors courses typically enroll between 15 and 25 students.

The Honors Core Curriculum is found in the University-Wide Instructional Programs chapter of this catalog.

2. *Graduation as a University Honors Scholar*

Students who complete the Honors Core Curriculum and achieve at least a 3.5 cumulative grade point average earn the prestigious designation of University Honors Scholar. Scholars are recognized at graduation, and the Honors Scholar designation appears on their diplomas and transcripts. For more information on graduation as a University 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 225 and 250 first-year students enroll in the Honors Program each year.

4. *The Honors Living and Learning Community*

The optional Honors living and learning community, located in Newsom Hall, 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. Newsom Hall is home to the Honors Office and classrooms that are used for the first year seminar, faculty firesides, invited lectures, study sessions, and a wide variety of co-curricular activities. The Leonard "Yank" Banowetz Honors Study Lounge is located across from the Program Office.

LIVING AND LEARNING COMMUNITIES

Key Academic Community

*Office in Aylesworth Hall, Northeast Wing
Tae Nosaka, Coordinator*

970-491-7095

www.casa.colostate.edu/achievement/key/index.cfm

The Key Academic Community is based on high standards for academic performance combined with the support and resources needed to succeed. Students live and learn within a close-knit group and attend at least three classes with others in the Key Community. Some classes are linked into clusters by common themes and subject areas. Group study sessions outside class with other Key students and “master students” reexamine classroom material. A freshman seminar challenges students to examine the ideas of great thinkers while providing an introduction to the University and methods for effective learning.

Natural Science Floors – The Ingersoll Residential College

See Student Services Chapter, Housing and Dining Services, Living and Learning Communities

Residents of Ingersoll Residential College (IRC) have an interest in science and want to live with others who share that interest. Natural Sciences students are invited to become part of the IRC. Majors include biochemistry, biological science, chemistry, computer science, mathematics, natural science, physics, psychology, and zoology. Natural Sciences open option and Life Sciences open option students are also welcome.

The IRC offers several advantages—several small review groups are offered each semester. In addition, there is a Tutorial Study Hall and a well-equipped computer lab.

The resident assistants (RAs) are all science majors. Residents and RAs take field trips to locations like the Denver Zoo, the CSU cadaver lab, and the Fort Collins Hewlett-Packard plant. Faculty members eat lunch with Ingersoll students and present programs on various topics.

Shared Interest Living

The Office of Housing and Food Services offers Living Learning Community options 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 having similar interest and/or lifestyles. There are nine Living Learning Community options designed to be academic or co-curricular in their

focus. Shared Interest Living floors connect students with faculty and staff advisers who engage students in their learning and provide information about opportunities available at the University.

Substance Free Lifestyles: For students committed to enjoying college without using alcohol or drugs, this option offers a supportive place. Students who choose to abstain from alcohol or drugs for personal, religious, or health reasons as well as those from alcoholic families or recovering from addictions, are invited to participate. Alcohol-free social events along with educational activities are offered to the residents in a community supportive of personal choices. This program is only offered if an entire floor section can be filled.

Allison Community for Engineering: This option offers an excellent academic environment for students majoring in engineering programs. Tutors are available for support. The hall hosts several events and is close to classes and the Engineering Computer Lab. Students have access to the University computer system in their rooms.

Equine and Agricultural Sciences: Begin with a combination of science and industry. Then add a love for animals, agronomy, farm and ranch management, food science, horticulture, landscape design, or agricultural business and economics. These are among the interests and majors brought together in this SIL option. Diverse programs and numerous leadership opportunities are provided by the College of Agricultural Sciences.

Leadership Community: Leadership skills are developed through workshops, class options, and information on how and where to get involved both on and off campus.

Personal Computing: This option is a place to share and gain knowledge of computer applications through study groups and a valuable resource network of other PC users. A computer lab equipped with Macintosh and IBM PCs is located in the hall. This program is offered on a men’s floor. Women interested in this program will be placed on a floor section that is in close proximity.

Pre-Veterinary Medicine: Students who love animals will enjoy living on a pre-veterinary medicine floor. Many residents share affection for animals and interest in working in veterinary medicine, while others pursue microbiology, environmental health, or the biomedical sciences open option. Informal tutoring, study groups, faculty advising, and test files are available to assist students with the demanding curricula in these majors.

Ram Pride: Located in Edwards Hall, this living option provides enthusiasm, energy, and opportunities that no other floors can offer! Residents show the greatest spirit at football, volleyball, and basketball games. There are opportunities to be involved with Homecoming, meet with

prominent alumni, and start that life-long connection with Colorado State.

Health and Exercise Science/Wellness: The wellness option is a place for students interested in improving and develop the holistic concept of living. Special emphasis is placed on activities that help students learn to define and fulfill their personal needs in eight wellness dimensions: physical, emotional, human awareness, life planning, intellectual, sexual, social, and values clarification.

Global Village: In the Global Village, students live in a community of peers who share interests and experiences from around the world. This community consists of both domestic and international students, from a variety of diverse 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 degree may find Global Village to be the next step in their journey. This dynamic community offers students an opportunity to learn from people's own life experiences of living, studying, volunteering, or working abroad.

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 based on a 4-year curriculum which expands students' self-awareness and explores values and ethics. The program begins with *A Call to Lead*, an introductory leadership development course based on the social change model of leadership. Enrollment is highly selective, with only 30 new students being admitted each year.

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.

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.

HONOR SOCIETIES

Promoting, advancing, and recognizing the top scholars of our campus community, honor 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 honor societies go to this website: www.provost.colostate.edu/index.asp?url=honorcsu.

RESEARCH AND CREATIVE OPPORTUNITIES

Qualified undergraduate students have several 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, the Lory Student Center Theatre, and the Johnson Hall Main Stage. Construction was recently finished on the University Center for the Arts, a facility that houses a 500-seat concert hall and a 300-seat theatre, as well as recital and rehearsal halls, dance studios, gallery space, 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 <http://www.honors.colostate.edu/ContinuingStudent/scholarships>. In addition, students can contact the Office of the Provost/Academic 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, adding a minor, adding an interdisciplinary studies program, or adding 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.

Study Abroad

International Programs

Office in Laurel Hall

Jerome Bookin-Weiner, Executive Director

(970) 491-5917

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

Infuse your studies with an international perspective through study abroad, area studies, and international education – just a few of the ways Colorado State can prepare you for work in tomorrow’s increasingly global economy. Graduate schools and employers are looking for people with international experience who understand their world and can appreciate other cultures.

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.

Model United Nations

At Colorado State University, students may participate in Model United Nations programs in two ways: through a course offered each year in which students prepare to run a Model UN Conference for high school students or through the student-run Model UN organization that puts together teams of students to represent the University at inter-collegiate Model UN programs in Colorado and around the country.

Summer Session

*Office in Natural and Environmental Science Building,
Room A317*

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 only 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 use the season for professional development; lighten a course load for another term.

Summer is an appealing time. The campus atmosphere is laid-back 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 the *Summer Class Schedule* can be made from the summer homepage or by calling the request line at (970) 491-7985. An on-line summer schedule can also be found 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 club sports 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

Office in the McGraw Athletic Center

Mark Driscoll, Director of Athletics

(970) 491-0214

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, 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 collegiate 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-Club Sports

Club sports are student-run competitive sport organizations that compete with other colleges and play for national championship 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
Offices in Spruce Hall
Mary Ontiveros, Executive Director*

*(970) 491-6909
www.admissions.colostate.edu*

All correspondence about undergraduate admissions should be addressed to the Office of Admissions, Colorado State University, 1020 Campus Delivery, Fort Collins, CO 80523-1020. Students interested in graduate admission should request a copy of the Graduate and Professional Bulletin. The Graduate and Professional Bulletin is available online at <http://graduateschool.coloradostate.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 performance, test scores, leadership qualities, high school and community service, principal/counselor/teacher recommendations, geographic residence, first generation status, and ethnic/racial background. 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 applying for admission may use the online application at www.admissions.colostate.edu or may e-mail to admissions@colostate.edu, call (970) 491-6909, or write the Office of Admissions, Spruce Hall, Colorado State University, 1020 Campus Delivery, Fort Collins, CO 80523-1020, for an application. High school seniors may also obtain their application from the high school counselor.

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

Freshmen: Completed applications with all supporting documents must be submitted by February 15 for priority consideration for fall semester. The deadline for spring semester is December 1. Applicants are encouraged to submit a complete application and all academic credentials as early as possible. Applications are processed up to 14 months before the requested date of entrance. Applications received after these deadlines will be considered until available slots have been filled.

Transfer students: Completed applications with all supporting documents must be submitted by April 15 for priority consideration for fall semester. The deadline for spring semester is December 1. Applicants are encouraged to submit a complete application and all academic credentials as early as possible. Applications are processed up to 14 months before the requested date of entrance. Applications received after these deadlines will be considered until all available slots have been filled.

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

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/Social Security Number

All students are required to submit a social security number (SSN) at the time of admission or before initial enrollment at the University. 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 and state and federal reports required by law.*

The social security number is also presently used as the personal identifier (PID) in student systems at the University and is imbedded electronically on the student photo identification card which may be used in connection with various University-related activities and services. *However, the use of the social security number as the personal identifier (PID) is optional. Students may request that a random number be assigned for PID by visiting the Registrar's Office in 100 Administration Annex. The University will be using a non-SSN identifier in its new student information system and has applied for a waiver from HB03-1175 for the implementation period until Fall 2006.*

The social security number is only released to agencies or individuals outside the University 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.

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, Campus Delivery 8031, 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

The following are requirements for high school graduates applying to Colorado State University.

1. Graduate from high school prior to enrollment.
2. Satisfactorily complete 18 high school units (grades 9 through 12), 15 of which must be academic. Course work may be deemed deficient if unsatisfactory grade (D, F, U) are earned. (A unit typically equals one year of course work.) These must include:
 - a. four units of English, including reading, composition, grammar, literature, and speech.
 - b. three units of mathematics, including algebra I, geometry, and algebra II (or a comparable three-year sequence). Admission preference will be given to students who participated in an accelerated mathematics program or who maintained enrollment in mathematics courses during their senior year in high school.
 - c. five units of social science and natural science with a minimum of two from each. It is highly recommended that at least one unit of natural science be laboratory-based.
 - d. admission to some programs may require a higher grade point average and/or specific course work. For example, the College of Engineering requires one-half unit of trigonometry, and one unit of chemistry, in addition to the required algebra and geometry.
3. Submit scores from the ACT or the SAT. Tests may be taken during the junior or senior year in high school. Arrangements for tests and transmittal of scores to Colorado State should be made with the high school counselor or with the nearest office of the ACT Program, P.O. Box 168, Iowa City, IA 52243-0168, or The College Board, P.O. Box 6200, Princeton, NJ 08541-6200.

Colorado State University selects for admission students who appear to be the best qualified to benefit from and contribute to the educational environment of the University. All applications are carefully and individually reviewed. Students accepted usually must meet the admissions standards for first-time freshmen as defined by the Colorado Commission on Higher Education.

In special cases, students otherwise well-qualified, but not meeting all requirements, are considered for admission on a case-by-case basis.

Effective for high school students who graduate in spring 2008 or later, completion of a pre-collegiate curriculum including 4 units of English, 3 units of mathematics (algebra I level and higher), 3 units of natural science (two units must be lab-based), and 3 units of social science (at least one unit of U.S. or world history) will be required for students to meet course work requirements for admission. Effective for high school students who graduate in spring 2010 or later, an additional unit in mathematics and two units of the same foreign language will be required for students to meet coursework requirements for admission.

For Applicants Who are Home-Schooled

Colorado State University encourages applications from homeschoolers 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 presentation of a portfolio that includes a description of the learning environment, a detailed list of courses and course content, an explanation of any applicable grading scales and documentation of any standardized curricula used.

While a grade point average and class rank may not be calculable, the admission decision will include a review of academic proficiency, ACT or SAT scores, required course work, academic rigor, trends in performance, essay, and other appropriate performance indicators.

Additional information may be found at http://admissions.colostate.edu/freshmen/faq_homeschool.shtml.

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, 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 link "Transfer Office," 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. Prior to July 1, 2001, students scoring 500 or higher are awarded a minimum of three semester credits for each examination or a maximum of 30 semester credits for all five examinations. Beginning July 1, 2001, 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

<u>(Prior to July 1, 2001)</u>	<u>(Beginning July 1, 2001)</u>
500-574 = 3 semester credits	50-57 = 3 semester credits
575-649 = 4 semester credits	58-65 = 4 semester credits
650-724 = 5 semester credits	66-72 = 5 semester credits
725-800 = 6 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 written communication or mathematics requirements.

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 equal to or greater than the mean scaled score prior to July 1, 2001, on a specific Subject Examination are granted credit in the amount allowed for the Colorado State equivalent course(s). 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 link "Transfer Office" 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 "Transfer Office" link 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 Entry Level Mathematics Exam.
4. Submit scores from either the ACT (American College Test Program) or the SAT of The College Board. 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 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).

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 2.0 GPA (on a 4.0 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 2.5 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 generally is not counted toward the minimum number of credits required for admission of transfer students.
2. Transfer students currently registered at another institution must submit a list of courses indicating those in which they are presently enrolled and those in which they will enroll prior to entering Colorado State.
3. Transfer students must 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 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 Entry Level Mathematics Exam, OR by submitting other credible evidence of adequate preparation of university-level mathematics courses.

4. Submit high school transcripts to determine if course work requirements have been met while attending high school.
5. Plan to complete college composition and college math 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

Colorado State maintains transfer guides with all community colleges in Colorado. Each guide consists of policies and practices for the acceptance of college credit, a list of courses which transfer to Colorado State, and an outline of academic programs. Students contemplating transfer are encouraged to meet with transfer advisers at their current institution as early as possible.

The Transfer Evaluation 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 completed with a grade of C- or better are generally accepted in transfer. Transfer grades and credits are not computed within the cumulative GPA earned at Colorado State.

Transfer Equivalency Source (T.E.S.)

T.E.S. (Transfer Equivalency Source) is a database of selected accredited institutions in the U.S., 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 T.E.S. If a particular institution is not listed, contact the Transfer Evaluation 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, which includes Colorado State University. There are more than 300 lower-division general education courses in 20 subject areas approved for guaranteed transfer.

After starting on your higher education pathway at any public college or university in Colorado, and upon acceptance to another, you can transfer up to 35 to 37 credits of previously and successfully (C- or better) completed guaranteed transfer general education coursework. These courses will transfer and continue to apply toward your general education core or graduation requirements for any of our bachelor's degree programs. You will find extended detail on the Colorado Commission for Higher Education (CCHE) web site at <http://www.state.co.us/cche/gened/gtpathways/index.pdf>. You may also reference Colorado State University's site at www.state.co.us/cche/; you should click on Students & Parents, then on General Education/Transfer.

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 Office in 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 Office 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

Office in 100 Administration Annex for presentation to the Vice Provost for Undergraduate Studies 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 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.

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.

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 Degree and Transfer Evaluation Office.

For Former Colorado State Students

Former Colorado State students who have not attended another institution since attending Colorado State must file an application for readmission. Students who have withdrawn prior to the end of a semester must also file an application for readmission. 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 application for readmission 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 and the student's academic performance at transfer institutions and if space is available.

For Those Seeking a Second Bachelor's Degree

Acceptance to work toward a second bachelor's degree is contingent upon completion of a first bachelor's degree and fulfillment of regular admission requirements as well as receipt of favorable recommendations by the appropriate college and/or department.

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.

Students seeking second bachelor's degrees cannot declare second majors.

For U.S. Citizens Educated Overseas

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

Colorado State recognizes that the pool of U.S. citizens educated abroad covers a wide spectrum, including students with dual citizenship who have never been to the U.S. and 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.

Applicants who are U.S. citizens 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 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.

All international applicants, except for those whose native language is English and for whom the language of instruction is English, are required to demonstrate a high level of English proficiency. 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 (525 on the paper-based exam) or a minimum IELTS exam 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 (450) on the paper-based exam) or a minimum IELTS exam 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 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.

Registration Changes

Tuition and fees will be adjusted for undergraduate students that go above or below the 9 credit assessment cut-off 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 classes begin, 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 according to the following chart:

Withdraw in Week	Withdrawal Assessment for Fall and Spring ¹							
	1	2	3	4	5	6	7	8
	10%	15%	20%	30%	35%	40%	45%	50%
Withdraw in Week	9	10	11	12	13	14	15	16
	60%	65%	70%	80%	85%	90%	100%	100%

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 fund programs. 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.

If a student withdraws a cash balance from his or her student account to use for living expenses, 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. No financial adjustment will be made for a student who is suspended, dismissed, or expelled for breach of discipline.
3. University room and board charges will be assessed through the vacate date from University housing.
4. In the case of a student death, a refund of tuition and fees may be made any time during the semester.

¹ Summer term has a different assessment schedule and the withdrawal policy is in the Summer Class Schedule.

5. 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.

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, PID, 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
Math and Composition Placement Examination fees (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 ² ; (college-wide)	
Agricultural Sciences	\$ 75.00
Applied Human Sciences	\$ 69.00
Business	\$100.00
Engineering	\$155.00
Intra-University	\$ 36.00
Liberal Arts	\$ 55.65
Natural Resources	\$100.00
Natural Sciences	\$100.00
Veterinary Medicine and Biomedical Sciences	\$100.00
Transcript fee per copy	\$ 8.00
University Technology Fee	\$ 15.00

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/Academic 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.*

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.

² 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.

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 2003-2004 figures)

The following estimate of student costs, exclusive of tuition and fees, 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.

	Per Semester	Total Academic Year (Two Semesters)
Living Allowance	\$ 3022	\$ 6045
Books and Supplies	\$ 450	\$ 900
Personal Expenses	<u>\$ 1000</u>	<u>\$ 2000</u>
Total Estimated Costs	\$ 4472	\$ 8945

Health Insurance

The University administers an optional health insurance plan for students at a reasonable rate. This insurance 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 booklet which accompanies the Residence Hall Application form.

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 booklet which accompanies the University Apartment Application form.

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 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 Records and Registration 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
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.”

“Domicile” is the legal term used to describe the place where a person has chosen to make a true and fixed permanent home. “Domicile” includes both physical presence and intent, and must be established for 12 months prior to the first day of class. 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.”

The initial tuition classification is determined from information provided by student/parent on the residency section of the admissions application. The University, in making this determination, may also consider relevant information contained in any other University educational records. Failure to answer all questions on the admissions application could lead to initial classification as “non-resident.”

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.

The petitioner’s classification will remain non-resident until he or she has received notification from the Tuition Classification Officer indicating a residency change has been approved. Students who are petitioning for residency remain responsible for paying their student account based upon their current tuition classification status at the time of billing.

Petition Deadline

Student Financial Services must receive completed petitions no later than their published deadline date for each term. Petitions submitted after the deadline dates or uncompleted petitions will not be accepted for review for that term and will result in tuition assessment as a non-resident for that term. It is the responsibility of the petitioner to submit a completed petition in a timely manner and no later than the deadline date. 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.

Appeal of Classification

Decisions made by the Tuition Classification Officer are subject to appeal to the Residency Appeals Committee. A student wishing to appeal a decision should contact Student Financial Services for instruction. Appeals must be submitted in writing, to Student Financial Services no later than 2 weeks (10 class days) after the date of the letter in which the decision is conveyed to the petitioner. The decision of the Residency Appeals Committee is the final University determination for that specific term.

Detailed information on tuition classification and copies of the Tuition Classification Statutes are available on request from Student Financial Services and on the Student Financial Services Web site at www.sfs.colostate.edu.

Any student who provides false information to avoid paying “non-resident” tuition may be subject to legal and/or disciplinary action.

Military Personnel and/or Their Dependents

Active duty members of the armed forces of the United States and Canada on permanent duty stationed 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 reported to a duty station in the state, as certified by the military command, no later than the first day of classes of the applicable academic term. Unless the student meets the requirement for domicile in Colorado for one year as detailed above, this eligibility expires at the first term that begins after retirement, permanent change of duty station, or loss of dependent status. It is the responsibility of the active duty member of the military or their dependents to notify the University each semester to initiate and/or maintain their status.

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)

*Cashier's Office
Office in Johnson Hall, Room 108
(970) 491-2767
<http://bursar.colostate.edu>*

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.

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. Payment of all University charges is to be received by the due date to avoid late payment penalties. Penalties include late fees of 1.5% per month and holds on University services. Payments by check are processed on the day of receipt (future dates are not honored).

All other charges for University services should be paid in the month billed. Summer session tuition is due when billed.

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 below).

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.

Late Payment

Mailed payments must reach the University Cashier's Office, Room 108 Johnson Hall, by 4:00 p.m. on the due date (postmarks do not apply). Online payments must be made by 2:00 p.m. on the due date for the payment to be considered timely. Penalties in the amount of 1.5% of the past due balance will be assessed for late payment of student accounts for the purpose of encouraging prompt payment.

Registration, Transcript, and Diploma Holds

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

Any person who presents a check, either paper or electronic, to the University that is not accepted for payment by the bank because of insufficient funds, stopped payment, nonexistent account, or other reason for which the person is responsible is charged a penalty as provided by state law.

The University will attempt to contact the person who presents such a check. Contact will be attempted 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. (Every student is required to promptly notify Enrollment Services of any address change.) Within the time specified in the notice the person is expected to make payment by cash, cashier's check, or credit card currently accepted by the University. The payment must be equal to the total 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 check permits a student to register for an academic term and if full payment of the check plus penalty and fee is not made within the time specified in the notice, 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 Address View/Update at www.ramweb.colostate.edu.

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 are also available in this office including 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 our 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 scholarship. 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.

- Colorado Student Grant
- Colorado Leveraging Educational Assistance Partnership Program
- Federal Supplemental Educational Opportunity Grant
- Federal Pell 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 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 Part Loan for Dependent Students (PLUS)
- 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 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 who 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.

Obtaining and Keeping Financial Aid

Application Procedures for Need-Based Financial Aid

Students use the Free Application for Federal Student Aid or FAFSA on the Web 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 the 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 scholarship, 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 113
(970) 491-5714
www.ses.colostate.edu*

Student Employment Services is responsible for the institution's Student Employment Program. This office lists many of the University's on-campus student positions, and is a central receiving and referral agency for jobs within the community and surrounding areas.

All individuals who are currently enrolled at the University in resident instruction credits may use the University's student employment services. Job postings may be viewed in person or on the Web at www.ses.colostate.edu, or on RAMweb, select Student Job Listings.

Financial Services for Students

Student employees are compensated on an hourly basis and are paid every other week, through direct deposit to the employee's personal checking or savings account. Students who enroll less than half time in resident instruction credits are subject to the Student Employee Retirement Program (SERP).

Colorado State is an Equal Opportunity Employer that provides on-campus work opportunities to several thousand students each year. The University adheres to the state's fiscal rules and the regulations set forth by the Department of Education and the Colorado Commission on Higher Education which govern the work-student and student employment programs.

Veterans' Benefits

The Records and Registration 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 Members)

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*. 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

Jerome B. Bookin-Weiner, Executive Director

(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 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 goals of its activities are to encourage 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 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 four functional units:

- International Education;
- International Research, Development, and Training;
- Study Abroad; and
- International Student and Scholar Services.

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, internships abroad, and ongoing campus programs 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 Russian, Eastern, and Central Europe (European); 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 in International Development offer the chance to bring a variety of international disciplines and perspectives together in one classroom. Students may also enroll in international internship courses that provide experience outside the U.S., and outside the traditional classroom. Special short-term study abroad programs are also offered under the IE course listings.

Graduate Programs

Graduate students may enroll in the International Development 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 College of Natural Resources, in the International Agriculture masters program within the College of Agricultural Sciences, and within the Teaching of English as a Second Language (TESOL) program within the Department of English in the College of Liberal Arts; 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 pre-arranged 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 study abroad, or research 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 bulletin 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.

International Research, Development, and Training

Office in Laurel Hall

Colorado State University has a long history of involvement in international development assistance projects around the world. Faculty and staff develop proposals and serve in other countries on both short- and long-term assignments. Past activities have featured water resources and agriculture. However, the current focus of international research, development, and training activities is changing towards environmental issues, public health, business management, civil society and education.

Colorado State University also offers a variety of short courses and non-degree training programs in a broad range of disciplines. In general, the clientele for these programs are international scholars, scientists, or technicians who need focused training in specific areas. Short courses are offered on the Colorado State campus and in other countries.

More comprehensive non-degree training programs are offered through the colleges; the Center for Science, Mathematics and Technology Education; the International School for Natural Resources; and the International School for Water Resources and associated programs. These

training programs may involve up to one year of residence at Colorado State University. For more information regarding short courses and non-degree training programs, contact the Office of International Programs.

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 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 students' 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 (SACC 482V) and pay an administrative charge. Registration in SACC 482V 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 at least 18 months before planning to go abroad.

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, on-campus orientation and various workshops, cross-cultural adjustment and advising information. ISSS serves as liaison to academic departments, other campus offices, and 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 (COISA) and through community outreach programs sponsored by the Fort Collins International Center.

INTERNATIONAL STUDENT APPLICATION AND EXPENSES

Application Procedures

Obtaining an Application

Students applying for admission may use the online application at www.admissions.colostate.edu or may e-mail to admissions@colostate.edu, call (970) 491-6909, or write the Office of Admissions, Spruce Hall, Colorado State University, 1020 Campus Delivery, Fort Collins, CO 80523-1020, for an application.

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

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

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

All students are required to submit a social security number (SSN) at the time of admission or before initial enrollment at the University. 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 and state and federal reports required by law.*

The social security number is also presently used as the personal identifier (PID) in student systems at the University and is imbedded electronically on the student photo identification card which may be used in connection with various University-related activities and services. *However, the use of the social security number as the personal identifier (PID) is optional. Students may request that a random number be assigned for PID by visiting the Registrar's Office in 100 Administration Annex. The University will be using a non-SSN identifier in its new student information system and has applied for a waiver*

from HB03-1175 for the implementation period until Fall 2006.

The social security number is only released to agencies or individuals outside the University 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.

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, Campus Delivery 8031, Colorado State University, Fort Collins, CO 80523-8031.

English Proficiency

All international applicants, except for those whose native language is English and for whom the language of instruction is English, are required to demonstrate a high level of English proficiency. 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 (525 on the paper-based exam) or a minimum IELTS exam 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 (450) on the paper-based exam) or a minimum IELTS exam score of 5.

Include with Application

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.

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.

Transfers must:

1. Submit official transcript 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.

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 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.

Registration Changes

Tuition and fees will be adjusted for undergraduate students that go above or below the 12 credit assessment cut-off 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 students drop part of their schedule.

University Withdrawal

Once classes begin, 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 according to the following chart:

		Withdrawal Assessment for Fall and Spring ¹							
Withdraw in Week		1	2	3	4	5	6	7	8
		10%	15%	20%	30%	35%	40%	45%	50%
Withdraw in Week		9	10	11	12	13	14	15	16
		60%	65%	70%	80%	85%	90%	100%	100%

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 programs. 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.

If a student withdraws a cash balance from his or her student account to use for living expenses, 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. No financial adjustment will be made for a student who is suspended, dismissed, or expelled for breach of discipline.
3. University room and board charges will be assessed through the vacate date from University housing.

¹ Summer term has a different assessment schedule and the withdrawal policy is in the Summer Class Schedule.

4. In the case of a student death, a refund of tuition and fees may be made any time during the semester.
5. 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.

Special Fees

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
Math and Composition Placement Examination fees (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 ² ; (college-wide)	
Agricultural Sciences	\$ 75.00
Applied Human Sciences	\$ 69.00
Business	\$100.00
Engineering	\$155.00
Intra-University	\$ 36.00
Liberal Arts	\$ 55.65
Natural Resources	\$100.00
Natural Sciences	\$100.00
Veterinary Medicine and Biomedical Sciences	\$100.00
Transcript fee per copy	\$ 8.00
University Technology Fee	\$ 15.00

Fees are subject to change.

² 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.

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/Academic 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 above. 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 <http://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 2003-2004. 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.

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

Non-resident tuition (fall and spring)	\$ 13,380
For full time enrollment per INS regulations	
Required Student Fees (fall and spring)	\$ 906
(Fees for first semester on campus will be \$951)	
Mandatory health/accident insurance coverage (12-month coverage)	\$ 965
Books and supplies	\$ 800
Housing, food, miscellaneous personal	<u>\$ 8,100</u>
Total estimate	\$ 24,151

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 2003-2004. 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	\$ 14,792
For full-time enrollment per INS regulations	
Required student fees	\$ 906
(Fees for first semester on campus will be \$951)	
Mandatory health/accident insurance coverage (12-month coverage)	\$ 965
Books and supplies	\$ 800
Housing, food, miscellaneous personal	<u>\$ 10,800</u>
Total estimate	\$ 28,263

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	\$ 2,022	\$ 1,341 ¹
Housing, food, miscellaneous		
Personal	<u>\$ 3,000</u>	<u>\$ 2,400</u> ²
Total estimate	\$ 5,022	\$ 3,741 ³
For two children		\$ 6,141
For three children		\$ 8,541
For four children		\$ 10,941

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 2003-2004 this is a minimum of \$24,151 for undergraduate students who are single or arriving without family members and a minimum of \$28,263 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/iss/newstudents/newstudents_estimatedexpenses.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 are required to live on campus for the first two consecutive semesters of their enrollment (unless married, living with parents, or over 21 years of age). First year students are guaranteed a room in one of ten residence halls (<http://www.housing.colostate.edu/halls>). Married students and graduate single students may find information on university apartments at <http://www.colostate.edu/depts/housing/apartments/index>.

html. Off-campus housing information is found at Off-Campus Student Services (http://www.sc.colostate.edu/ocss_ral/index.html).

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 Food Services booklet which accompanies the Residence Hall Application form.

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 Food Services booklet which accompanies the University Apartment Application form.

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. Those students and sponsoring agencies and entities receiving additional services over and above those provided to all international students will be assessed an additional \$50 service fee per student per semester. Both of these fees apply 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.

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 political viewpoints. If any members of our campus community (students, faculty, or staff) feel that they have been treated differently because of

their political perspectives, they should contact the Office of Dispute Resolution in Lory Student Center, Room 200. It is the policy of Colorado State University to encourage students 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.

Scholars have not only a right, but also a responsibility, to examine critically the insights, understanding, 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 invite guest lecturers, exhibitors, performers, and works of art to be performed or exhibited 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. It is expected that in exercising their rights, individuals and groups will be cognizant of their obligation to other individuals and groups, to the academic community, and to the larger community of the city, the state, and the nation.

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 deplors, 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 of Colorado State University
Office in 101 Student Services Building
Dana Hiatt, Director*

*(970) 491-5836
www.colostate.edu/Depts/OEO/*

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 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.

Sexual Harassment Policy

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

*(970) 491-5836
www.colostate.edu/Depts/OEO/*

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 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.

Full details of the Colorado State Sexual Harassment Policy, including what is involved in bringing a complaint and the procedures for informal and formal resolution are available from the Office of Equal Opportunity or online at the Colorado State Web site on the A-Z list under “Sexual Harassment Policy” or directly at www.colostate.edu/Depts/OEO.

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 Commission on 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 Office of Enrollment Services, or in the case of graduate studies, to the Graduate School, written requests that identify the record(s) they wish to inspect. The University official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained

by the University official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

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

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

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

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

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

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

An exception exists for public release of "directory information" unless the student has placed a written request that such information be withheld in the Office of Records and Registration 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, and honors and degrees awarded.

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 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.

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

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

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 on 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 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 Dispute Resolution, Office of the Vice President for Student Affairs, Office of Equal Opportunity, Provost'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.

If an instructor has evidence that a student has engaged in an act of academic dishonesty, the instructor 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/her position on the matter. If the student admits to engaging in academic dishonesty or if the instructor judges that the preponderance of evidence supports the allegation of academic dishonesty, the instructor may then assign an academic penalty. Examples of academic penalties include receiving a reduced grade for the work, a failing grade in the course, or other lesser penalty as the instructor deems appropriate. If, after making reasonable efforts, the instructor is unable to contact the student or collect all relevant evidence before final course grades are assigned, he/she shall assign an interim grade of incomplete and notify the student of the reason such grade was given.

If the student disputes the allegation of academic dishonesty he/she should request a hearing with Conflict Resolution and Student Conduct Services. The University Hearing Officer will determine whether or not a preponderance of evidence exists in support of the allegation of academic dishonesty.

If the University Hearing Officer finds insufficient evidence or clears the student of the charges, the instructor will determine a grade based upon academic performance and without reflection of the academic dishonesty charge and change any previously assigned grade accordingly. If the

Policies and Guiding Principles

University Hearing Officer finds the student culpable, the Hearing Officer may impose additional University disciplinary sanctions.

Instructors should report to Conflict Resolution and Student Conduct Services all cases of academic dishonesty in which a penalty is imposed. Instructors may recommend that a hearing be conducted to determine whether additional University disciplinary action should be taken.

Information about incidents of academic dishonesty is kept on file in 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.

Information regarding student rights, administrative hearing procedures, classifications and definitions of University disciplinary action, University Discipline Committee, appeal procedures, and the maintaining of disciplinary records is contained in the "Student Rights and Responsibilities" document available through the Vice President for Student Affairs' Office.

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.

Conduct Code

Students also 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 such as cheating, plagiarism, or knowingly furnishing false information to the University. (Specific procedures for cases of academic dishonesty are reviewed above under Academic Integrity in this section of the catalog, the *Graduate and*

Professional Bulletin, or the Honor Code of the Professional Veterinary School as applicable.)

2. Forgery, alteration, misuse, or mutilation of University documents, records, identification, educational materials, University property, or unauthorized use of the University computer system, computer access codes, and University long distance calling identity codes.
3. Obstruction or disruption of teaching, research, administration, disciplinary procedures, and other University activities. Rioting, aiding, abetting, encouraging, participating in, inciting a riot, or any act of misconduct as defined is specifically forbidden on University premises.
4. Abusive conduct which threatens or endangers the physical or psychological health, safety, or welfare of an individual or group of individuals; harassment of any member of the University community including harassment on the basis of race, sexual orientation, age, gender, religion, physical disability.
5. Intentional unauthorized interference with the right of access to University facilities, or freedom of movement or speech of any person on campus.
6. Failure to comply with the verbal or written directions of University officials 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.
7. Theft of, or damage to, use of, or possession of other persons' or University property in a manner inconsistent with its designated purpose; unauthorized entry, use, or occupation of University facilities, property or vehicles.
8. Use or possession on University property of firearms or simulated weapons; ammunition or other dangerous weapons, substances, or materials; bombs, explosives, or incendiary devices prohibited by law. Weapons for sporting purposes shall be stored with the University police.
9. Violations of any rules, contracts, or agreements governing residence in or use of University owned or controlled property including authorized special events.
10. Unauthorized soliciting or selling in violation of University solicitation policy.
11. Violation of any federal or state law or local ordinance including but not limited to those covering alcoholic beverages, narcotics and illegal drugs, gambling arson, sex offenses, assaults, harassment, violation of civil rights, disorderly conduct, or lewd, indecent, or obscene conduct or expression.

12. Aiding, abetting, conspiring, or inciting others to commit any act of misconduct set forth in 1 through 11 above.

13. Conviction of a crime of a serious nature. (Upon the filing of charges in the criminal or civil courts involving an offense of a serious nature and an administrative determination that the continued presence of the student would constitute a threat or danger to the University

community, such person may be temporarily suspended pending the disposition of charges.)

A complete, formal text of the Rights and Responsibilities of Students and disciplinary procedures is available through the Office of the Vice President for Student Affairs, 201 Administration Building, or at www.colostate.edu/Depts/DSA/RIGHTS.

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, *i.e.*, 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 a portion of responsibility 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 GUIDE (Guide to University and Individual Degree Evaluation) is a degree audit that shows you what graduation requirements you have completed and what requirements you still need to complete. Newly admitted transfer students receive a GUIDE after the evaluation of transfer coursework. Juniors and seniors (as well as freshmen and sophomores in selected departments) may obtain a GUIDE from the academic department each term after grades are posted. A GUIDE may also be requested at any time from the Degree and Transfer Evaluation staff in the Registrar's Office.

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://welcome.colostate.edu/index.asp?url=advres>.

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 www.careercenter.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 (welcome.colostate.edu/index.asp?url=advres).

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 8 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*. Approval of an overload for graduate students must be obtained from the department head or graduate dean.

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 Office" 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 Office of Records and Registration 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 Office of Records and Registration in 100 Administration Annex. After the student receives the appropriate approvals, the Records Office will process the change.

A student seeking an interdisciplinary studies program needs to contact the department 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: ramweb.colostate.edu/RW2000-0.cfm or through www.colostate.edu/Depts/Registrar. 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 by selecting the Registration link in RAMweb. To access RAMweb, use the following Web address: ramweb.colostate.edu. Deadlines for registration changes can be found on line at following address: www.colostate.edu/Depts/Registrar/registrationchanges.htm 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 section ID numbers 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. Students receive a copy of the override form from the department that offers the course. After obtaining the signature of the instructor or their designee, the student submits the form to the Records and Registration Office, 100 Administration Annex, for processing.

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 9 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. Each term (fall and spring) require submitting a GUEST application. 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:

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 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 Degree and Transfer Evaluation Office. The appropriate academic department must determine if courses will fulfill Colorado State degree requirements before the students enroll for the transfer work. See also <http://tes.colostate.edu>.

Students are responsible for insuring an official transcript will be sent to the Degree and Transfer Evaluation 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 Application for Readmission 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, for the corresponding term for which they are registered.

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.

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 Office.

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 working on an advanced degree and the course requested will be used to meet degree requirements.
4. The course is not offered on the student's own campus when that student can enroll.
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 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 Records and Registration 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 a # 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 below.

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 2.00 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*.

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 Office of Records and Registration, 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. Use of the repeat/delete policy may change a student’s cumulative grade point average, but will not result in a notation of probation on the student’s transcript.
2. It is the student’s responsibility to request the Repeat/Delete option from the Registrar, 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.

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. Use of the repeat/delete option may change a student’s cumulative grade point average, but will not change a notation of probation on the student’s 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 appeals 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 end of each term.

Transcripts

Transcripts of students' official academic records are maintained by and may be requested from the Office of Records and Registration. 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 Office of Records and Registration 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. 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 designee may make this request in person, by letter, or by telephone; however, the request will not be processed until a copy of the orders is received. Advisers will counsel with the student or her/his designee and the student's instructors to select the option (either withdrawal from the University, cancellation of courses, or receiving an incomplete—"I") that is most appropriate to that student's situation.

If the student wishes to withdraw from the university because he/she has been called to active duty, the student will receive a full tuition refund for the semester.

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 reenrolls at Colorado State. By this date, the grade will be changed by the instructor or the department head of record, or it will revert to a grade of F. CASA and the Office of Records and Registration will

assist students with any academic issues related to their active duty.

Retroactive Withdrawal

Under certain circumstances 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/her transcript. A retroactive withdrawal may be granted only when a student has experienced extenuating circumstances or an incident of such trauma and major proportions that he/she could not have been reasonably expected to possess normal capabilities necessary to complete the academic period satisfactorily or complete a university withdrawal during the semester.

An undergraduate or graduate student desiring to have a semester (or more) of courses retroactively dropped from his

or her transcript must submit a written request, with supporting documentation, to the Committee on Scholastic Standards and Awards through the Center for Advising and Student Achievement (CASA) in 201 Aylesworth Hall NE. CASA advisers are available to assist students with this process.

If the Committee on Scholastic Standards and Awards grants the appeal, all courses for the semester(s) will be removed from the student's transcript. No tuition refund will be given.

If the committee denies the retroactive withdrawal request, the student is allowed one additional request for that period. If the appeal is denied, the student's academic record, for the semester(s) in question, will remain on the student's transcript.

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 or the Office of Records and Registration 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 1, 3, or 5 above, e.g., special types of examinations which need more time or

Advising and Registration

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 changes.

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 University Scholastic Standards and Awards Committee. 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 2.0 on a 4.0 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 2.0 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 2.0 or higher will result in one of the following actions.

ACADEMIC PROBATION

Failure to maintain a CUM GPA earned at Colorado State University of 2.0 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 2.0 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 2.0 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 2.0 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 2.0 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 Commission on Higher Education or the governing board.

Appeal of Academic Dismissal

Students have the privilege to appeal academic dismissal. A written appeal may be submitted the Center for Advising and Student Achievement for consideration by the Scholastic Standards and Awards Committee. All appeals must be submitted in accordance with written instructions. All appeals of academic dismissal will be acted upon by the Scholastic Standards and Awards Committee 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

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 Office of Admissions 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.

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Student Services

DIVISION OF STUDENT AFFAIRS

*Office in the Administration Building, Room 201
Linda Kuk, Vice President for Student Affairs*

(970) 491-5312

www.colostate.edu/Depts/DSA/VPSA

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

Office in Gibbons Building, Room 117LL

(970) 491-6129

www.aac.colostate.edu

The Academic Advancement Center supports achievement of bachelor's degrees for first-generation students (neither parent completed a four-year college degree), students from low-income backgrounds, and students with disabilities. Under a federal TRIO Program, the Center's services are free to eligible students; services include:

- Assistance with academic goal attainment
- Academic skills improvement
- Individual and group tutoring

- Graduate study exploration: information, resources, referrals
- Peer mentoring with leadership skills development

Accounts Receivable Operations

Office in Johnson Hall, Room 129

(970) 491-6466

www.aroweb.colostate.edu

The accounts receivable office manages consistent, accurate, and efficient billing; collects University receivables in a timely manner and supports all customers with dignity and respect.

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, and Veterinary Medicine and Biomedical Sciences 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, and others.
- Withdrawal from the University.
- Scholastic Standards, including appeals for academic dismissal.
- Orientation programs for new students, including Preview Freshman Summer Orientation and Registration, Next Step Transfer Orientation, Fall/Spring Orientation, and Ram Welcome: Explore CSU.
- Student achievement programs, including Hughes Undergraduate Research Scholars Program, Key Academic Community and Key Plus Community, Taking Stock at First Semester, and support for students in the First Generation Award and Governor's Opportunity Scholars Programs.

Advocacy Offices

Asian/Pacific American Student Services

Office in Lory Student Center, Room 212

(970) 491-6154

www.colostate.edu/Depts/APASS

Asian/Pacific American Student Services (A/PASS) supports 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, A/PASS creates 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.colostate.edu/Depts/BSS

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
- Alumni network
- The Rites of Passage Program – a year-long transitional program for first-year and transfer students.
- Sophomore Year Experience – 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/

El Centro Student Services supports, assists, and encourages Hispanic and Latino students in their academic and professional endeavors through programs that provide leadership, cultural, and personal development. 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.

Gay, Lesbian, Bisexual, and Transgender Student Services

Office in Lory Student Center, Room 174

(970) 491-4342

www.glbts.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.colostate.edu/Depts/nass/

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

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.

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.colostate.edu/programs/WPS

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 expanding students' awareness and interest while creating conditions that allow both women and men to share safely and equally in the opportunities and resources provided by the University.

- 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)

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.

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.whatsup.colostate.edu

Campus and Community Programs is the concert promoting, film projecting, lecture producing, comedy showcasing, festival planning, tradition building, graphic designing, website creating, leadership developing, community fostering, and memory making source of good times at CSU.

The Campus Information Services is a resource center for information that is shared via telephone, person-to-person contact, and printed materials. Tickets for nearly all major campus events and athletic events can be purchased through the box office at Campus Information Services.

Student Organizations assists recognized student organizations in program planning, public relations, financial/budgetary matters, and leadership development for organizational officers and members. More than 300 campus organizations reflect the wide range of student interests – academic, political, religious, and special interest.

Student Services

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*

*Outdoor Adventure/Challenge Course Office
Lory Student Center, Lower Level North End
(970) 491-1669
www.oap.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 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 and 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.
- Club Sports are student-run competitive sport organizations that compete with other colleges and play for national championship titles.
- Outdoor Adventure offers a variety of outdoor activities, and rents equipment 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.

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
- On-campus recruiting program, including two annual all-campus career fairs

- Graduate school fair
- On-campus interviewing opportunities
- Job vacancy information through JOBS ONLINE, the Career Center website with extensive information and links (www.career.colostate.edu), and The Career Resource Guide.
- Resume and letter writing skills and resource library.

Conflict Resolution and Student Conduct Services

*Office in the Lory Student Center, Room 200
(970) 491-7165
www.colostate.edu/Depts/DSA/judicial.html*

This office provides:

- Consultation and mediation services regarding conflicts
- Outreach programs related to civility, academic dishonesty, disruptive behavior, conflict resolution, mediation, ethics education, and community relations
- Student disciplinary hearings
- Disputes of academic dishonesty charges
- DAY IV – substance abuse treatment diversion program
- HART – Healing Action Response Team for bias incidents
- Restorative Justice conferences affording the opportunity to repair harm.

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://lamar.colostate.edu/~ceao/>

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 campus experience.
- Educational Opportunity Center assists continuing, returning, first-time, or prospective adult students with a 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.

Enrollment Services

Office in Administration Annex, Room 203

(970) 491-0995

Registration and Student Records

Office in Administration Annex, Room 100

(970) 491-7148

www.registrar.colostate.edu/

Student academic records and registration information, including overrides, final exams, grade appeals and changes, incompletes, repeat/deletes and university withdrawal, transfer credits and registration changes can be found on the Registrar's homepage.

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 113

(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 are also available in this office including the Work-Study Program, on-campus departmental positions, and community part-time employment

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, Latino Greek, Rho Lambda, 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
- 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) 491-4720
www.housing.colostate.edu/halls*

Housing in the University residence halls provides services, programs, and facilities that are designed to enhance the students' total educational experience. Each residence hall is under the leadership of professional staff members, who are available to assist students in the development of programs, the understanding of policies, and to aid in the adjustment to University life.

Residence hall living allows students to actively participate in their hall's student government and educational programming opportunities. 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 has demonstrated that adjustment to academic and social life is greater for first-year students living in residence halls. 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 the Office of Housing and Dining Services, Palmer Center.

Housing Assignments

The residence hall application form, along with an informational brochure, is mailed to newly admitted students as part of the admissions packet. Inquiries from continuing students should be directed to the Office of Housing and Dining Services.

Living Learning Communities

Colorado State University gives students the opportunity to live in residence halls that provide special programs. These programs offer a unique residential experience consisting of special interest areas that help build positive communities among those with similar interests and/or lifestyles. These floors provide students with activities and resources as well as faculty and staff advisers who engage students in their learning and provide information about opportunities available at the University.

The following Living Learning Communities are offered to give students a choice of environments in which to live:

- Allison Community for Engineers
- Equine and Agricultural Sciences
- Global Village
- Health and Exercise Science/Wellness Community
- Honors Living Learning Community
- Ingersoll Residential College (College of Natural Sciences)
- Key Academic Community
- Leadership Community
- Personal Computing
- Pre-Veterinary Medicine
- Ram Pride
- Substance Free Lifestyles

For more information On these communities, see Shared Interest Living in the Broadening Your Horizons chapter.

Residential Dining Services

*Office in the Palmer Center, Room 108
(970) 491-4754
www.food.colostate.edu*

Residential Dining Services operates nine dining centers in eight 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 apartment housing application and an informational brochure are mailed to newly admitted students along with their certificate of admission. Inquiries from continuing students should be directed to the Office of Housing and Dining Services.

All utilities, including local telephone service and cable television hook-up are included in the monthly rent. Direct access to the University computer network via high speed Internet is available except at 1500 W. Plum, where a number of high-speed modems are available for a fee. A number of modified apartments for physically disabled students are available.

Family Housing

Centralized laundry facilities, playground areas, a fitness center, and community center are located at each of the family housing options. After all student family and couple applicants have been placed, singles, faculty, and staff are considered for remaining space.

Aggie Village offers 288 apartments with single-level floor plans in two-story building. Furniture options are available.

University Village is located west of campus. University Village at 1500 W. Plum consists of 150 two-bedroom townhouse apartments. University Village at 1600 W. Plum offers 150 two-bedroom and 50 three-bedroom townhouse units. University Village at 1700 W. Plum consists of 24 three-bedroom and 56 two-bedroom apartments. Furniture options are available in all three areas.

Single Student Apartments (For Graduate Students and 23-or-Older Undergraduates)

Lory Apartments are located on the northwest side of the main campus. These buildings consist of one- and two-bedroom units. The International House Apartments at 1400 W. Elizabeth consist of 198 one- and two-bedroom apartments. The two-bedroom apartments are designed to be shared with one other student and the one-bedroom apartments are rented to one student. Furniture options are available at both International House and Lory Apartments. Laundry facilities are available in each of the Lory Apartment buildings and at International House. All areas have community rooms.

Colorado State University Visitors' Center

Located at Pitkin and College, Southwest Corner

(970) 491-4636

The Colorado State University Visitors' Center offers academic and 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 on-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. From May through October, Pingree Park offers modern 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. Pingree is open to the public for educational purposes.

University ID and Vending

Office in Lory Student Center, Room 170

(970) 491-2344

www.id.colostate.edu

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 University ID & Vending Office in the Lory Student

Center, Student Recreation Center, or the Housing and Dining Services at Palmer 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 is issued at no cost, however, a \$15 fee (subject to change) will be charged for a replacement.

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 hair salon, 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, Lower Level

(970) 491-2248/491-0972

www.sc.colostate.edu/occs_ral

This office provides services and programs for the diverse needs of students living/moving off campus and adult learners transitioning to college life after a significant break. These include:

- Rental housing and roommate information
- Community liaison resources
- Adult learner orientation
- Non-traditional student networking
- Individual appointments

Orientation

(See Advising and Student Achievement, Center for)

Student Leadership and Civic Engagement

Office in Lory Student Center, Room 27

(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 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.
- 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.colostate.edu/Depts/SLS/index.html

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, traffic summons, consumer complaints, and debt problems. The staff educates clients 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 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 student television production facility, and a 10,000-watt radio station. Every medium is student-run, meaning the students determine the medium's content.

- 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.
- Campus Television (CTV) is a student-run and campus-oriented television production group offering programs weeknights during the semester on cable channel 25 in Fort Collins. Campus Television 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.

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) 491-0099

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/parking garage adjacent to the Lory Student Center designed for bus drop-off, pick-up, waiting area, ticket sales, and retail space was completed in summer 2003.

The Old Fort Collins High School was purchased from the school district in 1997. Renovation of this facility has begun and will provide space to relocate the music, theatre, and dance campus programs and establish the University Center for the Arts.

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 was completed in fall 2002. A new Foothills Fishery Facility also was completed in fall 2002. The new facility houses labs and research facilities for the Department of Fishery and Wildlife Biology.

The Environmental Learning Center (ELC), one mile east of Fort Collins, is a 181-acre educational and research unit managed by the Department of Natural Resources Recreation and Tourism. 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), 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.

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 interpretive services. These services include a comprehensive library instruction program, five major information service points, and Reserve and Interlibrary Loan services with electronic access.

William E. Morgan Library, the new and expanded central facility, houses the major part of the collection, which includes books, maps, journals, technical reports, archives, and manuscripts. The online catalog SAGE provides an index of all materials in the Libraries. The collection is enriched by a wide selection of electronic resources accessible from the library Web page (<http://www.library.Colostate.edu>). 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 study rooms, is available. The Journal Reading Room contains the most recent issues of approximately 8,000 journal titles.

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 maintain a storage facility, the University Libraries Depository, located on Lake Street.

The University Libraries is a member of the Association of Research Libraries (ARL), Greater Western Library Alliance, 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 participation on OCLC, Online Computer Library Center, Inc., which supports electronic access to the collections of over 10 million libraries worldwide.

UNIVERSITY SERVICES

Academic Computing and Networking Services

Office in University Services Center, Sixth Floor

Patrick J. Burns, Director

(970) 491-5133

www.colostate.edu/services/acns

Academic Computing and Networking Services (ACNS) provides networking services and central and distributed computing support to Colorado State University. Services include support and maintenance of central computing systems; implementation, support, and maintenance of campus networks and the University's central modem pool; end user training and support; negotiation of campus-wide software, hardware, and maintenance contracts; maintenance and repair services for personal computers and laser printers; and the sale of computer software and supplies.

Account information, documentation, and assistance with the University's computing systems is available from the ACNS Computing Help Desk, 224A Weber Building.

Students can access the Internet and the University's central campus network and UNIX-based computers at the CTSS Computer Lab, 224 Weber Building. Documentation, reference manuals, and help sheets are available at the lab, which is equipped with Windows computers, laser printers, color plotters, and scanners.

Computer supplies and software may be purchased at the Software Cellar in the Lory Student Center. The store requires a University identification card for cash purchases. Purchases may be charged to an individual's CSU account.

The ACNS Computer Repair and Maintenance Shop in the Lory Student Center installs, repairs, and maintains personal computers, terminals, laser printers, and networking cabling systems and components. Cables, switch boxes, surge protectors, and other replacement parts can be purchased from the shop.

For more information about ACNS, a free copy of VECTOR, a bimonthly newsletter published by ACNS, is available at the CTSS lab or at the main office in the University Services Center.

Division of Continuing Education

*Offices in Spruce Hall and downtown Denver
Director TBA*

*(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), 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. 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 Distance Degree Program offers credit courses toward graduate and undergraduate degrees via videotape, correspondence, online, or computer technology. Courses are available in several disciplines including adult education and training, agricultural sciences, business, computer science, engineering, fire service, organizational performance and change, liberal arts, rangeland ecosystem science, and statistics. Courses utilizing videotapes are only delivered to students using U.S. and Canadian addresses. Over 1,200 students have earned degrees via the Distance Degree Program with no on-campus residency requirement.

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 for Professional Development* 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.

Office of Equal Opportunity

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

*(970) 491-5836
www.colostate.edu/Depts/OEO*

The mission of the Office of Equal Opportunity is to support University efforts to achieve greater diversity through the development, promulgation, and monitoring of policies and procedures that comply with Affirmative Action, Equal Opportunity, and Nondiscrimination requirements. In furtherance of this mission, the Office engages in a number of core services and activities affecting almost every unit of the University.

Hiring: Develop, implement, and monitor the procedures used to fill all academic faculty and administrative professional positions. Review and approve all offers of state classified positions where the referral list includes an applicant from a protected category. Maintain a centralized web site for academic faculty and administrative professional position announcements.

Grievances: Implement procedures for the investigation and resolution of internal complaints of unlawful discrimination and sexual harassment. Coordinate and prepare responses to external complaints filed with state and federal agencies.

Coordination: Coordinate University compliance with the Americans with Disabilities Act and Title IX Regulations.

Education and Training: Provide education and training in diversity-related areas including, but not limited to, sexual harassment, disability awareness, and search procedures.

Policy Review: Review existing University policies to ensure compliance with equal opportunity and nondiscrimination laws, and diversity goals and recommend new policies as appropriate.

Office of Instructional Services

*Office in Clark Building, Room A 71
Thomas G. Maher, Director*

*(970) 491-1325
www.ois.colostate.edu*

The Office of Instructional Services is a University-wide organization responsible for providing instructional media and professional development services in support of University programs in instruction, research, service, and outreach.

Instructional Media Services provide faculty, administrators, staff, and students with professional services which assist in enhancing the quality of educational programs throughout the University. Emphasis is on the improvement of courses, presentations, public communications, and access to greater educational opportunities for distance learners and off-campus clientele. Located in the Clark Building, major media units include Classroom Support, Multimedia Development, Graphic, Photographic, and Video Production Services. These units provide a full range of high-quality, media-related services geared to clients' individual needs. Instructional Services is also responsible for the instructional facilities in general assignment classrooms; for instructional and informational programming on Channel 25 on the local cable television system; a television transmitting satellite earth station; a two-way interactive compressed video conferencing facility; seven video classrooms; and development of online and other computer-based instructional materials. A videotape library of over 11,500 titles is maintained in Instructional Services. The catalog for this resource is accessible online. An extensive photographic archive, including a large collection of historical photos, is also located in Instructional Services.

Professional Development Services focuses on the general faculty and graduate teaching assistants. The responsibility for professional growth and development resides with each individual and the home department. The responsibility of Instructional Services is to provide opportunities which assist in helping members of the University community to acquire knowledge, skills, sensitivity, and techniques related to their University responsibilities. Major programs include the Professional Development Institute, the University's Graduate Teaching Assistant Workshop, New Faculty Information Session and initiatives, a course on college teaching, individual consultation, the Student Course Survey Program, teaching discussion groups, and other appropriate professional development services.

Instructional Design Services provides faculty with individual consultation in course development, writing objectives, evaluation techniques, increasing interaction, and incorporating educational technology such as computer presentations, online interaction, and Web-based instruction into their courses. Workshops on instructional design

principles, structuring a course for Web delivery, adult learning theory, and teaching in front of a camera are available. A small course development lab with computers equipped with the capability for scanning images and slides, creating digital audio and/or video, and developing multimedia presentations is also maintained.

University Parking Services

*Office in Green Hall, Room 201
Mike Rose, Director*

*(970) 491-7041
www.colostate.edu/Depts/Parking*

Parking at Colorado State University is provided for faculty, staff, students, and visitors. Parking permits are required and can be purchased at the Office of University Parking Services. 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 Office of University Parking Services.

CSU Police Department

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

*(970) 491-6425
www.colostate.edu/Depts/CSUPD/csupd.html*

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.

OUTREACH UNITS OF THE UNIVERSITY

Agricultural Experiment Station

Office in Administration Building, Room 15

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 (AES) as a contributor to the federally-created state agricultural experiment station system. That system now encompasses all fifty states and a number of United States territories.

The AES is an integral part of Colorado State and conducts 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, but is an integrated, statewide research system.

The mission of the AES is to focus and support research leading to an agriculture that is economically viable, environmentally sustainable, and socially acceptable. Areas of disciplinary and interdisciplinary research emphasis for the AES include: a) environmental quality – the interaction of agricultural and natural resource systems; b) improvement of plant and animal resources; c) integrated agricultural systems; d) alternative uses for agricultural commodities; e) foods, their quality and safety; and f) enhancing agricultural and rural economies.

Agricultural research programs include the traditional areas of producing and processing food products such as wheat, beef, fruits, and vegetables and also 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 AES supports research projects conducted by faculty in the Colleges of Agricultural Sciences, Applied Human Sciences, Engineering, Liberal Arts, Natural Resources, and Veterinary Medicine and Biomedical Sciences. In addition to on-campus research programs, the Agricultural Experiment Station 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, at Orchard Mesa, and at Rogers Mesa. A number of farmers and ranchers cooperate with the Agricultural Experiment Station 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 AES 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 Forestry Building, Room 203

James E. Hubbard, Director/State Forester

Tom Wardle, Assistant State Forester

(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.

Cooperative relationships are maintained with Colorado State University Cooperative Extension, College of Natural Resources, and other federal/state natural resource agencies. The State Forest Service, via media, publications, and personal contact, provides forestry-related information to Colorado citizens.

Cooperative Extension

Offices in Administration Building, Room 1, and in

Aylesworth Hall NW, First and Second Floors

Milan A. Rewerts, 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: enhancing families and community; growing horticulture in Colorado; improving nutrition, food safety, and health; integrating natural resources; strengthening youth development; and sustaining agriculture and the environment.

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 Commission on 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 2.00 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. Until Summer Session 2002, students with continued enrollment from Spring Semester 2000 and newly admitted transfer or readmitted students were admitted under the University Studies Program (USP) and must complete those requirements unless they made an adviser-assisted decision to switch their program of study to the AUCC. Details about the University Studies Program and its programs of study are available in the *Colorado State University General Catalog, 1999-2000*.

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/Academic Vice President.

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 and Transfer Evaluation 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 Degree and Transfer Evaluation 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 of 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 a form found at www.core.colostate.edu and sent to Degree and Transfer Evaluation, 100 Administration Annex, 8021 Campus Delivery, and signed by the adviser and department head.

Intent to Graduate

No later than the third week of the term prior to the graduating term, students must declare an intent-to-graduate indicating their first major, and second major and/or minor if applicable, with the Degree and Transfer Evaluation Office. Students will subsequently receive a GUIDE (Gateway to University and Individual Degree Evaluation) concerning fulfillment of the University graduation requirements.

Contract for Graduation

Candidates for degrees must complete and sign a contract for graduation for majors, second majors, and minors in the first week of their graduation term in the department office(s) of their majors/minors. Students not completing degree requirements that term must file 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 Degree and Transfer Evaluation 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 Degree and Transfer Evaluation Office by the end of the third week of the graduation term. Official transcripts showing completion of work from another institution must be on file in this office by the last day of the graduation term.

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. 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. Each of the minimum grade point average 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 Core Curriculum, and achieve at least a cumulative 3.5 grade point average earn the designation of University 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, E 203 Newsom Hall, 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 HONOR 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 honor societies on campus. For further information, contact the societies' respective academic department or visit the Web site listed above.

All University

Golden Key
Mortar Board
National Society of Collegiate Scholars
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 – *Real Estate*
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

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*

Veterinary Medicine and Biomedical Sciences

Phi Zeta – *Veterinary Medicine*

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 30 credits.

Human Health Professions Advising

Colorado State University does not offer specific pre-med or “pre-health” majors because health professional 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 a major, a student is assigned an academic adviser from the department to ensure that they fulfill the requirements for that major.

Undergraduates who intend to pursue careers in the health professions should take the prerequisites for acceptance into one of the professional post-baccalaureate programs. Professional 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 attractive candidates, and aid 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 works with students in all majors who are planning for careers in the animal health professions. The adviser also provides support for the biomedical sciences open option students. After a major has been chosen, students work with their academic adviser to ensure that they fulfill graduation requirements and with a pre-vet adviser to be sure that their courses also satisfy admission requirements for professional veterinary programs.

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 Office of Records and Registration in Enrollment Services 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 an intent-to-graduate and a contract for graduation in the Degree and Transfer Evaluation Office for both majors. The single degree awarded is that degree appropriate for the first major. A single diploma 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.

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 transcripts.

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 Sciences (B.S.), Animal Sciences/Agricultural Sciences
Anthropology (B.A.), Anthropology/Liberal Arts
Apparel and Merchandising (B.S.), Design and Merchandising/Applied Human 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
Business Administration (B.S.), interdepartmental major/Business
Chemical Engineering (B.S.), Chemical Engineering/Engineering
Chemistry (B.S.), Chemistry/Natural Sciences
Civil Engineering (B.S.), Civil 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
Consumer and Family Studies (B.S.), interdepartmental major/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.), interdepartmental major/Engineering
Environmental Health (B.S.), Environmental and Radiological Health Sciences/Veterinary Medicine and Biomedical Sciences
Equine Science (B.S.), Animal Sciences/Agricultural Sciences
Fishery Biology (B.S.), Fishery and Wildlife 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.), Natural Resource Recreation and Tourism/Natural Resources
Natural Resources Management (B.S.), Forest, Rangeland, and Watershed Stewardship/Natural Resources
Natural Sciences (B.S.), interdepartmental major/Natural Sciences

Degree Programs

Nutrition and Food Science (B.S.), Food Science and Human Nutrition/Applied Human Sciences
Performing Arts (B.A.), Music, Theatre, and Dance/
Liberal Arts
Philosophy (B.A.), Philosophy/Liberal Arts
Physics (B.S.), Physics/Natural Sciences
Political Science (B.A.), Political Science/Liberal Arts
Psychology (B.S.), Psychology/Natural Sciences
Rangeland Ecology (B.S.), Forest, 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 (B.S.), Fishery and Wildlife 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.

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
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 – interdepartmental/
Engineering
Fishery Biology – Fishery and Wildlife Biology/Natural Resources
Forestry – Forest, Rangeland, and Watershed Stewardship/Natural Resources
French – Foreign Languages and Literatures/Liberal Arts
General Philosophy – Philosophy/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
Russian – Foreign Languages and Literatures/Liberal Arts
Sociology – Sociology/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 – Natural Resource Recreation and Tourism/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
 Ethnic Studies
 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 Studies
 Molecular Biology
 Molecular, Cellular and Integrative Neuroscience (Graduate)
 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, request a copy of the *Graduate and Professional Bulletin* from the Graduate School, Colorado State University, Fort Collins, CO 80523-2015 or visit their Web page at www.colostate.edu/Depts/Grad.

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
Biochemistry (M.S., Ph.D.), Biochemistry and Molecular Biology/Natural Sciences
Biomedical Science (M.S., Ph.D.), Biomedical Sciences/Veterinary Medicine and Biomedical Sciences
Botany (M.S., Ph.D.), Biology/Natural Sciences
Business Administration (M.S.), Business
Cell and Molecular Biology (M.S., Ph.D.) intra-University
Chemical Engineering (M.S., Ph.D.), Chemical Engineering/Engineering
Chemistry (M.S., Ph.D.), Chemistry/Natural Sciences
Civil Engineering (M.S., Ph.D.), Civil 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
Design and Merchandising (M.S.), Design and Merchandising/Applied Human Sciences
Earth Resources (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
Entomology (M.S., Ph.D.), Bioagricultural Sciences and Pest Management/Agricultural Sciences
Environmental Health (M.S., Ph.D.), Environmental and Radiological Health Sciences/Veterinary Medicine and Biomedical Sciences
Fishery and Wildlife Biology (M.S., Ph.D.), Fishery and Wildlife 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 Science/Natural Resources
Geosciences (M.S.), Geoscience/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 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
Manufacturing Technology and Construction Management (M.S.), Construction Management/Applied Human Sciences

Degree Programs

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
Plant Pathology and Weed Science (M.S., Ph.D.), Bioagricultural Sciences and Pest Management/Agricultural 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
Recreation Resources (M.S., Ph.D.), Natural Resource Recreation and Tourism/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.)
Master of Agriculture (M.Agr.)
Agricultural Sciences
Master of Business Administration (M.B.A.)
Business Administration/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 Forestry (M.F.)
Forest, Rangeland, and Watershed Stewardship/Natural Resources
Master of Music (M.M.)
Music/Liberal Arts
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 Studies
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	
A. Written Communication ¹	3
B. Mathematics ¹	3
2. Core Competencies	
A. Additional Communication	3
B. Logical/Critical Thinking	3
3. Foundations and Perspectives	
A. Biological/Physical Sciences	7
(At least one course will have an associated lab)	
B. Arts/Humanities	3
C. Social/Behavioral Sciences	3
D. Historical Perspectives	3
E. Global and Cultural Awareness	3
F. U.S. Public Values and Institutions	3
G. Health and Wellness	2
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.

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 2.0 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:

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.

COCC 150	College Composition	3
HPCC 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.

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.

M CC 117	College Algebra in Context I	1
M CC 118	College Algebra in Context II	1
M CC 120A-B	College Algebra I	1
M CC 121	College Algebra II	1
M CC 124	Logarithmic and Exponential Function	1
M CC 125	Numerical Trigonometry	1
M CC 126	Analytic Trigonometry	1
M CC 130	Math in the Social Sciences	3
M CC 133	Financial Mathematics	3
M CC 135	Patterns of Phenomena I	3
M CC 141	Calculus in Management Sciences	3
M CC 155	Calculus for Biological Scientists I	4
M CC 160	Calculus for Physical Scientists I	4
M CC 161	Calculus for Physical Scientists II	4
M CC 255	Calculus for Biological Scientists II	4
M CC 315	Mathematics for Economists	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.

Category 2. Core Competencies.

The Core rests upon the acquisition and effective practice of fundamental competencies. These include the ability to write clearly, speak effectively, understand and apply quantitative reasoning, make sense of abstract ideas, reason analytically, and read critically and with comprehension. Acquisition of these competencies is the primary objective of courses in this part of the Core.

A. Additional Communication. 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 three different options:

1. *Oral Communication* – development of effective rhetorical skills in oral communication.

SPCC 200	Public Speaking	3
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2. *Advanced Writing* – enhancement of skills in written communication.

COCC 300	Writing Arguments ¹	3
COCC 301A-D	Writing in the Disciplines	3
COCC 302	Writing Online	3
JTCC 300	Professional and Technical Communication	3

¹ Also listed in category 2B. Course may count in one category or the other, but not both.

3. *Second Language* – enhancement of communication competencies in a second, or alternative, language.

Students may satisfy this option with L CC 200 or L CC 201 or L CC 300 or if they reach an equivalent level of competence as measured by an examination.

B. Logical/Critical Thinking. The objective of the Logical/Critical Thinking requirement is to further develop, in a focused course of study, analytical and reasoning skills that students can use to assess information and concepts in order to make informed judgments and decisions.

CECC 208	Civil Engineering Analysis I	3
CHCC 104	Strategies of Engineering Problem Solving	3
COCC 300	Writing Arguments ¹	3
CSCC 153	Java Programming	4
EHCC 307	Introduction to Biostatistics	3
HSCC 300	Research in Applied Professions	3
PLCC 110	Logic and Critical Thinking	3
SPCC 207	Rhetoric and Argumentation	3
STCC 101	Activity Based Statistics	3
STCC 110	Statistical Thinking: Concepts and Applications	3
STCC 201	General Statistics	3
STCC 204	Statistics for Business Students	3
STCC 301	Introduction to Statistical Methods	3
STCC 307	Introduction to Biostatistics	3
STCC 309	Statistics for Engineers and Scientists	3
STCC 311	Statistics for Behavioral Sciences I	3

¹ Also listed in category 2A2. Course may count in one category or the other, but not both.

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 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

AACC 100	Introduction to Astronomy	3
AACC 101	Astronomy Laboratory	1
APCC 120	Human Origins and Variation	3
APCC 121	Human Origins and Variation Laboratory	1
BICC 102	Insects, Science, and Society	3
BZCC 101	Humans and Other Animals	3
BZCC 104	Basic Concepts of Plant Life	3
BZCC 105	Basic Concepts of Plant Life Laboratory	1
BZCC 110	Principles of Animal Biology	3
BZCC 111	Animal Biology Laboratory	1
BZCC 120	Principles of Plant Biology	4
C CC 103	Chemistry in Context	3
C CC 104	Chemistry in Context Laboratory	1
C CC 107	Fundamentals of Chemistry	4
C CC 108	Fundamentals of Chemistry Laboratory	1
C CC 111	General Chemistry I	4
C CC 112	General Chemistry Laboratory I	1
G CC 120	Exploring Earth: Physical Geology ²	3
G CC 121	Introductory Geology Laboratory ³	1
G CC 122	The Blue Planet: Geology of Our Environment ²	3
G CC 124	Geology of Natural Resources ²	3
H CC 100	Horticultural Science	4
LSCC 102	Attributes of Living Systems	4
LSCC 201A-B	Introductory Genetics	3
NRCC 130	Global Environmental Systems ⁴	3
NSCC 101	Phenomena of Matter and Energy	4
NSCC 102	Phenomena of Life	4
PACC 101	Introduction to Human Disease	3
PHCC 110	Descriptive Physics	3
PHCC 111	Descriptive Physics Laboratory	1
PHCC 121	General Physics I	5
PHCC 122	General Physics II	5
PHCC 141	Physics for Scientists and Engineers I	5
PHCC 142	Physics for Scientists and Engineers II	5
WRCC 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 Credit allowed for only one of the following: G CC 130, G CC 140, G 150, G CC 120, G CC 122, G CC 124.

³ Credit allowed for only one of the following: G CC 140, G 150, G CC 121.

⁴ Credit not allowed for both G CC 130 and NRCC 130.

B. Arts/Humanities. 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.

ARCC 100	Introduction to the Visual Arts	3
D CC 110	Understanding Dance	3
E CC 140	The Study of Literature	3
E CC 232	Introduction to Humanities	3
E CC 238	20th Century Fiction ¹	3
E CC 242	Reading Shakespeare	3
E CC 245	World Drama ¹	3
E CC 270	Introduction to American Literature ²	3
E CC 276	Survey of British Literature I	3
E CC 277	Survey of British Literature II	3
ETCC 205	Ethnicity and the Media ¹	3
ETCC 240	Native American Cultural Expressions	3
ETCC 256	Americans in a Changing World ¹	3
HPCC 392	Seminar ³	3
L CC 250	Language, Literature, Culture in Translation ¹	3
MUCC 100	Music Appreciation	3
MUCC 111	Music Theory Fundamentals	3
MUCC 131	Introduction to Music History and Literature	3
MUCC 231	Women in Music	3
PLCC 100	Appreciation of Philosophy	3
SPCC 100	Communication and Popular Culture	3
SPCC 201	Rhetoric in Western Thought	3
THCC 141	Introduction to Theatre	3

¹ Also listed in category 3E. Course may count in one category or the other, but not both.

² Also listed in category 3D. Course may count in one category or the other, but not both.

³ Also listed in category 3F. Course may count in both categories.

C. Social/Behavioral Sciences. 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.

APCC 100	Introductory Cultural Anthropology	3
EACC 202	Agricultural and Resource Economics	3
ECCC 101	Economics of Social Issues	3
ECCC 202	Principles of Microeconomics	3
HDCC 101	Individual and Family Development	3
HPCC 492	Senior Seminar	3
JTCC 100	Introduction to Mass Media ¹	3
POCC 101	American Government and Politics ¹	3
POCC 103	State and Local Government and Politics ¹	3
POCC 232	International Relations ³	3
POCC 241	Comparative Government and Politics ⁴	3
PYCC 100	General Psychology	3

S CC 100	General Sociology ¹	3
S CC 105	Social Problems ²	3
SWCC 110	Contemporary Social Welfare	3

¹ Also listed in category 3F. Course may count for both categories.

² Also listed in category 3F. May count for 3C and 3F.

³ Also listed in category 3D. Course may count in one category or the other, but not both.

⁴ Also listed in category 3E. Course may count in one category or the other, but not both.

D. Historical Perspectives. 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.

APCC 140	Introduction to Prehistory	3
AUCC 100	Self/Community in American Culture, 1600-1877	3
AUCC 101	Self/Community in American Culture Since 1877 ¹	3
E CC 270	Introduction to American Literature ²	3
ETCC 250	African American History, 1619-1865	3
ETCC 251	African American History Since 1865	3
ETCC 252	Asian American History	3
ETCC 253	Chicana/o History and Culture ³	3
ETCC 255	Native American History	3
HYCC 100	Western Civilization, Pre-Modern	3
HYCC 101	Western Civilization, Modern	3
HYCC 115	Islamic World to 1500 ³	3
HYCC 120	Asian Civilizations I ³	3
HYCC 150	U.S. History to 1876 ¹	3
HYCC 151	U.S. History Since 1876 ¹	3
HYCC 170	World History, Ancient-1500	3
HYCC 171	World History, 1500-Present	3
HYCC 215	Islamic World Since 1500 ³	3
HYCC 220	Asian Civilizations II ³	3
HYCC 230	Medieval Europe ³	3
HYCC 235	Slavic and East Central European Civilizations ³	3
HYCC 238	Latin America Since 1500 ³	3
HYCC 250	African American History, 1619-1865	3
HYCC 251	African American History Since 1865	3
HYCC 252	Asian American History	3
HYCC 255	Native American History	3
NRCC 320	Natural Resources History and Policy ¹	3
PLCC 120	History and Philosophy of Scientific Thought	3
POCC 131	Current World Problems ³	3
POCC 232	International Relations ⁴	3

¹ Also listed in category 3F. Course may count for both categories.

² Also listed in category 3B. Course may count in one category or the other, but not both.

³ Also listed in category 3E. Course may count in one category or the other, but not both.

⁴ Also listed in category 3C. Course may count in one category or the other, but not both.

E. Global and Cultural Awareness. 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.

All-University Core Curriculum

A CC	116	Plants and Civilization	3
A CC	270	World Interdependence-Population and Food	3
AMCC	250	Clothing, Adornment, and Human Behavior	3
APCC	200	Cultures and the Global System	3
E CC	238	20th Century Fiction ¹	3
E CC	245	World Drama ¹	3
ECCC	211	Gender in the Economy	3
ETCC	205	Ethnicity and the Media ¹	3
ETCC	253	Chicana/o History and Culture ²	3
ETCC	256	Americans in a Changing World ¹	3
HYCC	115	Islamic World to 1500 ²	3
HYCC	120	Asian Civilizations I ²	3
HYCC	215	Islamic World Since 1500 ²	3
HYCC	219	Africa-Precolonial States and Empires	3
HYCC	220	Asian Civilizations II ²	3
HYCC	230	Medieval Europe ²	3
HYCC	235	Slavic and East Central European Civilizations ²	3
HYCC	238	Latin America Since 1500 ²	3
IECC	116	Plants and Civilizations	3
IECC	270	World Interdependence-Population and Food ³	3
L CC	192	Modern Languages/Cultures: Italian and Japanese	3
L CC	215	Translation Between Cultures and Languages	3
L CC	250	Language, Literature, Culture in Translation ¹	3
L CC	255	Crossing Cultures	3
LBCC	170	World Literatures to 1500	3
LBCC	171	World Literatures-The Modern Period	3
PFCC	110	Performing Arts Around the World	3
PLCC	170	World Philosophies	3
POCC	131	Current World Problems ²	3
POCC	241	Comparative Government and Politics ³	3
S CC	205	Contemporary Race-Ethnic Relations	3
SACC	482V	Study Abroad	
SPCC	192	Introduction to Intercultural Communication	3

¹ Also listed in category 3B. Course may count in one category or the other, but not both.

² Also listed in category 3D. Course may count in one category or the other, but not both.

³ Also listed in category 3C. Course may count in one category or the other, but not both.

F. U.S. Public Values and Institutions. The objective of the U.S. Public Values and Institutions requirement is to engage students in an inquiry into norms, rules, laws, ethical principles, and values that are central to public life in the United States. It should also provide students opportunities to explore questions about individual and group responsibilities and the ethical dilemmas of citizenship.

AUCC	101	Self/Community in American Culture Since 1877 ¹	3
BGCC	205	Fundamentals of Business Law	3
BGCC	260	Social-Ethical Regulatory Issues in Business	3
EACC	240	Issues in Environmental Economics	3
ECCC	204	Principles of Macroeconomics	3
ECCC	212	Racial Inequality and Discrimination	3
ECCC	240	Issues In Environmental Economics	3
EDCC	275	Schooling in the United States	3
ETCC	100	Ethnicity in America	3
ETCC	204	Ethnicity in Colorado	3
HPCC	392	Seminar ²	3
HYCC	150	U.S. History to 1876 ¹	3
HYCC	151	U.S. History Since 1876 ¹	3
IDCC	200	Housing Values in America	3
JTCC	100	Introduction to Mass Media ³	3

NRCC	320	Natural Resources History and Policy ¹	3
PLCC	103	Moral and Social Problems	3
POCC	101	American Government and Politics ³	3
POCC	103	State and Local Government and Politics ³	3
S CC	100	General Sociology ³	3
S CC	105	Social Problems ³	3

¹ Also listed in category 3D.

² Also listed in category 3B.

³ Also listed in category 3C.

G. Health and Wellness. The objective of the Health and Wellness requirement is to identify those socioeconomic, environmental, physiological, and behavioral factors that affect the health and well-being of humans; and to obtain critical information necessary to make informed choices about health and wellness issues.

BSCC	110	Human Health and Environmental Perspectives	3
BSCC	120	Human Health and Disease	2
BSCC	122	Drugs and the Human Body	2
BSCC	124	Sexuality and Health	3
EHCC	110	Human Health and Environmental Perspectives	3
EXCC	123	Fitness and Health	2
EXCC	143	Survey of Health and Wellness	2
EXCC	145	Health and Wellness	3
FNCC	125	Food and Nutrition in Health	2
FNCC	150	Survey of Human Nutrition	3
MBCC	149	The Microbial World	3
PLCC	130	Bioethics and Society	2
PYCC	228	Psychology of Human Sexuality	3

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 COCC 150, College Composition.
2. Fulfillment of the COCC 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 COCC 150, section 550 (automatic credit for COCC 150) on the Department of English Composition Placement 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 Placement Examination before enrolling in COCC 150.

Credit for COCC 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 Office, 100 Administration Annex, to the Director of the Composition program (or designee) for final approval or disapproval.

Placement Procedures

All students, including freshmen and transfer students who have not satisfied the University composition requirement in one of the three ways explained above, must take the Composition Placement Examination. All students taking this exam will be assessed a fee of \$15, which will be billed to their student account. The examination is offered at PREVIEW Colorado State, at the beginning of each semester, and during preregistration each semester (contact the Department of English, (970) 491-6428, for time and place). Students should take this examination as soon as possible after admission and may take the test only once. 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 COCC 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).

2. If placement scores indicate adequate preparation in basic writing skills, the student is placed in COCC 150, College Composition.
3. If placement scores indicate superior writing skills, the student is placed in COCC 150-Section 550, College Composition-By Exam. Students receiving credit through COCC 150-Section 550 will be automatically enrolled in COCC 150-Section 550 and will receive three semester credits of COCC 150.

Students can check their placement by logging onto My RAMweb. On the Homepage, select the second option under More Links -- English Placement Results.

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 – M CC 117, M CC 118, M CC 124, M CC 125, and M CC 126 without earning credit. Placement out of a mini-course on the SPE 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 have 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 Studies 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 biophysical 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; land and soil management; 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, Horticulture and Landscape Architecture, Soil and Crop Sciences); *College of Applied Human Sciences* (Construction Management); *College of Engineering* (Atmospheric Science, Chemical Engineering, Civil Engineering, Mechanical Engineering); *College of Liberal Arts* (Anthropology, English, History, Philosophy, Political Science, Sociology); *College of Natural Resources* (Fishery and Wildlife Biology; Forest, Rangeland, and Watershed Stewardship, Geosciences, Natural Resource Recreation and Tourism, 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 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 the major most 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 premed or “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 that 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. Professional 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 attractive 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 works with students in all majors who are planning for careers in the animal health professions. The adviser also provides academic advising for the biomedical sciences open option 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 with a pre-vet 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 life sciences 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. The Microbiology and Environmental Health club offices are also housed in Aylesworth Hall.

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 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 the Office of International Programs.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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A minimum of 21 credits is required including 9 credits outside the student's major. Courses must be taken in at least *three* disciplines.

Core Courses (6 credits required)

Select one course from each section

Section I

HYCC 120	Asian Civilizations I	3	3D or 3E
PL 106	Wisdom of the East-Oriental Philosophy	3	
PL 172	Religions of the East	3	

Section II

AR 112	History of Asian Art	3	
E 356	Asian Literature	3	
HYCC 115	Islamic World to 1500	3	3D or 3E
HYCC 215	Islamic World Since 1500	3	3D or 3E
HYCC 220	Asian Civilizations II	3	3D or 3E
L 105C	First-Year Chinese I (no previous study in language)	5	
L 105J	First-Year Japanese I (no previous study in language)	5	
L 105K	First-Year Korean I (no previous study in language)	5	

Asian Studies Area Courses (9-15 credits required)

AP 312	Modern Indian Culture and Society (APCC 100 or APCC 200)	3	
AR 112	History of Asian Art	3	
AR 316	Art of the Pacific (ARCC 100 or AR 111 or AR 113)	3	
E 356	Asian Literature	3	
HY 302	Ancient Near East	3	
HY 335	Tokugawa and Modern Japan, 1600-Present (HYCC 101 or HYCC 151 or HYCC 171 or HYCC 215 or HYCC 220 or written consent of instructor)	3	
HY 337	Ancient China (HYCC 100 or HYCC 120 or HYCC 170)	3	
HY 339	Medieval China and Central Asia (HYCC 100 or HYCC 115 or HYCC 120 or HYCC 170)	3	
HY 341	China in the Modern World, 1600-Present (HYCC 101 or HYCC 151 or HYCC 171 or HYCC 215 or HYCC 220 or written consent of instructor)	3	
HY 344	Muhammad and the Origins of Islam (HYCC 100 or HYCC 115 or HYCC 120 or HYCC 170 or HYCC 230)	3	
HY 348	The Modern Middle East (HYCC 101 or HYCC 151 or HYCC 171 or HYCC 215 or HYCC 235)	3	
HY 404	Ancient Israel	3	
HY 532	Reading Seminar-Middle East (HY 501 or written consent of instructor)	3	
HY 533	Reading Seminar-East Asia (HY 501 or written consent of instructor)	3	
IE 271	India	3	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
L 106J	First-Year Japanese Review (placement exam or instructor placement)	3	
L 107C	First-Year Chinese II (L 105C)	5	
L 107J	First-Year Japanese II (L 105J or L 106J)	5	
L CC 200C	Second-Year Chinese I (L107C or placement exam)	5	2A3
L CC 200J	Second-Year Japanese I (L 107J or placement exam)	5	2A3
L CC 201C	Second-Year Chinese II (L CC 200C or placement exam)	5	2A3
L CC 201J	Second-Year Japanese II (L CC 200J or placement exam)	5	2A3
L CC 250C	Language, Literature, Culture in Translation-Chinese	3	3B or 3E
L CC 250J	Language, Literature, Culture in Translation-Japanese	3	3B or 3E
L 304J	Third-Year Japanese I (L CC 201J or placement exam)	3	
L 305J	Third-Year Japanese II (L 304J or placement exam)	3	
L 309	Contemporary Chinese Literature and the Arts	3	
L 465B	Studies in Foreign Film-Asia	3	
L 496J	Group Study-Japanese (L 305J)	Var	
PL 309	Ideas in Oriental Art and Literature	3	
PL 349	Philosophy of Tao and Zen (written consent of instructor)	3	
PL 360	Topics in Oriental Philosophy (sophomore standing or higher or written consent of instructor)	3	
PL 371	Contemporary Eastern Religious Thought	3	
PO 445	Comparative Asian Politics (POCC 241)	3	

Supporting Field Courses (0-6 credits)

May be taken from courses approved by Advisory Board.

Biomedical Engineering Interdisciplinary Studies Programs

Office in Engineering Building, Room A101

(970) 491-1055

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.

Program details are available at www.engr.colostate.edu/bep/, by calling (970) 491-1055, 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			
BE 470	Biomedical Engineering (PHCC 141; M CC 155 or M CC 160)	3	
BS 300	Principles of Human Anatomy and Physiology (BZCC 101 or BZCC 110 or LSCC 102; C CC 103 or C CC 107 or C CC 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:			
BE 306/	Bioprocess Engineering (C CC 107 or	4	
BH 306	C CC 111; PHCC 121 or PHCC 141		
CE 260	Engineering Mechanics-Statics (M CC 160, PHCC 141)	3	
CE 261	Engineering Mechanics-Dynamics (CE 260)	3	
CH 201	Material and Energy Balances (C CC 111, M CC 160, PHCC 141, 1 course in computer programming)	3	
CH 202	Thermodynamic Process Analysis (CH 201)	3	
CH 331	Momentum Transfer and Mechanical Separations (CH 201, M 340; CH 202 or ME 237)	3	
CH 406	Introduction to Transport Phenomena (C 474, CH 332)	3	
CH 420	Chemical Reactor Design (M 340, 1 course in physical chemistry)	3	
CH 430	Process Control and Instrumentation (CH 332, CH 341, CH 420)	4	
EE 201	Circuit Theory (EE 192 with grade of C- or better; concurrent registration in M CC 161 and PHCC 142)	3	
EE 204	Introduction to Electrical Engineering (M CC 161, PHCC 142)	3	
EE 303/ST 303	Introduction to Communication Principles (M 261)	3	
EE 331	Electronic Principles I (EE 202 with grade with grade of C- or better and M 340 or M 345)	4	
EE 341	Electromagnetic Fields and Devices I (M 340 or M 345)	3	
ME 120	Introduction to Computer-Aided Design (ME 121 or concurrent registration)	3	
ME 237	Introduction to Thermal Sciences (PHCC 142)	3	
ME 307	Mechatronics and Measurement Systems (CE 261, EE 204, M 340)	4	
ME 331	Introduction to Engineering Materials (C CC 112, C 113, PHCC 142)	4	
ME 342	Mechanics and Thermodynamics of Flow Processes (M 340; ME 237)	3	
PH 245	Introduction to Electronics (M CC 161, PHCC 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 (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent reg. in C 346)	4	
BE 486A-B	Biomedical Clinical Practicum (BE 470 and BS 300 or written consent of instructor)	2-4	
BGCC 205	Fundamentals of Business Law ¹	3	3F

Course	Title (Prerequisite)	Cr	AUCC
BN 420	New Venture Creation ¹ (BN 340)	3	
BN 440	New Venture Management ¹ (BN 420)	3	
BS 301	Human Gross Anatomy (BZCC 110 or LSCC 102)	5	
BS 325	Cellular Neurobiology (BS 300 or BY 310)	3	
BS 345	Functional Neuroanatomy (BS 300)	4	
BS 365	Nerve and Muscle-Toxins, Trauma, and Disease (BS 300 or BY 310)	3	
BS 420	Cardiopulmonary Physiology (BS 300)	3	
BS 430	Endocrinology (BS 300)	3	
BY 310	Cell Biology (1 semester of organic chemistry or concurrent reg.; 2 semesters of introductory biology)	4	
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent reg.)	1	
C 345	Organic Chemistry I (C 113, C 114)	4	
EX 207	Anatomical Kinesiology (LSCC 102)	3	
EX 307	Biomechanical Principles of Human Movement (EX 207 or BS 301; PHCC 121 or PHCC 141)	3	
EX 403	Physiology of Exercise (BS 300)	4	
EX 405	Exercise Testing Instrumentation (EX 403)	2	
EX 420	Electrocardiography and Exercise Management (BS 300)	3	
EX 476	Rehabilitation Exercise (EX 207, EX 240)	3	
LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	
MB 300	General Microbiology (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 345 or concurrent reg.)	3	
PL 205	Introduction to Ethics ¹ (sophomore standing or higher or written consent of instructor)	3	
PL 305E	Philosophical Issues in the Professions-Animal Science ¹	3	
PY 456	Sensation and Perception (PY 250)	3	
PY 457	Sensation and Perception Laboratory (PY 250; PY 456 or concurrent reg.)	2	
STCC 309	Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B
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).

Course	Title (Prerequisite)	Cr
CORE COURSES		
BE 570/ME 570	Bioengineering (ME 307, ME 324)	3
BS 500	Mammalian Physiology I (6 credits of biological sciences)	4
ST 511	Design and Data Analysis for Researchers I (STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311 or written consent of instructor)	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

BE 306/	Bioprocess Engineering (C CC 107 or C CC 111;	4
BH 306	PHCC 121 or PHCC 141)	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>
BE 522/ CH 522	Bioseparation Processes (CH 331)	3
BE 525/ CH 525	Cell and Tissue Engineering (BS 300 or BS 500/NB 501 or BY 310 or BC 351)	3
BE 571/ ME 571	Biomechanics (BE 470 or BE 570/ME 570)	3
BE 573/ ME 573	Structure and Function of Biomaterials (ME 331)	3
CH 504	Fundamentals of Biochemical Engineering (MB 300; M CC 255 or M 340; BE 306/BH 306 or CH 420 or concurrent reg.)	3
	TOTAL	3-6
Science, Engineering, Animal Research, Bioethics and Entrepreneurship Courses		
AN 565	Interpreting Animal Science Research ¹ (AN 101 or 102; STCC 301 or STCC 307/EHCC 307)	3
BC 565	Molecular Regulation of Cell Function (LS 210; BC 403 or concurrent reg. or BC 351)	4
BC 663	Gene Expression (BC 563)	3
BC 701	Grant Proposal Writing and Reviewing ¹ (BC 403; BC 563 or concurrent reg.; BC 511 or concurrent reg.)	1
BE 586A-B	Biomedical Clinical Practicum (BE 570/ME 570; BS 300 or BS 500 or written consent of instructor)	3-4
BS 501	Mammalian Physiology II (6 credits of biological science)	5
BS 550	Electron Microscopy-TEM, SEM, and X-ray (PHCC 110)	3
BS 560	Theory and Practice of Animal Biotechnology (1 semester of biochemistry or written consent of instructor)	3
BS 575	Human Anatomy Dissection (BS 301 and written consent of instructor)	4
BS 610A-B	Managing a Career in Science ¹	1
BS 620	Cardiovascular Physiology (BS 500)	3
BS 631	Mechanisms of Hormone Action (BS 430 or BS 501)	2
CM 501	Advanced Cell Biology (BY 310 or written consent of instructor)	4
CM 520	Proteolytic Regulation of Cellular Processes (CM 501)	3
MB 576/ BI 576	Bioinformatics (BC 463 or BY 310 or CM 501 or MB 450)	3
MB 651	Immunobiology (MB 342)	3
NB 505	Neuronal Circuits, Systems and Behavior (BS 325 or BS 500 or NB 501)	3
PL 547	Seminar in Ethical Theory ¹ (PL 447)	3
PL 564	Seminar in Animal Rights ¹ (written consent of instructor)	3
ST 512	Design and Data Analysis for Researchers II (ST 511 or written consent of instructor)	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 (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent reg. in C 346)	4	
BC 352	Principles of Biochemistry Laboratory (BC 351 or BC 401 or concurrent reg., 2 credits of college chemistry lab)	1	
BC 401	Comprehensive Biochemistry I (C 245 or C 345 or concurrent reg. in C 345; M CC 155 or M CC 160)	3	
BC 403	Comprehensive Biochemistry II (BC 401)	3	
BC 404	Comprehensive Biochemistry Laboratory (BC 401 or concurrent reg.; C 246 or C 344, LS 212)	2	
Microbiology Core		7	
MB 300	General Microbiology (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 345 or concurrent reg.)	3	
MB 301	Fundamental Microbiology Laboratory Techniques (MB 300 or concurrent reg.)	1	
MB 302	General Microbiology Laboratory (MB 300 or concurrent reg.)	2	
MB 432	Aquatic Microbiology (MB 301 or MB 302)	4	
MB 436	Industrial Microbiology (LS 206 or MB 301 or MB 302)	4	
Process Engineering Core		4-6	
BH 306/ BE 306	Bioprocess Engineering (C CC 107 or C CC 111; PHCC 121 or PHCC 141)	4	
CH 331	Momentum Transfer and Mechanical Separations (CH 201, M 340; CH 202 or ME 237)	3	
CH 333	Momentum and Heat Transfer Laboratory (CH 332)	2	
CH 442/ EV 442	Rate-Controlled Separations (CE 300 or CH 331, M 340; one course in physical chemistry)	3	
CH 443	Mass Transfer and Separation Laboratory (CH 341 or CH 442/EV 442 or concurrent reg.)	2	
Biotechnology			
MB 400	Capstone in Microbiology-Biotechnology (MB 342; MB 351 or MB 420 or concurrent registration in MB 351 or MB 420)	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 Gibbons Building, Room 201
College of Applied Human Sciences

Through a multi-university collaboration, GP-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 four other land-grant universities – Kansas State, Michigan State, Montana 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 five 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 (on-line) format, in cooperation with the Great Plains-Interactive Distance Education Alliance (GP-IDEA).

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>
HS 559	Foundations of Youth Development	1
----- <i>Select four courses from the following:</i>		
HS 660	Community Youth Development	3
HS 661	Adolescents and Families: Implications	3
HS 662	Contemporary Youth Issues and Life Skills	3
HS 663	Youth Policy	3
HS 665	Youth Development	3
HS 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, 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, College of Natural Resources.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Core Curriculum			
BY 220	Fundamentals of Ecology (one course in biology; M CC 124 or M CC 141 or M CC 155 or M CC 160)	3	
NR 120A	Environmental Conservation	3	
NR 300	Biological Diversity (NR 120A or B or one course in biology)	3	
NR 495	Independent Study	1-2 ¹	
S 320	Population-Natural Resources and Environment (S CC 100 or S CC 105)	3	
SC 330	Principles of Genetics ² (BZCC 110 or BZCC 120 or LSCC 102)	3	
----- <i>Select at least three credits from the following:</i>			
EH 446	Environmental Toxicology (C 245 or C 346)	3	
F 311	Forest Ecology (BY 220 or BY 320)	3	
FW 474	Wildlife Ecology (BY 220, STCC 301 or STCC 307/EHCC 307)	3	
NR 440	Land Use Planning	3	
NR 460	Wilderness Management (BY 220, NR 300, RR 431 or written consent of instructor)	3	
PL 345	Environmental Ethics (sophomore standing or higher or written consent of instructor)	3	
PO 361	U.S. Environmental Politics and Policy (POCC 101)	3	
RS 331	Rangeland Ecogeography (RS 300, BZ 223 or F 210 or NR 220)	3	
----- PROGRAM TOTAL = 20 credits			

¹The 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
Associate 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>			
LB 192	College of Liberal Arts First Year Seminar ¹	3	
POCC 101	American Government and Politics	3	3C, 3F
S CC 100	General Sociology	3	3C, 3F
S 253	Introduction to Criminal Justice (S CC 100 or S CC 105)	3	
TOTAL		6	
SOPHOMORE			
<i>Select 3 credits from the following:</i>			
ETCC 100	Ethnicity in America	3	3F
HYCC 250/ ETCC 250	African American History, 1619-1865	3	3D
HYCC 251/ ETCC 251	African American History Since 1865	3	3D
HYCC 252/ ETCC 252	Asian American History	3	3D
HYCC 255/ ETCC 255	Native American History	3	3D
TOTAL		3	
JUNIOR			
<i>Select 6 credits from the following:</i>			
AP 422/ S 422	Comparative Legal Systems (APCC 100 or S CC 100)	3	
HD 403	Families in the Legal Environment	3	
JT 415	Communications Law ²	3	
OR			
SP 349	Freedom of Speech ²	3	
PO 410	American Constitutional Law (POCC 101)	3	
PO 413	U.S. Civil Rights and Liberties (POCC 101)	3	
PO 431	International Law (POCC 232)	3	
S 355	Sociology of Law (S 253)	3	
TOTAL		6	
SENIOR			
<i>Select 6 credits from the following:</i>			
AP 318/ ET 318	Peoples and Cultures of the Southwest (APCC 100)	3	
ET 304	Race Formation in the United States	3	
ET 305	Ethnicity, Class, and Gender in the U.S.	3	
ET 312	African American Situation	3	
ET 324	Asian-Pacific Americans and the Law	3	
ET 332	Contemporary Chicano/a Latina/o Issues	3	
ET 352/ SW 352	Indigenous Women, Children and Tribes	3	
ET 414/ AP 414	Development in Indian Country	3	
ET 420	Asian/Pacific/American Families/Communities	3	
ET 444/ S 444	Federal Indian Law and Policy	3	
HY 469	United States Immigration History	3	
JT 316/ ET 316	Multiculturalism and the Media	3	
S 332	Comparative Majority/Minority Relations (S CC 100 or S CC 105)	3	
SP 305	Intercultural Communication	3	
SP 306	Co-Cultural Communication	3	
TOTAL		6	
PROGRAM TOTAL = 21 credits			

¹ LB 192 only counts if the topic is "Thurgood Marshall: Equality Under Law."

Other first year seminars may count with approval of the associate dean.

² Credit is not allowed for both JT 415 and SP 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 policy 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 at the same time 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 course from the following:</i>			
AP 330	Human Ecology (APCC 100; APCC 120 or BY 220 or BZCC 101)	3	
E 403	Nature Writing (one course in literature or COCC 301A-D or E 311A-C)	3	
EC 340/ EA 340	Introduction to Economics of Natural Resources (EACC 202 or EACC 202)	3	
HY 464	American Environmental History	3	
JT 461	Writing about Science, Health, and Environment (JT 192 or JT 210; JT 211)	3	
PL 345	Environmental Ethics (sophomore standing or higher or written consent of instructor)	3	
PO 361	U.S. Environmental Politics and Policy (POCC 101)	3	
OR			
PO 362	Global Environmental Politics (POCC 232 or POCC 241)	3	
S 460	Technology, Society, and Environment (S CC 100 or S CC 105)	3	
TOTAL		9	
Environmental Science			
A. Select one course from the following:			
EH 220	Environmental Health (BZCC 101 or BZCC 104 or BZCC 110 or BZCC 120 or LSCC 102 or concurrent registration)	3	
GR 210	Physical Geography	3	
NR 120A	Environmental Conservation	3	
NR 120B	Environmental Conservation (participation in University Honors Program)	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.			
A CC 116/ IECC 116	Plants and Civilization	3	3E
AT 350	Introduction to Weather and Climate AND	2	
AT 351	Introduction to Weather and Climate Laboratory (AT 350 or concurrent registration)	1	
BICC 102	Insects, Science, and Society	3	3A
CE 413	Environmental River Mechanics (CE 300 or WR 416)	3	
FW 100	Wildlife Fundamentals (concurrent registration in FW 192 for freshmen)	2	

University-Wide Instructional Programs

Course	Title (Prerequisite)	Cr	AUCC
G CC 122	The Blue Planet: Geology of Our Environment	3	3A
GR 100	Introduction to Geography	3	
NR 272	Oceanography I	3	
RS 300	Principles of Range Management (BZCC 120 or LS 103)	3	
WRCC 304	Principles of Watershed Management	3	3A
	TOTAL	6	

Liberal Arts Electives

Select one course from the list below OR a different course with strong environmental focus may be used with approval of adviser.

AP 330	Human Ecology ¹ (APCC 100; APCC 120 or BY 220 or BZCC 101)	3	
E 403	Nature Writing ¹ (one course in literature or COCC 301A-D or E 311A-C)	3	
ECCC 240/ EACC 240	Issues in Environmental Economics	3	3F
EC 340/ EA 340	Introduction to the Economics of Natural Resources ¹ (EACC 202 or ECCC 202)	3	
EC 344	Economics of Energy Resources (EACC 202 or ECCC 202)	3	
EC 346/ EA 346	Economics of Outdoor Recreation (EACC 202 or ECCC 202)	3	
ET 344	Native American Ceremony and the Sacred	3	
ET 414/ AP 414	Development in Indian Country	3	
HPCC 492	Senior Seminar (HPCC 392; participation in University Honors Program)	3	
HY 464	American Environmental History ¹	3	
HY 470	American West to 1900	3	
HY 471	American West Since 1900	3	
JT 461	Writing About Science, Health, and Environment ¹ (JT 192 or JT 210; JT 211)	3	
PL 345	Environmental Ethics ¹ (sophomore standing or higher or written consent of instructor)	3	
PO 361	U.S. Environmental Politics and Policy ^{1,2} (POCC 101)	3	
PO 362	Global Environmental Politics ^{1,2} (POCC 232 or POCC 241)	3	
S 320	Population-Natural Resources and Environment (S CC 100 or S CC 105)	3	
S 364	Agriculture and Global Society (S CC 100 or S CC 105)	3	
S 460	Technology, Society, and Environment ¹ (S CC 100 or S CC 105)	3	
S 461	Sociology of Water Resources (S CC 100 or S CC 105)	3	
	TOTAL	3	

Select from Other Colleges

Select one course from the list below OR a different course with a strong environmental components may be used with approval from adviser.

EACC 202	Agricultural and Resource Economics	3	3C
EACC 240/ ECCC 240	Issues in Environmental Economics	3	3F
EA 340/ EC 340	Introduction to Economics of Natural Resources (EACC 202 or ECCC 202)	3	
EA 342	Economic Analysis-Water Resource Development (EACC 202 or ECCC 202)	3	
EA 346/ EC 346	Economics of Outdoor Recreation (EACC 202 or ECCC 202)	3	
EA 375	Agricultural Law	3	
EA 460	Economics of World Agriculture (EACC 202 or ECCC 202)	3	
EA 478	Agricultural Policy (EACC 202 or ECCC 202 or EACC 240/ECCC 240)	3	
FW 356	Leopold's Ethic for Wildlife and Land	3	
GR 320	Cultural Geography (GR 100)	3	
GR 342	Geography of Water Resources	3	
LA 110	Introduction to Landscape Architecture	3	
LA 120	History of the Designed Landscape	3	
NR 220	Natural Resources Ecology and Measurements (BZCC 120 or LS 103; M CC 121)	5	
NRCC 320	Natural Resources History and Policy	3	3D, 3F
NR 355	Contemporary Environmental Issues (one course in biology or written consent of instructor)	3	

Course	Title (Prerequisite)	Cr	AUCC
	TOTAL	3	
PROGRAM TOTAL = 21 credits			

¹May be taken if not selected in the Environmental Affairs Core.

²Students may not get credit for both PO 361 and PO 362 in this program.

Ethnic Studies Interdisciplinary Studies Program

Office in Clark Building, C127

Coordinated by a Faculty Advisory Board and the

Director of the Center for Applied Studies in American Ethnicity

(970) 491-2418

www.colostate.edu/Depts/CASAE/Index

The Center for Applied Studies in American Ethnicity offers undergraduate and graduate curricula leading to a certificate in ethnic studies. The certificate will be in accordance with the philosophy that studying and understanding ethnicity in America can deepen appreciation of the various ethnic heritages of America, the patterns of interaction among those ethnic traditions, and the nature of problems suffered because of abuses and misunderstandings about ethnic and perceived racial identities. The ethnic studies program is dedicated to meeting the educational and research needs of students and faculty interested in issues such as inclusive histories, identity formation, cultural practices and beliefs, and historical representations of racial and ethnic groups. The program is designed to provide an instructional and resource base for future professionals working in fields where an understanding of ethnicity in America will enhance their professional effectiveness.

Students may pursue, in conjunction with their major, an interdisciplinary program of study in ethnic studies. Students will gain a broad understanding of the historical and contemporary experiences of four major racialized groups in the United States: Asian American, African American, Native American, and Chicana(o)/Latina(o). Certificate students are required to take three foundational courses: Ethnicity in America (ETCC 100), Race Formation in the United States (ET 304), and Ethnic Studies Research Methods and Writing (ET 493). In addition, students must take one elective course from each of the four major groups. A letter grade of "C" or better is required in all 21 credits of ET courses.

Program details are available from the office of the Center for Applied Studies in American Ethnicity. Students should consult with the Center prior to beginning the program and throughout their course work experience.

All CASAE students are required to have a letter grade of C (2.0) or better in all ET courses.

Course	Title (Prerequisite)	Cr	AUCC
Required Courses			
ETCC 100	Ethnicity in America	3	3F
ET 304	Race Formation in the United States	3	
ET 493	Ethnic Studies Research Methods and Writing	3	
TOTAL		9	
Choose one course from each of the four areas below:			
<i>African American Studies</i>			
ET 310	African American Studies	3	
ET 312	African American Situation	3	
ET 410	African-American Periods and Personalities	3	
<i>Asian American Studies</i>			
ETCC 252/	Asian-American History	3	3D
HYCC 252			
ET 324	Asian-Pacific Americans and the Law	3	
<i>Chicana/o/Latina/o Studies</i>			
ETCC 253	Chicana/o History and Culture	3	3D or 3E
ET 254	La Chicana in Society	3	
ET 430	Chicana/o/Latina/o Creative Expression	3	
ET 432	Chicana/o/Latina/o Routes to Empowerment	3	
<i>Native American Studies</i>			
ETCC 255/	Native American History	3	3D
HYCC 255			
ET 344	Native American Ceremony and the Sacred	3	
ET 352/	Indigenous Women, Children and Tribes	3	
SW 352			
ET 444/	Federal Indian Law and Policy	3	
S 444			
PROGRAM TOTAL = 21 credits			

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 in fitness, diet/nutrition, health, and human performance. Students admitted in this program will receive their M.S. degree in either health and exercise science or food science and nutrition, and completion of requirements for the interdisciplinary studies program will be noted on their transcript. 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.

Course	Title (Prerequisite)	Cr
Core Curriculum		
BS 500	Mammalian Physiology I (6 credits of biological science)	4
OR		
BS 501	Mammalian Physiology II (6 credits of biological science)	5
EX 560/	Exercise and Nutrition (EX 403, FN 350, undergraduate biochemistry course)	3
FN 560		
EX 600	Data Analysis for Research Design (one course in statistics)	3
EX 603	Advanced Topics in Exercise Physiology (EX 403)	3

Course	Title (Prerequisite)	Cr
EX 692	Seminar	1
OR		
FN 692	Seminar	1
EX 696C	Group Study-Exercise and Nutrition	1
OR		
FN 696D	Group Study-Exercise and Nutrition	1
EX 699	Thesis	10
OR		
FN 699B	Thesis-Nutrition	10
FN 550	Advanced Nutritional Science I (BC 351 or BC 403, FN 350)	3
FN 551	Advanced Nutritional Science II (BC 351 or BC 403, FN 350)	3
STCC 301	Introduction to Statistical Methods ¹ (M CC 118 or M CC 121)	3
	Electives ²	5-6
PROGRAM TOTAL = 40 credits		

¹ STCC 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 Applied Human Sciences, Agricultural 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.

University-Wide Instructional Programs

Course	Title (Prerequisite)	Cr	AUCC
Required Courses			
FT 400	Food Safety ¹ (6 credits in biology and/or chemistry)	3	
OR			
MB 334	Food Microbiology ¹ (LS 205 or MB 300)	3	
LS 205	Survey of Microbial Biology (C CC 107; or C 113 and LS 102)	3	
OR			
MB 300	General Microbiology (BZCC 110 and BZCC 120 or LSCC 102; C 245 or C 345 or concurrent registration)	3	
TOTAL			
6			
Foundation Courses (minimum of six credits chosen from the following)			
<i>Select one of the following courses:</i>			
AN 422	Animal Metabolism (C 245, C 246 or C 346)	3	
BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102, CD 245 or C 346 or concurrent registration in C 346)	4	
BC 401	Comprehensive Biochemistry I (C 245 or C 345 or concurrent registration in C 345; M.CC 155 or M.CC 160)	3	
C 245	Fundamentals of Organic Chemistry ² (C CC 107 or C 113)	4	
FT 110	Food-From Farm to Table (high school chemistry)	3	
FT 447	Food Chemistry (C 245; BC 351 or concurrent registration)	2	
H CC 100	Horticultural Science (high school biology)	4	3A
LS 206	Microbial Biology Laboratory (LS 205 or concurrent registration)	2	
OR			
MB 302	General Microbiology Laboratory (MB 300 or concurrent registration)	2	
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
TOTAL			
6			
Advanced Courses (minimum of 12 credits – must include at least three prefixes from the collaborating departments (AN, EH, FN/FT, H, MB, SC))			
AN 300L	Topics in Animal Sciences: Health Programs/Quality Assurance (AN 101 or AN 102)	2	
AN 350B	Animal and Product Judging-Meats	1-3	
AN 360	Principles of Meat Science (C CC 107 or C CC 111)	3	
AN 460	Meat Processing (AN 360)	3	
BH 306/	Bioprocess Engineering (C CC 107 or C CC 111; PHCC 121 or PHCC 141)	4	
BE 306			
EH 220	Environmental Health (BZCC 101 or BZCC 104 or BZCC 110 or BZCC 120 or LSCC 102 or concurrent registration)	3	
EH 332	Principles of Epidemiology (EHCC 307/STCC 307; MBCC 149 or MB 300)	3	
EH 430	Human Disease and the Environment (EH 320, EH 446)	3	
FN 300	Food Principles and Applications (C CC 107, FNCC 150)	3	
FN 350	Human Nutrition (BS 300; C 245 or C 345)	3	
FT 400	Food Safety ¹ (6 credits in biology and/or chemistry)	3	
FT 420	Quality Assessment of Food Products (FT 110, MB 300)	3	
FT 449	Food Analysis (FT 447)	3	
H 450A	Cool Season Vegetable Production (one plant science course)	1	
H 450B	Warm Season Vegetable Production (one plant science course)	1	
H 450C	Small Fruit Production (one plant science course)	1	
H 450D	Tree Fruit Production (one plant science course)	1	
H 454	Horticulture Crop Production and Management (H 310 or H 450A-B)	2	
H 475	Environmental Requirements of Horticultural Plants (BZ 440)	3	
MB 334	Food Microbiology ¹ (LS 205 or MB 300)	3	
MB 335	Food Microbiology Laboratory (LS 206 or MB 301 or MB 302; MB 334 or concurrent registration)	2	
SC 330	Principles of Genetics (BZCC 110 or BZCC 120 or LSCC 102)	3	

Course	Title (Prerequisite)	Cr	AUCC
SC 430	Applications of Plant Biotechnology (SC 330)	3	
	Special problems/internships ³		3
TOTAL			12
500-level courses that may be selected as electives by high achieving undergraduates:			
AN 560	Issues in the Meat Industry (AN 101)	3	
AN 565	Interpreting Animal Science Research (AN 100 or AN 102, STCC 301 or STCC 307/EHCC 307)	3	
AN 567	Meat Safety, HACCP, and TQM (written consent of instructor)	3	
FT 570	Food Product Development (FT 447)	2	
FT 572	Food Biotechnology (MB 334)	2	
FT 576	Cereal Science (FT 447)	2	
FT 578	Neutraceuticals (FT 447 or C 245 or C 345)	3	
PROGRAM TOTAL = 24 credits			

¹ If both FT 400 and MB 334 are taken, credit for one class may be used for Advanced Courses credit.

² Or higher level organic chemistry course.

³ 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		
MB 334	Food Microbiology (MB 300)	3
Core Courses		
FN 696A	Group Study-Food Science	2
FT 400	Food Safety (6 credits in biology and/or chemistry)	3
	Thesis or dissertation in home department ¹	Var
Supporting Courses – <i>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.</i>		
AN 560	Issues in the Meat Industry (AN 101)	3
AN 567	Meat Safety, HACCP, and TQM (written consent of instructor)	3
AN 660	Advanced Meat Science (AN 360 or AN 422 or FN 350)	3
EH 532	Epidemiologic Methods (EHCC 307/STCC 307)	3
EH 533/	Epidemiology of Infectious Diseases/Zoonoses (MB	3
MB 533	300)	
FT 570	Food Product Development (FT 447)	2
FT 572	Food Biotechnology (MB 334)	2
FT 576	Cereal Science (FT 447)	2
FT 578	Neutraceuticals (FT 447 or C 245 or C 345)	3
H 675	Plant Stress Physiology (BZ 440)	3
MB 335	Food Microbiology Laboratory (LS 206 or MB 301 or MB 302; MB 334 or concurrent registration)	2
MB 443	Microbiology Physiology (MB 300; BC 351 or BC 401)	4
MB 450	Microbial Genetics (MB 300; BC 351 or BC 401 or concurrent registration)	3
MB 550	Microbial and Molecular Genetics Laboratory (MB 301 or MB 302; M 450, written consent of instructor)	4
MB 624	Microbial Ecology (MB 300 or relevant ecology course)	2
SC 755	Advanced Soil Microbiology (MB 624 or SC 455)	3
VM 648	Food Animal Production and Food Safety (VM 601)	2
VS 570/	Issues in Animal Agriculture	2
A 570		

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, two 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 3.0 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)		
CE 576	Engineering Applications of FIS and GPS ¹	3
CE 577	GIS in Civil and Environmental Engineering (CE 300, CE 322/EV 322)	3
LA 520	Geographic Information Systems (LA 241 or written consent of instructor)	3
NR 422	GIS Applications in Natural Resource Management (NR 322)	4
NR 505	Concepts in GIS (STCC 301 or ST 511)	4
NR 621	Design of Geographic Information Systems (LA 520 or NR 322; CS 110)	3
GPS Skills (One course; minimum of 1 credit)		
CE 576	Engineering Applications of GIS and GPS ¹	3
NR 423	Applications of Global Positioning Systems (NR 322 or NR 505)	1
SC 577	Principles/Components: Precision Agriculture ² (A 140 or CS 110; SC 240, or written consent of instructor)	3
Remote Sensing Skills (Two courses; minimum of 6 credits)		
CS 612	Topics in Computer Graphics (CS 510)	4
EE 513	Digital Image Processing (EE 303/ST 303 with grade of C- or better, EE 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 (STCC 301, NR 322, NR 323, or written consent of instructor)	3
NR 523/	Quantitative Spatial Analysis (STCC 301 or STCC	3
ST 523	307/EHCC 307)	
NR 793	Seminar on Remote Sensing and GIS (NR 322 or NR 323 or NR 503 or NR 505)	1
SC 577	Principles/Components: Precision Agriculture ² (A 140 or CS 110; SC 240 or written consent of instructor)	3
ST 310	Data Analysis and Database Management Tools (STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311)	3

PROGRAM TOTAL = 15 credits

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

² SC 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 Gibbons Building, Room 201
College of Applied Human Sciences
Malcolm Scott, Director*

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

University-Wide Instructional Programs

in gerontology, the study of human aging. The primary purpose of the program is to provide students with background knowledge and practicum/internship experience to work effectively with and for the elderly 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 the aging process.

Program details are available from the Family and Youth Institute, College of Applied Human Sciences.

Course	Title (Prerequisite)	Cr	AUCC
Core Requirements			
EX 444	Successful Aging: Role of Physical Activity (LSCC 102 or BZCC 110)	2	
FN 444	Nutrition and Aging (FNCC 150 or admission to Gerontology Interdisciplinary Studies Program or written consent of instructor)	1	
HD 312	Adult Development-Middle Age and Aging (HDCC 101 or PYCC 100 or S CC 100)	3	
HS 201	Perspectives in Gerontology (HDCC 101 or PYCC 100 or S CC 100 or written consent of instructor)	3	
SW 371F	Social Work with Social Gerontology	3	
	TOTAL	12	
Elective Courses			
HD 332	Death, Dying, and Grief (HDCC 101)	3	
HD 403	Families in the Legal Environment	3	
OT 355	Handicapped Individual in Society (PYCC 100 or S CC 100)	2	
PL 366	Philosophy of Aging	3	
PY 296	Group Study	1-3	
PY 496	Group Study	1-3	
	TOTAL	5-8	

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 certificate are designed to prepare professionals who are working directly with older people or are involved in education and research related to the elderly. Professionals offering direct services often are involved in health promotion programs; directing intergenerational activities; managing senior centers or retirement communities; counseling older people 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 education 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. Courses are taken from the home institution and the other cooperating universities. The program has been designed to provide the core competencies identified by the Association for Gerontology in Higher Education.

Course	Title (Prerequisite)	Cr
To earn the graduate certificate in gerontology, students must complete:		
HS 612	Contemporary Perspectives in Gerontology (6 credits of social/behavioral sciences)	3
HS 613/ HD 613	Adult Development and Aging (1 course in adult development or 3 credits of upper-division behavioral science)	3
----- <i>Select two of the following courses:</i>		
HS 615	Environments and Aging (1 course in adult development or 3 credits of upper-division behavioral science)	3
HS 618	Aging and Public Policy (1 course in adult development or 3 credits of upper-division behavioral science)	3
HS 636/ HD 636	Aging and the Family (1 course in adult development or 6 credits of upper-division behavioral science)	3
HS 616	Research Methods in Gerontology (1 course in adult development or 3 credits of upper-division behavioral science)	3
HS 617	Physical Health and Nutrition in Aging (1 course in adult development or 3 credits of upper-division behavioral science)	3
HS 619	Professional Seminar in Gerontology (HS 612, HS 613/HD 613, HS 616, HS 617)	3
	TOTAL	21
PROGRAM TOTAL = 21 credits		

Information Science and Technology Interdisciplinary Studies Program

Office in Clark Building, Room C225

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 22 credits and is open to students majoring in any field.

Course	Title (Prerequisite)	Cr	AUCC
Mathematics and Computer Application Requirements – Before a student is admitted to this program (s)he must demonstrate mastery of the following skills:			
<ul style="list-style-type: none"> Mathematical concepts and models-demonstrated by completion of one of the following courses: M CC 141, M CC 155, M CC 160, or STCC 301 Computer applications software – demonstrated by completion of BD 150 or CS 110 			
Required Courses			
BD 301	End User Computing	3	
CS 115	Computer Science Concepts and Practices (high school algebra, experience with PC's)	3	
EE 325	Telecommunication Networks (M CC 141, M CC 155 or M CC 160)	3	
JT 413	New Communication Technologies and Society	3	
	TOTAL	12	
Elective Courses – <i>Select three of the following courses:</i>			

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
BD 240	Program Design and Construction	3	
BD 355	Business Database Systems (BD 220 and BD 240)	3	
CSCC 153	Java Programming (M CC 118 with grade of C or better)	4	2B
EE 421	Telecommunications I (EE 303/ST 303, EE 312)	3	
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
JT 372	Web Design and Management (JT 192 or JT 210; JT 211)	3	
TOTAL		9-10	
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			
A 224/ NR 224	Integrated Resource Management I (A 192)	3	
BY 220	Fundamentals of Ecology (1 course in biology; M CC 124 or M CC 141 or M CC 155 or M CC 160)	3	
RS 300	Principles of Range Management (BZCC 120 or LS 103)	3	
RS 320/ SC 320	Forest and Range Management (1 course in biological sciences)	3	
OR			
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
TOTAL		12-13	
JUNIOR			
A 424/ NR 424	Integrated Resource Management II (A 224/NR 224)	3	
AN 300E	Topics in Animal Science-Family Ranching (AN 101 or AN 102)	1	
EA 305	Agricultural and Resource Enterprise Analysis (EACC 202 or ECCC 202)	3	
EA 310	Agricultural Marketing (EACC 202 or ECCC 202)	3	
S 341	Sociology of Rural Life (S CC 100 or S CC 105)	3	
TOTAL		13	
SENIOR			
A 383/ NR 383	U.S. Travel-Integrated Resource Management	2	
AN 372	Sheep Production (AN 250, AN 310, AN 320, AN 330)	3	
OR			
AN 478	Beef Production and Management (AN 250, AN 310, AN 320, AN 330)	3	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
EA 478	Agricultural Policy (EACC 202 or ECCC 202 or EACC 240 or ECCC 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*

The International Development Interdisciplinary Studies Program offers an opportunity for students, regardless of discipline, to supplement their academic programs with knowledge in the field of international development. The focus of the programs is on the study of the structures, components, and processes of development (economic environmental, socio-cultural, and political). Students fulfilling program requirements will receive, in addition to a notation on their transcripts, official recognition of completion from the International Development Board.

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			
IE 492	International Development Seminar	3	
<i>Select six credits from the following:</i>			
APCC 200	Cultures and the Global System	3	3E
EC 460	Economic Development (EC 304)	3	
GR 100	Introduction to Geography	3	
IECC 270/ A CC 270	World Interdependence-Population and Food	3	3E
IE 470	Women and Development	3	
IE 471	Children and Youth in Global Context	3	
POCC 232	International Relations	3	3C or 3D
SPCC 192	Introduction to Intercultural Communication	3	3E
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.

AP 310	Peoples and Cultures of Africa (APCC 100)	3	
AP 329	Cultural Change (APCC 100)	3	
AP 332	Peoples of the Caribbean (APCC 100 or APCC 200)	3	
AP 340	Medical Anthropology (APCC 100)	3	
AP 441	Method in Cultural Anthropology (APCC 100)	3	
BF 475	International Business Finance (BF 300 or BF 305)	3	
BK 365	International Marketing (BK 300 or BK 305)	3	
BN 475	International Business Management (BF 300 or BF 305, BK 300 or BK 305; BN 305 or BN 320)	3	

University-Wide Instructional Programs

Course	Title (Prerequisite)	Cr	AUCC
EA 415	International Agricultural Trade (ECCC 204)	3	
EA 460	Economics of World Agriculture (EACC 202 or ECCC 202)	3	
EC 332/ PO 332	International Political Economy (EACC 202 or ECCC 202; and POCC 232)	3	
EC 370	Comparative Economic Systems (ECCC 101 or ECCC 202 or EACC 202)	3	
EC 440	International Economics I (EC 306)	3	
EC 442	International Economics II (EC 304)	3	
GR 320	Cultural Geography (GR 100)	3	
IECC 116/ A CC 116	Plants and Civilization	3	3E
IE 271	India	3	
IE 272	World Interdependence-Current Global Issues	1-3	
IN 300	Approaches to International Studies (9 credits from AUCC categories 3C, 3D, 3E, and/or 3F; 1 year of a foreign language)	3	
IN 492A	Seminar-Asia (HYCC 120, HYCC 220, IN 300)	3	
IN 492B	Seminar-Latin America (HY 354, IN 300)	3	
JT 412	International Mass Communication	3	
L	Foreign languages	3-6	
PL 345	Environmental Ethics (sophomore standing or higher or written consent of instructor)	3	
POCC 131	Current World Problems	3	3D or 3E
POCC 241	Comparative Government and Politics	3	3C or 3E
PO 331	Politics and Society Along Mexican Border	3	
PO 431	International Law (POCC 232)	3	
PO 433	International Organization (POCC 232)	3	
PO 444	Comparative African Politics (POCC 241)	3	
PO 445	Comparative Asian Politics (POCC 241)	3	
PO 446	Politics of South America (POCC 241)	3	
PO 447	Politics in Mexico, Central America, Caribbean (POCC 241)	3	
RR 320	International Issues-Recreation and Tourism	3	
S 320	Population-Natural Resources and Environment (S CC 100 or S CC 105)	3	
S 341	Sociology of Rural Life (S CC 100 or S CC 105)	3	
S 364	Agriculture and Global Society (S CC 100 or S CC 105)	3	
S 366	Peoples and Institutions of Latin America (S CC 100 or S CC 105)	3	
S 429	Comparative Urban Studies (S CC 100 or S CC 105)	3	
S 460	Technology, Society, and Environment (S CC 100 or S CC 105)	3	
S 461	Sociology of Water Resources (S CC 100 or S CC 105)	3	
SC 475	Tropical Soils, Crops, and Farming Systems	3	
SP 305	Intercultural Communication	3	
SW 450/ IE 450	International Social Welfare and Development	3	
	Internship	1-3	
	TOTAL	12	

Program Total = 21 credits

Graduate Program

For admission to the interdisciplinary 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 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		
IE 692	International Development Seminar	3
<i>Select one course from the following:</i>		
EA 566/ S 566	Contemporary Issues of Developing Countries (2 or more courses in economics and/or sociology)	3
EA 660	Economics of Agricultural Development (EA 460)	3
IE 470	Women and Development	3
IE 471	Children and Youth in Global Context	3
IE 550/ PL 550	Ethics and International Development (written consent of instructor)	3
NR 525	World Natural Resources (written consent of instructor)	3
PO 541	Political Economy of Change and Development (3 upper-division credits in comparative politics with grade of B or better)	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.		
AN 570	World Animal Agriculture (AN 101)	3
AP 414/ ET 414	Development in Indian Country	3
AP 529	Anthropology and Development (9 credits in anthropology or written consent of instructor)	3
AP 535	Globalization and Culture Change (9 credits in anthropology or written consent of instructor)	3
BF 675	International Finance	3
BG 662	International Business (admission to M.B.A. program)	2
BK 365	International Marketing (BK 300 or BK 305)	3
BN 475	International Business Management (BF 300 or BF 305; BK 300 or BK 305; BN 305 or BN 320)	3
CE 516	Water Control and Measurement	3
CE 524/ WR 524	Modeling Watershed Hydrology (CE 322/EV 322 or WR 416, ST 304 or STCC 309)	4
CE 544	Water Resources Planning and Management (CE 322/EV 322)	3
CE 578	Infrastructure Engineering and Management (10 credits of engineering, economics, public administration, or planning courses)	3
CE 639/ S 639	Technology Assessment and Social Forecasting (CE 544 or S 500)	3
DM 518	Consumer Issues-Global Perspectives	3
E 526	Teaching English as Foreign/Second Language	3
E 527	Theories of Foreign/Second Language Learning (E 526)	3
EA 415	International Agricultural Trade (ECCC 204)	3
EA 460	Economics of World Agriculture (EACC 202 or ECCC 202)	3
EA 660	Economics of Agricultural Development (EA 460)	3
EA 792B	Seminar-International	Var
EC 440	International Economics I (EC 306)	3
EC 442	International Economics II (EC 304)	3
EC 460	Economic Development (EC 304)	3
EC 640	International Trade Theory (EC 306 or EC 506)	3
EC 742	International Production and Monetary Theory (EC 304 or EC 504)	3
EC 760	Theories of Economic Development (EC 460 or written consent of instructor)	3
FN 661	International Nutrition (FN 350)	2
FW 573	Travel Abroad-Wildlife Ecology/Conservation (written consent of instructor)	3
GS 670	Interdisciplinary Agricultural Development (written consent of instructor)	3
IE 471	Children and Youth in Global Context	3

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>
JT 412	International Mass Communication	3
PO 433	International Organization (POCC 232)	3
PO 444	Comparative African Politics (POCC 241)	3
PO 445	Comparative Asian Politics (POCC 241)	3
PO 446	Politics of South America (POCC 241)	3
PO 447	Politics in Mexico, Central America, Caribbean (POCC 241)	3
PO 531	Policy Making, Diplomacy, and World Politics (3 upper-division credits in international relations with grade of B or better)	3
PO 540	Comparative Politics (3 upper-division credits in comparative politics with grade of B or better)	3
PO 670	Politics of Environment and Sustainability (written consent of instructor)	3
PO 739	International Environmental Politics (PO 530, PO 670)	3
PO 749	Comparative Environmental Politics (PO 670; PO 540 or PO 541)	3
RR 550	Ecotourism (RR 470)	3
RS 531	World Grassland Ecogeography (BZ 223)	3
S 631	Sociology of Rural Development (S 500)	3
S 660	Theories and Issues in Developmental Change (S 500)	3
S 661	Gender and Global Society (S 500)	3
S 663	Sociology of Sustainable Development (S 500)	3
S 666	Globalization and Socioeconomic Restructuring (S 500)	3
S 667	Theories of State, Economy, and Society (S 500)	3
S 669	International Stratification and Change (S 500)	3
S 797	Group Study in Developmental Change (S 660)	3
SC 475	Tropical Soils, Crops, and Farming Systems	3
VE 767	Cross-Culture and International Training (AD 624, VE 506)	3
WR 510	Watershed Management in Developing Countries (CE 322/EV 322 or WRCC 304)	2
	Internship	1-3
	Independent Study	1-3
	TOTAL	6

Latin American Studies Interdisciplinary Studies Program

Office in Laurel Hall

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

The Latin American 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 studies, students should complete, with a grade point average of 2.00 or better, a minimum of 15 credits in Latin American 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 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			
AP 319	Latin American Peasantries (APCC 100)	3	
AP 332	Peoples of the Caribbean (APCC 100 or APCC 200)	3	
AP 451	Andean Archaeology and Ethnohistory (APCC 100 or APCC 140)	3	
AP 510	Contemporary Issues and Ethics in Anthropology (AP 500 or written consent of instructor)	3	
AR 312	History of Pre-Columbian Art (AR 110, AR 111)	3	
HYCC 238	Latin America Since 1500	3	3D or 3E
HY 350	Mexico	3	
HY 352	Caribbean Civilization (HYCC 101 or HYCC 171 or HY 354)	3	
HY 354	Colonial Latin America (HYCC 101 or HYCC 171 or HYCC 238)	3	
HY 444	Revolutions in Latin America	3	
HY 472	American Southwest	3	
IN 492B	Seminar-Latin America (HY 354, IN 300)	3	
JT 412	International Mass Communication	3	
L 335S	Issues in Culture-Spanish (L CC 201S or L 208S)	3	
L 336	Introduction to Spanish-American Civilization (L CC 201S or L 208S)	3	
L 435	Caribbean Culture in Hispanic Literature (L 335S)	3	
L 436	Advanced Latin American Culture (L 335S)	3	
L 445	Women Writers in the Hispanic Worlds (L CC 300S, L 310S)	3	
L 449	Spanish-American Literary Movements and Periods (L CC 300S, L 310S)	3	
L 452S	Genre Studies-Spanish (L CC 300S, L 310S)	3	
L 465A	Studies in Foreign Film-The Americas	3	
L 492S	Spanish Language, Literature, and Society (L 310S and two 400-level courses; senior status)	3	
L 549	Literary Periods of Spanish America (undergraduate degree in the language or written consent of instructor)	3	
PO 331	Politics and Society Along Mexican Border	3	
PO 446	Politics of South America (POCC 241)	3	
PO 447	Politics in Mexico, Central America, Caribbean (POCC 241)	3	
S 366	Peoples and Institutions of Latin America (S CC 100 or S CC 105)	3	
SACC 482V	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.

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

University-Wide Instructional Programs

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 undergraduate 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, structure, replication, and repair; cell organization, communication, growth, aging, and death. Courses in physics, organic chemistry, statistical measurements, and research methods are required. Independent study, internships, or advanced research-oriented laboratory classes are taken during the junior and senior years to provide opportunities for experiential learning and working closely with an interdisciplinary group of faculty.

Students interested in participating in this program should contact the Department of Biochemistry and Molecular Biology (in the Molecular and Radiological Biosciences Building, room 316, (970) 491-5602, bmbugrad@colostate.edu).

Course	Title (Prerequisite)	Cr	AUCC
Mathematics Core			
M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
OR			
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
OR			
STCC 307/ EHCC 307	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B
TOTAL		7	
Physics Core			
<i>Select one of the following pairs of courses:</i>			
PHCC 121	General Physics I (concurrent registration in M CC 125)	5	3A
PHCC 122	General Physics II (PHCC 121)	5	3A
OR			
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A
TOTAL		10	
Chemistry Core			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A

Course	Title (Prerequisite)	Cr	AUCC
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent registration in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent registration)	1	
C 345	Organic Chemistry I (C 113, C 114)	4	
C 346	Organic Chemistry II (C 345)	4	
TOTAL		17	
Biology Core			
BY 310	Cell Biology (one semester of organic chemistry or concurrent registration; two semesters of introductory biology)	4	
OR			
LS 210	Introductory Eukaryotic Cell Biology (LSCC 102; C CC 111, C CC 112 or concurrent registration)	3	
AND			
LS 211	Eukaryotic Cell Biology Recitation (LS 210 or concurrent registration)	1	
AND			
LS 212	Eukaryotic Cell Biology Laboratory (C CC 112; LS 210 or concurrent registration)	1	
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
TOTAL		8-9	
Biochemistry Core			
BC 401	Comprehensive Biochemistry I (C 245 or C 345 or concurrent registration in C 345; M CC 155 or M CC 160)	3	
BC 403	Comprehensive Biochemistry II (BC 401)	3	
BC 404	Comprehensive Biochemistry Laboratory (BC 401 or concurrent registration; C 246 or C 344; LS 212)	2	
TOTAL		8	
Microbiology Core			
MB 300	General Microbiology (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 345 or concurrent registration)	3	
MB 342	Immunology (MB 300; C 245 or C 340 or C 341 or C 345)	4	
TOTAL		7	
Molecular Genetics Core			
BC 463	Molecular Genetics (BC 401 or concurrent registration or BC 351, LSCC 201B)	3	
OR			
MB 450	Microbial Genetics (MB 300; BC 351 or BC 401 or concurrent registration)	3	
<i>Select 4-5 credits from the following:</i>			
BZ 350	Molecular and General Genetics (LSCC 102, one course in statistics)	4	
LSCC 201B	Introductory Genetics (LSCC 102 or college-level introductory biology course)	3	3A
AND			
LS 202B	Introductory Genetics Recitation (concurrent registration in LSCC 201B)	1	
AND			
LS 203	Introductory Genetics Laboratory (LSCC 201A or concurrent registration or LSCC 201B or concurrent registration)	1	
SC 330	Principles of Genetics (BZCC 110 or BZCC 120 or LSCC 102)	3	
AND			
SC 331	Genetics Laboratory (SC 330 or concurrent registration)	1	
TOTAL		7-8	
Seminar			
BC 493	Senior Seminar (BC 401 or concurrent registration)	1	
Elective			
<i>Select one course from the following:</i>			
BC 465	Molecular Regulation of Cell Function (LS 210; BC 403 or concurrent registration or BC 351)	3	
BZ 402	Chromosomes of Eukaryotes (BY 310)	4	
BZ 403	Comparative Endocrinology (BY 310)	3	
BZ 433	Behavioral Genetics (one course in genetics)	3	
MB 420	Medical and Molecular Virology (MB 342, BC 351 or BC 401 or concurrent registration)	4	

Course	Title (Prerequisite)	Cr	AUCC
MB 443	Microbial Physiology (MB 300; BC 351 or BC 401)	4	
TOTAL			3-4
Advanced Laboratory			
<i>Select four credits from the following:</i>			
BC 406A-C	Investigative Biochemistry (BC 404)	2	
BC 408	Techniques in Structural Biology (BC 404, C 471 or C 474)	2	
BC 475	Mentored Research (BC 404)	3	
BC 495	Independent Study (minimum GPA of 3.0 and consent of laboratory mentor)	Var.	
BZ 495	Independent Study	Var.	
MB 302	General Microbiology Laboratory (MB 300 or concurrent registration)	2	
MB 343	Immunology Laboratory (MB 301 or MB 302; MB 342 or concurrent registration)	2	
MB 425	Virology and Cell Culture Laboratory (MB 301 or MB 302; MB 420 or concurrent registration)	2	
MB 495	Independent Study (MB 300)	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 24 faculty participants from 7 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.

A description of the program may be found in the *Graduate and Professional Bulletin*, and 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	Techniques in Neuroscience I (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 (BS 325 or BS 500 or NB 501)	3

Course	Title (Prerequisite)	Cr
NB 586	Practicum-Techniques in Neuroscience II (NB 501 and NB 502)	1
NB 793	Neuroscience Seminar ¹	2
NB 795	Independent Study	Var.
NB 796A-C	Group Study ¹	2

Political Economy Graduate Interdisciplinary Studies Program

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.		
AP 528	Economic Anthropology (9 credits in anthropology or written consent of instructor)	3
AP 535	Globalization and Culture Change (9 credits in anthropology or written consent of instructor)	3
EC 505	Political Economy I (EC 372 or EC 376 or EC 474)	3
EC 760	Theories of Economic Development (EC 460 or written consent of instructor)	3
PO 532	Governance of the World Political Economy (9 upper-division credits in international relations with grade of B or better or written consent of instructor)	3
PO 541	Political Economy of Change and Development (3 upper-division credits in comparative politics with grade of B or better)	3
S 666	Globalization and Socioeconomic Restructuring (S 500)	3
S 667	Theories of State, Economy, and Society (S 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.		
AP 318/ET 318	Peoples and Cultures of the Southwest (APCC 100)	3
AP 319	Latin American Peasantries (APCC 100)	3
AP 413	Indigenous Peoples Today (APCC 200 or AP 412 or AP 414/ET 414)	3
AP 414/ET 414	Development in Indian Country	3
AP 529	Anthropology and Development (9 credits in anthropology or written consent of instructor)	3
AP 530	Humans in Ecosystems (APCC 100)	3
EC 332/PO 332	International Political Economy (EACC 202 or ECCC 202 and POCC 232)	3
EC 370	Comparative Economic Systems (ECCC 101 or ECCC 202 or EACC 202)	3
EC 376	Marxist Economic Thought (ECCC 101 or ECCC 202 or EACC 202)	3
EC 379/HY 379	Economic History of the United States (ECCC 101 or ECCC 202 or EACC 202; or any two courses in American history)	3
EC 474	Recent Economic Thought (EC 304, EC 306)	3
EC 570	Evolution of Economic Thought (EC 304, EC 306)	3
EC 705	Political Economy II (EC 505)	3

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Course	Title (Prerequisite)	Cr	Course	Title (Prerequisite)	Cr	AUCC
EC 742	International Production and Monetary Theory (EC 304 or EC 504)	3	AR 496H	Group Study-Art History ¹	3	
EC 770	Economic Thought and Systems (EC 570)	3	E 160	Mythical and Biblical Backgrounds	3	
HY 319	Contemporary Europe	3	E 336	Goddess Religions	3	
HY 372	Reconstruction and the New South (HYCC 150)	3	E 337	Western Mythology	3	
HY 376	United States, 1917-1945	3	E 460	Chaucer (E 341 and one other upper-division E prefix course)	3	
HY 429	Modern Africa	3	E 463	Milton (E 341 and one other upper-division E prefix course)	3	
HY 444	Revolutions in Latin America	3	ET 344	Native American Ceremony and the Sacred	3	
HY 457	United States Foreign Relations Since 1914	3	HYCC 115	Islamic World to 1500	3	3D or 3E
HY 474	Industrial Revolution in Europe (HYCC 101 or HYCC 151 or HYCC 171)	3	HYCC 120	Asian Civilization I	3	3D or 3E
HY 475	Themes in Modern European Social History	3	HYCC 215	Islamic World Since 1500	3	3D or 3E
JT 412	International Mass Communication	3	HYCC 230	Medieval Europe	3	3D or 3E
PO 431	International Law (POCC 232)	3	HY 302	Ancient Near East	3	
PO 433	International Organization (POCC 232)	3	HY 310	Renaissance and Reformation Europe	3	
PO 670	Politics of Environment and Sustainability (written consent of instructor)	3	HY 335	Tokugawa and Modern Japan, 1600-Present (HYCC 101 or HYCC 151 or HYCC 171 or HYCC 215 or HYCC 220 or written consent of instructor)	3	
PO 739	International Environmental Politics (PO 530, PO 670)	3	HY 337	Ancient China (HYCC 100 or HYCC 120 or HYCC 170)	3	
S 366	Peoples and Institutions of Latin America (S CC 100 or S CC 105)	3	HY 339	Medieval China and Central Asia (HYCC 100 or HYCC 115 or HYCC 120 or HYCC 170)	3	
S 464	Environmental Justice (S CC 100 or S CC 105)	3	HY 341	China in the Modern World, 1600-Present (HYCC 101 or HYCC 151 or HYCC 171 or HYCC 215 or HYCC 220 or written consent of instructor)	3	
S 502	Foundations of Theoretical Sociology (S 500 or concurrent registration)	3	HY 344	Muhammad and the Origins of Islam (HYCC 100 or HYCC 115 or HYCC 120 or HYCC 170 or HYCC 230)	3	
S 660	Theories and Issues in Developmental Change (S 500)	3	HY 346	Crusades in the Near East (HYCC 100 or HYCC 115 or HYCC 120 or HYCC 170 or HYCC 230)	3	
S 669	International Stratification and Change (S 500)	3	HY 348	The Modern Middle East (HYCC 101 or HYCC 151 or HYCC 171 or HYCC 215 or HYCC 235)	3	
			HY 360	Colonial and Provincial America to 1740	3	
			HY 404	Ancient Israel	3	
			HY 438	Russia Before 1700	3	
			HY 451	Ancient Christianity to 500 A.D.	3	
			HY 452	Medieval Christianity, 500-1500	3	
			LBCC 170	World Literatures to 1500	3	3E
			PL 106	Wisdom of the East-Oriental Philosophy	3	
			PLCC 170	World Philosophies	3	3E
			PL 270	Issues in the Study of Religion (sophomore standing or higher or written consent of instructor)	3	
			PL 309	Ideas in Oriental Art and Literature	3	
			PL 349	Philosophy of Tao and Zen (written consent of instructor)	3	
			PL 351	Interpreting the New Testament	3	
			PL 355	Philosophy of Religion (PL 106 or PL 171 or PL 172 or PL 270)	3	
			PL 359	Philosophy of Humans (PL 105 or PL 205 or PL 206 or any upper-division course in philosophy)	3	
			PL 360	Topics in Oriental Philosophy (sophomore standing or higher or written consent of instructor)	3	
			PL 370	Contemporary Western Religious Thought (PL 106 or PL 171 or PL 172 or PL 270)	3	
			PL 371	Contemporary Eastern Religious Thought	3	
			PL 372	Meaning and Truth in Religion (PL 106 or PL 171 or PL 172 or PL 270)	3	
			PL 375	Science and Religion (PL 106 or PL 171 or PL 172 or PL 270)	3	
			PL 379	Mysticism East and West (PL 106 or PL 171 or PL 172 or PL 270)	3	
			PL 463	Seminar in Religious Studies	3	
			PL 497	Group Study ²	1-9	
			PY 492	Seminar ³ (psychology majors or written consent of instructor)	3	
			S 375	Sociology of Religion and Medicine (S CC 100 or S CC 105)	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
1.	Twenty-one credits, ordinarily seven courses, selected from approved courses in at least three		
2.	A grade point average of 2.0 in courses selected for the program		
3.	Two required courses designed to survey the religions of the world, and to introduce students to		
PL 171	Religions of the West	3	
PL 172	Religions of the East	3	
4.	In consultation with a Religious Studies adviser, select fifteen credits with at least three different prefixes:		
AP 312	Modern Indian Culture and Society (APCC 100 or APCC 200)	3	
AP 322	Religion and Society (APCC 100 or APCC 200)	3	
AP 324	Folk Religion	3	
AP 340	Medical Anthropology (APCC 100)	3	
AP 539	Anthropology of Modernity	3	
AR 411	History of Medieval Art (AR 110)	3	

¹Accepted only when designated "Image of the Goddess in Art."

²Accepted only when designated selected religious themes.

³Accepted only when designated "Psychology of Religion."

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

The Russian, Eastern, and Central European 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 HYCC 235)	3	
HYCC 235	Slavic and East Central European Civilizations	3	3D or 3E
PO 345	Russian, Central, and East European Politics (POCC 241)	3	
Elective Courses (12 credits minimum)			
No more than 9 credits can be taken from one department.			
EC 370	Comparative Economic Systems (ECCC 101 or ECCC 202 or EACC 202)	3	
EC 376	Marxist Economic Thought (ECCC 101 or ECCC 202 or EACC 202)	3	
HY 319	Contemporary Europe	3	
HY 422	Habsburg Empire	3	
HY 423	Eastern Europe Since 1918	3	
HY 435	Germany Since World War I	3	
HY 438	Russia Before 1700	3	
HY 440	Imperial Russia	3	
HY 442	The Soviet Union	3	
L	Any 200-level or above German course	3	
L	Any 200-level or above Russian course	3	
L CC 250R	Language, Literature, Culture in Translation	3	3B or 3E
L 450G	Selected Literary Movements and Periods-German (L CC 300G, L 310G)	3	
L 454G	Topic Studies-German (L CC 300G, L 310G)	3	
L 465C	Studies in Foreign Film-Europe	3	
PL 409	20 th Century Philosophy (PL 301)	3	
POCC 241	Comparative Government and Politics	3	3C or 3E
PO 421	Modern Political Theories	3	
PO 437	American Security Policy	3	
Colloquia, seminars, independent study, group study, and study abroad courses as appropriate.			

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			
BY 220	Fundamentals of Ecology ¹ (one course in biology; M CC 124 or M CC 141 or M CC 155 or M CC 160)	3	
EA 342	Economic Analysis-Water Resource Development (EACC 202 or ECCC 202)	3	
EA 475	Water Law (EA 375 or written consent of instructor)	3	
GR 342	Geography of Water Resources	3	
S 461	Sociology of Water Resources (S CC 100 or S CC 105)	3	
WRCC 304	Principles of Watershed Management ²	3	3A
	Elective	3	
	TOTAL	21	
ELECTIVE COURSES			
AT 350	Introduction to Weather and Climate	2	
BZ 315	Marine Ecology (BZCC 111 and BZCC 120 or LS 103; C 245)	3	
BZ 321	Aquatic Vascular Plants (BZ 223 or BZ 325 or written consent of instructor)	3	
CE 322/	Basic Hydrology (CE 300 or CH 331 or WR	3	
EV 322	416, STCC 301 or STCC 309 or CE 308; or written consent of instructor)		
CE 413	Environmental River Mechanics (CE 300 or WR 416)	3	
CE 423	Groundwater Engineering (CE 300 or CH 331 or WR 416)	3	
CE 440	Nonpoint Source Pollution (one course in soil science, hydrology, or fluid mechanics)	3	
EA 340/	Introduction to Economics of Natural	3	
EC 340	Resources (EACC 202 or ECCC 202)		
EA 346/	Economics of Outdoor Recreation (EACC	3	
EC 346	202 or ECCC 202)		
EA 375	Agricultural Law	3	
GR 210	Physical Geography	3	
PO 361	U.S. Environmental Politics and Policy (POCC 101)	3	
PY 316	Environmental Psychology (PYCC 100)	3	
S 320	Population-Natural Resources and Environment (S CC 100 or S CC 105)	3	
SC 370	Irrigation Principles and Management (H CC 100 or SC 100, SC 240)	3	
WR 416	Land Use Hydrology (SC 240, STCC 201)	3	
WR 417	Watershed Measurements (concurrent registration in WR 416)	2	
WR 418	Land Use and Water Quality (C CC 107, WR 416)	3	

¹ BZ 440 or EH 446 or MB 300 may be substituted for BY 220.

² CE 322/EV 322 or WR 416 may be substituted for WRCC 304.

Women's Interdisciplinary Studies Programs

Office in Student Services Building, Room 112

Coordinated by a Faculty Advisory 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 and 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 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 (2.0) 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	

Course	Title (Prerequisite)	Cr	AUCC
ECCC 211	Gender in the Economy	3	3E
HY 468	Women in America	3	
IE 470	Women and Development	3	
MUCC 231	Women in Music	3	3B
PL 251	Feminist Philosophies	3	
PY 296	Group Study	3	
OR			
PY 496	Group Study	3	
PY 327	Psychological Perspectives on Female Experience (PYCC 100)	3	
S 333	Gender Roles in Society (S CC 100 or S CC 105)	3	
SP 317	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 Studies ¹ (enrolled in Women's Interdisciplinary Studies Program or written consent of instructor)	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.

¹Required.

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 and an independent study or thesis, and will participate in non-credit colloquia.

Course	Title (Prerequisite)	Cr
Core Courses		
WS 692	Seminar in Women's Studies ¹ (1 semester of enrollment in Women's Interdisciplinary Graduate Studies Program or written consent of instructor)	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
Supporting Course		
	• 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.	
	TOTAL	3-6
PROGRAM TOTAL = 12 credits		

¹Required.

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 Gibbons Building, Room 201
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 four other land-grant universities – Kansas State, Michigan State, Montana 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 five 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 (on-line) format, in cooperation with the Great Plains-Interactive Distance Education Alliance (GP-IDEA).

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>
HS 559	Foundations of Youth Development	1

<i>Select four courses from the following:</i>		
HS 662	Contemporary Youth Issues and Life Skills	3
HS 663	Youth Policy	3
HS 664	Youth Program Administration and Management	3
HS 667	Youth Professionals as Consumers of Research	3
HS 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 348
Michael H. Fox, Chairman*

The graduate degree program in cell and molecular biology is a cooperative effort among more than 50 faculty members from several different colleges and departments of the University to offer M.S. and Ph.D. degrees. The program includes a core of lecture courses, modular courses in laboratory research methods and techniques, a seminar series in which students present their research, and a highly acclaimed seminar series that brings more than 30 national and international scientists to campus yearly. Regular programs are planned that bring together the diverse faculty members and students to discuss their current research. Most of the core courses are completed during the first three semesters. The Ph.d. degree can normally be finished within five years and the M.S. degree in two years.

Current areas of research include, but are not limited to: the molecular basis of hormone action, in vitro fertilization, the cell life cycle and its control; virus replication and infection; chromosome structure; the biochemistry of plant growth; cellular neurobiology; cell ultrastructure; cellular and molecular biophysics; pathobiology; molecular toxicology; cell differentiation; macromolecular structure and function; radiation biology; hyperthermia; eukaryotic gene structure; transcription and its regulation; regulation of protein synthesis and turnover; molecular immunology; tumor biology; cytogenetics; and oncogenesis.

A description of the program may be found in the *Graduate and Profession Bulletin*, and details are available from the program office.

Ecology

*Office in Natural and Environmental Sciences Building,
Rooms A116, A118
Daniel E. Binckley, Director*

The graduate degree program in ecology offers outstanding opportunities for graduate studies in basic and applied aspects of ecology. Any 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 80 faculty members from 15 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 and mixed grass prairies; sagebrush plains; montane and subalpine meadows, forests, and mountain grasslands; 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*, 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 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 (sophomore year if on scholarship) of ROTC enlists in the Army or Air Force Reserve and signs a contract. This contract includes a military commitment and obligates the student to complete the junior and senior year ROTC courses, and to accept a commission as a second lieutenant. Scholarship students and all junior and senior ROTC cadets receive \$250-\$400 per month, tax free, depending on the academic year.

Some graduates defer active duty until the attainment of graduate degrees. Opportunities also exist for graduate study while on active duty. Many active duty officers are selected each year for enrollment at civilian universities in graduate degree programs. 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 organized activities, and to qualify students for duty as officers with the Armed Forces of the United States. The courses are designed to develop self-reliance, confidence, initiative, 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. These ROTC scholarships provide up to full payment for tuition (resident and non-resident), laboratory expenses, certain fees, textbook allowance of \$480-\$600 per year, and an allowance of \$250-\$400 per month, tax free, 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 Dennis M. Kaan, 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.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
AS 101	Foundations of the Air Force I	1	
AS 102	Foundations of the Air Force II	1	
AS 201	Evolution of Air and Space Power I	1	
AS 202	Evolution of Air and Space Power II	1	

<i>Select one course from the following:</i>			
AS 250	Aerospace Studies-Ground School	3	
MS 110	Military Skills I	2	
MS 121	Military Skills II	2	
MS 210	Contemporary Management Principles	2	
MS 221	Dynamics of Military Operations	2	
TOTAL			6-7

UPPER DIVISION			
AS 301	Air Force Leadership Studies I	3	
AS 302	Air Force Leadership Studies II	3	
AS 401	National Security Affairs/Active Duty I	3	
AS 402	National Security Affairs/Active Duty II	3	
MS 401/	The American Military Experience	3	
HY 401			
TOTAL			15
PROGRAM TOTAL = 21-22 credits			

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. 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 Jackson Self, 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>			
MS 110	Military Skills I	2	
MS 121	Military Skills II	2	
MS 210	Contemporary Management Principles	2	
MS 221	Dynamics of Military Operations	2	
MS 250	Basic Camp Leader Internship ^{1,2}	2-8	
MS 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>			
MS 310	Leadership Assessment	3	
MS 320	Applied Leadership (MS 310 or written consent of instructor)	3	

University-Wide Instructional Programs

Course	Title (Prerequisite)	Cr	AUCC
MS 386	Advanced Camp Practicum ⁴ (MS 320)	8	
MS 395	Independent Study	1-3	
MS 401/ HY 401	The American Military Experience	3	
MS 420	Role and Ethics of the Officer (MS 320, MS 401/HY 401)	3	
MS 492	Seminar-Leadership and Management	<u>2</u>	
	TOTAL	14	

PROGRAM TOTAL = 22 credits

¹Taken between the student's sophomore and junior years, the five-week Basic Camp (MS 250) will meet commissioning requirements for MS 110, MS 121, MS 210, MS 221. The number of 100- and 200-level MS courses taken will determine the number of credits awarded for MS 250.

²Students who have taken all of the Basic Course (MS 110, MS 121, MS 210, MS 221) or have completed Basic Training as a prior service member are not eligible to take MS 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 (MS 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 \$600 per year for books. In addition to the above, Congress has increased the monthly stipend to \$250 per month. The stipend increases each year the student remains in the program, up to a maximum of \$400 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 Newsom Residence Hall, Room E203
(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 Curriculum

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. 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. The Honors courses enroll between 15 and 25 students and are taught by the University's best teachers.

University-Wide Instructional Programs

<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>
FRESHMAN				HP 499	Senior Honors Thesis (HP 399)	<u>3</u>	
HP 192	First Year Seminar (participation in University Honors Program)	4		TOTAL			
HPCC 193	Seminar (HP 192, participation in University Honors Program)	3	2A	PROGRAM TOTAL = 23 credits³			
TOTAL				<u>6</u>			
SOPHOMORE				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; 2A1 – Oral Communication; 3B – Arts/Humanities; 3C – Social/Behavioral Sciences; 3D – Historical Perspectives; 3E – Global and Cultural Awareness; 3F – U.S. Public Values and Institutions. 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.			
JUNIOR							
HPCC 392	Seminar (HPCC 193, participation in University Honors Program)	3	3B, 3F				
HP 399	Pre-thesis (HPCC 193, participation in University Honors Program)	1					
TOTAL				<u>3</u>			
SENIOR							
HPCC 492	Senior Seminar (HPCC 392, participation in University Honors Program)	3	3C				
TOTAL				<u>7</u>			

College of Agricultural Sciences

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

Professor Marc A. Johnson, Vice Provost and Dean
Professor James C. Heird, Associate Dean

UNDERGRADUATE MAJORS

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

UNDERGRADUATE MINORS

Agricultural and Resource Economics
Horticulture
Landscape Horticulture
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. No more than 16 credits from independent study and/or internship courses may be used in fulfillment of the 120 credits. 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 complete 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. Students interested in study abroad should plan in advance by discussing opportunities with their academic adviser and by visiting the Office of International Programs in Laurel Hall (www.international.colostate.edu/study_abroad).

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. See the Web address <http://tes.colostate.edu> for detailed 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.

For a bachelor's degree, a minimum of 15 credits must be earned from Colorado State's College of Agricultural Sciences. More restrictive requirements may be established by departments.

INTERDEPARTMENTAL MAJOR

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

Associate Dean James C. Heird, Coordinator

Major in Agricultural Education

Agricultural education is an interdepartmental major in both the College of Agricultural Sciences and 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 2.75 cumulative GPA, completion of an introductory education course, 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://teachered.colostate.edu/>) or in room 111 of the Education Building.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A 192A-B	Orientation to Agricultural Systems	2	
AN 101	Food Animal Science	4	
OR			
AN 102	Introduction to Equine Science	4	
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent reg.)	1	3A
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A

<i>Select three credits from the following</i>			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
OR			
M CC 130	Math in the Social Sciences (Math Placement Exam)	3	1B
OR			
M CC 133	Financial Mathematics (Math Placement Exam)	3	1B
PLCC 110	Logic and Critical Thinking	3	2B
SC 100	General Crops	4	
	Historical perspectives ¹	3	3D
	TOTAL	30	
SOPHOMORE			
A 244E	Small Gas Engines Repair and Maintenance	2	
A 300	Issues in Agriculture	2	
EACC 202	Agricultural and Resource Economics	3	3C
EXCC 143	Survey of Health and Wellness	2	3G
H CC 100	Horticultural Science (high school biology)	4	3A
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
SPCC 200	Public Speaking	3	2A1
	Agriculture electives	6	

Course	Title (Prerequisite)	Cr	AUCC
	Arts/humanities ²	3	3B
	Global and cultural awareness ³	3	3E
	TOTAL	32	
JUNIOR			
AN 250	Live Animal and Carcass Evaluation	3	
EA 205	Farm and Ranch Management (EACC 202 or ECCC 202)	3	
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology and Assessment (Completion of Phase 1 courses; BD 150 or CS 110 within three years or computer proficiency test; consent of Teacher Licensure Office)	2	
ED 340	Literacy and the Learner (Completion of 30 credits of course work; Required background check through CDE, CBI, FBI)	3	
ED 350	Instruction I- Individualization/Management (EDCC 275, ED 340; concurrent reg. In ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 275, ED 340, concurrent reg. in ED 350, admission to Teacher Licensure Program)	1	
MC 151	Construction Materials and Methods	3	
VE 420	Agricultural Experience and Adult Education	3	
	Agricultural electives	8	
	TOTAL	32	
SENIOR			
EA 308	Agricultural Finance (EACC 202 or ECCC 202)	3	
	OR		
EA 310	Agricultural Marketing (EACC 202 or ECCC 202)	3	
ED 450	Instruction II: Standards and Assessment (ED 350, ED 386; concurrent reg. in ED 486J)	4	
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
ED 493B	Seminar-Assessment of Learning (ED 426 or ED 450, VE 426, concurrent reg. in ED 485A or B or C or VE 485)	1	4B
A 330/PL 330	Agricultural Ethics	3	
	OR		
PL 305E	Philosophical Issues in the Professions-Animal Science	3	
VE 425	Methods/Materials in Agricultural Education (admission to Teacher Licensure Program; concurrent reg. in ED 450, ED 486J, VE 492)	4	
VE 485	Student Teaching (ED 450, VE 425)	12	4A,4C
VE 492	Seminar-Professional Relations (ED 450, VE 425; concurrent reg. in ED 485A or B or VE 485)	2	4C
	TOTAL	30	
PROGRAM TOTAL = 124 credits			

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

DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS

Office in Clark Building, Room B320
(970) 491-6325
<http://dare.colostate.edu>

Professor Paul C. Huszar, 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. Agricultural business majors can easily complete a second major in animal sciences, industry concentration.

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 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 go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

Some examples include: 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
	Elective	3	
	TOTAL	30	
JUNIOR			
BF 305	Fundamentals of Finance (BA 205, ECCC 204)	3	
BK 305	Fundamentals of Marketing (ECCC 101 or ECCC 202 or EACC 202)	3	
EA 305	Agricultural and Resource Enterprise Analysis (EACC 202 or ECCC 202)	3	
EA 310	Agricultural Marketing (EACC 202 or ECCC 202)	3	
EA 335/ EC 335	Introduction to Econometrics (ECCC 204 or STCC 201 or STCC 204 or STCC 301)	3	
EC 306	Intermediate Microeconomics (ECCC 204, M CC 141)	3	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
	Agricultural science electives ²	3	
	Electives	6	
	TOTAL	30	
SENIOR			
BK 362	Professional Selling (BK 300 or BK 305)	3	

<i>Select three courses from the following:</i>			
EA 308	Agricultural Finance (EACC 202 or ECCC 202)	3	
EA 375	Agricultural Law	3	
EA 405	Agricultural Production Management (EACC 202 or ECCC 202)	3	
EA 412	Agricultural Commodities Marketing (EA 310)	3	
EA 415	International Agricultural Trade (ECCC 204)	3	
EA 428	Agricultural Business Management (EA 305, EA 310, and senior standing)	3	4A, 4C
EA 460	Economics of World Agriculture (EACC 202 or ECCC 202)	3	4B
OR			
EA 478	Agricultural Policy (EACC 202 or ECCC 202 or EACC 240 or ECCC 240)	3	4A, 4B, 4C
	Agricultural science electives ²	3	
	EA/EC electives ⁴	3	
	Electives	6-7	
	TOTAL	30-31	
PROGRAM TOTAL = 120 credits			

¹ Select from the list of courses in category 3G of the All-University Core Curriculum (AUCC).
² Select from the courses in A, AN, BI, EA, FT, H, LA, SC, FNCC 150, NR 120A-B, or NRCC 320. A maximum of 6 EA credits may be used as agricultural science electives.
³ Select three courses to meet the core requirements in arts/humanities (3B), historical perspectives (3D), global and cultural awareness (3E), and U.S. public values and institutions (3F). The course selected for category 3F must also fulfill the requirement for category 3B or category 3D.
⁴ Select 3 credits from EA and/or EC courses.

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

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A 140	Technology in Agriculture	3	
A 192A-B	Orientation to Agricultural Systems	2	

<i>Select one course from the following:</i>			
AN 101	Food Animal Science	4	
AN 102	Introduction to Equine Science	4	
FT 110	Food-From Farm to Table (high school chemistry)	3	
H CC 100	Horticultural Science (high school biology)	4	3A
SC 100	General Crops	4	

<i>Select four credits from the following:</i>			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent reg.)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
C CC 103	Chemistry in Context	3	3A
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
EACC 202	Agricultural and Resource Economics	3	3C
ECCC 204	Principles of Macroeconomics (ECCC 202 or EACC 202)	3	

<i>Select one pair of courses from the following:</i>			
M CC 117	College Algebra in Context I (Math Placement Exam)	1	1B
M CC 118	College Algebra in Context II (M CC 117)	1	1B
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
	Health and wellness ¹	2	3G
	TOTAL	29-30	
SOPHOMORE			
BA 205	Fundamentals of Accounting	3	
COCC 300	Writing Arguments (COCC 150)	3	2A2 or 2B
OR			
JT 301	Business Communication (COCC 150)	3	
M CC 141	Calculus in Management Sciences (M CC 118 or M CC 121)	3	1B
SPCC 200	Public Speaking	3	2A1
	Agricultural science electives ²	6	
	Foundations and perspectives ³	9	3B, 3D-3F

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: 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			
A 140	Technology in Agriculture	3	
A 192A-B	Orientation to Agricultural Systems	2	
<i>Select one of the following courses:</i>			
AN 101	Food Animal Sciences	4	
AN 102	Introduction to Equine Science	4	
FT 110	Food-From Farm to Table (high school chemistry)	3	
H CC 100	Horticultural Science (high school chemistry)	4	3A
SC 100	General Crops	4	
<i>Select four credits from the following courses:</i>			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent reg.)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
C CC 103	Chemistry in Context ¹	3	3A
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
EACC 202	Agricultural and Resource Economics	3	3C
ECCC 204	Principles of Macroeconomics (ECCC 202 or EACC 202)	3	
<i>Select one pair of the following:</i>			
M CC 117	College Algebra in Context I (Math Placement Exam)	1	1B
M CC 118	College Algebra in Context II (M CC 117)	1	1B
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
	Health and wellness ²	2	3G
	TOTAL	29-30	
SOPHOMORE			
BA 205	Fundamentals of Accounting	3	
COCC 300	Writing Arguments (COCC 150)	3	2A2
OR			
JT 301	Business Communication (COCC 150)	3	
M CC 141	Calculus in Management Sciences (M CC 118 or M CC 121)	3	1B
SPCC 200	Public Speaking	3	2A1
	Foundations and perspectives ³	9	3B, 3D-3F
	Agricultural electives ⁴	3	
	Electives	6	
	TOTAL	30	
JUNIOR			
BF 305	Fundamentals of Finance (BA 205, ECCC 204)	3	
EA 305	Agricultural and Resource Enterprise Analysis (EACC 202 or ECCC 202)	3	
<i>Select two courses from the following:</i>			
EA 308	Agricultural Finance (EACC 202 or ECCC 202)	3	
EA 310	Agricultural Marketing (EACC 202 or ECCC 202)	3	
EA 412	Agricultural Commodities Marketing (EA 310)	3	
EA 428	Agricultural Business Management	3	
EA 335/ EC 335	Introduction to Econometrics (ECCC 204 and STCC 201 or STCC 204 or STCC 301)	3	

College of Agricultural Sciences

Course	Title (Prerequisite)	Cr	AUCC
EA 340/ EC 340	Introduction to Economics of Natural Resources (EACC 202 or ECCC 202)	3	
OR			
EA 342	Economic Analysis-Water Resource Development (EACC 202 or ECCC 202)	3	
EC 306	Intermediate Microeconomics (ECCC 204, M CC 141)	3	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
	Agricultural sciences electives ⁴	3	
	Electives	3	
	TOTAL	30	
SENIOR			
EA 405	Agricultural Production Management (EACC 202 or ECCC 202)	3	4A, 4C
EA 415	International Agricultural Trade (ECCC 204)	3	
EA 478	Agricultural Policy (EACC 202 or ECCC 202 or EACC 240 or ECCC 240)	3	4A, 4B, 4C
EC 304	Intermediate Macroeconomics (ECCC 204, M CC 141)	3	
	Agricultural sciences electives ⁴	6	
	EA, EC electives ⁵	9	
	Electives	3-4	
	TOTAL	30-31	

PROGRAM TOTAL = 120 credits

¹ Students planning to take SC 240 should take C CC 107 and C CC 108.

² Select from the list of courses in category 3G in the All-University Core Curriculum (AUCC).

³ Select three courses to meet the core requirements in arts/humanities (3B), historical perspectives (3D), global and cultural awareness (3E), and U.S. public values and institutions (3F). The course selected for category 3F must also fulfill the requirement for category 3B or category 3D.

⁴ Select three credits from courses in A, AN, BI, EA, FT, H, LA, SC, FNCC 150, NR 120A-B, or NRCC 320. A maximum of three EA credits may be used as agricultural electives.

⁵ Select nine credits from EA and/or EC courses.

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			
A 140	Technology in Agriculture	3	
A 192A-B	Orientation to Agricultural Systems	2	
<i>Select one of the following courses:</i>			
AN 101	Food Animal Sciences	4	
AN 102	Introduction to Equine Science	4	
FT 110	Food-From Farm to Table (high school chemistry)	3	
H CC 100	Horticulture Science (high school biology)	4	3A
SC 100	General Crops	4	
<i>Select four credits from the following courses:</i>			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent reg.)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
C CC 103	Chemistry in Context	3	3A
COCC 150	College Composition (Composition Placement Examination score of 3-6 or CO 130)	3	1A
EACC 202	Agricultural and Resource Economics	3	3C
ECCC 204	Principles of Macroeconomics (ECCC 202 or EACC 202)	3	
<i>Select one pair of the following:</i>			
M CC 117	College Algebra in Context I (Math Placement Exam)	1	1B

Course	Title (Prerequisite)	Cr	AUCC
M CC 118	College Algebra in Context II (M CC 117)	1	1B
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
	Health and wellness ¹	2	3G
	TOTAL	29-30	

SOPHOMORE

BA 205	Fundamentals of Accounting	3	
COCC 300	Writing Arguments (COCC 150)	3	2A2
OR			
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
EA 305	Agricultural and Resource Enterprise Analysis (EACC 202 or ECCC 202)	3	
M CC 141	Calculus in Management Sciences (M CC 118 or M CC 121)	3	1B
SPCC 200	Public Speaking	3	2A1
	Foundations and perspectives ²	9	3B, 3D-3F
	Agricultural science electives ³	3	
	Elective	3	
	TOTAL	30	

JUNIOR

BK 305	Fundamentals of Marketing (ECCC 101 or EACC 202 or ECCC 202)	3	
BK 362	Professional Selling (BK 300 or BK 305)	3	
EA 308	Agricultural Finance (EACC 202 or ECCC 202)	3	
EA 335/ EC 335	Introduction to Econometrics (ECCC 204 and STCC 201 or STCC 204 or STCC 301)	3	
EC 306	Intermediate Microeconomics (ECCC 204, M CC 141)	3	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
	Agricultural science electives ³	6	
	Electives	6	
	TOTAL	30	

SENIOR

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

PROGRAM TOTAL = 120-121 credits

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

² Select three courses to meet the AUCC requirements in arts/humanities (3B), historical perspectives (3D), global and cultural awareness (3E), and U.S. public values and institutions (3F). The course selected for category 3F must also fulfill the requirement for category 3B or category 3D.

³ Select a total of 15 credits from courses in A, AN, BI, EA, FT, H, LA, SC, FNCC 150, NR 120A-B, or NRCC 320. A maximum of three EA credits may be used as agricultural science electives.

⁴ Select from EA and/or EC courses.

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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A 140	Technology in Agriculture	3	
A 192A-B	Orientation to Agricultural Systems	2	
<i>Select four credits from the following:</i>			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent reg.)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
EACC 202	Agricultural and Resource Economics	3	3C
ECCC 204	Principles of Macroeconomics (ECCC 202 or EACC 202)	3	
<i>Select one pair from the following:</i>			
M CC 117	College Algebra in Context I (Math Placement Exam)	1	1B
M CC 118	College Algebra in Context II (M CC 117)	1	1B
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
	Biological/physical science ¹	3	3A
	Health and wellness ²	2	3G
	Agriculture, forestry, or natural science elective ³	3	
	TOTAL	29	
SOPHOMORE			
BA 205	Fundamentals of Accounting	3	
COCC 300	Writing Arguments (COCC 150)	3	2A2 or 2B
OR			
JT 301	Business Communication (COCC 150)	3	
M CC 141	Calculus in Management Sciences (M CC 118 or M CC 121)	3	1B
SPCC 200	Public Speaking	3	2A1
	Foundations and perspectives ⁴	9	3B, 3D-3F
	Agriculture, forestry, or natural science elective ³	3	
	Electives	7	
	TOTAL	31	
JUNIOR			
BF 305	Fundamentals of Finance (BA 205, ECCC 204)	3	
EA 375	Agricultural Law	3	
EACC 240/ ECCC 240	Issues in Environmental Economics	3	
EA 335/ EC 335	Introduction to Econometrics (ECCC 204 or STCC 201 or STCC 204 or STCC 301)	3	
EA 340/ EC 340	Introduction to Economics of Natural Resources (EACC 202 or ECCC 202)	3	
EC 306	Intermediate Microeconomics (ECCC 204, M CC 141)	3	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
	Agriculture, forestry, natural science electives ³	3	
	Social science electives ³	6	
	TOTAL	30	
SENIOR			
<i>Select two courses from the following:</i>			
EA 342	Economic Analysis-Water Resource Development (EACC 202 or ECCC 202)	3	
EA 346/ EC 346	Economics of Outdoor Recreation (EACC 202 or ECCC 202)	3	

Course	Title (Prerequisite)	Cr	AUCC
EC 344	Economics of Energy Resources (EACC 202 or ECCC 202)	3	
EA 460	Economics of World Agriculture (EACC 202 or ECCC 202)	3	4B
EA 478	Agricultural Policy (EACC 202 or ECCC 202 or EACC 240 or ECCC 240)	3	4A, 4B, 4C
EC 304	Intermediate Macroeconomics (ECCC 204, M CC 141)	3	
	Agriculture, forestry, natural science elective ³	3	
	EA or EC electives ⁵	6	
	Electives	6	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

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

² Select from the list of courses in category 3G in the AUCC.

³ See departmental list.

⁴ Select three courses to meet the core requirements in arts/humanities (3B), historical perspectives (3D), global and cultural awareness (3E), and U.S. public values and institutions (3F). The course selected for category 3F must also fulfill the requirement for category 3B or category 3D.

⁵ Select 6 credits from EA and/or EC courses.

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			
EACC 202	Agricultural and Resource Economics	3	3C
UPPER DIVISION			
EA*	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*.

DEPARTMENT OF ANIMAL SCIENCES

Office in Animal Sciences Building, Room 106C
(970) 491-6672

www.colostate.edu/Dept/AnimSci/

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. Two concentrations of study, industry and science, are available.

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 and feedlots; 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.

Industry Concentration

The industry concentration emphasizes economics, business, and livestock management, as well as basic sciences. This concentration prepares students for careers in the livestock or related industries. Animal science majors in the industry concentration have an opportunity to complete a second major in agricultural business. Elective credits in one major are used to meet the required courses in the other major.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A 192A-B	Orientation to Agricultural Systems	2	
AN 101	Food Animal Science	4	
<i>Select four credits from the following:</i>			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent reg.)	1	3A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
<i>Select one of the following pairs of courses:</i>			
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent reg.)	1	3A
OR			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
EACC 202	Agricultural and Resource Economics	3	3C
OR			
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
	Health and wellness ¹	2	3G
	Historical perspectives ²	3	3D
	Mathematics ³	3	1B
	TOTAL	29	
SOPHOMORE			
AN 250	Live Animal and Carcass Evaluation	3	
AN 286	Livestock Practicum (AN 100 or concurrent reg.)	2	
<i>Select one of the following courses:</i>			
BS 300	Principles of Human Anatomy and Physiology (BZCC 101 or BZCC 110 or LSCC 102; C CC 103 or C CC 107 or C CC 111)	4	
BS 305	Domestic Animal Gross Anatomy (LSCC 102 or BZCC 110)	4	
VS 333	Domestic Animal Anatomy (LSCC 102 or BZCC 110)	4	
	Additional communication ⁴	3	2A
	Arts/humanities ⁵	3	3B
	Global and cultural awareness ⁶	3	3E
	Logical/critical thinking ⁷	3	2B
	U.S. public values and institutions ⁸	3	3F
	Applied courses ⁹	5	
	TOTAL	29	
JUNIOR			
AN 310	Animal Reproduction (BS 230 or BS 300)	3	4B
AN 320	Principles of Animal Nutrition (one semester of chemistry)	3	4B
AN 330	Principles of Animal Breeding (three credits in statistics)	3	4A,4B
RS 320/SC 320	Forage and Range Management (one course in biological sciences)	3	
VS 300	Prevention and Control of Livestock Diseases	3	
	Advanced courses ¹⁰	5-6	
	Agricultural economics, economics, or business ¹¹	9	
	TOTAL	29-30	
SENIOR			
<i>Select one of the following courses:</i>			
AN 372	Sheep production (AN 250, AN 310, AN 320, AN 330)	3	4C
AN 376	Dairy Farm Operations (AN 310, AN 320, AN 330)	3	4C
AN 474	Swine Production (AN 250, AN 310, AN 320, AN 330)	3	4C
AN 476	Beef Feedlot Management (AN 320)	3	4C

Course	Title (Prerequisite)	Cr	AUCC	Course	Title (Prerequisite)	Cr	AUCC				
AN 478	Beef Production and Management (AN 250, AN 310, AN 320, AN 330)	3	4C	BS 300	Principles of Human Anatomy and Physiology (BZCC 101 or BZCC 110 or LSCC 102; C CC 103 or C CC 107 or C CC 111)	4					
	Electives	29-30		BS 305	Domestic Animal Gross Anatomy (LSCC 102 or BZCC 110)	4					
	TOTAL	32-33		VS 333	Domestic Animal Anatomy (LSCC 102 or BZCC 110)	4					
PROGRAM TOTAL = 120 credits				<i>Select one of the following sets of courses:</i>							
¹ Select from the list of courses in category 3G in the all-University Core Curriculum (AUCC).				C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4					
² Select from the list of courses in category 3D in the AUCC.				C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent reg.)	1					
³ Select from the list of courses in category 1B in the AUCC.				OR							
⁴ Select from the list of courses in category 2A in the AUCC.				C 345	Organic Chemistry I (C 113, C 114)	4					
⁵ Select from the list of courses in category 3B in the AUCC.				C 346	Organic Chemistry II (C 345)	4					
⁶ Select from the list of courses in category 3E in the AUCC.				M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B				
⁷ Select statistics course from the list in category 2B in the AUCC.					Additional communications ³	3	2A				
⁸ Select from the list of courses in category 3F in the AUCC.					Arts/humanities ⁴	3	3B				
⁹ Select 5 credits from at least 3 courses from the department approved list.					Global and cultural awareness ⁵	3	3E				
¹⁰ Select two courses from the department approved list for animal science industry majors.					U.S. public values and institutions ⁶	3	3F				
¹¹ Select nine credits of agricultural economics, economics, or business from the departmental approved list.					TOTAL	28-31					
Science Concentration				JUNIOR							
The science concentration emphasizes biological sciences, physics, and chemistry. This concentration prepares students to enter graduate programs and provides students with most of the preprofessional requirements for veterinary medicine.				AN 310	Animal Reproduction (BS 230 or BS 300)	3	4B				
Students in the science concentration of the animal science major having less than a 3.0 cumulative grade point average after completion of 60 credits must change to the industry concentration in animal science,				AN 320	Principles of Animal Nutrition (one semester of chemistry)	3	4B				
				AN 330	Principles of Animal Breeding (three credits of statistics)	3	4A, 4B				
				PHCC 121	General Physics I (concurrent reg. in M CC 125)	5	3A				
				OR				PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
				<i>Select one of the following:</i>				STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
				AND				STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
				FRESHMAN				STCC 307/ EHCC 307	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B
				A 192A-B	Orientation to Agricultural Systems	2		STCC 309	Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B
				AN 101	Food Animal Science	4		<i>Advanced courses⁷</i>			
				BZCC 110	Principles of Animal Biology	3	3A	<i>Applied courses⁸</i>			
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A	TOTAL							
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A	27-29							
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or higher)	4	3A	SENIOR							
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent reg.)	1	3A	<i>Select one of the following:</i>							
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3		AN 372	Sheep Production (AN 250, AN 310, AN 320, AN 330)	3	4C				
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent reg.)	1		AN 376	Dairy Farm Operations (AN 310, AN 320, AN 330)	3	4C				
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A	AN 474	Swine Production (AN 250, AN 310, AN 320, AN 330)	3	4C				
EACC 202	Agricultural and Resource Economics	3	3C	AN 476	Beef Feedlot Management (AN 320)	3	4C				
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C	AN 478	Beef Production and Management (AN 250, AN 310, AN 320, AN 330)	3	4C				
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B	MB 300	General Microbiology (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 345 or concurrent reg.)	3					
M CC 125	Numerical Trigonometry (M CC 118 or M CC 121 or placement)	1	1B	MB 302	General Microbiology Laboratory (MB 300 or concurrent reg.)	2					
	Health and wellness ¹	2	3G	<i>Advanced science⁹</i>							
	Historical perspectives ²	3	3D	Electives							
	TOTAL	32		TOTAL							
SOPHOMORE				PROGRAM TOTAL = 120 credits							
AN 250	Live Animal and Carcass Evaluation	3		¹ Select from the list of courses in category 3G of the All-University Core Curriculum (AUCC).							
<i>Select one of the following courses:</i>				² Select from the list of courses in category 3D of the AUCC.							
				³ Select from the list of courses in category 2A of the AUCC.							
				⁴ Select from the list of courses in category 3B of the AUCC.							
				⁵ Select from the list of courses in category 3E of the AUCC.							
				⁶ Select from the list of courses in category 3F of the AUCC.							

⁷ Select two courses from the department approved list.

⁸ Select five credits from three courses from the departmental approved list.

⁹ Pick two courses from the departmental approved list.

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. Students have a choice of two concentrations that focus on different career objectives – the industry concentration and the science concentration.

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

Industry Concentration

The industry concentration emphasizes economics, business, and equine management, as well as basic sciences. This concentration prepares students for careers in the horse or related industries. Equine science majors in the industry concentration have an opportunity to complete a second major in agricultural business. Elective credits in one major are used to meet the required courses in the other major.

Course	Title (Prerequisite)	Cr	AUCC
AN 102	Introduction to Equine Science	4	
<i>Select 4 credits from the following:</i>			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent reg.)	1	3A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
<i>Select one of the following pairs of courses:</i>			
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent reg.)	1	3A
OR			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
EACC 202	Agricultural and Resource Economics	3	3C
OR			
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
	Health and wellness ¹	3	3G
	Historical perspectives ²	3	3D
	Mathematics ³	3	1B
	TOTAL	30	
SOPHOMORE			
<i>Select one of the following courses:</i>			
BS 300	Principles of Human Anatomy and Physiology (BZCC 101 or BZCC 110 or LSCC 102; C CC 103 or C CC 107 or C CC 111)	4	
BS 305	Domestic Animal Gross Anatomy (LSCC 102 or BZCC 110)	4	
VS 333	Domestic Animal Anatomy (LSCC 102 or BZCC 110)	4	
	Additional communication ⁴	3	2A
	Applied courses ⁵	5	
	Arts/humanities ⁶	3	3B
	Global and cultural awareness ⁷	3	3E
	Statistics ⁸	3	2B
	U.S. public values and institutions ⁹	3	3F
	Electives	6	
	TOTAL	30	
JUNIOR			
AN 310	Animal Reproduction (BS 230 or BS 300)	3	4B
AN 320	Principles of Animal Nutrition (one semester of chemistry)	3	4B
AN 330	Principles of Animal Breeding (three credits in statistics)	3	4A, 4B
AN 346	Equine Disease Management (BS 230)	3	
RS 320/SC 320	Forage and Range Management (one course in biological sciences)	3	
	Agricultural economics, economics, business electives ¹⁰	9	
	Electives	6	
	TOTAL	30	
SENIOR			
AN 440	Equine Production and Industry (AN 346, AN 444, AN 446)	3	4C
AN 444	Equine Reproductive Management (AN 310)	3	
AN 446	Equine Nutrition (AN 320)	2	
	Electives	22	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

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

² Select from the list of courses in category 3D of the AUCC.

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

⁴ Select from the list of courses in category 2A of the AUCC.

Course	Title (Prerequisite)	Cr	AUCC
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FRESHMAN

A 192A-B	Orientation to Agricultural Systems	2	
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⁵ Select five credits from three different courses; see approved department list.

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

⁷ Select from the list of courses in category 3E of the AUCC.

⁸ Select statistics course from category 2B of the AUCC.

⁹ Select from the list of courses in category 3F of the AUCC.

¹⁰ Select nine credits from the department approved list.

Science Concentration

The science concentration emphasizes biological sciences, physics, and chemistry. This concentration prepares students to enter graduate programs and provides students with most of the preprofessional requirements for veterinary medicine.

Students in the science concentration of the equine science major having less than a 2.75 cumulative grade point average after completion of 80 credits must change to the industry concentration in equine science.

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 science concentration in the major in equine science.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A 192A-B	Orientation to Agricultural Systems	2	
AN 102	Introduction to Equine Science	4	
<i>Select four credits from the following:</i>			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher).	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
EACC 202	Agricultural and Resource Economics	3	3C
OR			
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 141 or M CC 160)	3	3C
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
M CC 125	Numerical Trigonometry (M CC 118 or M CC 121 or placement)	1	1B
	Health and wellness ¹	2	3G
	Historical perspectives ²	3	3D
	TOTAL	32	
SOPHOMORE			
<i>Select one of the following courses:</i>			
BS 300	Principles of Human Anatomy and Physiology (BZCC 101 or BZCC 110 or LSCC 102; C CC 103 or C CC 107 or C CC 111)	4	
BS 305	Domestic Animal Gross Anatomy (LSCC 102 or BZCC 110)	4	
VS 333	Domestic Animal Anatomy (LSCC 102 or BZCC 110)	4	
<i>Select one of the following sets of courses:</i>			
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	

Course	Title (Prerequisite)	Cr	AUCC
C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent reg.)	1	
OR			
C 345	Organic Chemistry I (C 113, C 114)	4	
C 346	Organic Chemistry II (C 345)	4	
M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
	Additional communications ³	3	2A
	Arts/humanities ⁴	3	3B
	Global and cultural awareness ⁵	3	3E
	Electives	6	
	TOTAL	28-31	
JUNIOR			
AN 310	Animal Reproduction (BS 230 or BS 300)	3	4B
AN 320	Principles of Animal Nutrition (one semester of chemistry)	3	4B
AN 330	Principles of Animal Breeding (three credits of statistics)	3	4A, 4B
AN 346	Equine Disease Management (BS 230)	3	
AN 422	Animal Metabolism (C 245, C 246 or C 346, C 344)	3	
OR			
BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 343 or concurrent reg. in C 346)	4	
PHCC 121	General Physics I (concurrent reg. in M CC 125)	5	3A
OR			
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
<i>Select one of the following:</i>			
STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
STCC 307/ EHCC 307	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B
STCC 309	Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B
	Applied course ⁵	5	
	U.S. public values and institutions ⁷	3	3F
	TOTAL	31-32	
SENIOR			
AN 440	Equine Production and Industry (AN 346, AN 444, AN 446)	3	4C
AN 444	Equine Reproductive Management (AN 310)	3	
AN 446	Equine Nutrition (AN 320)	2	
MB 300	General Microbiology (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 345 or concurrent reg.)	3	
MB 302	General Microbiology Laboratory (MB 300 or concurrent reg.)	2	
	Advanced science ⁸	6-8	
	Electives ⁹	4-10	
	TOTAL	25-29	
PROGRAM TOTAL = 120 credits			

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

² Select from the list of courses in category 3D of the AUCC.

³ Select from the list of courses in category 2A of the AUCC.

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

⁵ Select from the list of courses in category 3E of the AUCC.

⁶ Select from approved departmental list.

⁷ Select from the list of course in category 3F of the AUCC.

⁸ Pick two courses from approved departmental list.

⁹ Select enough credits to bring total to the minimum of 120.

Preprofessional Veterinary Medicine Requirements

Preveterinary medical students with specific interest in animal science or equine science may follow the science concentration listed under 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.

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*.

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
Professor Scott Nissen, 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.

Minor in Entomology

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
<i>Select one pair of the following:</i>			
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	

Course	Title (Prerequisite)	Cr	AUCC
OR			
BZCC 110	Principles of Animal Biology	3	3A
BZCC 120	Principles of Plant Biology	4	3A
TOTAL		7-8	
UPPER DIVISION			
BI 302	Applied and General Entomology	2	
BI 303A-C	Entomology Laboratory (BI 302 or concurrent reg.)	3	
<i>Select 12-13 credits from the following:</i>			
BI 423	Evolution and Classification of Insects (BI 303A or B or C)	4	
BI 445	Aquatic Insects (BZCC 111 or LS 103)	4	
BI 451	Integrated Pest Management (BI 302 or BI 361 or BI 308 or 10 credits of biology)	4	
BI 462/	Parasitology and Vector Biology	5	
MB 462/	(BZCC 110 or LS 103; MB 301 or MB 302 or LS 206 or BZ 212)		
BZ 462*			
BI 487	Internship	3	
OR			
BI 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
BI 302	Applied and General Entomology	2	
<i>Select one of the following:</i>			
BI 303A	General Entomology Laboratory (BI 302 or concurrent reg.)	2	
BI 303B	Horticultural Entomology Laboratory (BI 302 or concurrent reg.)	1	
BI 303C	Agricultural Entomology Laboratory (BI 302 or concurrent reg.)	1	
BI 308*	Biology and Control of Weeds (BZCC 120 or LS 103; C CC 107 or C CC 111)	4	
BI 310	Fundamentals of Pesticides (introductory biological science or introductory chemistry)	2	
BI 361	Elements of Plant Pathology (BZCC 104 or BZCC 120 or H CC 100 or LSCC 102)	3	
<i>Select a minimum of 8-9 credits from the following (including the selections of BI 487 or BI 495 or LS/LSCC courses below):</i>			
BI 365*	Integrated Tree Health Management (BZCC 120 or LSCC 102)	4	
BI 423	Evolution and Classification of Insects (BI 303A or B or C)	4	
BI 445	Aquatic Insects (BZCC 111 or LS 103)	4	
BI 450	Molecular Plant Microbe Interactions (1 course in biology and 1 course in genetics)	3	
BI 451	Integrated Pest Management (BI 302; BI 361 or BI 308 or 10 credits of biology)	3	
BI 462/	Parasitology and Vector Biology (BZCC 110 or LS 103; MB 301 or MB 302 or LS 206 or BZ 212)	5	
MB 462/			
BZ 462*			
BI 487	Internship	3	
OR			
BI 495	Independent Study	3	
BZCC 120	Principles of Plant Biology ¹	4	3A
OR			
LSCC 102	Attributes of Living Systems ¹ (high school chemistry)	4	3A
AND			
LS 103	Biology of Organisms-Animal and Plants ¹ (LSCC 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 and Pest Management

The department offers graduate programs leading to master of science and doctor of philosophy degrees in entomology and plant pathology and weed science. A specialization in crop protection is available in the master of science program. These programs are described in the *Graduate and Profession Bulletin*.

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 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, art, 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 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 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			
BZCC 120	Principles of Plant Biology	4	3A
----- <i>Select one of the following sets of courses:</i>			
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent reg.)	1	3A
OR			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A

College of Agricultural Sciences

Course	Title (Prerequisite)	Cr	AUCC
H CC 100	Horticultural Science (high school biology)	4	3A
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
	Arts/humanities ¹	3	3B
	Global and cultural awareness ²	3	3E
	Electives	2-4	
	TOTAL	29-31	

SOPHOMORE

Select one of the following courses:

AUCC 101	Self/Community in American Culture Since 1877	3	3D, 3F
HYCC 150	U.S. History to 1876	3	3D, 3F
HYCC 151	U.S. History Since 1876	3	3D, 3F
NRCC 320	Natural Resources History and Policy	3	3D, 3F
BZ 223	Plant Identification (BZCC 120 or LS 103)	3	
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
EACC 202	Agricultural and Resource Economics	3	3C
H 260	Plant Propagation (H CC 100)	4	
SPCC 200	Public Speaking	3	2A1
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
	Logical/critical thinking ³	3	2B
	Electives	3	
	TOTAL	30	

JUNIOR

A 320B	Computer Applications in Agriculture-Data Base ⁴ (A 140 or BD 150 of CS 110)	1	
A 320D	Computer Applications in Agriculture-Project Management ⁴ (A 140 or BD 150 or CS 110)	1	
A 320E	Computer Applications in Agriculture-Spreadsheets ⁴ (A 140 or BD 150 or CS 110)	1	
BI 302	Applied and General Entomology	2	
BI 303B	Horticultural Entomology Laboratory (BI 302 or concurrent reg.)	1	
BI 361	Elements of Plant Pathology (BZCC 104 or BZCC 120 or H CC 100 or LSCC 102)	3	
H 310	Greenhouse Management	4	4B
H 322	Herbaceous Plants (one course in botany, biological science, or horticulture)	3	
H 486	Practicum ⁵	2	
H 487	Internship ⁶	3	
SC 330	Principles of Genetics (BZCC 110 or BZCC 120 or LSCC 102)	3	

Select 3-4 credits from the following:

H 321	Nursery Production and Management (H CC 100)	4	
H 331	Landscape Design	2	
H 341	Turfgrass Management (H CC 100)	3	
H 441	Turfgrass Science (BZCC 120, H 341, SC 240)	3	
H 450A	Cool Season Vegetable Production (one plant science course)	1	
H 450B	Warm Season Vegetable Production (one plant science course)	1	
H 450C	Small Fruit Production (one plant science course)	1	
H 450D	Tree Fruit Production (one plant science course)	1	
H 460/SC 460	Plant Breeding (SC 330)	3	
H 464	Arboriculture and Urban Plant Management (H CC 100, SC 240)	3	
H 475	Environmental Requirements of Horticultural Plants (BZ 440)	3	
	Electives	2-3	
	TOTAL	30	

SENIOR

BN 305	Fundamentals of Management	3	
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Course	Title (Prerequisite)	Cr	AUCC
BZ 440	Plant Physiology (BZCC 120 or LS 103; C 245 or concurrent reg.)	3	
H 412	Floriculture Crops (H 310)	4	
H 454	Horticulture Crop Production and Management (H 310 or H 450A-B)	2	4A, 4C
H 486	Practicum ⁷	2	
	Advanced writing ⁸	3	2A2
	Agricultural economics ⁹	3	
	Health and wellness ¹⁰	2	3G
	Horticulture electives ¹¹	3-4	
	Electives ¹²	3-6	
	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 SPCC 207 or other courses listed in category 2B in the AUCC.

⁴ A 140 and BD 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 All junior-level floriculture majors are required to register for at least two credits of H 486 for one term.

⁶ For internship requirements, refer to departmental policy.

⁷ All senior-level floriculture majors are required to register for at least two credits of H 486 for one term.

⁸ Select from the list of courses in category 2A2 in the AUCC.

⁹ Select from the list of courses taught in the Department of Agricultural and Resource Economics.

¹⁰ Select from the list of courses in category 3G in the AUCC.

¹¹ Select three credits from the list of horticulture courses 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, 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 master of business administration with one additional year.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BZCC 120	Principles of Plant Biology	4	3A
C CC 107	Fundamentals of Chemistry I (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
EACC 202	Agricultural and Resource Economics	3	3C
ECCC 204	Principles of Macroeconomics (ECCC 202 or EACC 202)	3	3F
H CC 100	Horticultural Science (high school biology)	4	3A
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M 118 or M CC 121 or placement)	1	1B
	Health and wellness ¹	2	3G
	Elective	2	

Course	Title (Prerequisite)	Cr	AUCC	Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE				FRESHMAN			
TOTAL 29				BZCC 120	Principles of Plant Biology	4	3A
A 140	Technology in Agriculture	3		<i>Select one of the following sets of courses:</i>			
OR				C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
BD 150	Business Computing Concepts and Applications	3		C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent reg.)	1	3A
BA 205	Fundamentals of Accounting	3		OR			
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4		C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
EA 375	Agricultural Law	3		C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent reg.)	1	3A
H 260	Plant Propagation (H CC 100)	4		C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4		C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent reg.)	1	
SPCC 200	Public Speaking Electives	3	2A1	COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
TOTAL 6				EACC 202	Agricultural and Resource Economics	3	3C
TOTAL 30				H CC 100	Horticultural Science (high school biology)	4	3A
JUNIOR				M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
BF 305	Fundamentals of Finance (BA 205, ECCC 204)	3		M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
OR				M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
EA 308	Agricultural Finance (EACC 202 or ECCC 202)	3		Health and wellness ¹	2	3G	
BI 302	Applied and General Entomology	2		Elective	2		
BI 361	Elements of Plant Pathology (BZCC 104 or BZCC 120 or H CC 100 or LSCC 102)	3		TOTAL 26-30			
BK 305	Fundamentals of Marketing (ECCC 101 or ECCC 202 or EACC 202)	3		SOPHOMORE			
BN 305	Fundamentals of Management	3		C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
BZ 440	Plant Physiology (BZCC 120 or LS 103; C 245 or concurrent reg.)	3		H 260	Plant Propagation (H CC 100)	4	
SC 330	Principles of Genetics (BZCC 110 or BZCC 120 or LSCC 102)	3		SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
STCC 204	Statistics for Business Students (M CC 117 or M CC 120A-B)	3	2B	SPCC 200	Public Speaking	3	2A1
Horticulture, upper division				STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
TOTAL 6				OR			
TOTAL 29				STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
SENIOR				JUNIOR			
H 454	Horticulture Crop Production and Management (H 310 or H 450A-B)	2	4A, 4C	A 140	Technology in Agriculture	3	
H 460/SC 460	Plant Breeding (SC 330)	3	4B	OR			
H 475	Environmental Requirements of Horticultural Plants (BZ 440)	3		CS 110	Personal Computing	4	
Arts/humanities ²				BI 302	Applied and General Entomology	2	
Global and cultural awareness ³				BI 303B	Horticultural Entomology Laboratory (BI 302 or concurrent reg.)	1	
Historical perspectives ⁴				BI 361	Elements of Plant Pathology (BZCC 104 or BZCC 120 or H CC 100 or LSCC 102)	3	
Horticulture, upper division				BZ 440	Plant Physiology (BZCC 120 or LS 103; C 245 or concurrent reg.)	3	
Upper division agricultural economics, business, or economics				H 486	Practicum	3	
Electives				OR			
TOTAL 7				H 487	Internship	3	
TOTAL 32				SC 330	Principles of Genetics (BZCC 110 or BZCC 120 or LSCC 102)	3	
PROGRAM TOTAL = 120 credits				TOTAL 18-19			
¹ Select from the list of courses in category 3G in the All-University Core Curriculum (AUCC).				SENIOR			
² Select from the list of courses in category 3B in the AUCC.				BI 308	Biology and Control of Weeds (BZCC 120 or LS 103; C CC 107 or C CC 111)	4	
³ Select from the list of courses in category 3E in the AUCC.				H 450A	Cool Season Vegetable Production (one plant science course)	1	
⁴ Select from the list of courses in category 3D in the AUCC.				H 450B	Warm Season Vegetable Production (one plant science course)	1	

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. 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.

College of Agricultural Sciences

Course	Title (Prerequisite)	Cr	AUCC
H 454	Horticulture Crop Production and Management (H 310 or H 450A-B)	2	4A, 4C
H 460/ SC 460	Plant Breeding (SC 330)	3	4B
H 475	Environmental Requirements of Horticultural Plants (BZ 440)	3	
	TOTAL	14	

PROGRAM TOTAL = 88-93 credits⁶

¹ Select from the list of courses in category 3G 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 3D 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 3F in the AUCC.

⁶ 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			
H 310	Greenhouse Management	4	
SC 350	Soil Fertility Management (SC 240)	3	
	Electives	4-5	
	TOTAL	11-12	
SENIOR			
H 450C	Small Fruit Production (one plant science course)	1	
H 450D	Tree Fruit Production (One plant science course)	1	
SC 370	Irrigation Principles and Management (H CC 100 or SC 100; SC 240)	3	
	Electives ¹	11	
	TOTAL	16	

PROGRAM TOTAL = 120 credits

¹ Select 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 (BZCC 120 or LS 103)	3	
JUNIOR			
<i>Select 5 credits from the following:</i>			
H 310	Greenhouse Management	4	
H 321	Nursery Production and Management (H CC 100)	4	
H 341	Turfgrass Management (H CC 100)	3	
H 412	Floriculture Crops (H 310)	4	
H 450C	Small Fruit Production (one plant science course)	1	
H 450D	Tree Fruit Production (one plant science course)	1	
SC 304	Seed Production, Conditioning and Marketing (SC 100)	3	
SC 446	Physiology of Seeds (BZ 440)	2	
	Electives	1-3	
	TOTAL	11-13	
SENIOR			

Course	Title (Prerequisite)	Cr	AUCC
H 461/ SC 461	Plant Breeding Laboratory (H 460/SC 460 or concurrent reg.)	1	
	Electives ¹	12-15	
	TOTAL	13-16	

PROGRAM TOTAL = 120 credits

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

Horticultural Science Concentration

Horticultural science graduates conduct research to discover new information about plant growth, development, and environmental response. This research can lead to new plant varieties and production methods. The curriculum consists of a solid foundation in the basic natural 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			
BZCC 120	Principles of Plant Biology	4	3A
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
H CC 100	Horticultural Science (high school biology)	4	3A
M CC 126	Analytic Trigonometry ¹ (M CC 125 or placement)	1	1B
	Arts/humanities ²	3	3B
	Historical perspectives ³	3	3D
	Social/behavioral sciences ⁴	3	3C
	Elective	2	
	TOTAL	32	
SOPHOMORE			
A 140	Technology in Agriculture	3	
OR			
CS 110	Personal Computing	4	
H 260	Plant Propagation (H CC 100)	4	
PHCC 121	General Physics I (concurrent reg. in M CC 125)	5	3A
PHCC 122	General Physics II (PHCC 121)	5	3A
SPCC 200	Public Speaking	3	2A1
	Global and cultural awareness ⁵	3	3E
	Health and wellness ⁶	2	3G
	U.S. public values and institutions ⁷	(3)	3F
	Electives	3	
	TOTAL	28-29	
JUNIOR			
<i>Select one of the following sets of courses:</i>			
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C 108 or C CC 112 or C 114; C 245 or concurrent reg.)	1	
OR			
C 345	Organic Chemistry I (C 113, C 114)	4	
C 346	Organic Chemistry II (C 345)	4	
M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B

Course	Title (Prerequisite)	Cr	AUCC
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
SC 330	Principles of Genetics (BZCC 110 or BZCC 120 or LSCC 102)	3	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
	Horticulture electives	8	
	Electives	0-3	
	TOTAL	30	
SENIOR			
BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent reg. in C 346)	4	
----- <i>Select two credits from the following courses:</i>			
BC 352	Principles of Biochemistry Laboratory (BC 351 or BC 401 or concurrent reg., two credits of college chemistry laboratory)	1	
BZ 441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
SC 331	Genetics Laboratory (SC 330 or concurrent reg.)	1	
BZ 440	Plant Physiology (BZCC 120 or LS 103; C 245 or concurrent reg.)	3	
BI 302	Applied and General Entomology	2	
BI 303B	Horticultural Entomology Laboratory (BI 302 or concurrent reg.)	1	
BI 361	Elements of Plant Pathology (BZCC 104 or BZCC 120 or H CC 100 or LSCC 102)	3	
H 454	Horticulture Crop Production and Management (H 310 or H 450A-B)	2	4A, 4C
H 460/ SC 460	Plant Breeding (SC 330)	3	4B
H 475	Environmental Requirements of Horticultural Plants (BZ 440)	3	
	Horticulture electives	3	
	Electives ⁸	3-4	
	TOTAL	29-30	

PROGRAM TOTAL = 120 credits

¹ The equivalent to M CC 120A-B, M CC 121, and M CC 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. One of the courses selected for 3C or 3D must also be listed in category 3F.

⁴ Select from the list of courses in category 3C in the AUCC. One of the courses selected for 3C or 3D must also be listed in category 3F.

⁵ Select from the list of courses in category 3E in the AUCC.

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

⁷ Select from the list of courses in category 3F in the AUCC. The course selected for 3F must also be listed in category 3C or category 3D.

⁸ 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 45 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 2006. 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			
BZCC 120	Principles of Plant Biology	4	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
G CC 120	Exploring Earth-Physical Geology	3	3A
LA 110	Introduction to Landscape Architecture	3	
LA 120	History of the Designed Landscape	3	
M CC 141	Calculus in Management Sciences (M CC 118 or M CC 121)	3	1B
PHCC 110	Descriptive Physics	3	3A
PYCC 100	General Psychology	3	3C
	Health and wellness ¹	2	3G
	TOTAL	27	
SOPHOMORE			
BY 220	Fundamentals of Ecology (one course in biology, M CC 124 or M CC 141 or M CC 155 or M CC 160)	3	
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
LA 230	Drawing the Landscape	4	
LA 240	Fundamentals of Landscape Design Process (LA 230)	4	
LA 241	Environmental Analysis (LA 230, concurrent reg. in LA 240)	3	
PLCC 110	Logic and Critical Thinking	3	2B
SPCC 200	Public Speaking	3	2A1
	Arts/humanities ²	3	3B
	Global and cultural awareness ³	3	3E
	TOTAL	30	
JUNIOR			
EACC 202	Agricultural and Resource Economics	3	3C
OR			
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
LA 360	Basic Landscape Design and Construction (LA 240)	3	4A

Course	Title (Prerequisite)	Cr	AUCC
LA 361	Digital Methods (LA 360 or concurrent reg.)	3	
LA 362	Form and Expression in Garden Design (LA 361)	3	
LA 363	Advanced Landscape Site Engineering (LA 360)	4	
LA 444	Ecology of Landscapes (LA 360, 1 course in biology)	3	
----- <i>Select one of the following courses:</i>			
LA 454	Landscape Field Studies (LA 366)	5	
LA 455	Travel Abroad-European Landscape Architecture (LA 362 or written consent of instructor)	5	
NR 220	Natural Resources Ecology and Measurements (BZCC 120 or LS 103, M CC 121)	5	
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
	TOTAL	28	
SENIOR			
H 368/	Landscape Irrigation and Water Conservation (H CC 100 or LA 110 or written consent of instructor)	3	
LA 368			
LA 364	Design and Nature (LA 361)	4	4B
LA 365	Landscape Contract Drawing and Specifications (LA 363)	3	
LA 366	Landscape Design Expression (LA 365)	4	
PL 345	Environmental Ethics (sophomore standing or higher or written consent of instructor)	3	
	Historical perspectives ⁴	3	3D
	U.S. public values and institutions ⁵	3	3F
	TOTAL	23	
FIFTH YEAR			
BZ 223	Plant Identification (BZCC 120 or LS 103)	3	
OR			
H 221	Landscape Plants	4	
LA 392	Seminar-Designed Landscapes-Theory and Criticism (LA 365)	2	
LA 446	Urban Design (LA 366)	4	
LA 447	Comprehensive Landscape Design (LA 446)	4	4C
LA 449	Professional Practice (LA 447 or concurrent reg.)	1	4C
NR 323	Remote Sensing of Natural Resources Electives	3	
	TOTAL	23-24	
PROGRAM TOTAL = 131-132 credits			

¹ Select from the list of courses in category 3G 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 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 3F 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 to possess.
- 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, 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 nursery manager.

Landscape Design and Contracting Concentration

Landscape design and contracting prepares students to design, install, and maintain landscapes 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 sprinkler 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 Association of Landscape Contractors of America.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
A 140	Technology in Agriculture	3	
OR			
BD 150	Business Computing Concepts and Applications	3	
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
H CC 100	Horticultural Science (high school biology)	4	3A
H 130	Landscape Graphics Studio	4	
H 140	Principles of Landscape Design (H 130)	4	
<i>Select one of the following pairs of courses:</i>			
M CC 117	College Algebra in Context I (Math Placement Exam)	1	1B
M CC 118	College Algebra in Context II (M CC 117)	1	1B
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 125	Numerical Trigonometry (M CC 118 or M CC 121 or placement)	1	1B
	Health and wellness ¹	2	3G
	Electives	4	
	TOTAL	31	
SOPHOMORE			
BA 205	Fundamentals of Accounting	3	
H 221	Landscape Plants	4	
H 235	Landscape Grading and Drainage Studio (H 140; M CC 118 or M CC 121)	4	
H 487	Internship	3-6	
LA 120	History of the Designed Landscape	3	
MC 131	Graphic Communications/CAD	3	
MC 261	Construction Surveying (MC 131 or ID 166, M CC 125 or M CC 160)	3	
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
SPCC 200	Public Speaking	3	2A1
OR			
	Spanish ²	3-5	
	Electives	3	
	TOTAL	33-38	
JUNIOR			
H 322	Herbaceous Plants (one course in botany, biological science, or horticulture)	3	
H 330	Computers for Landscape Design (one course or knowledge of AutoCAD)	2	
H 335	Landscape Structures (H 140, one CAD class)	4	
H 341	Turfgrass Management (H CC 100)	3	
H 368/ LA 368	Landscape Irrigation and Water Conservation (H CC 100 or LA 110 or written consent of instructor)	3	
H 465	Landscape Estimating (3 credits of mathematics)	3	
	Logical/critical thinking ³	3	2B
	Advanced writing ⁴	3	2A2
	Arts/humanities ⁵	3	3B
	Social/behavioral sciences ⁶	3	3C
	Electives	3	
	TOTAL	33	
SENIOR			

College of Agricultural Sciences

Course	Title (Prerequisite)	Cr	AUCC
BI 302	Applied and General Entomology	2	
BI 303B	Horticultural Entomology Laboratory (BI 302 or concurrent reg.)	1	
H 332	Planting Design Studio (H 140, H 221, H 322)	4	4A
H 432	Intensive Landscape Design Studio (H 332)	5	4B, 4C
H 464	Arboriculture and Urban Plant Management (H CC 100, SC 240)	3	
	Global and cultural awareness ⁷	3	3E
	Historical perspectives ⁸	3	3D
	U.S. public values and institutions ⁹	3	3F
	Business electives	3	
	Electives	3	
	TOTAL	30	

PROGRAM TOTAL = 127-132 credits

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

² One semester.

³ Select from the list of courses in category 2B in the AUCC.

⁴ Select from the list of courses in category 2A2 in the AUCC.

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

⁸ Select from the list of courses in category 3D in the AUCC.

⁹ Select from the list of courses in category 3F 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 firms. 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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BZCC 120	Principles of Plant Biology	4	3A
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
EACC 202	Agricultural and Resource Economics	3	3C
H CC 100	Horticultural Science (high school biology)	4	3A
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120 A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
	Health and wellness ¹	2	3G
	Electives	6	
	TOTAL	30	

SOPHOMORE

Select one of the following courses:

Course	Title (Prerequisite)	Cr	AUCC
AUCC 101	Self/Community in American Culture Since 1877	3	3D, 3F
HYCC 150	U.S. History to 1876	3	3D, 3F
HYCC 151	U.S. History Since 1876	3	3D, 3F
NRCC 320	Natural Resources History and Policy	3	3D, 3F
BZ 223	Plant Identification (BZCC 120 or LS 103)	3	
H 221	Landscape Plants	4	
H 260	Plant Propagation (H CC 100)	4	
SPCC 200	Public Speaking	3	2A
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
	Arts/humanities ²	3	3B
	Global and cultural awareness ³	3	3E
	Logic/critical thinking ⁴	3	2B
	TOTAL	30	

JUNIOR

<i>Select three credits from the following:</i>			
A 140	Technology in Agriculture	3	
A 320A	Computer Applications in Agriculture-Optimization (A 140 or BD 150 or CS 110)	1	
A 320B	Computer Applications in Agriculture-Data Base (A 140 or BD 150 or CS 110)	1	
A 320C	Computer Applications in Agriculture-Communications (A 140 or BD 150 or CS 110)	1	
A 320D	Computer Applications in Agriculture-Project Management (A 140 or BD 150 or CS 110)	1	
A 320E	Computer Applications in Agriculture-Spreadsheets (A 140 or BD 150 or CS 110)	1	
A 320F	Computer Applications in Agriculture-Presentation Technology (A 140 or BD 150 or CS 110)	1	
BI 302	Applied and General Entomology	2	
BI 303B	Horticultural Entomology Laboratory (BI 302 or concurrent reg.)	1	
C 245	Fundamentals of Organic Chemistry (C CC107 or C 113)	4	
H 310	Greenhouse Management	4	4B
H 321	Nursery Production and Management (H CC 100)	4	4A
H 322	Herbaceous Plants (one course in botany, biological science, or horticulture)	3	
H 331	Landscape Design	2	
H 341	Turfgrass Management (H CC 100)	3	
H 487	Internship ⁵	3	
	TOTAL	29	

SENIOR

BI 308	Biology and Control of Weeds (BZCC 120 or LS 103; C CC 107 or C CC 111)	4	
BI 361	Elements of Plant Pathology (BZCC 104 or BZCC 120 or H CC 100 or LSCC 102)	3	
BZ 440	Plant Physiology (BZCC 120 or LS 103; C 245 or concurrent reg.)	3	
EA 328	Small Agribusiness Management (EACC 202 or ECCC 202)	3	
H 464	Arboriculture and Urban Plant Management (H CC 100, SC 240)	3	4C
H 465	Landscape Estimating (3 credits of mathematics)	3	
	Electives	12	
	TOTAL	31	

PROGRAM TOTAL = 120 credits

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

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

⁵ 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			
BZCC 120	Principles of Plant Biology	4	3A
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
EACC 202	Agricultural and Resource Economics	3	3C
H CC 100	Horticultural Science (high school biology)	4	3A
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 125	Numerical Trigonometry (M CC 118 or M CC 121 or placement)	1	1B
	Global and cultural awareness ¹	3	3E
	Health and wellness ²	2	3G
	Elective	2	
	TOTAL	29	
SOPHOMORE			
<i>Select one of the following courses:</i>			
A 140	Technology in Agriculture	3	
BD 150	Business Computing Concepts and Applications	3	
CS 110	Personal Computing	4	
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
H 221	Landscape Plants	4	
H 487	Internship	3	
MC 261	Construction Surveying (MC 131 or ID 166, M CC 125 or M CC 160)	3	
SC 240	Introductory Soil Sciences (C CC 107 or C CC 111)	4	
SPCC 200	Public Speaking	3	2A1
	Arts/humanities ³	3	3B
	Logical/critical thinking ⁴	3	2B
	TOTAL	30-31	
JUNIOR			
<i>Select one course from the following:</i>			
AUCC 101	Self/Community in American Culture Since 1877	3	3D, 3F
HYCC 150	U.S. History to 1876	3	3D, 3F
HYCC 151	U.S. History Since 1876	3	3D, 3F
NRCC 320	Natural Resources History and Policy	3	3D, 3F
BZ 440	Plant Physiology (BZCC 120 or LS 103; C 245 or concurrent reg.)	3	
H 321	Nursery Production and Management (H CC 100)	4	4A
H 341	Turfgrass Management (H CC 100)	3	
H 464	Arboriculture and Urban Plant Management (H CC 100, SC 240)	3	
BI 361	Elements of Plant Pathology (BZCC 104 or BZCC 120 or H CC 100 or LSCC 102)	3	
SC 350	Soil Fertility Management (SC 240)	3	
	Electives	8	

Course	Title (Prerequisite)	Cr	AUCC
TOTAL		30	
SENIOR			
BN 305	Fundamentals of Management	3	
BI 302	Applied and General Entomology	2	
BI 303B	Horticultural Entomology Laboratory (BI 302 or concurrent reg.)	1	
BI 308	Biology and Control of Weeds (BZCC 120 or LS 103; C CC 107 or C CC 111)	4	4B
H 367	Landscape Irrigation	3	
H 441	Turfgrass Science (BZCC 120, H 341, SC 240)	3	4C
H 465	Landscape Estimating (3 credits of math)	3	
	Electives ⁵	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 3G in the AUCC.

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

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

⁵ 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			
H CC 100	Horticultural Science (high school biology)	4	3A
H 260	Plant Propagation (H CC 100)	4	
	TOTAL	8	
UPPER DIVISION			
H 310	Greenhouse Management	4	
<i>Select two courses from the following for a minimum of seven credits:</i>			
H 401	Medicinal and Value-Added Uses of Plants (BZCC 120 or H CC 100; C CC 107 and C CC 108)	3	
H 412	Floriculture Crops (H 310)	4	
H 450A-D	Horticulture Food Crops (one plant science course)	1-4	
H 460/SC 460*	Plant Breeding (SC 330)	3	
H 475*	Environmental Requirements of Horticultural Plants (BZ 440)	3	
H 454	Horticulture Crop Production and Management (H 310 or H 450A-B)	2	
	TOTAL	13-14	
PROGRAM TOTAL = 21-22 credits without prerequisites			

*Additional course work may be required because of prerequisites.

Minor in Landscape Horticulture

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
H CC 100	Horticultural Science (high school biology)	4	3A
H 221	Landscape Plants	4	
	TOTAL	8	

Course	Title (Prerequisite)	Cr	AUCC
UPPER DIVISION			
H 341	Turfgrass Management (H CC 100)	3	
H 464*	Arboriculture and Urban Plant Management (H CC 100, SC 240)	3	
----- <i>Select a minimum of seven credits (six must be upper division) from the following:</i>			
H 260	Plant Propagation (H CC 100)	4	
H 321	Nursery Production and Management (H CC 100)	4	
H 322	Herbaceous Plants (one course in botany or biological science or horticulture)	3	
H 331	Landscape Design	2	
H 441*	Turfgrass Science (BZCC 120, H 341, SC 240)	3	
LA 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. A description of the programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF SOIL AND CROP SCIENCES

Office in Plant Science Building, C127
(970) 491-6517
www.colostate.edu/Depts/SoilCrop

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, and fiber 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.

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			
A 192A-B	Orientation to Agricultural Systems	2	
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
EACC 202	Agricultural and Resource Economics	3	3C
----- OR			
EACC or ECCC elective ¹			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B

Course	Title (Prerequisite)	Cr	AUCC
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
PHCC 110	Descriptive Physics	3	3A
SC 100	General Crops	4	
	Biology electives ²	4	
	Electives	2	
	TOTAL	29	
SOPHOMORE			
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent reg.)	1	
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
SPCC 200	Public Speaking	3	2A1
	Arts/humanities ³	3	3B
	Global and cultural awareness ⁴	3	3E
	Health and Wellness ⁵	2	3G
	U.S. public values and institutions ⁶	3	3F
	Biology elective ²	3	
	Electives	1-5	
	TOTAL	27-31	
JUNIOR			
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
SC 330	Principles of Genetics (BZCC 110 or BZCC 120 or LSCC 102)	3	
	Historical perspectives ⁷	3	3D
	Soil and crop science electives ⁸	6	
	Statistics ⁹	3	2B
	Technical electives ¹⁰	6	
	Electives	6	
	TOTAL	30	
SENIOR			
<i>Select from the following courses:</i>			
BZ 440	Plant Physiology (BZCC 120 or LS 103; C 245 or concurrent reg.)	3	
AND			
BZ 441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
OR			
G CC 120	Exploring Earth-Physical Geology	3	3A
<i>Select four credits from the following:</i>			
SC 421	Crop and Soil Management Systems II (H CC 100 or SC 100, SC 240)	4	4A, 4B, 4C
SC 478	Environmental Soil Sciences (SC 470, SC 467 or concurrent registration; or written consent of instructor)	3	4A, 4B, 4C
AND			
SC 479	Environmental Soil Science Laboratory (SC 478 or concurrent registration)	1	4A, 4B, 4C
SC 492	Seminar	1	4A
	Soil and crop science electives ⁸	5	
	Technical electives ¹⁰	12	
	Electives	3-9	
	TOTAL	30-34	
PROGRAM TOTAL = 120 credits			

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

² Select after consultation with adviser.

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

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

⁵ Select from the list of courses in category 3G in the AUCC.

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

⁷ Select from the list of courses in category 3D in the AUCC.

⁸ Select course(s) with SC prefix.

⁹ Select a statistics course from the list of courses in category 2B in the AUCC.

¹⁰ Select from the Colleges of Agricultural Sciences, Business, Engineering, Natural Resources, Natural Sciences, and/or Veterinary Medicine and Biological 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
FRESHMAN			
A 192A-B	Orientation to Agricultural Systems ¹	2	
BZCC 120	Principles of Plant Biology	4	3A
<i>Select one of the following sets of courses:</i>			
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent reg.)	1	3A
OR			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
EACC 202	Agricultural and Resource Economics	3	3C
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
SC 100	General Crops	4	
	Health and wellness ²	2	3G
	Historical perspectives ³	3	3D
	TOTAL	29-33	
SOPHOMORE			
BA 205	Fundamentals of Accounting	3	
OR			
EA 205	Farm and Ranch Management (EACC 202 or ECCC 202)	3	
BY 220	Fundamentals of Ecology (one course in biology; M CC 124 or M CC 141 or M CC 155 or M CC 160)	3	
PHCC 110	Descriptive Physics	3	3A
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
SPCC 200	Public Speaking	3	2A1
	Agricultural economics/business ⁴	3	
	Arts/humanities ⁵	3	3B
	Global and cultural awareness ⁶	3	3E
	U.S. public values and institutions ⁷	3	3F
	Elective	3	
	TOTAL	31	

College of Agricultural Sciences

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
BZ 440	Plant Physiology (BZCC 120 or LSCC 103; C 245 or concurrent reg.)	3	
BZ 441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent reg.)	1	
JTCC 300	Professional and Technical communication (COCC 150)	3	2A2
SC 330	Principles of Genetics (BZCC 110 or BZCC 120 or LSCC 102)	3	
SC 350	Soil Fertility Management (SC 240)	3	
SC 351	Soil Fertility Laboratory (SC 350 or concurrent reg.)	1	
SC 370	Irrigation Principles and Management (H CC 100 or SC 100, SC 240)	3	
SC 420	Crop and Soil Management Systems I (H CC 100 or SC 100, SC 240)	3	
----- <i>Select one course from the following:</i>			
STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
STCC 307/ EHCC 307	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B
Electives		1	
TOTAL		30	
SENIOR			
----- <i>Select three courses from the following:</i>			
BZ 223	Plant Identification (BZCC 120 or LS 103)	3	
BI 302	Applied and General Entomology	2	
AND			
BI 303C	Agricultural Entomology Laboratory (BI 302 or concurrent reg.)	1	
BI 361	Elements of Plant Pathology (BZCC 104 or BZCC 120 or H CC 100 or LSCC 102)	3	
BI 308	Biology and Control of Weeds (BZCC 120 or LS 103; C CC 107 or C CC 111)	4	
----- <i>Select three credits from the following:</i>			
SC 446	Physiology of Seeds (BZ 440)	2	
SC 200	Seed Anatomy and Identification (one course in biology or SC 100 or H CC 100 or written consent of instructor)	1	
SC 201	Seed Development and Metabolism (one course in biology or SC 100 or H CC 100 or written consent of instructor)	1	
SC 310	Agronomic Plant and Seed Identification (SC 100, H CC 100 or one course in biology)	2	
----- <i>Select three courses from the following:</i>			
SC 304	Seed Production, Conditioning and Marketing (SC 100)	3	
SC 320/ RS 320	Forage and Range Management (one course in biological sciences)	3	
SC 322	Principles of Microclimatology (BY 220 or NR 220; PHCC 141)	3	
SC 377/ CE 377	Geographic Information Systems in Agriculture (CS 110)	3	
SC 414	Agricultural Experimental Design (STCC 201 or STCC 301)	3	
SC 440	Pedology (SC 240)	4	
SC 460/ H 460	Plant Breeding (SC 330)	3	
SC 421	Crop and Soil Management Systems II (H CC 100 or SC 100, SC 240)	4	4A,4B,4C
SC 492	Seminar	1	4A
Electives		2-4	
TOTAL		30	

Course	Title (Prerequisite)	Cr	AUCC
PROGRAM TOTAL = 120-124 credits			

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

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			
A 192A-B	Orientation to Agricultural Systems	2	
AN 101	Food Animal Sciences	4	
OR			
AN 102	Introduction to Equine Science	4	
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
SC 100	General Crops	4	
STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
Health and wellness ¹		2	3G
TOTAL		34	
SOPHOMORE			
A 140	Technology in Agriculture	3	
A 300	Issues in Agriculture	2	
BI 302	Applied and General Entomology	2	
EACC 202	Agricultural and Resource Economics	3	3C
EA 205	Farm and Ranch Management (EACC 202 or EACC 202)	3	
JTCC 100	Introduction to Mass Media	3	3C, 3F
PYCC 100	General Psychology	3	3C
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
SPCC 200	Public Speaking	3	2A1
Arts/humanities ²		3	3B
TOTAL		29	

Course	Title (Prerequisite)	Cr	AUCC	Course	Title (Prerequisite)	Cr	AUCC
JUNIOR				C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
A 320A-F	Computer Applications in Agriculture (A 140 or BD 150 or CS 110)	2		C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent reg.)	1	
AT 150	Science of Weather and Climate (high school algebra; high school chemistry or physics)	2		COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
AT 151	Weather and Climate Laboratory (AT 150 or concurrent reg.)	1		EACC 240/ ECCC 240 LSCC 102	Issues in Environmental Economics	3	3F
EA 305	Agricultural and Resource Enterprise Analysis (EACC 202 or ECCC 202)	3		M CC 141	Attributes of Living Systems (high school chemistry)	4	3A
EA 310	Agricultural Marketing (EACC 202 or ECCC 202)	3		M CC 141	Calculus in Management Sciences (M CC 118 or M CC 121)	3	1B
NR 220	Natural Resources Ecology and Measurements (BZCC 120 or LS 103; M CC 121)	5		SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
PHCC 110	Descriptive Physics	3	3A		Arts/humanities ¹	3	3B
SC 322	Principles of Microclimatology (BY 220 or NR 220; PHCC 141)	3			Health and wellness ²	2	3G
	Historical perspectives ³	3	3D		TOTAL	33	
	Electives	5		SOPHOMORE			
	TOTAL	29		BY 220	Fundamentals of Ecology (one course in biology; M CC 124 or M CC 141 or M CC 155 or M CC 160)	3	
SENIOR				G CC 120	Exploring Earth-Physical Geology	3	3A
A 346	Principles of Cooperative Extension	3		G CC 121	Introductory Geology Laboratory (G CC 120 or G CC 122 or G CC 124 or concurrent registration in G CC 120 or G CC 122 or G CC 124)	1	3A
A 487	Internship (A 346)	4	4A, 4B	M CC 125	Numerical Trigonometry (M CC 118 or M CC 121 or placement)	1	1B
A 492A	Seminar-Agricultural Extension Education (A 3546; concurrent reg. in A 487)	1	4C	PHCC 121	General Physics I (concurrent reg. in M CC 125)	5	3A
CE 204/ EV 204	Agricultural and Environmental Measurements (PHCC 110 or PHCC 141)	3		PHCC 122	General Physics II (PHCC 121)	5	3A
CE 425	Soil and Water Engineering (CE 300 or CH 331 or SC 240)	4		SC 350	Soil Fertility Management (SC 240)	3	
EA 328	Small Agribusiness Management (EACC 202 or ECCC 202)	3		SC 351	Soil Fertility Laboratory (SC 350 or concurrent reg.)	1	
EA 478	Agricultural Policy (EACC 202 or ECCC 202 or EACC 240 or ECCC 240)	3		SPCC 200	Public Speaking	3	2A1
SC 377/ CE 377	Geographic Information Systems in Agriculture (CS 110)	3		STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
	Global and cultural awareness ⁴	3	3E		OR		
	TOTAL	27		STCC 307/ EHCC 307	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B
PROGRAM TOTAL = 120 credits					Global and cultural awareness ⁴	3	3E
					TOTAL	31	

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

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

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 and extensive understanding of science and math.

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			
A 192A-B	Orientation to Agricultural Systems	2	
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent reg.)	1	3A

JUNIOR			
<i>Select one of the following sets of courses:</i>			
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent reg.)	1	
OR			
C 345	Organic Chemistry I (C 113, C 114)	4	
C 346	Organic Chemistry II (C 345)	4	
C 331	Quantitative Analysis (C 113)	3	
C 334	Quantitative Analysis Laboratory (C 114; C 331 or concurrent reg.)	1	
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
MB 300	General Microbiology (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 345 or concurrent reg.)	3	
SC 440	Pedology (SC 240)	4	
SC 467	Soil Chemistry (C 331, SC 240)	3	
	Historical perspectives ⁴	3	3D
	Social/behavioral sciences ⁵	3	3C
	Technical electives ⁶	4	
	TOTAL	32-	
		35	
SENIOR			
<i>Select one of the following courses:</i>			
BC 301	Survey of Biochemistry (C 245)	3	
BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent reg. in C 346)	4	
BZ 440	Plant Physiology (BZCC 120 or LS 103; C 245 or concurrent reg.)	3	
SC 455	Soil Microbiology (MB 300 or SC 240)	3	

College of Agricultural Sciences

Course	Title (Prerequisite)	Cr	AUCC
SC 456	Soil Microbiology Laboratory (SC 455 or concurrent reg.)	1	
SC 470	Soil Physics (SC 240)	3	
SC 471	Soil Physics Laboratory (SC 470 or concurrent reg.)	1	
SC 478	Environmental Soil Sciences (SC 470, SC 467 or concurrent reg.; or written consent of instructor)	3	4A 4B, 4C
SC 479	Environmental Soil Science Laboratory (SC 478 or concurrent reg.)	1	4A, 4B, 4C
SC 492	Seminar	1	4A
	Technical electives ⁶	6	
	Electives	1-2	
	TOTAL	24	

PROGRAM TOTAL = 120-123 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 3G in the AUCC.

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

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

⁵ Select from the list of courses in category 3C in the AUCC.

⁶ Select from departmental list.

International Soil and Crop Sciences Concentration

International soil and crop sciences prepares students to work in developing nations by giving them technical soil and crop science skills along with education in the political, social, and cultural aspects of countries they may work in. Scientists design appropriate practices that can succeed under a variety of climatic and socioeconomic constraints. Many research opportunities are available. Students may work with the Peace Corps or other agencies in demonstration and extension positions in developing countries.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A 192A-B	Orientation to Agricultural Systems	2	
BZCC 120	Principles of Plant Biology	4	3A
<i>Select one of the following sets of courses:</i>			
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent reg.)	1	3A
OR			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
EACC 202	Agricultural and Resource Economics	3	3C
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
SC 100	General Crops	4	
	Health and wellness ¹	2	3G

Course	Title (Prerequisite)	Cr	AUCC
Electives		1-4	
TOTAL		30-31	
SOPHOMORE			
A CC 270/IECC 270A	World Interdependence-Population and Food	3	3E
BY 220	Fundamentals of Ecology (one course in biology; M CC 124 or M CC 141 or M CC 155 or M CC 160)	3	
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent reg.)	1	
ECCC 204	Principles of Macroeconomics (ECCC 202 or EACC 202)	3	3F
PHCC 110	Descriptive Physics	3	3A
POCC 131	Current World Problems	3	3D or 3E
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
SPCC 200	Public Speaking	3	2A1
	Arts/humanities ²	3	3B
TOTAL		30	

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
BZ 440	Plant Physiology (BZCC 120 or LS 103; C 245 or concurrent reg.)	3	
BZ 441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
PO 332/EC 332	International Political Economy (EACC 202 or ECCC 202 and POCC 232)	3	

<i>Select one of the following courses:</i>			
S 341	Sociology of Rural Life (S CC 100 or S CC 105)	3	
S 364	Agricultural and Global Society (S CC 100 or S CC 105)	3	
S 366	Peoples and Institutions of Latin America (S CC 100 or S CC 105)	3	

SC 330	Principles of Genetics (BZCC 110 or BZCC 120 or LS CC 102)	3	
SC 350	Soil Fertility Management (SC 240)	3	
SC 351	Soil Fertility Laboratory (SC 350 or concurrent reg.)	1	
SC 420	Crop and Soil Management Systems I (H CC 100 or SC 100, SC 240)	3	

<i>Select one course from the following:</i>			
STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
STCC 307/EHCC 307	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B
Electives		3	
TOTAL		30	

SENIOR			
EA 460	Economics of World Agriculture (EACC 202 or ECCC 202)	3	
OR			
EC 460	Economic Development (EC 304)	3	

<i>Select two courses from the following:</i>			
BI 302	Applied and General Entomology	2	

AND			
BI 303C	Agricultural Entomology Laboratory (BI 302 or concurrent reg.)	1	
BI 361	Elements of Plant Pathology (BZCC 104 or BZCC 120 or H CC 100 or LS CC 102)	3	
BI 308	Biology and Control of Weeds (BZCC 120 or LS 103; C CC 107 or C CC 111)	4	

<i>Select two courses from the following:</i>			
SC 304	Seed Production, Conditioning and Marketing (SC 100)	3	
SC 320/RS 320	Forage and Range Management (one course in biological sciences)	3	
SC 322	Principles of Microclimatology (BY 220 or NR 220; PHCC 141)	3	
SC 377/CE 377	Geographic Information Systems in Agriculture (CS 110)	3	

Course	Title (Prerequisite)	Cr	AUCC
SC 440	Pedology (SC 240)	4	
SC 460/ H 460	Plant Breeding (SC 330)	3	
SC 370	Irrigation Principles and Management (H CC 100 or SC 100, SC 240)	3	
SC 421	Crop and Soil Management Systems II (H CC 100 or SC 100, SC 240)	4	4A, 4B, 4C
SC 475	Tropical Soils, Crops, and Farming Systems	3	
SC 492	Seminar	1	4A
	Electives	2-3	
	TOTAL	29-30	

PROGRAM TOTAL = 120 credits

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

² Select from the list of courses in category 3B 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.

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 A 140, is considered a review course; previous background in computers is expected. If a computer course is needed, A 140 must be taken as a free elective.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A 192A-B	Orientation to Agricultural Systems	2	
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
M CC 125	Numerical Trigonometry (M CC 118 or M CC 121 or placement)	1	1B
M CC 126	Analytic Trigonometry (M CC 125 or placement)	1	1B
M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
SC 100	General Crops	4	
	TOTAL	33	

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
A CC 116/ IECC 116	Plants and Civilization	3	3E
OR			
A CC 270/ IECC 270A	World Interdependence-Population and Food	3	3E
BY 310	Cell Biology (one semester of organic chemistry or concurrent reg.; two semesters of introductory biology)	4	
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent reg.)	1	
EACC 202	Agricultural and Resource Economics	3	3C
PHCC 110	Descriptive Physics	3	3A
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
SPCC 200	Public Speaking	3	2A1
	Arts/humanities ¹	3	3B
	Health and wellness ²	2	3G
	Historical perspectives ³	3	3D
	U.S. public values and institutions ⁴	(3)	3F
	TOTAL	33	
JUNIOR			
BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent reg. in C 346)	4	
<i>Select nine credits from the following courses:</i>			
BC 352	Principles of Biochemistry Laboratory (BC 351 or BC 401 or concurrent reg., two credits of college chemistry laboratory)	1	
BC 463	Molecular Genetics (BC 401 or concurrent reg. or BC 351; LSCC 201B)	3	
BZ 331	Developmental Plant Anatomy (BZCC 120 or LS 103; C 245 or C 346; BZ 350 or concurrent reg.)	4	
BZ 346	Population and Evolutionary Genetics (BZ 220, M CC 155, STCC 301 or STCC 307 or EHCC 307)	3	
BZ 402	Chromosomes of Eukaryotes (BY 310)	4	
BZ 476	Topics in Advanced Genetics (BZ 350 or SC 330)	3	
H 450A	Horticulture Food Crops-Cool Season Vegetable Production (one plant science course)	1	
H 450B	Horticulture Food Crops-Warm Season Vegetable Production (one plant science course)	1	
H 450C	Horticulture Food Crops-Small Fruit Production (one plant science course)	1	
H 450D	Horticulture Food Crops-Tree Fruit Production (one plant science course)	1	
H 454	Horticulture Crop Production and Management (H 310 or H 450A-B)	2	
MB 300	General Microbiology (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 341 or concurrent reg.)	3	
MB 450	Microbial Genetics (MB 300; BC 351 or BC 401 or concurrent reg.)	3	
SC 414	Agricultural Experimental Design (STCC 201 or STCC 301)	3	
BZ 440	Plant Physiology (BZCC 120 or LS 103; C 245 or concurrent reg.)	3	
BZ 441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
<i>Select two courses from the following:</i>			
BI 302	Applied and General Entomology	2	
AND			
BI 303C	Agricultural Entomology Laboratory (BI 302 or concurrent reg.)	1	
BI 361	Elements of Plant Pathology (BZCC 104 or BZCC 120 or H CC 100 or LSCC 102)	3	
BI 308	Biology and Control of Weeds (BZCC 120 or LS 103; C CC 107 or C CC 111)	4	

College of Agricultural Sciences

Course	Title (Prerequisite)	Cr	AUCC
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
SC 330	Principles of Genetics (BZCC 110 or BZCC 120 or LSOC 102)	3	
SC 331	Genetics Laboratory (SC 330 or concurrent reg.)	1	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
STCC 307/ EHCC 307	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B
OR			
	TOTAL	34-35	

SENIOR

SC 430	Applications of Plant Biotechnology (SC 330)	3	4A, 4B, 4C
SC 460/ H 460	Plant Breeding (SC 330)	3	4A, 4B, 4C
SC 461/ H 461	Plant Breeding Laboratory (SC 460/H 460 or concurrent reg.)	1	4A, 4B, 4C
SC 492	Seminar	1	4A
	Soil and crop electives	8	
	Electives	3-7	
	TOTAL	19-23	

PROGRAM TOTAL = 120-123 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 3G in the AUCC.

³ Select from the list of courses in category 3D in the AUCC. The course selected for category 3D should also be listed in category 3F.

⁴ Select from the list of courses in category 3F in the AUCC. The course selected for category 3F should also be listed in category 3D.

Soil Resources and Conservation Concentration

Soil resources and conservation graduate provide technical assistance to farmers, ranchers, state and local governments, and others concerned with the conservation of soil, water, and related natural resources. Emphasis is on interpretations of land sustainability for agricultural, urban, industrial, and recreational land uses, waste disposal, water management systems, and ecological purposes. Specialists develop programs designed to obtain the most productive use of land while minimizing or mitigating damages. Others help landowners and managers develop management practices to combat erosion. Students are prepared for careers in environmental consulting, government conservation and resource management agencies, farm management, and municipal soil and water resource management agencies.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A 192A-B	Orientation to Agricultural Systems	2	
BZCC 120	Principles of Plant Biology	4	3A
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
EACC 202	Agricultural and Resource Economics	3	3C
ECCC 204	Principles of Macroeconomics (ECCC 202 or EACC 202)	3	3F

Course	Title (Prerequisite)	Cr	AUCC
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
MBCC 149	The Microbial World	3	3G
OR			
MB 300	General Microbiology (BZCC 110 or BZCC 120 or LSOC 102; C 245 or C 345 or concurrent reg.)	3	
SC 100	General Crops	4	
	TOTAL	34	
SOPHOMORE			
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
G CC 120	Exploring Earth: Physical Geology	3	3A
G CC 121	Introductory Geology Laboratory (G CC 120 or G CC 122 or G CC 124 or concurrent registration in G CC 120 or G CC 122 or G CC 124)	1	3A
PHCC 110	Descriptive Physics	3	3A
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
SPCC 200	Public Speaking	3	2A1
	Arts/humanities ¹	3	3B
	Global and cultural awareness ²	3	3E
	U.S. Public values and institutions ³	3	3F
	TOTAL	27	

JUNIOR

SC 320/ RS 320	Forage and Range Management (one course in biological sciences)	3	
SC 330	Principles of Genetics (BZCC 110 or BZCC 120 or LSOC 102)	3	
SC 350	Soil Fertility Management (SC 240)	3	
SC 351	Soil Fertility Laboratory (SC 350 or concurrent reg.)	1	
SC 370	Irrigation Principles and Management (H CC 100 or SC 100, SC 240)	3	
SC 420	Crop and Soil Management Systems I (H CC 100 or SC 100, SC 240)	3	
SC 440	Pedology (SC 240)	4	
<i>Select one of the following courses:</i>			
STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
STCC 307/ EHCC 307	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B
	Health and wellness ⁴	2	3G
	Historical perspectives ⁵	(3)	3D
	TOTAL	25	

SENIOR

BZ 440	Plant Physiology (BZCC 120 or LS 103; C 245 or concurrent reg.)	3	
BZ 441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
G 454	Geomorphology (G CC 120 or G 150 or GR 210; M CC 155 or M CC 160)	4	
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
SC 421	Crop and Soil Management Systems II (H CC 100 or SC 100, SC 240)	4	4A, 4B, 4C
SC 470	Soil Physics (SC 240)	3	
SC 492	Seminar	1	4A
	Electives	14	
	TOTAL	34	

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 3F in the AUCC. The course selected should also count for category 3D.

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

⁵ Select from the list of courses in category 3D in the AUCC. The course selected should also count for category 3F.

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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LOWER DIVISION			
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
UPPER DIVISION			
BZ 440*	Plant Physiology (BZCC 120 or LS 103; C 245 or concurrent reg.)	3	
G 454*	Geomorphology (G CC 120 or G 150 or GR 210; M CC 155 or M CC 160)	4	
<i>Select one course from the following:</i>			
SC 320/ RS 320	Forage and Range Management (one course in biological sciences)	3	
SC 370*	Irrigation Principles and Management (H CC 100 or SC 100, SC 240)	3	
SC 420*	Crop and Soil Management Systems I (H CC 100 or SC 100, SC 240)	3	
SC 455	Soil Microbiology (MB 300 or SC 240)	3	
SC 350	Soil Fertility Management (SC 240)	3	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
SC 351	Soil Fertility Laboratory (SC 350 or concurrent reg.)	1	
SC 421*	Crop and Soil Management Systems II (H CC 100 or SC 100, SC 240)	4	
SC 440	Pedology (SC 240)	4	
SC 442	Forest and Range Soils (SC 240)	3	
SC 467*	Soil Chemistry (C 331, SC 240)	3	
OR			
SC 470	Soil Physics (SC 240)	3	
AND			
SC 471	Soil Physics Laboratory (SC 470 or concurrent reg.)	1	
			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

Programs in crop science, soil science, or plant genetics lead to master of science and doctor of philosophy degrees. A description of these programs may be found in the *Graduate and Professional Bulletin*.

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

College of Applied Human Sciences

Office in Gibbons Building, Room 204
(970) 491-6331
www.caahs.colostate.edu

Professor April Mason, Dean
Professor Antigone Kotsiopulos, Associate Dean

TEACHER LICENSURE

UNDERGRADUATE MAJORS

Apparel and Merchandising
Construction Management
Consumer and Family Studies
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 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 which 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.caahs.colostate.edu>.

The College of Applied Human Sciences is the only unit of higher education in Colorado offering a degree and teacher licensure in consumer and family studies. Undergraduate students may complete either the consumer and family studies concentration or the consumer and family studies 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, consumer and family studies, human services, management, or natural sciences and technology.

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/us/studyabroad>.

INTERDEPARTMENTAL MAJOR

Major in Consumer and Family Studies

*Office in Education Building, Room 203 or Room 227
(970) 491-5319 or 491-5141
<http://www.caahs.colostate.edu/cfs/>*

Carole Makela and Dawn Mallette

Consumer and family studies 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. Consumer and family studies 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 consumer and family studies 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 consumer and family studies concentration or the consumer and family studies 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 consumer and family studies 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 consumer and family studies (Design and Merchandising, Food Science and Human Nutrition, and Human Development and Family Studies).

Consumer and Family Studies Concentration

The consumer and family studies 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			
AR 101	Visual Form	3	
<i>Select one pair of courses from the following:</i>			
C CC 103	Chemistry in Context	3	3A
C CC 104	Chemistry in Context Laboratory (C CC 103 or concurrent reg.)	1	3A
OR			
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent reg.)	1	3A
CF 179	Introduction to Consumer and Family Studies	2	
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
DM 120	Textiles	3	
FNCC 150	Survey of Human Nutrition	3	3G
HDCC 101	Individual and Family Development	3	3C
<i>Select one of the following courses:</i>			
M CC 130	Math in the Social Sciences (math placement exam)	3	1B
M CC 133	Financial Mathematics (math placement exam)	3	1B
M CC 135	Patterns of Phenomena I (math placement exam)	3	1B
PYCC 100	General Psychology	3	3C
	Elective	2	
	TOTAL	29-30	
SOPHOMORE			
BD 150	Business Computing Concepts and Applications	3	
OR			
CS 110	Personal Computing	4	
BZCC 101	Humans and Other Animals	3	3A
OR			
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
DM 272	Consumers in the Marketplace	3	
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
EXCC 145	Health and Wellness	3	3G
S CC 100	General Sociology	3	3C, 3F
SPCC 200	Public Speaking	3	2A1
	Arts/humanities ¹	3	3B
	Consumer and family studies ²	3	

Course	Title (Prerequisite)	Cr	AUCC
	Elective	3	
	TOTAL	30-32	
JUNIOR			
DM 320	Finance-Personal and Family	3	
FN 300	Food Principles and Applications (C CC 107, FNCC 150)	3	
FN 301	Food Principles and Applications Laboratory (FN 300 or concurrent reg.)	2	
<i>Select one course from the following:</i>			
HD 310	Infant and Child Development in Context (HDCC 101 or PYCC 100)	3	
HD 311	Adolescent/Early Adult Development in Context (HDCC 101)	3	
HD 312	Adult Development-Middle Age and Aging (HDCC 101 or PYCC 100 or S CC 100)	3	
HSCC 300	Research in Applied Professions	3	2B
	AM/DM elective	3	
	FN, FT, RM elective	3	
	Consumer and family studies elective ²	3	
	Historical perspectives ³	3	3D
	Support career objective-elective ⁴	3	
	TOTAL	29	
SENIOR			
CF 479	Colloquium-Consumer and Family Studies (CF 179 or written consent of instructor)	2	4A, 4C
HD 302	Marriage and Family Relationships (PYCC 100 or S CC 100)	3	
HD 334	Parenting Across the Lifespan (HDCC 101 or HD 310)	3	4B
HD 402	Family Studies (HDCC 101)	3	
HD 403	Families in the Legal Environment	3	
	Global and cultural awareness ⁵	3	3E
	Consumer and family studies ²	12	
	Support career objective-electives ⁴	2-3	
	TOTAL	31-32	

PROGRAM TOTAL = 120-122 credits

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

² Select courses with prefixes AM, CF, DM FN, FT, HD, ID, or RM. Keep in mind the requirement of 42 upper-division credits when choosing these courses.

³ Select from the list of courses in category 3D in the AUCC. AUCC 100 and POCC 131 are recommended.

⁴ Select courses to enhance knowledge and skill in chosen career area.

⁵ Select from the list of courses in category 3E in the AUCC. AMCC 250 is suggested but not required.

Consumer and Family Studies Education Concentration

Consumer and family studies education directly addresses the needs of youth, families, and consumers. Helping to shape the future, teachers of consumer and family studies 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 consumer and family studies 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. Students are assigned for 15 weeks to both 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

consumer and family studies mentor teacher(s) and a university professor(s).

Students completing the program meet the requirements for the bachelor of science degree in consumer and family studies, a Colorado Teaching License in Consumer and Family Studies, and a Consumer and Family Studies Vocational Credential.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one pair of courses from the following:</i>			
C CC 103	Chemistry in Context	3	3A
C CC 104	Chemistry in Context Laboratory (C CC 103 or concurrent reg.)	1	3A
OR			
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent reg.)	1	3A
CF 179	Introduction to Consumer and Family Studies	2	
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
<i>Select one of the following courses:</i>			
HS 192	Applied Human Sciences First Year Seminar	2	
PL 192	Conceptions of the Good Life	3	
S 192	Civic Culture and Social Responsibility	3	
EXCC 145	Health and Wellness	3	3G
FNCC 150	Survey of Human Nutrition	3	
HDCC 101	Individual and Family Development	3	
<i>Select one of the following courses:</i>			
M CC 130	Math in the Social Sciences (math placement exam)	3	1B
M CC 133	Financial Mathematics (math placement exam)	3	1B
M CC 135	Patterns of Phenomena I (math placement exam)	3	1B
PYCC 100	General Psychology	3	3C
	Arts/humanities ¹	3	3B
	TOTAL	29-31	
SOPHOMORE			
AM 101	Fashion Industries	3	
AMCC 250	Clothing, Adornment and Human Behavior	3	3E
DM 272	Consumers in the Marketplace	3	
EC	Economics	3	
HD 310	Infant and Child Development in Context (HDCC 101 and PYCC 100)	3	
AM 130	Design Appreciation-Apparel and Merchandising	3	
OR			
ID 129	Introduction to Interior Design	3	
SPCC 200	Public Speaking	3	2A1
	Biological/physical sciences ²	3	3A
	Consumer and family studies electives ³	3	
	Historical perspectives ⁴	3	3D
	TOTAL	30	
JUNIOR			
DM 320	Finance-Personal and Family	3	
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology and Assessment (Completion of Phase I courses; BD 150 or CS 110 within three years or computer proficiency test; consent of Teacher Licensure Office)	2	
ED 340	Literacy and the Learner (completion of 30 credits of course work. Required background check through CDE, CBI, FBI.)	3	
ED 350	Instruction I-Individualization/Management (EDCC 275, ED 340, concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	

Course	Title (Prerequisite)	Cr	AUCC
ED 386	Practicum-Instruction I (EDCC 275, ED 340; concurrent reg. in ED 350; admission to Teacher Licensure Program)	1	
FN 300	Food Principles and Applications (C CC 107, FNCC 150)	3	
FN 301	Food Principles and Applications Laboratory (FN 300 or concurrent reg.)	2	
HD 302	Marriage and Family Relationships (PYCC 100, S CC 100)	3	
HD 311	Adolescent/Early Adult Development in Context (HDCC 101)	3	
HSCC 300	Research in Applied Professions	3	2B
	Consumer and family studies electives ³	3-4	
	TOTAL	32-33	
SENIOR			
CF 479	Colloquium-Consumer and Family Studies (CF 179 or written consent of instructor)	2	4A
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. in ED 486J)	4	
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
ED 493B	Seminar-Assessment of Learning (ED 426 or ED 450; VE 451; concurrent reg. in ED 485A or B or C or VE 485)	1	4B
HD 334	Parenting Across the Lifespan (HDCC 101 or HD 310)	3	
HD 403	Families in the Legal Environment	3	
VE 451	Methods-Consumer and Family Studies Education (concurrent reg. in ED 450)	4	
VE 485	Student Teaching (ED 450, VE 451)	11	4C
VE 492	Seminar-Professional Relations (ED 450, VE 451; concurrent reg. in ED 485A or B or VE 485)	1	4C
	TOTAL	30	
PROGRAM TOTAL = 122-123 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 3A in the AUCC.

³ Select courses with prefixes AM, CF, DM, FN, FT, HD, ID, or RM.

⁴ Select from consumer and family studies' list of recommended courses.

This concentration is accredited and approved by the Colorado Commission on Higher Education (CCHE) and the Colorado Board 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://teachered.colostate.edu/>) or in room 111 of the Education Building.

DEPARTMENT OF CONSTRUCTION MANAGEMENT

Office in Guggenheim Hall, Room 102
(970) 491-7353
www.caahs.colostate.edu/mtcm/

Professor Larry Grosse, Head
Professor Mostafa Khattab, Graduate and Undergraduate
Coordinator

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 4,000 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 2.3 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 organization. The PPO also assist graduating students and alumni with in-house interviews, an annual career fair, and the publication of a graduate resume book. Additionally, JOBS OnLine 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			
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
----- <i>Select one of the following courses:</i>			
G CC 120	Exploring Earth: Physical Geology	3	3A
G CC 122	The Blue Planet: Geology of Our Environment	3	3A
G CC 124	Geology of Natural Resources	3	3A
M CC 117	College Algebra in Context I (Math Placement Exam)	1	1B
M CC 118	College Algebra in Context II (M CC 117)	1	1B
M CC 125	Numerical Trigonometry (M CC 118 or M CC 121 or placement)	1	1B
MC 110	Team Problem Solving and Leadership	3	
MC 131	Graphic Communications/CAD	3	
MC 151	Construction Materials and Methods	3	
MC 251	Materials Processing and Testing (MC 151)	3	
	Arts/humanities ¹	3	3B
	Health and wellness ²	2	3G
	Historical perspectives ³	3	3D
	TOTAL	29	
SOPHOMORE			
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
M CC 141	Calculus in Management Sciences (M CC 118 or M CC 121)	3	1B
MC 241	Energy Controls for Industry	3	
MC 261	Construction Surveying (MC 131 or ID 166, M CC 125 or M CC 160)	3	
MC 363	Plan Reading for Estimating (MC 131, MC 151, MC 261 or concurrent registration)	3	
MC 364	Advanced Construction Systems (MC 151, MC 261 or concurrent registration OR MC 363 or concurrent registration)	3	
MC 366	Construction Equipment and Methods (MC 261)	3	
PHCC 121	General Physics I (concurrent registration in M CC 125)	5	3A
SPCC 200	Public Speaking	3	2A1
	TOTAL	29	
JUNIOR			
BA 205	Fundamentals of Accounting	3	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
CE 359	Basics of Statics and Strength of Materials (M CC 125, M CC 141; PHCC 110 or PHCC 121 or PHCC 141)	3	
F 432	Design of Wood Structures (CE 360)	3	
MC 267	Construction Management Pre-Internship	1	
MC 317	Safety Management	2	
MC 362	Construction Contracts (MC 363 or concurrent registration)	2	4B
MC 365	Construction Estimating (MC 363, MC 364)	3	4A
MC 461	Construction Project Scheduling and Cost Control (MC 365)	3	
STCC 204	Statistics for Business Students (M CC 117 or M CC 120A-B)	3	2B
	Global and cultural awareness ⁴	3	3E
	Technical elective ⁵	3	
	MC technical elective ⁶	2	
	TOTAL	31	
SENIOR			
BGCC 205	Fundamentals of Business Law	3	3F
BN 305	Fundamentals of Management	3	
BN 473	Labor Relations and Collective Bargaining	3	
CE 350	Soil Engineering for Nonengineers (CE 359)	3	
CE 370	Introductory Structural Engineering (CE 359, F 432)	3	
MC 361	Mechanical and Electrical Systems (MC 241 or ID 276; MC 363 or concurrent registration or ID 256 or concurrent registration)	3	
MC 462	Financial Management for Construction (BA 205, BN 305 or concurrent registration)	3	
MC 464	Construction Project Administration (MC 362, MC 461 or concurrent registration)	2	
MC 465	Construction Management Professional Practice (MC 461; MC 464 or concurrent registration; MC 487A or MC 487E)	2	4C
MC 487E	Internship-Construction Management II (MC 267, MC 317, 500 hours co-op)	3	
	Technical elective ⁵	3	
	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 3G 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 from department list of approved courses.

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 2.3.

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			
MC 131	Graphic Communications/CAD	3	
MC 151	Construction Materials and Methods	3	
MC 261*	Construction Surveying (MC 131 or ID 166, M CC 125 or M CC 160)	3	
	TOTAL	9	
UPPER DIVISION			
MC 362*	Construction Contracts (MC 363 or concurrent registration)	2	
MC 363*	Plan Reading for Estimating (MC 131, MC 151; MC 261 or concurrent registration)	3	
MC 364*	Advanced Construction Systems (MC 151,	3	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
	MC 2761 or concurrent registration OR MC 363 or concurrent registration)		
MC 365*	Construction Estimating (MC 363, MC 364)	3	
MC 461	Construction Project Scheduling and Cost Control (MC 365)	3	
MC 464	Construction Project Administration (MC 362, MC 461 or concurrent registration)	2	
	TOTAL	16	
PROGRAM TOTAL = 25 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. A description of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF DESIGN AND MERCHANDISING

Office in Aylesworth Hall, Room 150

(970) 491-1629

<http://www.caahs.colostate.edu/dm/>

Linda Carlson, Interim Head

Major in Apparel and Merchandising

There are two concentrations in the major – apparel design and production and merchandising.

Learning Outcomes

Students will demonstrate:

- Knowledge and mastery of skills in conceptualizing, sketching, pattern drafting, marker making, constructing, and utilizing computer-aided design to produce and wholesale merchandise a line of clothing that is suitable for a specified target market.
- Ability to apply concepts of textile science to the evaluation of apparel and textile products including: 1) recognizing inter-relationships between fiber properties and end-use performance and product quality standards; 2) applying the theory and principles behind the test methods used in apparel and textile industries, specifically concepts related to fiber analysis, yarn and fabric characterization, strength

analysis, flammability testing, abrasion testing, and color quality control and analysis; 3) critically evaluating, interpreting, and effectively communicating quantitative test data and results.

- 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; demonstrate the ability to integrate and apply experience, knowledge, diverse perspectives and merchandising strategies to solve problems related to target market research; product forecasting, development, and production, including global sourcing; product promotion; and domestic and global retailing, including merchandise buying, sales, and customer service; and demonstrate development and refinement of communication, critical thinking, problem solving, time management, and teamwork skills that will better prepare students for professional careers in merchandising.
- Upon completion of the merchandising internship, an understanding of the following: a) industry knowledge, b) professional behavior, c) the design process, d) distribution channels, e) diversity of target markets, f) textile and apparel economics, g) evolution of merchandising, h) layout and composition, i) industry legislation and regulations, j) consumer research, k) technical sketching, l) social psychology of appearance, m) textile science, n) trade issues, and o) trends.

Potential Occupations

Some examples of careers for apparel design and production concentration graduate 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; computer-aided design (CAD) manager.

Some examples of careers for merchandising concentration graduates include, but are not limited to: retail sales worker; personal shopper; manufacturer; wholesale buyer; retail buyer; store manager; sales manager; quality controller; importer; showroom coordinator.

Students interested in *teaching* apparel and merchandising content at the secondary level should explore the College’s interdepartmental major in consumer and family studies. The consumer and family studies education concentration allows students to combine their interests in apparel, merchandising, and/or interior design with teaching. Consumer and family studies students take course work in the Departments 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 consumer and family studies 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.

Apparel Design and Production Concentration

In the apparel design and production concentration, students learn all facets of the apparel and textile industries. The curriculum focuses on apparel design, production, and marketing strategies to enable students to develop the skills to work within the industry.

Opportunities are available to assess student learning in apparel design, production, and textiles, including judges; comments on garments selected for the senior fashion show and evaluation of interns from on-site supervisors.

Assessment of student progress includes a portfolio review. By limited enrollment through portfolio review, individual attention in advanced course work is increased. Portfolio review is held only during the spring semester.

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	
C CC 103	Chemistry in Context	3	3A
C CC 104	Chemistry in Context Laboratory (C CC 103 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
DM 120	Textiles	3	
M CC 130	Math in the Social Sciences (math placement exam)	3	1B
-----	-----	-----	-----
PYCC 100	General Psychology	3	3C
OR			
S CC 100	General Sociology	3	3C
	Elective	5	
	TOTAL	31	
SOPHOMORE			
AM 240	Computer-Aided Apparel Design	3	
AM 241	Apparel Production (AM 143)	3	
AMCC 250	Clothing, Adornment and Human Behavior	3	3E
PLCC 110	Logic and Critical Thinking	3	2B
OR			
STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
SPCC 200	Public Speaking	3	2A1
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	3	3A
	Health and wellness ³	2	3G
	Historical perspectives ⁴	3	3D
	U.S. public values and institutions ⁵	3	3F
	Electives	2	
	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)	3	
AM 345	Draping Design (AM 241)	3	
AM 363	Historic Costume	3	4A
	Electives	15	
	TOTAL	30	

Course	Title (Prerequisite)	Cr	AUCC
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 ⁶ (GPA 2.5; AM 343, AM 446, DM 492)	12	
DM 492	Preinternship Seminar (written consent of instructor)	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 3G in the AUCC.

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

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

⁶ 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 of the process of planning, negotiating, acquiring, selling, and evaluating merchandise at the wholesale or retail level. Students acquire knowledge of merchandise, sales techniques, marketplace trends, and customer service. The merchandising concentration received the first Award for Excellence from the American Textile Manufacturers Institute.

Courses instruct students in all aspects of apparel merchandising including the use of computer software to simulate management strategies and design promotional campaigns. The merchandising internship may involve participation in seminars; training manual assignments; experience buying offices; department management; and rotation in the control, promotion, operations, and personnel divisions.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
AM 101	Fashion Industries	3	
AM 130	Design Appreciation-Apparel and Merchandising	3	
BD 150	Business Computing Concepts and Applications	3	
C CC 103	Chemistry in Context	3	3A
C CC 104	Chemistry in Context Laboratory (C CC 103 or concurrent registration)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
DM 120	Textiles	3	
<i>Select one pair of the following courses:</i>			
M CC 117	College Algebra in Context I (Math Placement Exam)	1	1B
M CC 118	College Algebra in Context II (M CC 117)	1	1B
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
PYCC 100	General Psychology	3	3C
OR			
S CC 100	General Sociology	3	3C
	Arts/humanities ²	3	3B
	Health and wellness ²	2	3G

Course	Title (Prerequisite)	Cr	AUCC
	Mathematics ³	1	1B
	Elective	2	
	TOTAL	32	
SOPHOMORE			
AMCC 250	Clothing, Adornment and Human Behavior	3	3E
AM 270	Merchandising Processes	3	
BA 205	Fundamentals of Accounting	3	
DM 272	Consumers in the Marketplace	3	
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
SPCC 200	Public Speaking	3	2A1
STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B

OR

STCC 204	Statistics for Business Students (M CC 117 or M CC 120A-B)	3	2B
	Biological/physical sciences ⁴	3	3A
	Historical perspectives ⁵	3	3D
	Elective	3	
	TOTAL	30	

JUNIOR

AM 321	Advanced Textiles (DM 120)	3	
AM 330	Textile and Apparel Economics (DM 120; ECCC 202)	3	4B
AM 366	Merchandising Promotion (AM 270 or BK 300 or BK 305)	3	
AM 371	Merchandising Systems (AM 270, BA 205 or BA 210)	4	
BK 305	Fundamentals of Marketing (ECCC 101 or ECCC 202 or EACC 202)	3	
BN 305	Fundamentals of Management	3	
DM 300	Retail Sales and Customer Strategies	3	
DM 360/ BK 360	Retailing (BK 300 or BK 305)	3	
	AM electives ⁶	3	
	U.S. public values and institutions ⁷	3	3F
	TOTAL	31	

SENIOR

AM 479	Merchandising Policies and Strategies (AM 270, AM 330, AM 366, AM 371, DM 360/BK 360)	3	4A, 4C
DM 487A	Internship-Merchandising (GPA 2.5; AM 371, DM 360/BK 360, DM 492)	12	
DM 492	Preinternship Seminar (written consent of instructor)	1	
	AM, DM, ID elective ⁸	3	
	Upper division AM elective	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 from the list of courses in category 3G in the AUCC.

³ M CC 124 or higher.

⁴ Select one three credit course from the list of courses in category 3A in the AUCC.

⁵ Select from the list of courses in category 3D in the AUCC.

⁶ Choose upper-division AM courses which end in 00-81.

⁷ Select from the list of courses in category 3F in the AUCC.

⁸ Choose any course with an AM, DM, or ID 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 (AUCC math requirement except M CC 130)	3	
DM 120	Textiles	3	
	TOTAL	9	
UPPER DIVISION			
AM 330*	Textile and Apparel Economics (DM 120 and ECCC 202)	3	
OR			
AM 366	Merchandising Promotion (AM 270 or BK 300 or BK 305)	3	
AM 371*	Merchandising Systems (AM 270; BA 205 or BA 210)	4	
AM*	Elective ¹	3	
DM 360/ BK 360*	Retailing (BK 300 or BK 305)	3	
	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 enhances 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 Foundation for Interior Design Education Research (FIDER). Assessment of student programs includes a design scenario. By limited enrollment through the design scenario, individual attention in advanced course work is increased. The design scenario is held once a year.

Faculty in the interior design program value learning as a collaborative effort inviting diversity, design research as the root of 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.

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 design intent, selection of furniture and finish materials, construction documentation, 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, 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 Foundation for Interior Design Education Research (FIDER) accreditation measures ranging from understanding human behavior and design history to concept development.
- 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. Other graduates work in lighting design, product development, marketing, research, design-related journalism, illustration, facility management, showroom management, and as manufacturers' representatives.

Students interested in *teaching* interior design content at the secondary level should explore the college's interdepartmental major in consumer and family studies. The consumer and family studies education concentration allows students to combine their interests in apparel, merchandising, and/or interior design with teaching. Consumer and family studies students take course work in the Departments 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 consumer and family studies 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN AR 101	Visual Form	3	

Course	Title (Prerequisite)	Cr	AUCC
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
ID 129	Introduction to Interior Design	3	
ID 166	Visual Communication/Sketching	3	
MC 151	Construction Materials and Methods	3	
PYCC 100	General Psychology	3	3C
	Biological/physical science ¹	4	3A
	Historical perspectives ²	3	3D
	Mathematics ³	3	1B
	Electives	3	
	TOTAL	31	
SOPHOMORE			
ARCC 100	Introduction to the Visual Arts	3	3B
DM 120	Textiles	3	
ID 210	Interior Design Anatomy (ID 129, ID 166, design scenario review)	3	
ID 236	Three-Dimensional Thinking (ID 256; concurrent registration in ID 276; advancement to Interior Design second year or written consent of instructor)	2	
ID 256	Computer Aided Design for Interior Designers (ID 129, ID 166; design scenario review)	3	
ID 266	Visual Communication-Multi-Media (ID 129, ID 166, advancement to Interior Design second year or written consent of instructor)	3	
ID 276	Interior Design I (ID 210, ID 256, ID 266)	3	
ID 350	Codes-Health and Safety (ID 210, concurrent registration with ID 275)	3	
MC 235	Construction Graphics (ID 210, ID 256)	3	
	Additional communication ⁴	3	2A
	Electives	2	
	TOTAL	31	
JUNIOR			
HSCC 300	Research in Applied Professions	3	2B
ID 330	Lighting Design (ID 256, ID 276)	3	
ID 340	Interior Materials and Finishes (DM 120, ID 276)	3	
ID 356	Professional Communications-Interior Design (COCC 150; advancement to Interior Design second year)	3	4A
ID 357	History of International Interiors (ID 276)	3	
ID 358	History of American and 20 th Century Interiors (ID 357)	3	
ID 360	Interior Project Management (ID 276 and ID 356)	3	
ID 376	Interior Design II (ID 276, ID 330, ID 340)	3	
MC 361	Mechanical and Electrical Systems (MC 241 or ID 276; MC 363 or concurrent registration or ID 256 or concurrent registration)	3	
PY 316	Environmental Psychology (PYCC 100)	3	
	TOTAL	30	
SENIOR			
ID 400	Interior Design Research Proposal (ID 376, HSCC 300 or concurrent registration)	4	4B
ID 476	Interior Design Project (ID 400)	4	4C
ID 487	Internship-Interior Design (ID 356, ID 376) ⁵	3	
	Biological/physical science ¹	3	3A
	Global and cultural awareness ⁶	3	3E
	Health and wellness ⁷	2	3G
	U.S. public values and institutions ⁸	3	3F
	Electives	6	
	TOTAL	28	
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 3D in the AUCC.

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

⁴ Select from the list of courses in category 2A in the AUCC.

⁵ Substitute experiences could include study abroad or independent study (service learning) with prior adviser approval.

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

⁷ Select from the list of courses in category 3G in the AUCC.

⁸ Select from the list of courses in category 3F in the AUCC.

Graduate Programs in Design and Merchandising

The department offers graduate programs leading to a master of science degree in design and merchandising. Students may specialize in apparel and merchandising or interior design. For more information about program emphases and requirements, contact the department. A description of these programs may be found in the *Graduate and Professional Bulletin*.

SCHOOL OF EDUCATION

Office in Education Building, Room 209
(970) 491-6316
<http://soe.cahs.colostate.edu/>

Professor Rick Ginsberg, Director
Professor David C. Whaley, Associate Director, Educator Licensing Programs
Professor Jean Lehmann, Associate Director, Graduate Programs

Educator Licensing Program

Office in Education Building, Room 111
(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:

Secondary (Grades 7-12)

- Agricultural Education
- Business Education
- Family and Consumer Sciences
- English
- Foreign Language (French, German, Spanish)
- Marketing Education
- Mathematics
- Science
- Social Studies
- Speech
- Technology Education
- Trade and Industrial Education

Grades K-12

- Art
- Music

Grades PreK-3

- Early Childhood Education

Other Endorsement Areas

- Counselor
- English as a Second Language
- Occupational Therapist
- Principal
- School Social Worker

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 Commission on 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
- Master 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
Agriculture	Agricultural Education (B.S.)	Agricultural Sciences
Art	Art (B.A.)	Liberal Arts
Business Education	Business Administration (B.S.)	Business
Family and Consumer Sciences	Consumer and Family Studies Education (B.S.)	Applied Human Sciences
Early Childhood Education	Human Development and Family Studies (B.S.)	Applied Human Sciences
English	English (B.A.)	Liberal Arts
Foreign Languages	Languages, Literatures, and Cultures (B.A.)	Liberal Arts
Marketing Education	Business Administration (B.S.)	Business
Mathematics	Mathematics (B.S.)	Natural Sciences
Social Studies	Liberal Arts (Interdepartmental) History (B.A.)	Liberal Arts
Speech	Speech Communication (B.A.)	Liberal Arts
Technology Education ¹	Only available to post-bachelor candidates	
Trade and Industry Education ¹	Only available to post-bachelor candidates	

¹ Contact the Educator Licensing Program office for information on curriculum for technology education and trade and industry education.

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 a writing sample;
- Submission of reference forms;
- Field experience documentation (20 hour form);
- 2.75 cumulative GPA;
- Evidence of computer proficiency;
- Evidence of oral English proficiency;

- Background check (fingerprinting using CDE forms/process;
 - Successful completion of Phase I courses.
- (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 111, and through the program’s Web site (<http://teachered.colostate.edu>).

Student Teaching

Teacher licensure candidates apply for student teaching placement one semester before student teaching. Candidates must pass the state teacher’s exam in their respective teaching area to begin the student teaching experience. Additionally, candidates must demonstrate acceptable personal and academic fitness. Student teaching must be completed at an approved school. Placement is contingent upon acceptance of the student by a school system. All assignments are made by the University. The experience is full time for the specific time period.

Requirements for Licensure

Colorado licensure requires completion of an approved program and the recommendation of the institution at which the program was completed. The Associate 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 Commission on 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 in the successful completion of the teacher’s exam.

Colorado State University’s approved program requirements include completion of a baccalaureate degree, completion of course work in general education, content area, and professional education, and fulfillment meeting the Colorado Performance Based Standards for teachers at the proficient or advanced proficient level. Additionally, all grades in professional education and content courses must be a C or better for licensing. The minimum scholastic average acceptable for completion of the Teacher Licensure Program and recommendation for licensing is 2.75 computed for all course work.

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 ED 400, ED 425, and ED 426 are required in place of ED 350, ED 386, ED 450, and ED 486J. Additional courses may be required by specific endorsement areas. For clarification, refer to individual coursework check sheets which can be obtained in Room 111, Education Building.

Course	Title (Prerequisite)	Cr	AUCC
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology and Assessment (Completion of Phase I courses; BD 150 or CS 110 within three years or computer proficiency test; consent of Teacher Licensure Office)	2	
ED 340	Literacy and the Learner (completion of 30 credits of course work; required background check through CDE, CBI, FBI)	3	
ED 350	Instruction I-Individualization/ Management (EDCC 275, ED 340; concurrent registration in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 275, ED 340, concurrent registration in ED 350; admission to Teacher Licensure Program)	1	
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent registration in ED 486J)	4	
ED 485A-C	Student Teaching ¹ (ED 450 and appropriate special methods courses)	Var.	
OR			
VE 485	Student Teaching ¹ (ED 450 and appropriate special (content) methods courses)	Var.	
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
ED 493A-B	Seminar (ED 426 or ED 450 and appropriate special methods course(s); concurrent registration in ED 485A or B or C or VE 485)	1	
OR			
VE 492	Seminar-Professional Relations (ED 450 and appropriate special (content) methods courses; concurrent registration in ED 485A or B or VE 485)	1	
ED/VE	Special methods course ²	2-4	
ED/VE	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:

Course	Title (Prerequisite)	Cr
ED 460	Methods and Materials in Teaching Science (admission to Teacher Licensure Program)	4
ED 462	Methods and Assessment in Teaching Languages (admission to Teacher Licensure Program; oral and written competency in the language endorsement area)	4
ED 463	Methods in Teaching Language Arts (admission to Teacher Licensure Program)	4
ED 464	Methods and Materials in Teaching Mathematics (18 credits in mathematics, admission to Teacher Licensure Program)	4
ED 465	Methods and Materials in Social Studies (admission to Teacher Licensure Program)	4
ED 466	Methods and Assessment in K-12 Art Education (EDCC 275, admission to Teacher Licensure Program)	4

Course	Title (Prerequisite)	Cr
ED 475	Elementary School Music Methods (MU 217, admission to Teacher Licensure Program)	4
ED 476	Choral Methods for Secondary Schools (MU 217, admission to Teacher Licensure Program)	2
ED 477	Instrumental Methods for Secondary Schools (MU 217, admission to Teacher Licensure Program)	2
VE 425	Methods/Materials in Agricultural Education (admission to Teacher Licensure Program; concurrent registration in ED 450, ED 486J, VE 492)	4
VE 431	Methods/Materials in Business Education (successful completion of Phase II of Teacher Licensure Program or written consent of instructor)	4
VE 441	Methods/Materials-Vocational Marketing Education (VE 431 or concurrent registration; admission to Teacher Licensure Program or written consent of instructor)	1
VE 451	Methods-Consumer and Family Studies Education (concurrent registration in ED 450)	4
VE 465	Methods and Materials in Technology Education	3

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 111.

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, 9075 E. Lowry Boulevard, Building 965, Denver, CO 80230; phone (303) 365-7646.

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.

Adult Technical Education

Assistant Professor James Folkestad, Program Chair

Applicants in adult technical education must have a minimum of three years of experience in a technical occupation. Applicants may be accepted provisionally with less occupational experience if they can reasonably expect to complete the requirements before the degree is granted.

For the detailed curriculum, refer to the Educator Licensing Office in room 111 Education Building.

Agricultural Education

Professor David Whaley, Program Chair

Candidates studying agricultural education are prepared to teach youth and adults in high schools, community colleges, junior colleges, area career and technical schools, and technical institutes. Two 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.

Business Education

Assistant Professor Teresa Yohan, Program Chair

Individuals majoring in business with a concentration in management, accounting, 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, organizational management, or a related business area, refer to the College of Business.

Consumer and Family Studies

Professor Carole Makela, Program Chair

Candidates majoring in consumer and family studies with a concentration in consumer and family studies 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 consumer and family studies, consumer and family studies education concentration, in this section of the catalog.

Marketing Education

Assistant Professor Teresa Yohon, Program Chair

Individuals majoring in business administration with a concentration in marketing or a related business area, and desiring to teaching 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.

Trade and Industrial Education

Assistant Professor James Folkestad, Program Chair

Work Experience Requirement

Individuals in trade and industrial education must have a minimum of three years of trade and/or industrial experience. Applicants should be engaged in teaching or preparing to be engaged in teaching or in supervising a career and technical program. Applicants without career and technical credentials must complete three years of occupational experience before completing the degree requirements.

For the detailed curriculum, refer to the Educator Licensing Office in room 111 Education Building.

Graduate Programs

*Office in Education Building, Room 100
(970) 491-1963
<http://soegrad.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, human resource studies, 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 and local career and technical (vocational) director.

A description of these programs may be found in the *Graduate and Professional Bulletin*.

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 relationships 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 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 in nutrition of

evolving methods of assessing health status, medical nutrition therapy, nutrition and metabolism; in management of program planning, monitoring, and evaluation, facility management, organizational change theory, financial management; in food technology, food safety, role of food in promotion of a healthy lifestyle.

- Competent application of nutrition knowledge and skills in a work environment, including an ability (in nutrition) 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; (in management) to 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 scientists; restaurant management; caterer; quality assurance specialist; food scientists; food inspector; food technologist, food plant manager; food service manager.

Students interested in *teaching* nutrition and/or food science content at the secondary level should explore the interdepartmental major in consumer and family studies education concentration at the beginning of this college section. The consumer and family studies education concentration allows students to combine their interests in nutrition, wellness/health, food science, culinary arts, and/or catering with teaching. Consumer and family studies 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 consumer and family studies 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.

Nutrition and Food Science Core

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
----- <i>Select one pair of the following courses:</i>			
M CC 117	College Algebra in Context I (Math Placement Exam)	1	1B
M CC 118	College Algebra in Context II (M CC 117)	1	1B
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B

M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
S CC 100	General Sociology	3	3C, 3F
	Option courses ¹	17-25	
	Electives	2	
	TOTAL	28-36	
SOPHOMORE			

BS 300	Principles of Human Anatomy and Physiology (BZCC 101 or BZCC 110 or LSCC 102; C CC 103 or C CC 107 or C CC 111)	4	
OR			
BS 310/ BZ 310	Fundamentals of Physiology (BZCC 101 or BZCC 110 or LSCC 102; C 245 or concurrent registration)	3	

	Foundations and perspectives ²	6	3B, 3D, 3E
	Option courses ¹	19-24	
	TOTAL	28-34	
JUNIOR			
FN 350	Human Nutrition (BS 300; C 245 or C 345)	3	
	Option courses ¹	25-29	
	TOTAL	28-32	
SENIOR			
FN 492	Seminar in Dietetics and Nutrition (minimum of 12 credits in FN courses and senior standing)	3	4C
	Option courses ¹	24-29	
	TOTAL	27-32	
PROGRAM TOTAL = 120-124 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 3B, 3D, and 3E of the All-University Core Curriculum (AUCC).

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) requirements.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BD 150	Business Computing Concepts and Applications	3	
OR			
CS 110	Personal Computing	4	

Course	Title (Prerequisite)	Cr	AUCC
<i>Select four credits from the following courses:</i>			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
<i>Select one of the following sets of courses:</i>			
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent registration)	1	3A
OR			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent registration in M CC 155 or M CC 160)	3	
ECCC 101	Economics of Social Issues	3	3C
FNCC 150	Survey of Human Nutrition	3	3G
PYCC 100	General Psychology	3	3C
TOTAL		21-25	
SOPHOMORE			
BS 302	Laboratory in Principles of Physiology (BS 300)	2	
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent registration)	1	
FN 300	Food Principles and Applications (C CC 107, FNCC 150)	3	
FN 301	Food Principles and Applications Laboratory (FN 300 or concurrent registration)	2	
FN 310	Food Service Systems-Operations	3	
LS 205	Survey of Microbial Biology (C CC 107 or C 113 and LSCC 102)	3	
LS 206	Microbial Biology Laboratory (LS 205 or concurrent registration)	2	
OT 215	Medical Terminology Foundations and perspectives ¹	1 3	3B, 3D, 3E
TOTAL		24	
JUNIOR			
BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent registration in C 346)	4	
BN 305	Fundamentals of Management	3	
<i>Select one of the following courses:</i>			
COCC 300	Writing Arguments (COCC 150)	3	2A2
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
SPCC 200	Public Speaking	3	2A1
FN 311	Food Service Systems-Production and Purchasing (FN 310)	3	
FN 360	Nutrition Assessment (C 246, FN 350)	2	
FN 386	Practicum in Food Service Management	2	
FN 496A-I	Group Study in Dietetics and Nutrition (FN 350)	1	
STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
OR			
STCC 204	Statistics for Business Students (M CC 117 or M CC 120A-B)	3	2B
Electives		4	
TOTAL		25	
SENIOR			
FN 414	Food Service Systems-Operations Analysis (FN 311; BD 150 or CS 110)	3	
FN 428	Nutrition Teaching and Counseling Techniques (FN 350; nine credits in food science and nutrition)	3	
FN 450	Medical Nutrition Therapy (FN 350; BS 300)	5	4B

Course	Title (Prerequisite)	Cr	AUCC
FN 451	Community Nutrition (FN 350)	3	4A
FN 459	Nutrition in the Life Cycle (FN 350)	3	
FN 470	Integrative Nutrition and Metabolism (FN 350; BC 351)	3	
FN 496A-I	Group Study in Dietetics and Nutrition (FN 350)	1	
FT 447	Food Chemistry (C 245; BC 351 or concurrent registration)	2	
Electives		1	
TOTAL		24	
OPTION TOTAL = 94-98 credits			

¹Select one course each from the list in category 3B, 3D, and 3E of the All-University Core Curriculum (AUCC).

Food Safety and Nutrition Option

The food safety and nutrition option blends a strong science base with courses in nutrition, food science, food safety, and food microbiology. 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>			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
<i>Select one of the following sets of courses:</i>			
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent registration)	1	3A
OR			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent registration in M CC 155 or M CC 160)	3	
FNCC 125	Food and Nutrition in Health	2	3G
OR			
FNCC 150	Survey of Human Nutrition	3	3G
FT 110	Food-From Farm to Table (high school chemistry) Foundations and perspectives ¹	3	3B, 3D, 3E
TOTAL		17-21	
SOPHOMORE			
BD 150	Business Computing Concepts and Applications	3	
OR			
CS 110	Personal Computing	4	

College of Applied Human Sciences

Course	Title (Prerequisite)	Cr	AUCC	Course	Title (Prerequisite)	Cr	AUCC
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4		BZCC 110	Principles of Animal Biology	3	3A
C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent registration)	1		BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
ECCC 101	Economics of Social Issues	3	3C	LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
FN 300	Food Principles and Applications (C CC 107, FNCC 150)	3		----- <i>Select one of the following sets of courses:</i>			
FN 301	Food Principles and Applications Laboratory (FN 300 or concurrent registration)	2		C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
----- <i>Select one of the following courses:</i>				C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent registration)	1	3A
COCC 300	Writing Arguments (COCC 150)	3	2A2	----- OR			
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2	C CC 111	General Chemistry I (M CC 118 or M CC 121 or M CC 124 or M CC 125 or M CC 126 or placement in M CC 141 or higher)	4	3A
SPCC 200	Public Speaking	3	2A1	C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
----- TOTAL				C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent registration in M CC 155 or M CC 160)	3	
JUNIOR				FNCC 150	Survey of Human Nutrition	3	3G
FT 447	Food Chemistry (C 245; BC 351 or concurrent registration)	2	4B	PYCC 100	General Psychology	3	3C
MB 300	General Microbiology (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 345 or concurrent registration)	3		----- TOTAL			
MB 302	General Microbiology Laboratory (MB 300 or concurrent registration)	2		18-22			
	Upper division FN courses	6		SOPHOMORE			
	Advanced courses ²	8		BS 302	Laboratory in Principles of Physiology (BS 300)	2	
	Electives	6		C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
	TOTAL	27		C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent registration)	1	
SENIOR				----- <i>Select one of the following courses:</i>			
FT 400	Food Safety (6 credits in biology and/or chemistry)	3		COCC 300	Writing Arguments (COCC 150)	3	2A2
FT 420	Quality Assessment of Food Products (FT 110, MB 300)	3	4A	JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
MB 334	Food Microbiology (LS 205 or MB 300)	3		SPCC 200	Public Speaking	3	2A1
MB 335	Food Microbiology Laboratory (LS 206 or MB 301 or MB 302; MB 334 or concurrent registration)	2		EX 332F	Techniques of Teaching Weight Training (corresponding laboratory or competency in area)	1	
STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B	FN 300	Food Principles and Applications (C CC 107, FNCC 150)	3	
----- OR				FN 301	Food Principles and Applications Laboratory (FN 300 or concurrent registration)	2	
STCC 204	Statistics for Business Students (M CC 117 or M CC 120A-B)	3	2B	FN 310	Food Service Systems-Operations	3	
	Upper division FN courses	6		OT 215	Medical Terminology Foundations and perspectives ¹	1	
	Advanced courses ²	4		----- TOTAL			
	Electives	2-6		23			
	TOTAL	26-30		JUNIOR			
PROGRAM TOTAL = 93-94 credits				BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent registration in C 346)	4	
----- ¹ Select one course each from the list in category 3B, 3D, and 3E of the All-University Core Curriculum (AUCC).				BS 420	Cardiopulmonary Physiology (BS 300)	3	
² Select a minimum of 12 credits from the following: AN 360, AN 460, BA 205, BC 351, BH 306, BN 305, EH 220, EH 332, M CC 125, M CC 126, M CC 141 or M CC 155, PHCC 121, RM 330, RM 400, SC 330, SC 430.				EX 240	First Aid and Emergency Care	2	
Nutrition and Fitness Option				EX 332H	Techniques of Teaching Aerobics (corresponding laboratory or competency in area)	1	
The nutrition and fitness option prepares students for employment as nutrition and fitness counselors 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 course requirements.				EX 403	Physiology of Exercise (BS 300)	4	
-----				FN 496A-I	Group Study in Dietetics and Nutrition (FN 350)	1	
Course				LS 205	Survey of Microbial Biology (C CC 107 or C 113 and LSCC 102)	3	
Title (Prerequisite)				LS 206	Microbial Biology Laboratory (LS 205 or concurrent registration)	2	
Cr				STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
AUCC				----- OR			
FRESHMAN				STCC 204	Statistics for Business Students (M CC 117 or M CC 120A-B)	3	2B
BD 150	Business Computing Concepts and Applications	3		----- 5			
OR				TOTAL			
CS 110	Personal Computing	4		28			
----- <i>Select four credits from the following courses:</i>				SENIOR			
-----				EX 405	Exercise Testing Instrumentation (EX 403)	2	
-----				FN 360	Nutrition Assessment (C 246, FN 350)	2	
-----				FN 428	Nutrition Teaching and Counseling Techniques (FN 350; nine credits in food science and nutrition)	3	

Course	Title (Prerequisite)	Cr	AUCC
FN 450	Medical Nutrition Therapy (FN 350 BS 300)	5	4B
FN 451	Community Nutrition (FN 350)	3	4A
FN 459	Nutrition in the Life Cycle (FN 350)	3	
FN 470	Integrative Nutrition and Metabolism (FN 350; BC 351)	3	
FN 496A-I	Group Study in Dietetics and Nutrition (FN 350)	1	
FT 447	Food Chemistry (C 245; BC 351 or concurrent registration)	2	
	Electives	1	
	TOTAL	25	

OPTION TOTAL = 94-98 credits

¹ Select one course each from the list in category 3B, 3D, and 3E of the All-University Core Curriculum (AUCC).

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. The option can form 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>			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
BZCC 120	Principles of Plant Biology	4	3A
OR			
LS 103	Biology of Organisms-Animal and Plants (LSCC 102)	4	
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent registration in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 on concurrent registration)	1	
M CC 125	Numerical Trigonometry (M CC 118 or M CC 121 or placement)	1	1B
PYCC 100	General Psychology	3	3C
	TOTAL	21	
SOPHOMORE			
BS 302	Laboratory in Principles of Physiology (BS 300)	2	
C 345	Organic Chemistry I (C 113, C 114)	4	
C 346	Organic Chemistry II (C 345)	4	
FNCC 150	Survey of Human Nutrition	3	3G
M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
MB 300	General Microbiology (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 345 or concurrent registration)	3	
MB 302	General Microbiology Laboratory (MB 300 or concurrent registration)	2	
OT 215	Medical Terminology	1	
	TOTAL	23	

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent registration in C 346)	4	
BC 352	Principles of Biochemistry Laboratory (BC 351 or BC 401 or concurrent registration; two credits of college chemistry laboratory)	1	
BD 150	Business Computing Concepts and Applications	3	
OR			
CS 110	Personal Computing	4	
BY 310	Cell Biology (one semester of organic chemistry or concurrent registration; two semesters of introductory biology)	4	
<i>Select one of the following courses:</i>			
COCC 300	Writing Arguments (COCC 150)	3	2A2
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
SPCC 200	Public Speaking	3	2A1
PHCC 121	General Physics I (concurrent registration in M CC 125)	5	3A
PHCC 122	General Physics II (PHCC 121) Foundations and perspectives ¹	5	3A
		3	3B, 3D, 3E
	TOTAL	28-29	
SENIOR			
FN 360	Nutrition Assessment (C 246, FN 350)	2	
FN 428	Nutrition Teaching and Counseling Techniques (FN 350; nine credits in food science and nutrition)	3	
FN 450	Medical Nutrition Therapy (FN 350, BS 300)	5	4B
FN 451	Community Nutrition (FN 350)	3	4A
FN 459	Nutrition in the Life Cycle (FN 350)	3	
FN 470	Integrative Nutrition and Metabolism (FN 350; BC 351)	3	
FN 496A-I	Group Study in Dietetics and Nutrition (FN 350)	2	
STCC 201	General Statistics (M CC 120A-B)	3	2B
	TOTAL	24	

OPTION TOTAL = 96-97 credits

¹ Select one course from each category (3B, 3D, 3E) in the All-University Core Curriculum (AUCC).

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 basic science such as physical or biological sciences.

Course	Title (Prerequisite)	Cr	AUCC
UPPER DIVISION			
BC 351*	Principles of Biochemistry (LSCC 102 or BZCC 110 or BZCC 120; C 245 or C 346 or concurrent registration in C 346)	4	
BS 300*	Principles of Human Anatomy and Physiology (BZCC 101 or BZCC 110 or LSCC 102; C CC 103 or C CC 107 or C CC 111)	4	
FN 350*	Human Nutrition (BS 300, C 245 or C 345)	3	
FN 360*	Nutrition Assessment (C 246, FN 350)	2	
FN 451	Community Nutrition (FN 350)	3	
FN 459	Nutrition in the Life Cycle (FN 350)	3	
FN 470	Integrative Nutrition and Metabolism (FN 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>			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
BZCC 120	Principles of Plant Biology	4	3A

Course	Title (Prerequisite)	Cr	AUCC
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
FNCC 150	Survey of Human Nutrition <i>Select one pair of courses from the following:</i>	3	3G
M CC 117	College Algebra in Context I (Math Placement Exam)	1	1B
M CC 118	College Algebra in Context II (M CC 117)	1	1B
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
RM 101	Hospitality Industry	3	
RR 270	Principles of Natural Resource Tourism Electives	2	
		28	
SOPHOMORE			
BA 205	Fundamentals of Accounting	3	
BGCC 205	Fundamentals of Business Law	3	3F
CS 110	Personal Computing	4	
ECCC 204	Principles of Macroeconomics (ECCC 202 or EACC 202)	3	3F
FN 310	Food Service Systems-Operations	3	
JT 301	Business Communication (COCC 150)	3	
MBCC 149	The Microbial World	3	
RM 200	Resort Operations (RM 101 or written consent of instructor)	3	
SPCC 200	Public Speaking	3	2A1
STCC 204	Statistics for Business Students (M CC 117 or M CC 120A-B)	3	2B
		3	
		34	
JUNIOR			
BF 305	Fundamentals of Finance (BA 205, ECCC 204)	3	
FN 300	Food Principles and Applications (C CC 107; FNCC 150)	3	
FN 301	Food Principles and Applications Laboratory (FN 300 or concurrent registration)	2	4A
FN 311	Food Service Systems-Production and Purchasing (FN 310)	3	
FN 414	Food Service Systems-Operations Analysis (FN 311; BD 150 or CS 110)	3	
RM 330	Alcoholic Beverage Control and Management (C CC 103 or C CC 107)	2	
RM 400	Food and Society (S CC 100, completion of AUCC categories 3D and 3E)	3	4B
S CC 100	General Sociology	3	3C, 3F
		6	
		28	
SENIOR			
BN 305	Fundamentals of Management	3	
BN 310	Human Resource Management	3	
FT 400	Food Safety (6 credits in biology and/or chemistry)	3	
RM 350	Restaurant and Resort Marketing (RM 101)	3	
RM 415	Catering Techniques and Culinary Arts (FN 311)	3	
RM 492	Seminar on Restaurant and Resort Management (RM 350)	3	4C
		9	3B, 3D, 3E
		3	
		30	
PROGRAM TOTAL = 120 credits			

¹ Select one course each from the list in category 3B, 3D, and 3E in the All-University Core Curriculum (AUCC).

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. For more information about the graduate programs, refer to the *Graduate and Professional Bulletin*.

DEPARTMENT OF HEALTH AND EXERCISE SCIENCE

Office in Health and Exercise Science Complex, B220
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(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 concentration 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			
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A

Select one pair of courses from the following:			
C CC 103	Chemistry in Context	3	3A
C CC 104	Chemistry in Context Laboratory (C CC 103 or concurrent registration)	1	3A
OR			
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent registration)	1	3A
OR			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A

COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
EXCC 145	Health and Wellness	3	3G
PYCC 100	General Psychology	3	3C
	Historical perspectives and U.S. public values and institutions ¹	3	3D, 3F
	Mathematics ²	3	1B
	Electives	2	
	TOTAL	25-26	
SOPHOMORE			
BS 300	Principles of Human Anatomy and Physiology (BZCC 101 or BZCC 110 or LSCC 102; C CC 103 or C CC 107 or C CC 111)	4	
EX 207	Anatomical Kinesiology (LSCC 102)	3	
EX 240	First Aid and Emergency Care	2	
SPCC 200	Public Speaking	3	2A1
	TOTAL	12	
JUNIOR			
EX 403	Physiology of Exercise (BS 300)	4	4B
	Arts/humanities ³	3	3B
	Global and cultural awareness ⁴	3	3E
	TOTAL	10	
SENIOR			

Select one of the following:			
STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
STCC 307/	Introduction to Biostatistics (M CC 118 or	3	2B
EHCC 307/	M CC 121)		
EX 492	Health and Exercise Science Seminar	2	4A, 4C
	TOTAL	5	
CORE TOTAL = 52-53 credits⁵			

¹ Select from the list of courses meeting both category 3D and category 3F in the All-University Core Curriculum (AUCC).

² Select from departmental list of courses in category 1B of the AUCC.

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 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 2.5 with no grade below C in the following courses: AY/PS/BS 300, EXCC 145, EX 240, and EX 340, before departmental approval will be given to register for EX 386B, Practicum-Wellness Program Management; EX 486B, Practicum-Wellness Program Management; and EX 487, Internship.

Course	Title (Prerequisite)	Cr	AUCC
EX 386A	Practicum in Adult Fitness (EXCC 145, EX 240, EX 332F, EX 332H, FNCC 150, concurrent registration in EX 340)	2	
EX 386B	Practicum in Wellness Program Management (EX 386A)	3	
	Electives	3	
	TOTAL	21	
SENIOR			
EX 456	Advanced Wellness Programming (EX 356; EX 386B or concurrent registration)	3	
EX 486B	Practicum in Wellness Program Management (EX 386B)	3	
EX 487	Internship (EX 486B and all course work)	15	
	Electives	2	
	TOTAL	23	

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			
	EX 100 or EX 101 ¹	1	
	Electives	3	
	TOTAL	4	
SOPHOMORE			
BS 301	Human Gross Anatomy (BZCC 110 or LSCC 102)	5	
BS 302	Laboratory in Principles of Physiology (BS 300)	2	
EX 332F	Techniques of Teaching Weight Training (corresponding lab or competency in area)	1	
PHCC 121	General Physics I (concurrent registration in M CC 125)	5	
PHCC 122	General Physics II (PHCC 121)	5	
	TOTAL	18	
JUNIOR			
BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent registration in C 346)	4	
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
OR			
LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BSCC 122	Drugs and the Human Body	2	
FNCC 150	Survey of Human Nutrition	3	3G
EX 332F	Techniques of Teaching Weight Training (corresponding lab or competency in area)	1	
	TOTAL	6	
SOPHOMORE			
BD 150	Business Computing Concepts and Applications	3	
OR			
CS 110	Personal Computing	4	
COCC 300	Writing Arguments (COCC 150)	3	
OR			
JTCC 300	Professional and Technical Communication (COCC 150)	3	
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
EX 332H	Techniques of Teaching Aerobics (corresponding lab or competency in area)	1	
EX 345	Population Health and Disease Prevention (EXCC 145)	3	
	Electives	4-5	
	TOTAL	18	
JUNIOR			
BA 205	Fundamentals of Accounting	3	
BK 305	Fundamentals of Marketing (ECCC 101 or ECCC 202 or EACC 202)	3	
BK 320	Integrated Marketing Communications (BK 300 or BK 305)	3	
EX 340	Exercise Prescription (concurrent registration in EX 386A)	1	
EX 356	Wellness Programming (EXCC 145, EX 386A)	3	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent registration)	1	
EX 307	Biomechanical Principles of Human Movement (EX 207 or BS 301; PHCC 121 or PHCC 141)	3	
EX 319	Neuromuscular Aspects of Human Movement (BS 300, BS 301)	3	
	Electives		3
	TOTAL		22
SENIOR			
EX 405	Exercise Testing Instrumentation (EX 403)	2	
EX 476	Rehabilitation Exercise (EX 207, EX 240)	3	
EX 479	Psychology and Sport (PYCC 100)	3	
FN 350	Human Nutrition (BS 300; C 245 or C 345)	3	
HDCC 101	Individual and Family Development	3	
OR			
PY 320	Abnormal Psychology (PYCC 100)	3	
	EX, upper division ¹		3
	Electives		6-7
	TOTAL		23-24
PROGRAM TOTAL = 120 credits			

¹ Select any EX 100 or 101 courses.

² Select any upper division EX course.

Graduate Programs in Health and Exercise Science

The department offers graduate programs leading to the master of science. A description of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF HUMAN DEVELOPMENT AND FAMILY STUDIES

Office in Gifford Building, Room 102
(970) 491-5558
<http://www.caahs.colostate.edu/hdfs/>

Professor Clifton E. Barber, Head
Karen Rattenborg, Undergraduate Program Coordinator
Associate 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 consumer and family studies, education concentration, at the beginning of this college section. The consumer and family studies education concentration allows students to combine their interests in human/child development, marriage and family relationships, and/or parenting with teaching. Consumer and family studies 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 sequence³ which qualifies them for a secondary teaching license. The demand for secondary consumer and family studies 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 HD prefix course. The minimum scholastic average acceptable for graduation is 2.00 computed only for courses attempted at Colorado State.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BZCC 101	Humans and Other Animals	3	3A
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
HDCC 101	Individual and Family Development	3	3C
PYCC 100	General Psychology	3	3C
S CC 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			
FNCC 150	Survey of Human Nutrition	3	3G
HD 286	Practicum-Professional Skills ⁵ (COCC 150 and HDCC 101)	3	
HD 310	Infant and Child Development in Context (HDCC 101, PYCC 100)	3	
SPCC 200	Public Speaking	3	2A1
	Advanced writing or second language ⁵	3	2A2 or 2A3
	Global and cultural awareness ⁷	3	3E
	Logic/critical thinking ⁸	3	2B
	U.S. public values and institutions ⁹	3	3F
	Elective	6	
	TOTAL	30	
JUNIOR			
HD 311	Adolescent/Early Adult Development in Context (HDCC 101)	3	
HD 312	Adult Development-Middle Age and Aging (HDCC 101 or PYCC 100 or S CC 100)	3	
HD 334	Parenting Across the Lifespan (HDCC 101 or HD 310)	3	4A, 4B
	Career interest electives ¹⁰	8-10	
	Electives	11-13	
	TOTAL	30	
SENIOR			
----- Select two of the following courses:			
HD 302	Marriage and Family Relationships (PYCC 100, S CC 100)	3	
HD 402	Family Studies (HDCC 101)	3	
HD 403	Families in the Legal Environment	3	
HD 492	Seminar-Program Proposal Development (HD 477 and HD 488A-E or concurrent registration or written consent of instructor)	3	4C
	Career interest electives ¹⁰	3-6	
	Experiential learning ¹¹	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 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 2A2 or 2A3 in the AUCC.

⁷ Select from the list of courses in category 3E in the AUCC.

⁸ Select an STCC course from category 2B in the AUCC.

⁹ Select from the list of courses in category 3F in the AUCC.

¹⁰ Students choose a total of 11-16 credits from department list.

¹¹ HD 477, Professional Skills Development (1 credit), and HD 488AV-EV, Field Placement (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			
BZCC 101	Humans and Other Animals	3	3A
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
HDCC 101	Individual and Family Development	3	3C
PYCC 100	General Psychology	3	3C
S CC 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	3	
	TOTAL	31	
SOPHOMORE			
FNCC 150	Survey of Human Nutrition	3	3G
HD 217	Creative Experiences for Children (HDCC 101 or concurrent registration in HD 286)	3	
HD 286	Practicum-Professional Skills (COCC 150, HDCC 101)	3	
HD 310	Infant and Child Development in Context (HDCC 101, PYCC 100)	3	
HD 311	Adolescent/Early Adult Development in Context (HDCC 101)	3	
HD 312	Adult Development-Middle Age and Aging (HDCC 101 or PYCC 100 or S CC 100)	3	
HD 375	Programming for Children and Families (HD 286, HD 310)	3	
SPCC 200	Public Speaking	3	2A1
	Global and cultural awareness ⁷	3	3E
	Logic/critical thinking ⁸	3	2B
	TOTAL	30	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
BS 300	Principles of Human Anatomy and Physiology (BZCC 101 or BZCC 110 or LSCC 102; C CC 103 or C CC 107 or C CC 111)	4	
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology and Assessment (Completion of Phase 1 courses; BD 150 or CS 110 within three years or computer proficiency test; consent of Teacher Licensure Office)	2	
ED 340	Literacy and the Learner (Completion of 30 credits of course work. Required background check through CDE, CBI, FBI)	3	
ED 400	Diagnostic Teaching of Reading (EDCC 275, ED 340, HD 217, HD 310, HD 400)	3	
ED 425	Early Childhood Education I (EDCC 275, ED 340; admission to Teacher Licensure Program)	4	
HD 334	Parenting Across the Lifespan (HDCC 101 or HD 310)	3	4A, 4B
HD 400	Speech, Language, and Communication Development (HD 310 or PY 260)	3	
PY 460	Childhood Exceptionality and Psychopathology (PYCC 100)	3	
	Advanced writing or second language ⁷	3	2A
	TOTAL	31	
SENIOR			
ED 426	Early Childhood Education II (ED 425)	4	
ED 485C	Student Teaching-Early Childhood (ED 426)	12	
HD 401	Childhood Socialization (HD 310, HD 334)	3	
	<i>Select two of the following courses:</i>		
HD 302	Marriage and Family Relationships (PYCC 100, S CC 100)	3	
HD 402	Family Studies (HCDD 101)	3	
HD 403	Families in the Legal Environment	3	
HD 492	Seminar-Program Proposal Development (HD 477 and HD 488A or B or C or D or concurrent registration or written consent of instructor)	3	4C
	TOTAL	28	
PROGRAM TOTAL = 120 credits			

¹ Select from department 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 HYCC courses in category 3D in the AUCC.

⁴ Select from departmental list of courses in category 1B in the AUCC.

⁵ Select from departmental list of courses in category 3E in the AUCC.

⁶ Select from STCC courses in category 2B in the AUCC.

⁷ Select from the list of courses in category 2A2 or 2A3 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. Descriptions are found in the *Graduate and Professional Bulletin*.

In collaboration with the Department of Human Development and Family Studies, the Department of Psychology offers a doctoral program with a lifespan development emphasis within the applied social psychology program. Web site information may be found at <http://www.colostate.edu/Depts/Psychology/aps/aps8.htm>

Also in collaborating with the Department of Human Development and Family Studies, the School of Education offers a doctoral program with a focus in early childhood education or marriage and family therapy. This program is

available through the School of Education's doctoral degree in education and human resource studies with emphasis in interdisciplinary studies. Web site information may be found at <http://soegrad.colostate.edu/programs/Interdisciplinary/program.html>.

DEPARTMENT OF OCCUPATIONAL THERAPY

Office in Occupational Therapy Building, Room 219 (970) 491-6253

<http://www.cahs.colostate.edu/ot/>

Professor Jodie R. Hanzlik, Head

Known nationally and internationally for its excellence, the Department of Occupational Therapy is ranked among the top 10 programs in the nation by *U.S. News and World Report*. It is recognized by Colorado State as a Program of Research and Scholarly Excellence and it has been designated as a Program of Excellence by the state of Colorado. The department offers graduate-level education to prepare students as leaders in the field of occupational therapy.

Students interested in earning a masters degree in occupational therapy must first earn an undergraduate degree. Contact the Pre-OT adviser (Kim Wellnitz, (970) 491-3658; kurata@lamar.colostate.edu), 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).

A description of the programs may be found in the *Graduate and Professional Bulletin*.

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, school systems, or families – to assist with individual needs. Most social workers specialize in a single field such as child welfare and family services, mental health, medical social work, school social work, criminal justice, 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 the 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 sciences, 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 of the social work code of ethics and mastery of skills in maintaining client confidentiality, establishing professional boundaries, and resolving ethical dilemmas that are presented in case scenarios.

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. Graduate 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 aide; occupational social services worker; foster parent consultant; probation officer; client advocate; victim-witness program counselor; program manager; school social services; substance abuse counselor.

Practicum, Internship, and Progression Requirements

Students directly apply classroom knowledge, skills, and social work values through a six-credit supervised practicum, SW 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 SW 286 practicum. Students must have an overall 2.0 GPA, and a 2.5 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 2.0 overall GPA and a 2.5 GPA with no grade less than C in any social work course. Students will be required to retake any social work course (SW 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 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>			
APCC 120	Human Origins and Variation	3	3A
APCC 121	Human Origins and Variation Laboratory (APCC 120 or concurrent reg.)	1	3A
OR			
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
HDCC 101	Individual and Family Development	3	3C
PYCC 100	General Psychology	3	3C
S CC 100	General Sociology	3	3F
OR			
S CC 105	Social Problems	3	3F
SW 150	Introduction to Social Work (PYCC 100 or concurrent reg.; S CC 100 or S CC 105 or concurrent reg.)	3	
	Mathematics ¹	3	1B

Course	Title (Prerequisite)	Cr	AUCC
	Social/behavioral sciences	3	
	Elective	5	
	TOTAL	30	
SOPHOMORE			
SW 233	Human Behavior in the Social Environment (HDCC 101 or concurrent reg.; SW 150 or concurrent reg.)	3	
SW 286A	Practicum-Communication Skills (SW 233 or concurrent reg.)	3	
SW 286B	Practicum-Applied Helping Skills (SW 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	3G
	Historical perspectives ⁶	3	3D
	Logical/critical thinking ⁷	3	2B
	Electives	4	
	TOTAL	30	
JUNIOR			
HSCC 300	Research in Applied Professions	3	
SW 330	Human Diversity in Practice Issues (SW 233 or concurrent reg.)	3	
SW 340	Generalist Practice-Individuals and Families (progression into the major, SW 286B or concurrent reg.)	3	
SW 341	Generalist Practice-Small Groups (SW 340 or concurrent reg.)	3	
	Additional communication ⁸	3	2A
	Arts/humanities ⁹	6	3B
	Electives	9	
	TOTAL	30	
SENIOR			
SW 342	Generalist Practice-Organizations/Communities (SW 340 or concurrent reg.)	3	4B
SW 410	Social Welfare Policy (SW 342 or concurrent reg.)	3	4A
SW 488	Field Placement (S 311 or HSCC 300 or concurrent reg. in S 311 or HSCC 300; SW 341, SW 342)	10	
SW 492	Seminar (concurrent reg. in SW 488)	3	4C
	Social/behavioral sciences ¹⁰	6	
	Electives	5	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 1B in the AUCC. M CC 130 or M CC 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 the list of courses in category 3G in the AUCC.

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

⁷ Select any three credit statistics course from the list of courses in category 2B in the AUCC. STCC 101 or STCC 110 are recommended.

⁸ Select from the list of courses in category 2A1, 2A2, or 2A3 in the AUCC. See the All-University Core Curriculum section of the catalog for an explanation of which language courses will satisfy category 2A requirements.

⁹ Select from the list of courses in category 3B in the AUCC, or with approval of adviser, from the following prefixes: ARCC, D CC, E CC, ETCC (see department list), HPCC, L CC, MUCC, PLCC, SPCC, and THCC.

¹⁰ Select six upper-division credits, with approval of adviser, from the following prefixes: AP, EC ET (see department list), HY, HD, PO, PY, and S.

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. A description of this program may be found in the *Graduate and Professional Bulletin*.

College of Business

Office in Rockwell Hall, Room 125
(970) 491-6471
<http://www.biz.colostate.edu>

Professor Ajay Menon, Dean
Professor Willie Hopkins, Associate Dean
Professor Tom Ingram, Associate Dean

MAJOR IN BUSINESS ADMINISTRATION WITH CONCENTRATIONS IN

Accounting
Finance-Real Estate
Information Systems
Marketing
Organizational Management

The College of Business is accredited by the AACSB International-the Association to Advance Collegiate Schools of Business. Undergraduate and graduate programs offered include bachelor of science and master of science degrees in business administration as well as the master of business administration degree (MBA).

The programs of study offered provide functional business education in marketing, finance, real estate, management, accounting, and management operations to undergraduates. The skills acquired help prepare students for entry-level positions in a wide range of both private and public enterprises and also provide a solid foundation for further academic study. The program follows a philosophy of linking theory with practical application.

Study Abroad

Study abroad programs are available to students in the College of Business. Because the knowledge of at least one other culture is valuable in understanding our own, students are strongly encouraged to take a summer or semester to study outside the United States as part of their overall program at Colorado State University. Students interested in study abroad should plan far in advance by discussing opportunities with their academic adviser and by visiting the Office of International Programs in Laurel Hall or the Web site, www.international.colostate.edu/us/studyabroad.

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. Additional objectives are to prepare students to teach business subjects in secondary schools, and to provide opportunities for non-business majors to gain an understanding of the business environment as well as specific business and management activities.

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 sufficient specialized work in business disciplines to prepare students to enter their chosen fields in the business world. At the same time, the program attempts to develop 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; informational 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 and real estate, computer information systems, marketing, or organizational management. 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. Until December 26, 2004, students not meeting the 111 index will be admitted to University Open Option Seeking Business. To be eligible for admission to the College from University Open Option Seeking Business, students must complete a minimum of 15 graded credits, including M CC 141 and ECCC 202 with grades of B- or above, and a 2.85 cumulative GPA at Colorado State. Effective December 27, 2004, CSU students (including Open Option Seeking Business) must have a 3.0 cumulative GPA on a minimum of 15 graded credits at Colorado State and grades of B- or higher in ECCC 202 and M CC 141 to gain admission to the College of Business.

External transfer students who have completed a minimum of 15 graded credits with M CC 141 and ECCC 202 with grades of B- or higher and a 3.0 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:

- Effective and complex decision making that integrates knowledge of all functional areas: marketing, accounting, finance, information systems, and management.
- Use of a variety of financial and manufacturing information to make prudent decisions regarding: investment in fixed assets, financing an enterprise using equity and debt, managing inflows and outflows of cash, and efficient utilization of resources.
- Use of a variety of marketing information and analysis of market and customer information to make effective marketing mix decisions that deal with issues including: the type of product that will be sold, the degree of quality inherent in the product, advertising and promotions strategies, pricing options, and channel of distribution strategies.

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 2.0 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 Committee on Scholastic Standards and Awards of the University for consideration of academic dismissal from the College of Business.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
BD 150	Business Computing Concepts and Applications	3	
BG 100	Introduction to Business	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
ECCC 204	Principles of Macroeconomics (ECCC 202 or EACC 202)	3	3F
M CC 120A-B	College Algebra I ¹ (Math Placement Exam)	1	1B
M CC 121	College Algebra II ¹ (M CC 120A-B or placement)	1	1B
M CC 141	Calculus in Management Sciences (M CC 118 or M CC 121)	3	1B
	Biological/physical sciences ²	4	3A
	Global and cultural awareness ³	3	3E
	Health and wellness ⁴	2	3G
	TOTAL	27	
SOPHOMORE			
BA 210	Introduction to Financial Accounting	3	
BA 220	Introduction to Managerial Accounting (BA 205 or BA 210)	3	
BG 200	Business Communications and Report Writing (COCC 150)	3	
BGCC 260	Social-Ethical-Regulatory Issues in Business	3	3F
STCC 204	Statistics for Business Students (M CC 117 or M CC 120A-B)	3	2B
	Additional communication ⁵	3	2A
	Arts/humanities ⁶	3	3B
	Biological/physical sciences ²	3	3A
	Historical perspectives ⁷	3	3D
	TOTAL	27	
JUNIOR⁸			
BF 300	Principles of Finance (BA 205 or BA 210, ECCC 204)	3	4A,4B
BK 300	Marketing (EACC 202 or ECCC 202)	3	4B
BN 301	Production Fundamentals (STCC 204 or STCC 301)	3	
BN 320	Organization Management (BG 200)	3	
	TOTAL	12	
SENIOR			
BD 400	Information Management in the Enterprise (Any two of BF 300, BK 300, BN 320, BN 301)	3	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
BG 479	Business Policy and Administration (BN 301; BF 300 or BF 305; BK 300 or BK 305; BN 305 or BN 320)	3	4A,4C
TOTAL		6	
CORE TOTAL = 72 credits^{9,10}			

¹ Students who test out of M CC 120A-B and/or M CC 121 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 3G in the AUCC.

⁵ Select from list of courses in category 2A in the AUCC.

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

⁷ Select from list of courses in category 3D in the AUCC.

⁸ 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.

⁹ Additional requirements which all business majors must complete are: 1) one of the concentrations described on the following pages; 2) a minimum of 60 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 L 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, Ethnic Studies, International Development, Latin American Studies, Russian, Eastern and Central European Studies, etc.); **OR** 5) complete 1 semester of study abroad.

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:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
SOPHOMORE			
	Electives	3	
JUNIOR			
BA 311	Intermediate Accounting I (BA 205 with grade of B- or better or BA 210 with grade of B- or better; BA 220 with grade of B- or better)	3	

DEPARTMENT OF ACCOUNTING

*Office in Rockwell Hall, Room 205
(970) 491-5102; (970) 491-2676 (fax)
<http://www.biz.colostate.edu/accounting>*

Professor F. C. “Ted” Watson, Acting 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 makes (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.

Course	Title (Prerequisite)	Cr	AUCC	Course	Title (Prerequisite)	Cr	AUCC
BA 312	Intermediate Accounting II (BA 311 with grade of C- or better)	3			TOTAL	32	
BA 321	Cost Management (BA 220)	3		JUNIOR			
BA 350	Accounting Information Systems (BA 220)	3		BA 311	Intermediate Accounting I (BA 205 with grade of B- or better or BA 210 with grade of B- or better; BA 220 with grade of B- or better)	3	
	Accounting elective ¹	3					
	Electives	3		BA 312	Intermediate Accounting II (BA 311 with grade of C- or better)	3	
	TOTAL	18		BF 300	Principles of Finance (BA 205 or BA 210; ECCC 204)	3	4A, 4B
SENIOR				BK 300	Marketing (EACC 202 or ECCC 202)	3	4B
BA 330	Introduction to Taxation (BA 205 or BA 210)	3		BN 301	Production Fundamentals (STCC 204 or STCC 301)	3	
BA 411	Advanced Accounting (BA 312 with grade of C- or better)	3		BN 320	Organization Management (BG 200)	3	
BA 441	Auditing Practices (BA 312 with grade of C- or better; BA 350 with grade of C- or better)	3		ED 350	Instruction I-Individualization/Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
	Electives ²	18		ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. in ED 486J)	4	
	TOTAL	27		ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
PROGRAM TOTAL = 120 credits					Elective	4	

¹ Choose an additional three credits in accounting courses (BA prefix).

² Students must take 24 credits of electives to make up 120 credits. Twelve 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://teachered.colostate.edu/>) or in room 111 of the Education Building.

Course	Title (Prerequisite)	Cr	AUCC	Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN							
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	1A				
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C				
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B				
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	1B				
SPCC 200	Public Speaking	3	2A1				
	Arts/humanities ¹	3	3B				
	Biological/physical sciences ²	7	3A				
	Health and wellness ³	2	3G				
	Historical perspectives ⁴	3	3D				
	Elective	4					
	TOTAL	30					
SOPHOMORE							
BA 210	Introduction to Financial Accounting	3					
BA 220	Introduction to Managerial Accounting (BA 205 or BA 210)	3					
BG 200	Business Communications and Report Writing (CO/COCC 150)	3					
BGCC 260	Social-Ethical-Regulatory Issues in Business	3	3F				
ECCC 204	Principles of Macroeconomics (EC/ECCC 202 or EA/EACC 202)	3	3F				
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F				
ED 331	Educational Technology (Completion of Phase I courses; BD 150 or CS 110 within 3 years or computer proficiency test; consent of Teacher Licensure Office)	2					
ED 340	Literacy and the Learner (completion of 30 credits of course work. Required background check through CDE, CBI, FBI)	3					
M CC 141	Calculus in Management Sciences (M CC 118 or M CC 121)	3	1B				
STCC 204	Statistics for Business Students (M CC 117 or M/M CC 120A-B)	3	2B				
	Global and cultural awareness ⁵	3	3E				

PROGRAM TOTAL = 120 credits

¹ Select 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 3G of the AUCC.

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

⁵ 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>

Associate Professor John Plotnicki, Chair
Associate Professor Susan Athey, Graduate Coordinator

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
FRESHMAN			
BD 120	Business Programming Fundamentals	3	
SOPHOMORE			
BD 220	Object-Oriented Information Design (BD 120)	3	
BD 240	Program Design and Construction	3	
	TOTAL	6	
JUNIOR			
BD 320	Project Management for Information Systems (BD 120)	3	
BD 350	Operating Systems and Networks (BD 220 and BD 240)	3	
BD 355	Business Database Systems (BD 220 and BD 240)	3	
BD 360	Systems Analysis and Design (BD 220 and BD 240)	3	
	Electives	6	
	TOTAL	18	
SENIOR			
----- <i>Select one course from the following:</i>			
BD 410	Web Application Development (BD 355)	3	
BD 411	Enterprise Resource Planning Systems (BA 220; BF 300 or BF 305; BK 300 or BK 305; BN 305 or BN 320)	3	
BD 412	Issues and Cases in Electronic Commerce (BD 355)	3	
BD 462	Systems Development Project (BD 320, BD 360)	3	

OR			
BD 487	Internship (BD 355, BD 360)	3	
	Electives ¹	15	
	TOTAL	21	

PROGRAM TOTAL = 120 credits			

¹ Students must take 21 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-Real Estate 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 and real estate students learn to apply market concepts, trend analysis, and forecasting to the management of financial and real estate assets. Both fields are complex, constantly evolving, and action oriented.

Finance refers to the financial management of businesses and management of 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.

Real estate includes the development, finance, management, and marketing of land resources. The utilization and disposition of these resources by developers, owners, managers, brokers, traders, and real estate financiers are analyzed. Students are trained in real estate principles, finance, investment, law, and evaluation.

Learning Outcomes

At the end of the program, students will have demonstrated:

- Time value of money skills.
- Valuation of securities.
- Measurement and management of risk.
- Ability to analyze the financial health of companies.
- Ability to manage investment portfolios.

Potential Occupations

Finance and real estate majors 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; real estate; stock brokerage; government banking and securities regulation; government finance; teaching and research.

Some fields in which real estate graduates find professional employment opportunities include, but are not limited to: property development; real estate sales; real estate appraisal; property management; mortgage lending; land-use planning; government housing and home finance; construction programs; teaching and research.

In addition to the business administration core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
SOPHOMORE			
	Electives		3

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
BF 311	Investments-Fixed Income Securities (BF 300 or BF 305)	3	
BF 355	Investments-Equity Securities (BF 300 or BF 305)	3	
EC 315	Money and Banking (ECCC 204)	3	
	Accounting, upper division	3	
	Option ¹	6	
	TOTAL	18	
SENIOR			
	Option ¹	27	
PROGRAM TOTAL = 120 credits			

¹Choose either the finance option or the real estate option.

Finance Option

In addition to the business administration and finance-real estate core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
	Electives	6	
SENIOR			
<i>Select one of the following:</i>			
BF 342	Risk Management and Insurance (BF 300 or BF 305)	3	
BF 360	Real Estate Principles (ECCC 204)	3	
BF 470	Financial Risk Management (BF 311)	3	
BF 370	Financial Management-Theory and Application (BF 300 or BF 305)	3	
BF 475	International Business Finance (BF 300 or BF 305)	3	
BF 478	Contemporary Issues in Finance (BF 370; BF 311 or BF 355)	3	
	Electives	15	
	TOTAL	27	
OPTION TOTAL = 33 credits			

Real Estate Option

In addition to the business administration and finance-real estate core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
BF 360	Real Estate Principles (ECCC 204)	3	
	Electives	3	
	TOTAL	6	
SENIOR			
BF 367	Real Estate Law (BGCC 205 or BGCC 260 or HD 403)	3	
BF 460	Real Estate Finance and Investment (BF 300 or BF 305, BF 360 or written consent of instructor)	3	
BF 465	Real Estate Appraisal (BF 360 or written consent of instructor)	3	
BF 470	Financial Risk Management (BF 311)	3	
	Electives	15	
	TOTAL	27	
OPTION TOTAL = 33 credits			

DEPARTMENT OF MANAGEMENT

Office in Rockwell Hall, Room 213

(970) 491-5323

www.biz.colostate.edu/management

Associate Professor Paul Mallette, Interim Chair

Organizational Management Concentration

This program is designed to provide its students with a comprehensive knowledge of organizational 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.

Course work is 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 organizational 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, including human resource management, management trainee, and public administration.
- Ethical decision making skills.
- Application of business principles/practices apply in the international context.

Potential Occupations

Some examples include, but are not limited to: account management; analyst; client services; consultant; distribution management; events planner; executive assistant; human resource specialist; project management; recruiter; relationship management; retail management; team leader; trainer/facilitator.

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
	Electives	3	
JUNIOR			
Select two of the following courses:			
BN 310	Human Resource Management	3	
BN 375	Introduction to Supply Chain Management (BN 301)	3	
BN 410	Organizational Behavior (BN 305 or BN 320)	3	
	Electives	12	
	TOTAL	18	
SENIOR			
Select five of the following courses: ¹			
BN 330	Organizational Theory (BN 305 or BN 320)	3	
BN 340	Entrepreneurship in the Contemporary World	3	
BN 425	Strategic Communications in Organizations (BF 300 or BF 305; BK 300 or BK 305; BN 305 or BN 320)	3	
BN 470	Managerial Decisions-Issues and Analysis (BN 301, BN 305 or BN 320)	3	
BN 471	Micro Issues in Supply Chain Management (BN 375)	3	
BN 472	Macro Issues in Supply Chain Management (BN 375)	3	
BN 475	International Business Management (BF 300 or BF 305; BK 300 or BK 305; BN 305 or BN 320)	3	
	Electives ²	12	
	TOTAL	27	
PROGRAM TOTAL = 120 credits			

¹ Course not selected in the junior year may be taken as one of the five courses.

² Students must take 27-29 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://teachered.colostate.edu/>) or in room 111 of the Education Building.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
SPCC 200	Public Speaking	3	2A1
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	7	3A
	Health and wellness ³	2	3G
	Historical perspectives ⁴	3	3D
	Elective	4	
	TOTAL	30	
SOPHOMORE			
BA 210	Introduction to Financial Accounting	3	
BA 220	Introduction to Managerial Accounting (BA 205 or BA 210)	3	
BG 200	Business Communications and Report Writing (COCC 150)	3	
BGCC 260	Social-Ethical-Regulatory Issues in Business	3	3F
BK 300	Marketing (EACC 202 or ECCC 202)	3	4B
BN 340	Entrepreneurship in the Contemporary World	3	

Course	Title (Prerequisite)	Cr	AUCC	Course	Title (Prerequisite)	Cr
ECCC 204	Principles of Macroeconomics (ECCC 202 or EACC 202)	3	3F	BK 440	Pricing and Financial Analysis in Marketing (BK 300 or BK 305) [use this course if there is a possibility that you may wish to add Marketing as an endorsement]	3
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F	Group III: Select one of the following:		
ED 331	Educational Technology (Completion of Phase I courses; BD 150 or CS 110 within 3 years or computer proficiency test; consent of Teacher Licensure Office)	2		BD 355	Business Database Systems (BD 220 and BD 240) [use this course for an information system focus]	3
M CC 141	Calculus in Management Sciences (M CC 118 or M CC 121)	3	1B	BF 367	Real Estate Law (BGCC 205 or BGCC 260 or HD 403)	3
STCC 204	Statistics for Business Students (M CC 117 or M CC 120A-B)	3	2B	BK 360/	Retailing (BK 300 or BK 305) [use this course if there is a possibility that you may wish to add Marketing as an endorsement]	3
	TOTAL		32			
JUNIOR						
BA 431	Corporate Taxation (BA 220, BA 330)	3	4A, 4B			
BF 300	Principles of Finance (BA 205 or BA 210, ECCC 204)	3				
BN 420	New Venture Creation (BN 340)	3				
ED 340	Literacy and the Learner (completion of 30 credits of course work. Required background check through CDE, CBI, FBI)	3				
ED 350	Instruction I- Individualization/Management (EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3				
ED 386	Practicum-Instruction I (EDCC 275, ED 340, concurrent reg. in ED 350; admission to Teacher Licensure Program)	1				
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. in ED 486J)	4				
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1				
VE 431	Methods/Materials in Business Education (successful completion of Phase II of Teacher Licensure Program or written consent of instructor)	4				
	Global and cultural awareness ⁵	3	3E			
	Group I, II, or III courses ⁶	6				
	TOTAL		34			
SENIOR						
BG 479	Business Policy and Administration (BN 301; BF 300 or BF 305; BK 300 or BK 305 or BN 305 or BN 320)	3	4A, 4C			
BN 301	Production Fundamentals (STCC 204 or STCC 301)	3				
BN 320	Organization Management (BG 200)	3				
BN 440	New Venture Management (BN 420)	3				
VE 485	Student Teaching (ED 450, VE 431)	11				
VE 492	Seminar-Professional Relations (ED 450, VE 431; concurrent reg. in ED 485A or B or VE 485)	1				
	Group I, II, or III course ⁶	3				
	TOTAL		27			

PROGRAM TOTAL = 123 credits

¹ Select 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 3G of the AUCC.

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

⁵ Select from list of courses in category 3E of the AUCC.

⁶ Select from the following groups of courses.

Course	Title (Prerequisite)	Cr
Group I: Select one of the following:		
BD 240	Program Design and Construction [use this course for an information system focus]	3
BF 360	Real Estate Principle (ECCC 204)	3
BK 320	Integrated Marketing Communications (BK 300 or BK 305) [use this course if there is a possibility that you may wish to add Marketing as an endorsement]	3
Group II: Select one of the following:		
BD 360	Systems Analysis and Design (BD 220 or BD 240) [use this course for an information system focus]	3
BF 460	Real Estate Finance and Investment (BF 300 or BF 305, BF 360 or written consent of instructor)	3

DEPARTMENT OF MARKETING

Office in Rockwell Hall, Room 111

(970) 491-5063

<http://www.biz.colostate.edu/marketing>

Professor O. C. Ferrell, Chair

Marketing Concentration

This program will provide its students with a comprehensive knowledge of organizational marketing along with the skills necessary for effective decision making in a business environment that is diverse, global, and highly competitive. Marketing is the process of planning and executing the conception, pricing, promotion, and distribution of ideas, goods, and services to consumers, industrial customers, governments, and social agencies. 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 thought to be excellent training for higher organization levels because of the knowledge of products and consumers gained in these jobs. The following is a partial list of occupations to which graduates may apply their education. 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:

No BK course with a grade of C- (C minus) may count toward graduation requirements for the marketing concentration in the major in business administration.

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
	Electives	3	
JUNIOR			
BK 361	Buyer Behavior (BK 300 or BK 305)	3	
BK 410	Marketing Research (BK 300 or BK 305; STCC 204)	3	
	Electives	12	
	TOTAL	18	
SENIOR			
<i>Select three of the following courses:</i>			
BK 320	Integrated Marketing Communication (BK 300 or BK 305)	3	
BK 330	Business Customer Relationships (BK 300 or BK 305)	3	
BK 360/ DM 360	Retailing (BK 300 or BK 305)	3	
BK 362	Professional Selling (BK 300 or BK 305)	3	
BK 363	Sales Management (BK 300 or BK 305)	3	
BK 364	Product Development and Management (BK 300 or BK 305)	3	
BK 365	International Marketing (BK 300 or BK 305)	3	
BK 366	Services Marketing (BK 300 or BK 305)	3	
BK 440	Pricing and Financial Analysis in Marketing (BK 300 or BK 305)	3	
BK 492	Seminar (BK 300 or BK 305; written consent of instructor)	3	
BK 479	Marketing Strategy and Management (BK 410)	3	
	Electives ¹	15	
	TOTAL	27	
PROGRAM TOTAL = 120 credits			

¹Students must take 30-32 credits of electives to make up 120 credits. Nine 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://teachered.colostate.edu/>) or in room 111 of the Education Building.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
SPCC 120	Public Speaking	3	2A1
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	7	3A
	Health and wellness ³	2	3G
	Historical perspectives ⁴	3	3D
	Elective	4	
	TOTAL	30	
SOPHOMORE			
BA 210	Introduction to Financial Accounting	3	
BA 220	Introduction to Managerial Accounting (BA 205 or BA 210)	3	
BG 200	Business Communications and Report Writing (COCC 150)	3	
BGCC 260	Social-Ethical-Regulatory Issues in Business.	3	3F
BK 300	Marketing (EACC 202 or ECCC 202	3	4B
ECCC 204	Principles of Macroeconomics (ECCC 202 or EACC 202)	3	3F
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
M CC 141	Calculus in Management Sciences (M CC 118 or M CC 121)	3	1B
STCC 204	Statistics for Business Students (M CC 117 or M CC 120A-B)	3	2B
	Global and cultural awareness ⁵	3	3E
	TOTAL	30	
JUNIOR			
BF 300	Principles of Finance (BA 205 or BA 210, ECCC 204)	3	4A, 4B
BK 320	Integrated Marketing Communications (BK 300 or BK 305)	3	
BK 330	Business Customer Relationships (BK 300 or BK 305)	3	
BK 360/ DM 360	Retailing (BK 300 or BK 305)	3	
BK 410	Marketing Research (BK 300 or BK 305, STCC 204)	3	
BK 440	Pricing and Financial Analysis in Marketing (BK 300 or BK 305)	3	
BN 301	Production Fundamentals (STCC 204 or STCC 301)	3	
BN 320	Organization Management (BG 200)	3	
ED 331	Educational Technology (Completion of Phase I courses; BD 150 or CS 110 within 3 years or computer proficiency test; consent of Teacher Licensure Office)	2	
ED 340	Literacy and the Learner (completion of 30 credits of course work. Required background check through CDE, CBI, FBI)	3	
ED 350	Instruction I- Individualization/Management (EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 275, ED 340; concurrent reg. in ED 350; admission to Teacher Licensure Program)	1	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
TOTAL		33	
SENIOR			
BG 479	Business Policy and Administration (BN 301; BF 300 or BF 305; BK 300 or BK 305; BN 305 or BN 320)	3	4A, 4C
BK 479	Marketing Strategy and Management (BK 410)	3	
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. in ED 486J)	4	
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
VE 431	Methods/Materials in Business Education (successful completion of Phase II of Teacher Licensure Program or written consent of instructor)	4	
VE 441	Methods/Materials-Vocational Marketing Education (VE 431 or concurrent reg.; admission to Teacher Licensure Program or written consent of instructor)	1	
VE 485	Student Teaching (ED 450, VE 431, VE 441)	12	
VE 492	Seminar-Professional Relations (ED 450, VE 431, VE 441; concurrent reg. in ED 485A or B or VE 485)	1	
VE 495	Independent Study	1	
TOTAL		30	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
PROGRAM TOTAL = 123 credits			
¹ Select 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 3G of the AUCC.			
⁴ Select from list of courses in category 3D of the AUCC.			
⁵ 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.). 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. A description of these programs may be found in the *Graduate and Professional Bulletin*.

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 Steven Abt, Interim Dean
Professor Thomas Siller, Associate Dean

UNDERGRADUATE MAJORS

Chemical Engineering
Civil Engineering
Computer Engineering
Electrical Engineering
Engineering Science
Environmental Engineering
Mechanical Engineering

UNDERGRADUATE MINOR

Environmental Engineering

The mission of the College of Engineering is to provide high quality teaching, advising, research, outreach, and service in a land grant, Carnegie Class I environment and to serve the people and industries of the state, nation, and world.

Engineers are critically involved in every facet of modern technological society, processing information, designing systems and equipment, maintaining society's infrastructure, solving environmental and energy problems, and helping attain desired levels of efficiency and comfort. The College of Engineering continues its tradition – a tradition as old as Colorado State – of providing broad training in the basic fields of engineering through both undergraduate instruction and graduate programs strongly supported by modern research facilities.

COLLEGE PROGRAMS

All engineering programs except engineering science are accredited at the basic level by the Accreditation Board for Engineering and Technology (ABET).

Undergraduate programs are administered by the Departments of Chemical Engineering, Civil 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 in environmental engineering is administered by the Department of Civil Engineering. This program, which builds upon a foundation in biological science as well as mathematics and physical science, is supported by faculty from the Departments of Atmospheric Science, Chemical Engineering, Civil Engineering, and Mechanical Engineering. It has a strong interdisciplinary flavor and prepares students for careers with large industries, consulting companies, and regulatory agencies.

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 four concentrations: engineering physics, international engineering and international students (jointly with the College of Liberal Arts), space engineering, and a dual degree in the College of Liberal Arts and a B.S. degree in the College of 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.

International Opportunities

Study abroad programs are available to students in the College of Engineering. Because 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/studyabroad>.

Students can obtain a concentration in international engineering and international studies in the Engineering Science major. See the Interdepartmental Majors section for more information.

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 from the ABET accredited majors 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, the Principles and Practice of Engineering Examination (PE) for licensing may be taken.

Engineering Field Trips

The first Fridays of November and March are set aside for departmental field trips primarily to industrial and research organizations in Colorado. Specific requirements of the field trips are established by individual departments. Transportation expense of trips is borne by the student.

ADMISSION INFORMATION

Students may be admitted to one of the undergraduate majors in this college or as undecided 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, than by 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 and English classes as well as courses in computer programming, physics, and mechanical drawing or three-dimensional representation (art).

Course Placement and Advising for Freshmen

All entering freshmen are required to take composition and mathematics placement examinations 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 before enrolling in calculus (M CC 160). Credits for review courses may not be used toward a degree in engineering.

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 C CC 111, with at least one B and nothing 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. Transfer advisers in each department are available for assisting students who wish to transfer.

Transfer of credits earned at other colleges and universities within Colorado is facilitated by the existence of standing agreements 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 physics (PHCC 141) or chemistry (C CC 111) with at least one B and nothing less than a C and a minimum 2.3 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 available 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 a program emphasizing mathematics, physics, chemistry, and basic engineering since 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 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 responsibilities as citizens. To broaden the students' perspectives in non-technical areas, the programs in engineering require a minimum of 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 an asset of great value to the engineer who is constantly 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 2.0 in required engineering, mathematics, chemistry, and physics 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 Committee on Scholastic Standards and Awards for consideration of academic dismissal from the College of Engineering. 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.

INTERDEPARTMENTAL MAJORS

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 and 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. Four concentrations are available – engineering physics, international engineering and international studies, space engineering,

and the dual degree program in engineering and the liberal arts. Regardless of the concentration, graduates are well prepared for a professional career. These degrees are not ABET accredited programs.

Learning Outcomes

Individuals graduating from the engineering science major will have displayed:

- Familiarity with fundamentals of mathematics, science, and the engineering sciences;
- Use of the fundamental, experiential, experimental and technical aspects of engineering;
- Demonstration of strong problem solving skills, related to both closed-form and open-ended problems;
- Recognition of the professional nature of engineering, through ethics, contact with practicing professionals and professional societies;
- Study and experience of multidisciplinary group dynamics and communication;
- Appreciation for subject areas beyond the traditional engineering science, mathematics, and sciences required in engineering majors; and
- Appreciation of the need for life-long learning.

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 wide 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 Science Core

To qualify for graduation, engineering science majors must achieve a minimum 2.0 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or C CC 125 or C CC 126 or C CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A

Course	Title (Prerequisite)	Cr	AUCC
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
PHCC 141	Physics for Scientists and Engineering I (M CC 126; M CC 155 or M CC 160)	5	3A
TOTAL		<u>14</u>	
SOPHOMORE			
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent registration in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent registration)	1	
CE 260	Engineering Mechanics-Statics (M CC 160, PHCC 141)	3	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B
M 261	Calculus for Physical Scientists III (M CC 161)	4	
ME 237	Introduction to Thermal Sciences (PHCC 142)	3	
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A
	Additional communication ¹	3	2A
	Arts/humanities ²	3	3B
	Health and wellness ³	2	3G
	Social/behavioral sciences ⁴	<u>3</u>	3C
TOTAL		<u>37</u>	
JUNIOR			
CE 261	Engineering Mechanics-Dynamics (CE 260)	3	
CE 300	Fluid Mechanics (CE 261 or CE 262, ME 237)	4	
OR			
ME 342	Mechanics and Thermodynamics of Flow Processes (M 340; ME 237)	3	
M 340	Introduction to Ordinary Differential Equations (M CC 255 or M 261)	4	4A, ⁵ 4B
TOTAL		<u>10-11</u>	
SENIOR			
STCC 309	Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B
CORE TOTAL = 64-65 credits⁶			

¹ Select from the list of courses in category 2A 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 3G in the AUCC.

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

⁵ M 340 counts for category 4B in both concentrations. The course only counts for category 4A for students in the engineering physics concentration.

⁶ To complete the major, students must select one of the following concentrations: engineering physics or space engineering.

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 Computer Science, Mathematics, and Physics in the College of Natural Sciences.

In addition to the engineering science core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
EE 102	Digital Circuit Logic	4	
EE 192	Electrical Engineering Fundamentals (high school algebra and geometry)	3	
TOTAL		<u>7</u>	
SOPHOMORE			
EE 201	Circuit Theory (EE 192 with grade of C- or better; concurrent reg. in M CC 161 and PHCC 142)	3	
EE 202	Circuit Theory Applications (EE 201 with grade of C- or better)	4	
	Global and cultural awareness ¹	3	3E
	Historical perspectives ²	3	3D
	U.S. Public values and institutions ³	<u>3</u>	3F
TOTAL		<u>16</u>	
JUNIOR			
EE 341	Electromagnetic Fields and Devices I (M 340 or M 345)	3	
EE 342	Electromagnetic Fields and Devices II (EE 341 with grade of C- or better)	3	
PH 314	Introduction to Modern Physics (PHCC 142, concurrent registration in M 261)	4	
PH 315	Modern Physics Laboratory (concurrent registration in PH 314)	2	
TOTAL		<u>12</u>	
SENIOR			
EE 401	Senior Design Project I (EE 312 with grade of C- or better, EE 332 with grade of C- or better, and EE 342 with grade of C- or better or EE 343 with grade of C- or better)	3	4A
EE 402	Senior Design Project II (EE 401)	3	4C
PH 353	Optics and Waves (M 261, PHCC 142)	4	
	Mathematics ⁴	3	
	Technical electives ⁵	18-19	
	Electives	<u>5</u>	
TOTAL		<u>36-37</u>	
PROGRAM TOTAL = 136 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 Select from the list of courses in category 3F in the AUCC.

⁴ Mathematics elective (300 level or higher). Select course with adviser's approval.

⁵ Select courses with adviser's approval.

Space Engineering Concentration

The space engineering concentration provides students with a broad background in aerospace and space engineering. The curriculum is based on a firm foundation of engineering disciplines and applied mathematics.

In addition to the engineering science core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CE 108	Civil Engineering Principles I	3	
CE 109	Civil Engineering Principles II (CE 108)	<u>3</u>	
TOTAL		<u>6</u>	
SOPHOMORE			
EE 204	Introduction to Electrical Engineering (M CC 161, PHCC 142)	3	
ME 250	Computer Applications in Mechanical Engineering (M 340 or concurrent registration)	2	
	Global and cultural awareness ¹	3	3E
	Historical perspectives ²	3	3D
	U.S. public values and institutions ³	<u>(3)</u>	3F
TOTAL		<u>11</u>	
JUNIOR			
CE 360	Mechanics of Solids (CE 260 or CE 262)	3	
CE 367	Structural Analysis (CE 360)	3	

College of Engineering

Course	Title (Prerequisite)	Cr	AUCC
ME 304	Engineering Design (ME 120, ME 250, ME 307, ME 324, ME 325, ME 331, ME 338, ME 344, CE 363 or concurrent registration in ME 250, ME 307, ME 324, ME 325, ME 331, ME 338, ME 344, CE 363)	3	4A
ME 307	Mechatronics and Measurement Systems (CE 261, EE 204, M 340)	4	
ME 337	Thermodynamics (M 261, ME 237)	3	
SENIOR			
CE 408	Civil Engineering Design I (CE 309 or CE 322/EV 322)	3	
CE 409	Civil Engineering Design II (CE 408)	3	4C
ME 344	Heat and Mass Transfer (ME 342)	3	
ME 417	Control Systems (M 340, ME 304)	3	
ME 460	Aeronautics (ME 342)	3	
PO 371	U.S. Space Policy	3	
	Mathematics, upper division	6	
	Technical electives ⁴	11-12	
	Electives	3	
TOTAL		38-39	

PROGRAM TOTAL = 136 credits

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

² Select from the list of courses in category 3D in the AUCC. See footnote 3.

³ In categories 3C or 3D select one of the following courses: AUCC 101 (3D), HYCC 150 (3D), HYCC 151 (3D) NRCC 320 (3D), POCC 101 (3C), POCC 103 (3C), S CC 100 (3C), S CC 105 (3C).

⁴ 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.). 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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent registration in M CC 155 or M CC 160)	3	
CE 108	Civil Engineering Principles I	3	
CE 109	Civil Engineering Principles II (CE 108)	3	
COCC 150	College Composition (composition placement exam score of 3-6 or CO 130)	3	1A
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
EG 192	Seminar	1	

180

Course	Title (Prerequisite)	Cr	AUCC
L CC 200	Second Year Language I (L 107 or L 108 or placement)	3	
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	
TOTAL		32	
SOPHOMORE			
ECCC 204	Principles of Macroeconomics (ECCC 202 or EACC 202)	3	3F
L CC 201	Second Year Language II (L CC 200 or placement)	3	
M 229	Matrices and Linear Equations (M CC 141 or M CC 155 or M CC 160)	2	
M 261	Calculus for Physical Scientists III (M CC 161)	4	
M 340	Introduction to Ordinary Differential Equations (M CC 255 or M 261)	4	4A, 4B
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A
POCC 131	Current World Problems	3	3D
SPCC 200	Public Speaking	3	2A
TOTAL		32	
JUNIOR			
CE 260	Engineering Mechanics-Statics (M CC 160, PHCC 141)	3	
CE 261	Engineering Mechanics-Dynamics (CE 260)	3	
ME 237	Introduction to Thermal Sciences (PHCC 142)	3	
POCC 232	International Relations	3	
OR			
POCC 241	Comparative Government and Politics	3	
STCC 309	Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B
	Foreign language minor ¹	6	
	Global and cultural awareness ²	3	3E
	Health and wellness ³	2	3G
	Electives from approved list ⁴	3	
	Technical electives ⁵	3	
TOTAL		32	
SENIOR			
CE 300	Fluid Mechanics (CE 261 or CE 262, ME 237)	4	
EC 370	Comparative Economic Systems (ECCC 101 or ECCC 202 or EACC 202)	3	
EE 204	Introduction to Electrical Engineering (M CC 161, PHCC 142)	3	
	Foreign language minor ¹	6	
	Technical electives ⁵	15	
TOTAL		31	
FIFTH YEAR			
<i>Select one of the following pairs of courses:</i>			
CE 408	Civil Engineering Design I (CE 309 or CE 322/EV 322)	3	
CE 409	Civil Engineering Design II (CE 408)	3	4C
OR			
CH 451	Chemical Engineering Design I (CH 341, CH 420, CH 442/EV 442 or concurrent reg.)	3	4C
CH 452	Chemical Engineering Design II (CH 451)	3	4C
OR			
EE 401	Senior Design Project I (EE 312 with grade of C- or better, EE 332 with grade of C- or better and EE 342 with grade of C- or better EE 343 with grade of C- or better)	3	
EE 402	Senior Design Project II (EE 401)	3	4C
OR			
ME 486A	Engineering Design Practicum I (ME 304)	3	4C
ME 486B	Engineering Design Practicum II (ME 486A)	3	4C
TOTAL		3	3B
	Arts and humanities ⁶	3	
	Foreign language minor ¹	3	
	Electives from approved list ⁴	9	
	Technical electives ⁵	6	
	Free electives	2	
TOTAL		29	
PROGRAM TOTAL = 156 credits			

¹ Each student is required to complete a minor in a foreign language.

² Select courses from approved list that fall into category 3E in the All-University Core Curriculum (AUCC).

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

⁴ 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.

⁵ Courses are to be selected with the approval of the adviser. A minimum of 7 credits must be upper division.

⁶ Select from list of courses in category 3B in 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.). 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.)

Major in Environmental Engineering

Office in Engineering Building, Room 203

The environmental engineering program is administered by the Department of Civil 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 natural sciences, mathematics, biological sciences, and engineering fundamentals. Upper-level courses address engineering applications in air, water, land pollution, and environmental toxicology in which pollution prevention and control measures are emphasized. Other topics include agricultural and environmental measurements, rate-controlled separations, basic hydrology, environmental law, and environmental ethics. Careful selection of technical electives allows students to specialize in a related field of interest.

Minors can be obtained in a variety of related subjects such as watershed science, range ecology, fishery biology, soil resources and conservation, and the interdisciplinary studies program in water resources. Seniors complete a year-long design project. Graduates are well prepared for entry-level positions with regulatory agencies, engineering consulting firms, and pollution prevention/control divisions of large industries. Students in the environmental engineering program are strongly encouraged to take the Fundamentals of Engineering examination, which constitutes the first step toward registration as a Professional Engineer.

Environmental engineering is a broadly based interdisciplinary major that requires students to acquire a strong base in mathematics, the physical and biological sciences, and engineering fundamentals. In addition, students complete selected courses in several engineering disciplines including chemical engineering, civil engineering, and mechanical engineering as they relate to environmental engineering. They also pursue a broad background in the liberal arts.

Learning Outcomes

Individuals graduating from the environmental engineering major will have displayed:

- Familiarity with fundamentals of mathematics, science, and the engineering sciences;
- Use of the fundamental, experiential, experimental, and technical aspects of engineering;
- Strong problem solving skills, related to both closed-form and open-ended problems;
- Recognition of the professional nature of engineering, through ethics, contact with practicing professionals and professional societies;
- Study and experience of multidisciplinary group dynamics and communication;
- Appreciation for subject areas related to environmental engineering but taught outside of the traditional science, mathematics, and sciences required in engineering majors; by appreciation of the need for life-long learning.

Potential Occupations

As our population and economy expands, the number of potential water and air pollution sources will rise. Also, public concern for the regulation of environmental quality is growing. As a result, demand for the services of environmental engineers is certain to increase. Today, environmental engineers are at work designing pollution prevention equipment and systems; monitoring and cleaning up polluted air, water, and land; designing drinking water and waste water systems for needy communities, and restoring ecosystem health. Graduates from Colorado State's environmental engineering program are in an excellent position to make significant contributions enhancing environmental quality. 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. Some examples include: environmental engineer, pollution control engineer, wastewater engineer, ecologist, environmental consultant, ecosystem restoration specialist, air/water quality specialist, and regulatory compliance.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent registration)	1	
CE 108	Civil Engineering Principles I	3	
CE 109	Civil Engineering Principles II (CE 108)	3	

College of Engineering

Course	Title (Prerequisite)	Cr	AUCC
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124 and M CC 160)	4	1B
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A
TOTAL		33	

SOPHOMORE

Select four credits from the following courses:

BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A

C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
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CE 262	Engineering Mechanics (M CC 161, PHCC 141)	4	
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COCC 150	College Composition (Composition Placement Exam score of 3, to 6 or CQ 130)	3	1A
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EACC 202	Agricultural and Resource Economics	3	3C
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OR			
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C

EE 204	Introduction to Electrical Engineering (M CC 161, PHCC 142)	3	
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M 261	Calculus for Physical Scientists III (M CC 161)	4	
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M 340	Introduction to Ordinary Differential Equations (M CC 255 or M 261)	4	4A, 4B
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ME 237	Introduction to Thermal Sciences (PHCC 142)	3	
TOTAL		32	

JUNIOR

CE 300	Fluid Mechanics (CE 261 or CE 262, ME 237)	4	
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CE 322/	Basic Hydrology (CE 300 or CH 331 or WR 416, STCC 301 or STCC 309 or CE 308 or written consent of instructor)	3	
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CE 438/	Pollution Control Engineering (C 113, CE 300 or CH 331 or ME 342)	4	
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CH 201	Material and Energy Balances (C CC 111, M CC 160, PHCC 141, one course in computer programming)	3	
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MB 300	General Microbiology (C 245 or C 345 or concurrent reg.; LSCC 102 or BZCC 110 or BZCC 120)	3	
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MB 301	Fundamental Microbiology Laboratory Techniques (MB 300 or concurrent registration)	1	
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STCC 309	Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B
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Additional communication ¹		3	2A
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Health and wellness ²		2	3G
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Technical electives ³		6	
TOTAL		32	

SENIOR

CE 408	Civil Engineering Design I (CE 309 or CE 322/EV 322)	3	
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CE 409	Civil Engineering Design II (CE 408)	3	4C
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CE 439/	Environmental Engineering Chemical Concepts (C 113, M 340)	3	
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EH 446	Environmental Toxicology (C 245 or C 346)	3	
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EV 441	Water and Wastewater Characterization (CE 440 or concurrent registration or CE 438/EV 438 or concurrent registration)	1	
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ME 448/	Pollution Prevention (CE 300 or CH 331 or ME 342)	3	
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EV 448	Arts/humanities ⁴	3	3B
Global and cultural awareness ⁵		3	3E
Historical perspectives ⁶		3	3D

Course	Title (Prerequisite)	Cr	AUCC
	U.S. public values and institutions ⁷	3	3F
	Technical electives ³	3	
TOTAL		31	

PROGRAM TOTAL = 128 credits

¹ Select from the list of courses in category 2A in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3G in the AUCC.

³ Select courses with adviser's approval.

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

⁷ Select from the list of courses in category 3F in the AUCC. If the course taken for category 3D also satisfies 3F, then a humanities or social science elective may be substituted.

Interdepartmental Minor in Environmental Engineering

In order to permit undergraduate students in any engineering major to take advantage of Colorado State's environmental expertise, the College of 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
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LOWER DIVISION

C 245*	Fundamentals of Organic Chemistry ^{1,2} (C CC 107 or C 113)	4	
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C 246*	Fundamentals of Organic Chemistry Laboratory ^{1,2} (C CC 108 or C CC 112 or C 114; C 245 or concurrent registration)	1	
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TOTAL		5	
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UPPER DIVISION

C 471*	Physical Chemistry for Biological Sciences (C 113; M CC 161 or M CC 255; PHCC 122 or PHCC 142)	4	
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CE 438/	Pollution Control Engineering ^{3,4} (C 113, CE 300 or CH 331 or ME 342)	4	
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EV 438*			
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OR			
ME 448/	Pollution Prevention (CE 300 or CH 331 or ME 342) ⁴	3	

EV 448*			
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MB 300*	General Microbiology (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 345 or concurrent registration)	3	
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MB 301	Fundamental Microbiology Laboratory Techniques (MB 300 or concurrent registration)	1	
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Select four to five credits from the following:⁴

BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent registration in C 346)	4	
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CE 440	Nonpoint Source Pollution (one course in soil science, hydrology, or fluid mechanics)	3	
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CH 439/	Environmental Engineering Chemical Concepts (C 113, M 340)	3	
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CE 439*			
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CH 443/	Mass Transfer and Separation Laboratory (CH 341 or CH 442/EV 442 or concurrent registration)	2	
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EV 443*			
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EH 446	Environmental Toxicology (C 245 or C 346)	3	
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MB 432	Aquatic Microbiology (MB 301 or MB 302)	4	
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ME 463*	Building Energy Systems (ME 344)	3	
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PL 345	Environmental Ethics (sophomore standing or higher or written consent of instructor)	3	
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 C CC 111, C CC 112, C 113, C 114.

² C 345 may be substituted for C 245, C 246, but additional elective credit may be needed to bring program total to 21.

³ Civil Engineering majors cannot take CE 438/EV 438 for credit in the minor, and therefore must take nine credits from the elective list.

⁴ If CE 438/EV 438 is selected, select four credits from the following list; if ME 448/EV 448 is selected, select five credits. Students cannot select courses offered by their department that are required by their major.

DEPARTMENT OF ATMOSPHERIC SCIENCE

*Office in Atmospheric Science Building, Foothills
Campus, Room 305
(970) 491-8360
www.atmos.colostate.edu*

Professor Steven A. Rutledge, 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*.

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 ENGINEERING

*Office in Glover Building, Room 100
(970) 491-5252
http://www.engr.colostate.edu/cheme*

Professor A. Ted Watson, Head

Major in Chemical Engineering

Chemical engineers learn to describe physical, chemical, and biological changes of matter. These skills are then used to create new materials and products, new processes for improved manufacture of products, or design new devices to improve health, the environment, or utilization of energy resources.

The chemical 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 and environmental engineering, and interdisciplinary studies programs in biotechnology and biomedical engineering.

The chemical 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 higher education. The broad, strong scientific basis of chemical engineering has kept our graduates consistently near or at the top in salary and demand among B.S. graduates.

Learning Outcomes

Students will:

- Mathematically describe chemical, biological, and physical transformations of matter
- Design products and processes for making products
- Work effectively in teams
- Communicate effectively

Potential Occupations

Chemical engineering graduates find employment within pharmaceuticals, biomedical engineering, biochemical and food processing, microelectronics, environmental engineering, petroleum, and other private sector industries and within government agencies. Chemical engineering is also an excellent preparation for graduate study leading to

the M.S. and Ph.D. degrees within chemical or other engineering disciplines, as well as entry into medical school.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent registration)	1	
CHCC 104	Strategies of Engineering Problem Solving (CH 192)	3	2B
CH 192	Strategies of Engineering Design	3	
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124 and M CC 160)	4	1B
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141; concurrent registration in M CC 161 or M CC 255)	5	3A
	TOTAL	33	
SOPHOMORE			
C 345	Organic Chemistry I (C 113, C 114)	4	
C 346	Organic Chemistry II (C 345)	4	
CH 201	Material and Energy Balances (C CC 111, M CC 160, PHCC 141, one course in computer programming)	3	
CH 202	Thermodynamic Process Analysis (CH 201)	3	
CE 262	Engineering Mechanics (M CC 161, PHCC 141)	4	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
EE 204	Introduction to Electrical Engineering (M CC 161, PHCC 142)	3	
M 261	Calculus for Physical Scientists III (M CC 161)	4	
M 340	Introduction to Ordinary Differential Equations (M CC 255 or M 261) Health and wellness ¹	4	4A, 4B
	TOTAL	2	3G
		34	
JUNIOR			
C 472	Physical Chemistry for Engineers (C 113, M 261, PHCC 142)	4	
CH 330	Process Simulation (CH 202; concurrent registration in M 340)	3	
CH 331	Momentum Transfer and Mechanical Separations (CH 201, M 340; CH 202 or ME 237)	3	4B
CH 332	Heat Transfer and Thermal Separations (M 340; CH 331 or CE 300 or concurrent registration)	3	
CH 333	Momentum and Heat Transfer Laboratory (CH 332)	2	
CH 341	Equilibrium-States Separations (CH 202 or ME 237; one course in physical chemistry)	4	
CH 420	Chemical Reactor Design (M 340, one course in physical chemistry)	3	
	Additional communication ²	3	2A
	Advanced science ³	4	
	Social/behavioral sciences ⁴	3	3C
	Elective	3	
	TOTAL	3	35
SENIOR			
CH 430	Process Control and Instrumentation (CH 332, CH 341, CH 420)	4	
CH 442/ EV 442	Rate-Controlled Separations (CE 300 or CH 331; M 340; one course in physical chemistry)	3	
CH 443/ EV 443	Mass Transfer and Separation Laboratory (CH 341 or CH 442/EV 442 or concurrent registration.)	2	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
CH 451	Chemical Engineering Design I (CH 341; CH 420; CH 442/EV 442 or concurrent registration)	3	4C
CH 452	Chemical Engineering Design II (CH 451)	3	4A, 4C
CH 493	Seminar	1	
	Arts/humanities ⁵	3	3B
	Global and cultural awareness ⁶	3	3E
	Historical perspectives ⁷	3	3D
	U.S. public values and institutions ⁸	3	3F
	TOTAL	28	

PROGRAM TOTAL = 130 credits

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

²Select from the list of courses in category 2A in the AUCC.

³Select from departmental list of approved courses.

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

⁵Select from the list of courses in category 3B in the AUCC.

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

⁷Select from the list of courses in category 3D in the AUCC.

⁸Select from the list of courses in category 3F in the AUCC. Certain courses taken to satisfy a requirement in other areas of Foundations and Perspectives may simultaneously satisfy this requirement.

Graduate Programs in Chemical Engineering

The department offers graduate programs leading to a master of science and doctor of philosophy. A description of these programs may be found in the *Graduate and Professional Bulletin*. The department publishes a descriptive brochure, which may be obtained from our web site or by writing to the department head.

DEPARTMENT OF CIVIL ENGINEERING

Office in Engineering Building, Room 203
(970) 491-5048

<http://www.engr.colostate.edu/ce>

Professor Sandra L. Woods, 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 Engineering administers undergraduate and graduate degrees in civil engineering and an interdisciplinary undergraduate degree program in environmental engineering (see the description and program of study for environmental engineering in the Interdepartmental Majors section earlier in this chapter).

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. Colorado State University engineering graduates have a greater than 90% pass rate on the Fundamentals of Engineering exam, the first step towards registration as a Professional Engineer.

The series of civil engineering core classes – CE 108, CE 109, CECC 208, CE 209, CE 308, CE 309, CE 408, and CE 409 – 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. The objectives of the undergraduate civil engineering program are:

- To provide our graduates with a solid base in the natural sciences, mathematics, engineering sciences, civil engineering and design processes, and management concepts, along with an ability to apply this knowledge to the broad area of civil engineering in a global and societal context.
- To develop student abilities to identify and assess engineering needs and requirements, formulate relevant design questions, and solve these equations through appropriate investigations, experiments, and acquisition and interpretation of design data and information.
- To help students develop their abilities to analyze and design basic system components and basic skills and techniques for modeling, designing, and managing civil engineering systems using both basic principles and modern engineering tools.
- Through both technical and humanities/social sciences classes, provide students with a knowledge of contemporary issues and to instill in them a sensitivity to the increasing challenges of providing socially and economically acceptable facilities and services for human society within a global context, consistent with environmental concerns.
- To prepare our graduates to communicate well in the various models (verbal, written, graphical/pictorial) used to convey ideas and information among both professionals and society at large.
- To prepare our graduates to work effectively in modes ranging from independent study to multi-disciplinary teams.
- To instill in our graduates an increased ability to learn, inquisitiveness and critical assessment skills, and an appreciation for the need to continue development of

their professional skills, and a desire to continue their education through life-long learning.

- To provide our graduates with an awareness and appreciation of professional standards, ethics, and responsibilities.
- To prepare our graduates for either immediate employment in any primary branch of civil engineering or to continue into a graduate program for further study in a civil engineering specialty area.

Learning Objectives

Graduating seniors will have demonstrated:

- An ability to design a system, component, or process to meet desired needs.
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- Effective oral communication skills.

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.

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.

Some example job titles 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			
CE 108	Civil Engineering Principles I	3	
CE 109	Civil Engineering Principles II (CE 108)	3	

College of Engineering

Course	Title (Prerequisite)	Cr	AUCC
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent reg. in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124 and M CC 160)	4	1B
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent reg. in M CC 161 or M CC 255)	5	3A
	Arts/humanities ¹	3	3B
	Health and wellness ²	2	3G
	TOTAL	32	
SOPHOMORE			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
CECC 208	Civil Engineering Analysis I (CE 109)	3	2B
CE 209	Civil Engineering Analysis II (C CC 111, CE 208, CE 260)	3	
CE 260	Engineering Mechanics-Statics (M CC 160, PHCC 141)	3	
CE 261	Engineering Mechanics-Dynamics (CE 260)	3	
CE 360	Mechanics of Solids (CE 260 or CE 262)	3	
M 261	Calculus for Physical Scientists III (M CC 161)	4	
M 340	Introduction to Ordinary Differential Equations (M CC 255 or M 261)	4	
ME 237	Introduction to Thermal Sciences (PHCC 142)	3	
	TOTAL	34	
JUNIOR			
CE 300	Fluid Mechanics (CE 261 or CE 262, ME 237)	4	
CE 308	Civil Engineering Synthesis I (CE 204/EV 204 or CE 209)	3	4A
CE 309	Civil Engineering Synthesis II (CE 308)	3	4B
CE 322/ EV 322	Basic Hydrology (CE 300 or CH 331 or WR 416; STCC 301 or STCC 309 or CE 308; or written consent of instructor)	3	
CE 367	Structural Analysis (CE 360)	3	
CE 450	Introduction to Geotechnical Engineering (CE 360)	4	
CE 466	Design and Behavior of Steel Structures (CE 367)	3	
EE 204	Introduction to Electrical Engineering (M CC 161, PHCC 142)	3	
	Additional communications ³	3	2A
	Social/behavioral sciences ⁴	3	3C
	TOTAL	32	
SENIOR			
CE 401	Hydraulic Engineering (CE 300)	3	
CE 408	Civil Engineering Design I (CE 309)	3	
CE 409	Civil Engineering Design II (CE 408)	3	4C
CE 438/ EV 438	Pollution Control Engineering (C 113, CE 300 or CH 331 or ME 342)	4	
CE 467	Design of Reinforced Concrete Structures (CE 367)	3	
	Global and cultural awareness ⁵	3	3E
	Historical perspectives ⁶	3	3D
	U.S. public values and institutions ⁷	(3)	3F
	Technical electives ⁸	9	
	TOTAL	31	
PROGRAM TOTAL = 129 credits			

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

² Select from C.E. departmental list of courses from those in category 3G in the AUCC.

³ Select from C.E. departmental list of courses from those in category 2A in the AUCC.

⁴ Select from C.E. departmental list of courses from those in category 3C in the AUCC.

⁵ Select from C.E. departmental list of courses from those in category 3E in the AUCC.

⁶ Select from C.E. departmental list of courses from those in category 3D in the AUCC.

⁷ Select from the list of courses in category 3F in the AUCC. The course selected for 3F should also be listed in 3C or 3D so the two requirements may be fulfilled with one course.

⁸ Select from C.E. departmental list of permissible technical elective courses.

Soil and Water Resource Engineering Concentration

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CE 108	Civil Engineering Principles I	3	
CE 109	Civil Engineering Principles II (CE 108)	3	
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent reg. in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124 and M CC 160)	4	1B
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent reg. in M CC 161 or M CC 255)	5	3A
	Arts/humanities ¹	3	3B
	Health and wellness ²	2	3G
	TOTAL	32	
SOPHOMORE			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory II (C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
CECC 208	Civil Engineering Analysis I (CE 109)	3	2B
CE 209	Civil Engineering Analysis II (C CC 111, CE 208, CE 260)	3	
CE 260	Engineering Mechanics-Statics (M CC 160, PHCC 141)	3	
CE 261	Engineering Mechanics-Dynamics (CE 260)	3	
CE 360	Mechanics of Solids (CE 260 or CE 262)	3	
M 261	Calculus for Physical Scientists III (M CC 161)	4	
M 340	Introduction to Ordinary Differential Equations (M CC 255 or M 261)	4	
ME 237	Introduction to Thermal Sciences (PHCC 142)	3	
	TOTAL	34	
JUNIOR			
CE 300	Fluid Mechanics (CE 261 or CE 262, ME 237)	4	
CE 308	Civil Engineering Synthesis I (CE 204/EV 204 or CE 209)	3	4A
CE 309	Civil Engineering Synthesis II (CE 308)	3	4B
CE 322/ EV 322	Basic Hydrology (CE 300 or CH 331 or WR 416; STCC 301 or STCC 309 or CE 308; or written consent of instructor)	3	
CE 367	Structural Analysis (CE 360)	3	
CE 450	Introduction to Geotechnical Engineering (CE 360)	4	
CE 466	Design and Behavior of Steel Structures (CE 367)	3	
EE 204	Introduction to Electrical Engineering (M CC 161, PHCC 142)	3	
	Additional communications ³	3	2A
	Social/behavioral sciences ⁴	3	3C
	TOTAL	34	
JUNIOR			
CE 300	Fluid Mechanics (CE 261 or CE 262, ME 237)	4	
CE 308	Civil Engineering Synthesis I (CE 204/EV 204 or CE 209)	3	4A
CE 309	Civil Engineering Synthesis II (CE 308)	3	4B
CE 322/ EV 322	Basic Hydrology (CE 300 or CH 331 or WR 416; STCC 301 or STCC 309 or CE 308; or written consent of instructor)	3	
CE 367	Structural Analysis (CE 360)	3	
CE 450	Introduction to Geotechnical Engineering (CE 360)	4	
EE 204	Introduction to Electrical Engineering (M CC 161, PHCC 142)	3	
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
	Additional communications ³	3	2A
	Social/behavioral sciences ⁴	3	3C
	TOTAL	33	
SENIOR			
CE 401	Hydraulic Engineering (CE 300)	3	
CE 408	Civil Engineering Design I (CE 309)	3	
CE 409	Civil Engineering Design II (CE 408)	3	4C

Course	Title (Prerequisite)	Cr	AUCC
CE 425	Soil and Water Engineering (CH 331 or CE 300 or SC 240)	4	
CE 440	Nonpoint Source Pollution (one course in soil science, hydrology, or fluid mechanics)	3	
SC 420	Crop and Soil Management Systems I (H CC 100 or SC 100, SC 240)	3	
	Global and cultural awareness ⁵	3	3E
	Historical perspectives ⁶	3	3D
	U.S. public values and institutions ⁷	(3)	3F
	Technical electives ⁸	5	
	TOTAL	30	

PROGRAM TOTAL = 129 credits

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

² Select from C.E. departmental list of courses from those in category 3G in the AUCC.

³ Select from C.E. departmental list of courses from those in category 2A in the AUCC.

⁴ Select from C.E. departmental list of courses from those in category 3C in the AUCC.

⁵ Select from C.E. departmental list of courses from those in category 3E in the AUCC.

⁶ Select from C.E. departmental list of courses from those in category 3D in the AUCC.

⁷ Select from the list of courses in category 3F in the AUCC. The course selected for 3F should also be listed in 3C or 3D so the two requirements may be fulfilled with one course.

⁸ Select from C.E. departmental list of permissible technical elective courses.

Graduate Programs in Civil 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 water resources planning and management.

Addition of a practice-oriented, course-work only, master of engineering program was approved in 2001. Students with a baccalaureate degree in engineering are eligible to apply. Graduates of some science programs are also eligible, but are typically required to also complete some background courses at the undergraduate level.

For more information on the various graduate programs available in the department, interested students should write to the Department of Civil Engineering and request a copy of the departmental *Graduate Studies Bulletin*.

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, Graduate and Undergraduate Adviser

Major in Electrical or Computer Engineering

Engineering is the art of creating things that benefit people. Approximately two million engineers work in the United States. Electrical and computer engineering are those branches of engineering that involve things that use electricity.

Electrical and computer engineering students develop a solid foundation in math and physics. The electrical engineering core comprises the bulk of the courses. Students achieve advanced and in-depth understanding in a number of technical areas; develop proficiency in critical workplace skills; obtain hands-on experience in laboratory experimentation and data analysis; and use a broad range of software tools for analysis and design. State-of-the-art laboratory facilities provide students with an in-depth understanding of the concepts learned in class. The senior design project is conducted in a team setting under the direct guidance of a faculty member and includes written and oral presentations.

Graduates of the program will be academically well prepared with technical knowledge and creative skills to enter the industrial workplace as well as pursue advanced degrees. In particular, they will be proficient in open-ended problem solving and in engineering design. This will be accomplished by ensuring that our students achieve the following specific objectives:

- Gain a thorough understanding of the fundamentals of electrical and computer engineering,
- Achieve advanced and in-depth understanding in number of technical areas within the discipline,
- Develop proficiency in critical workplace skills including teamwork, oral and written communication, and independent learning, and
- Become skilled in hands-on laboratory experimentation and data analysis, and in the use of a broad range of software tools for analysis and design.

Learning Outcomes

Students will:

- Demonstrate their ability to design a system, component, or process to meet specifications.

- Demonstrate their ability to use the techniques, skills, and modern engineering skills necessary for engineering practice.
- Interact with the ECE faculty to gain an understanding and appreciation of the areas within electrical and computer engineering.

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. Electrical and computer engineers work 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.

Colorado State University engineering graduates are well prepared for a professional career with a greater than 90% pass rate on the Fundamentals of Engineering professional exam. With electrical engineering being the fastest growing, graduates readily find employment in many fields of industry, education, government, and service. Students may enhance their employment in many fields of industry, education, government, and service. Students may enhance their employment opportunities by completing a minor in computer science, mathematics, or physics. 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.

Some examples include: computer engineer, electrical test engineer, field engineer, integrated circuit layout designer, biomedical engineer, computer programmer, electronics research engineer, occupational safety specialist, production manager, specification writer, electrical power superintendent, numerical control programmer, geophysicist, aerospace engineer, communications specialist, transportation engineer.

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 2.0 in electrical engineering courses as a graduation requirement. It is the responsibility of any student who fails to maintain a 2.0 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)	Cr5	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
CSCC 153	Java Programming (M CC 118 with a C or better)	4	2B
EE 102	Digital Circuit Logic	4	
EE 192	Electrical Engineering Fundamentals (high school algebra and geometry)	3	
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
SPCC 200	Public Speaking Health and wellness ¹	3 2	2A1 3G
	TOTAL	32	
SOPHOMORE			
CS 200	Algorithms and Data Structures (CSCC 153 with a C or better, CS 166/M 166 with a C or better. M CC 160 with a C or better)	4	
CS 253	Problem Solving with C++ (CS 166/M 166 with C or better, CS 200 with C or better, CS 270 with C or better, or EE 251 with a C or better)	4	
EE 201	Circuit Theory (EE 192 with grade of C- or better; concurrent registration in M CC 161 and PHCC 142)	3	
EE 202	Circuit Theory Applications (EE 201 with grade of C- or better)	4	
EE 251	Introduction to Microprocessors (EE 102 with grade of C- or better)	4	
M 261	Calculus for Physical Scientists III (M CC 161)	4	
M 340	Introduction to Ordinary Differential Equations (M CC 255 or M 261)	4	
	OR		
M 229	Matrices and Linear Equations (M CC 141 or M CC 155 or M CC 160)	2	
	AND		
M 345	Differential Equations (M 229; M CC 161 or M CC 255)	4	
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A
	TOTAL	32-34	
JUNIOR			
CS 301	Foundations of Computer Science ² (CS 166/M 166 with C or better, CS 200 with a C or better, M CC 161 with grade of C or better, M 229 with C or better and concurrent registration in CS 253)	4	
	OR		
EE 332	Electronics Principles II ³ (EE 331 with grade of C- or better)	4	
CS 370	System Architecture and Software (CS 200 with a C or better, CS 270 with a C or better; STCC 301 with a C or better, STCC 309 with a C or better)	4	
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
EE 311	Linear System Analysis I (EE 202 with grade of C- or better and M 340 or M 345)	3	
EE 312	Linear System Analysis II (EE 311 with grade of C- or better)	3	
EE 331	Electronics Principles I (EE 202 and M 340 or M 345)	4	

Course	Title (Prerequisite)	Cr5	AUCC
EE 343	Electrodynamics for Computer Engineers (EE 202 with grade of C- or better and M 340 or M 345)	4	
EE 450	Digital System Design Laboratory (concurrent registration in EE 451)	1	
EE 451	Digital System Design (EE 251 with grade of C- or better; concurrent registration in EE 450)	3	
EE 452	Principles of Digital Computing and Networking (EE 251 with grade of C- or better)	3	
	Historical perspectives ⁴	3	3D
	TOTAL	35	
SENIOR			
EE 303/ST 303	Introduction to Communications Principles (M 261)	3	
EE 401	Senior Design Project I (EE 312 with grade of C- or better, EE 332 with grade of C- or better, and EE 342 with grade of C- or better or EE 343 with grade of C- or better)	3	4A, 4B
EE 402	Senior Design Project II (EE 401)	3	4C
EE 456	Computer Networks (CSCC 153, EE 451)	4	
	Arts/humanities ⁵	3	3B
	Global and cultural awareness ⁶	3	3E
	U.S. public values and institutions ⁷	3	3F
	Technical electives ⁸	10	
	TOTAL	32	

PROGRAM TOTAL = 131-133 credits

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

² CS 301 (followed by CS 453 in the senior year) is recommended for students interested in specializing in computer system design.

³ EE 332 is recommended for students interested in specializing in VLSI.

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

⁵ Select from list of courses in category 3B of the AUCC.

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

⁷ Select from the list of courses in category 3F in the AUCC.

⁸ 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 optoelectronic 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 2.0 in electrical engineering courses as a graduation requirement. It is the responsibility of any student who fails to maintain a 2.0 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			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
CSCC 153	Java Programming (M CC 118 with a C or better)	4	2B
EE 102	Digital Circuit Logic	4	
EE 192	Electrical Engineering Fundamentals (high school algebra and geometry)	3	
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
SPCC 200	Public Speaking	3	2A1
	TOTAL	30	
SOPHOMORE			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
EE 201	Circuit Theory (EE 192 with grade of C- or better; concurrent registration in M CC 161 and PHCC 142)	3	
EE 202	Circuit Theory Applications (EE 201 with grade of C- or better)	4	
EE 251	Introduction to Microprocessors (EE 102 with grade of C- or better)	4	
M 261	Calculus for Physical Scientists III (M CC 161)	4	
M 340	Introduction to Ordinary Differential Equations (M CC 255 or M 261)	4	
	OR		
M 345	Differential Equations (M 229; M CC 161 or M CC 255)	4	
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A
	Science/engineering elective ¹	4	
	TOTAL	32	
JUNIOR			
EE 303/ST 303	Introduction to Communications Principles (M 261)	3	
EE 311	Linear System Analysis I (EE 202 with grade of C- or better and M 340 or M 345)	3	
EE 312	Linear System Analysis II (EE 311 with grade of C- or better)	3	
EE 331	Electronics Principles I (EE 302 with grade of C- or better and M 340 or M 345)	4	
EE 332	Electronics Principles II (EE 331 with grade of C- or better)	4	4A
EE 341	Electromagnetic Fields and Devices I (M 340 or M 345)	3	
EE 342	Electromagnetic Fields and Devices II (EE 341 with grade of C- or better)	3	
EE 362	Electromechanical Devices (EE 311 with grade of C- or better, EE 331 with grade of C- or better, EE 341 with grade of C- or better)	3	
	OR		
EE 372	Physical Electronics (EE 341 with grade of C- or better, PHCC 142)	3	

College of Engineering

Course	Title (Prerequisite)	Cr	AUCC
	Global and cultural awareness ²	3	3E
	Historical perspectives ³	3	3D
	TOTAL	32	
SENIOR			
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B, M CC 121 or M CC 140 or M CC 160)	3	3C
EE 362	Electromechanical Devices ⁴ (EE 311 with grade of C- or better, EE 331 with grade of C- or better, EE 341 with grade of C- or better)	3	
	OR		
EE 372	Physical Electronics ⁵ (EE 341 with grade of C- or better, PHCC 142)	3	
EE 401	Senior Design Project I (EE 312 with grade of C- or better, EE 332 with grade of C- or better, and EE 342 with grade of C- or better or EE 343 with grade of C- or better)	3	4A, 4B
EE 402	Senior Design Project II (EE 401)	3	4C
	Arts/humanities ⁶	3	3B
	Health and wellness ⁶	2	3G
	U.S. public values and institutions ⁷	3	3F
	Technical electives ⁸	15	
	TOTAL	35	
PROGRAM TOTAL = 129 credits			

¹ One or more courses to be chosen from C CC 112, CE 260, CE 262, CS 200, M 229, M 366, M 419, M 470, ME 237, PH 314, PH 341, or PH 353. If selected course(s) is/are less than four credits, the credit deficiency must be replaced by additional senior elective credits.

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 Select either EE 362 or EE 372, whichever course remains to be taken.

⁵ Select from the list of courses in category 3B in the AUCC.

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

⁷ Select from the list of courses in category 3F in the AUCC.

⁸ Select from departmental list of approved courses.

Optoelectronic Engineering Concentration

Optoelectronic engineering focuses on optics and waves, optical electronics, optical information processing, and communications.

Optoelectronic engineering students take an additional physics course, senior-level courses in optical electronics and optical processing, and technical electives in the optical area.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
CSCC 153	Java Programming (M CC 118 with a C or better)	4	2B
EE 102	Digital Circuit Logic	4	
EE 192	Electrical Engineering Fundamentals (high school algebra and geometry)	3	
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
SPCC 200	Public Speaking	3	2A1
	TOTAL	30	
SOPHOMORE			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
EE 201	Circuit Theory (EE 192 with grade of C- or better; concurrent registration in M CC 161 and PHCC 142)	3	

Course	Title (Prerequisite)	Cr	AUCC
EE 202	Circuit Theory Applications (EE 201 with grade of C- or better)	4	
EE 251	Introduction to Microprocessors (EE 102 with grade of C- or better)	4	
M 261	Calculus for Physical Scientists III (M CC 161)	4	
M 340	Introduction to Ordinary Differential Equations (M CC 255 or M 261)	4	
	OR		
M 345	Differential Equations (M 229; M CC 161 or M CC 255)	4	
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A
	Health and wellness ¹	2	3G
	Science/engineering elective ²	4	
	TOTAL	34	
JUNIOR			
EE 311	Linear System Analysis I (EE 202 with grade of C- or better and M 340 or M 345)	3	
EE 312	Linear System Analysis II (EE 311 with grade of C- or better)	3	
EE 331	Electronics Principles I (EE 202 with grade of C- or better and M 340 or M 345)	4	
EE 332	Electronics Principles II (EE 331 with grade of C- or better)	4	4A
EE 341	Electromagnetic Fields and Devices I (M 340 or M 345)	3	
EE 342	Electromagnetic Fields and Devices II (EE 341 with grade of C- or better)	3	
EE 372	Physical Electronics (EE 341 with grade of C- or better, PHCC 142)	3	
PH 353	Optics and Waves (M 261, PHCC 142)	4	
	Global and cultural awareness ³	3	3E
	Historical perspectives ⁴	3	3D
	TOTAL	33	
SENIOR			
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
EE 303/ST 303	Introduction to Communications Principles (M 261)	3	
EE 401	Senior Design Project I ⁵ (EE 312 with grade of C- or better, EE 332 with grade of C- or better and EE 342 with grade of C- or better or EE 343 with grade of C- or better)	3	4A, 4B
EE 402	Senior Design Project II (EE 401)	3	4C
EE 404	Experiments in Optical Electronics (concurrent registration in EE 441)	2	
EE 441	Optical Electronics (EE 342 with grade of C- or better)	3	
EE 457	Optical Information Processing (EE 312 with grade of C- or better, EE 342 with grade of C- or better or EE 343 with grade of C- or better)	3	
	Arts/humanities ⁶	3	3B
	U.S. public values and institutions ⁷	3	3F
	Technical electives ⁸	9	
	TOTAL	35	
PROGRAM TOTAL = 132 credits			

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

² One or more courses to be chosen from C CC 112, CE 260, CE 262, CS 200, M 229, M 366, M 419, M 470, ME 237, PH 314, PH 341, or PH 353. If selected course(s) is/are less than four credits, the credit deficiency must be replaced by additional senior elective credits.

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 Project must be an optoelectronic engineering topic.

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

⁷ Select from the list of courses in category 3F in the AUCC.

⁸ Select from departmental list of approved courses in the optoelectronic engineering area.

Graduate Programs in Electrical 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. A description of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF MECHANICAL ENGINEERING

Office in Engineering Building, Room A101
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Professor Allan T., Kirkpatrick, Head
Professor Wade O. Troxell, Associate Department Head
Vicki Jensen, Undergraduate Adviser
Kathy Stencel, Graduate Adviser

Major in Mechanical Engineering

Mechanical engineers design, develop, and manufacture machines and instrumentation. Examples include production machinery, ground/air/space vehicles, medical devices and technologies, robots, heating/refrigeration/air conditioning units, environmental control equipment, and power plants. 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. At Colorado State University 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 from a broad range of technical electives. Participation in labs further develops design, modeling, and analysis skills. Many seniors participate in intercollegiate engineering competitions, applying their knowledge to the solution of real world problems.

Learning Objectives

Graduating mechanical engineers will have displayed:

Competence

- Familiarity with the fundamentals of mathematics, sciences, and the engineering sciences;
- Application of fundamental, experiential, experimental, and technical aspects of mechanical engineering; and
- Strong closed-form and open-ended problem solving skills.

Professionalism

- Recognition of the professional nature of engineering, through ethics, contact with practicing professional, and the study of the role of engineering in industry and society;
- Skills in group dynamics and communications (oral, written, and electronic); and
- Appreciation of the need for life-long learning and an awareness of contemporary issues.

Potential Occupations

Some employment examples include, but are not limited to: design engineer, manufacturing engineer, biomedical engineer, aeronautical engineer, automotive engineer, and building systems engineer.

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			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124 and M CC 160)	4	1B
ME 120	Introduction to Computer-Aided Design (ME 121 or concurrent registration)	3	
ME 121	Mechanical Engineering Shop Practicum	1	
ME 192	Introduction to Mechanical Engineering	2	
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A
	Arts/humanities ¹	3	3B
	Health and wellness ²	2	3G
	TOTAL	32	
SOPHOMORE			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
CE 260	Engineering Mechanics-Statics (M CC 160, PHCC 141)	3	

College of Engineering

Course	Title (Prerequisite)	Cr	AUCC	Course	Title (Prerequisite)	Cr	AUCC
CE 261	Engineering Mechanics-Dynamics (CE 260)	3		ME 344	Heat and Mass Transfer (ME 342)	3	4B
EE 204	Introduction to Electrical Engineering (M CC 161, PHCC 142)	3			TOTAL	32	
M 261	Calculus for Physical Scientists III (M CC 161)	4		SENIOR			
M 340	Introduction to Ordinary Differential Equations (M CC 255 or M 261)	4		ME 486A	Engineering Design Practicum I (ME 304)	3	4C
ME 237	Introduction to Thermal Sciences (PHCC 142)	3		ME 486B	Engineering Design Practicum II (ME 486A)	3	4C
ME 250	Computer Applications in Mechanical Engineering (M 340 or concurrent registration)	2			Global and cultural awareness ⁴	3	3E
STCC 309	Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B		Historical perspectives ⁵	3	3D
	Additional communications ³	3	2A		Social/behavioral sciences ⁶	3	3C
	TOTAL	36			U.S. public values and institutions ⁷	3	3F
JUNIOR					Technical electives ⁸	12	
CE 360	Mechanics of Solids (CE 260 or CE 262)	3			TOTAL	30	
CE 363	Material Properties (CE 360)	1		PROGRAM TOTAL = 130 credits			
ME 304	Engineering Design (ME 120, ME 250; ME 307, ME 324, ME 325, ME 331, ME 338, ME 344, CE 363 or concurrent registration in ME 250; ME 307, ME 324, ME 325, ME 331, ME 338, ME 344, CE 363)	3	4A	¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC).			
ME 307	Mechatronics and Measurement Systems (CE 261, EE 204, M 340)	4		² Select from the list of courses in category 3G in the AUCC.			
ME 324	Dynamics of Machines (ME 121, CE 261 or concurrent registration, M 340 or concurrent registration)	4		³ Select from the list of courses in category 2A in the AUCC.			
ME 325	Machine Design (CE 360)	3		⁴ Select from the list of courses in category 3E in the AUCC.			
ME 331	Introduction to Engineering Materials (C CC 112, C 113, PHCC 142)	4		⁵ Select from the list of courses in category 3D in the AUCC.			
ME 337	Thermodynamics (M 261, ME 237)	3		⁶ Select from the list of course in category 3C in the AUCC.			
ME 338	Thermosciences Laboratory (ME 337, concurrent registration in ME 344)	1		⁷ Select from the list of courses in category 3F in the AUCC.			
ME 342	Mechanics and Thermodynamics of Flow Processes (M 340, ME 237)	3		⁸ Select from department list of approved courses.			

Graduate Programs in Mechanical Engineering

Programs are offered leading to the master of science, master of engineering (mechanical engineering specialization), and doctor of philosophy. A description of these programs may be found in the *Graduate and Professional Bulletin*.

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

College of Liberal Arts

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<http://www.colostate.edu/Colleges/LibArts/>

Professor Heather K. Hardy, Dean
Professor Ann Gill, Associate Dean
Professor Alan C. Lamborn, 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
French
General Philosophy
German
History
Japanese
Media Studies
Music
Political Science
Religious Studies
Russian
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

environment. The College offers courses in the arts, humanities, and social sciences, which are the foundation of a liberal arts education.

Students who major in one of the liberal arts are prepared for a wide variety of careers in areas such as teaching, research, communication, journalism, music therapy, the arts, business, industry, and government, as well as graduate study in the arts, humanities, and social sciences and professional training in the law, ministry, and foreign service.

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 2.0 average in all major courses in addition to the overall grade point average requirement of 2.0 for Colorado State courses.

Prelaw

Offices in Clark Building, Rooms C346 and B349

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 skill in speaking and writing; their insight into social, cultural, economic, and political forms, and their analytical capabilities. Law schools generally require an undergraduate degree for admission.

International Studies and Careers

The College of Liberal Arts encourages students to consider study abroad, international travel, and international careers.

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.international.colostate.edu/studyabroad.

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 one interdisciplinary masters degree. 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. Information may be obtained from any participating department.

For detailed information about graduate programs, contact individual departments. See also the *Graduate and Professional Bulletin*.

OPEN OPTION PROGRAM

This program is for freshmen and sophomores with undecided majors but with interests in the general areas of the College of Liberal Arts. Students may declare a specific major any time after freshman fall registration and must do so no later than the second semester of the sophomore year.

INTERDEPARTMENTAL MAJOR IN LIBERAL ARTS

*Office in Clark Building, Room C138
(970) 491-5421*

<http://www.colostate.edu/Colleges/LibArts/lamajor>

*Professor Ann Gill, Associate Dean
Blane Harding, College Adviser*

Liberal arts majors can select from six concentrations – American studies; arts and humanities; international studies; social sciences; social sciences with social studies licensure; 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 concentration requires courses in American studies along with philosophy, political science, history, sociology, anthropology, English, ethnic studies, art, music, and speech communication.

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			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	4	3A
	Health and wellness ³	2	3G
	Mathematics ⁴	3	1B
	Electives	15	
	TOTAL	30	
SOPHOMORE			
AUCC 100	Self/Community in American Culture, 1600-1877	3	3D
AUCC 101	Self/Community in American Culture Since 1877	3	3F
	Additional communication ⁵	3	2A
	Biological/physical sciences ²	3	3A
	Global and cultural awareness ⁶	3	3E
	Logical/critical thinking ⁷	3	2B
	Social/behavioral sciences ⁸	3	3C
	Electives	9	
	TOTAL	30	
JUNIOR			
AU 300/ E 300	American Lives-Methods in American Studies (AUCC 100, AUCC 101)	3	4A, 4B
	American identities ⁹	6	
	American studies option ¹⁰	10	
	Foreign language ¹¹	6-10	
	Electives	1-5	
	TOTAL	30	
SENIOR			
AU 492	Seminar in American Studies (AU 300/E 300)	3	4C
AU 499	Thesis in American Studies (AU 492)	3	
	OR		
	Additional course from American studies option ¹⁰	3	
	American identities ⁵	3	
	American studies option ¹⁰	11	

Course	Title (Prerequisite)	Cr	AUCC
	Electives	10	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

¹ Select 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 3G of the AUCC.

⁴ Select from list of courses in category 1B of the AUCC.

⁵ Select from list of courses in category 2A of the AUCC.

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

⁷ Select from list of courses in category 2B of the AUCC.

⁸ Select from list of courses in category 3C of the AUCC.

⁹ 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.

¹⁰ 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 prefixes from an approved list for the option.

¹¹ 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 CC 200/L CC 201 or L CC 300).

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>			
AP 412	Indians of North America (APCC 100 or APCC 200 or AP 413 or AP 414/ET 414, or written consent of instructor.	3	
AP 413	Indigenous Peoples Today (APCC 200 or AP 412 or AP 414/ET 414)	3	
AR 314	Women in Art History (ARCC 100 or AR 110)	3	
AR 318	Native American Art (AR 110; ARCC 100 or AR 111 or AR 113)	3	
E 330	Images of Women in Literature	3	
E 332	Modern Women Writers	3	3F
ETCC 100	Ethnicity in America	3	
ET 310	African-American Studies	3	
ET 312	African-American Situation	3	
ET 320	Ethnicity and Film Asian-American Experience	3	
ET 324	Asian-Pacific Americans and the Law	3	
ET 332	Contemporary Chicana/o/Latina/o Issues	3	
ET 340	Native-American Perspectives on Conquest	3	
ET 344	Native-American Ceremony and the Sacred	3	
ET 410	African-American Periods and Personalities	3	
ET 412	Africa and African Diaspora	3	
ET 420	Asian/Pacific-American Families/Communities	3	
ET 424	Asian/Pacific-American Literature and Culture	3	
ET 430	Chicana/o/Latina/o/Creative Expression	3	
ET 432	Chicana/o/Latina/o/Routes to Empowerment	3	
ET 444/ S 444	Federal Indian Law and Policy	3	3D
HYCC 250/ ETCC 250	African-American History 1619-1865	3	3D
HYCC 251/ ETCC 251	African-American History Since 1865	3	
HY 468	Women in America	3	
PO 413	U.S. Civil Rights and Liberties (POCC 101)	3	
PO 423	American Political Theories (POCC 101)	3	
S CC 100	General Sociology	3	3C, 3F
S CC 105	Social Problems	3	3C, 3F
S CC 205	Contemporary Race-Ethnic Relations	3	3E
S 332	Comparative Majority-Minority Relations (S CC 100 or S CC 105)	3	
S 333	Gender Roles in Society (S CC 100 or S CC 105)	3	
S 341	Sociology of Rural Life (S CC 100 or S CC 105)	3	
S 342	Leisure and Society (S CC 100 or S CC 105)	3	
S 343	Sport and Society	3	
S 372	Sociology of Deviance (S CC 100 or S CC 105)	3	

College of Liberal Arts

Course	Title (Prerequisite)	Cr	AUCC
S 375	Sociology of Religion and Medicine (S CC 100 or S CC 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>			
AR 310	History of American Art (AR 212)	3	
AR 315	United States Art Since 1945 (AR 212)	3	
E 234/	Native American Literature	3	
ET 234			
E 247	Vietnam War in Fiction	3	
E CC 270	Introduction to American Literature	3	3B or 3D
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 371	American Authors to 1870 (one course in literature)	3	
E 372	American Authors Since 1870 (one course in literature)	3	
E 403	Nature Writing (one course in literature or COCC 301A-D or E 311A-C)	3	
E 434	American Fiction, 1865-1914 (one course in literature)	3	
E 435	American Fiction, 1914-1945 (one course in literature)	3	
E 436	American Fiction, 1945-Present (one course in literature)	3	
E 437	Heritage of the West (one course in American history)	3	
E 438/	Contemporary Native American Literature	3	
ET 438			
E 439	Novel in the American West (E 179 or E CC 270)	3	
E 475	American Poetry (E 240)	3	
HY 466	American Intellectual History	3	
MU 230	Music of Black Americans	3	
MU 332	History of Jazz	3	
MU 431	American Music	3	
PL 350	Social and Political Philosophy (PL 105 or PL 205 or PL 206 or any upper-division philosophy course)	3	
PO 423	American Political Theories (PO/POCC 101)	3	
S 342	Leisure and Society (S CC 100 or S CC 105)	3	
S 343	Sport and Society	3	
S 375	Sociology of Religion and Medicine (S CC 100 or S CC 105)	3	
SP 311	Historical Speeches on American Issues	3	
SP 349	Freedom of Speech	3	
SP 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>			
EC 310	Poverty and the Welfare State (ECCC 101 or ECCC 202 or EACC 202)	3	
EC 379/	Economic History of the United States	3	
HY 379	(ECCC 101 or ECCC 202 or EACC 202; or any two courses in American history)		
HY 360	Colonial and Provincial America to 1740	3	
HY 362	Era of the American Revolution	3	
HY 364	Early U.S. Republic (HYCC 150)	3	
HY 368	Age of Jackson (HYCC 150)	3	
HY 370	Civil War Era (HYCC 150)	3	
HY 372	Reconstruction and the New South (HYCC 150)	3	
HY 375	United States, 1876-1917	3	
HY 376	United States, 1917-1945	3	
HY 377	United States Since 1945	3	
PL 350	Social and Political Philosophy (PL 105 or PL 205 or PL 206 or any upper-division course in philosophy)	3	
PL 447	Ethical Theory (PL 205 or PL 300 or PL 301)	3	
POCC 101	American Government and Politics	3	3C, 3F
POCC 103	State and Local Government and Politics	3	3C, 3F
PO 301	Political Parties and Interest Groups (POCC 101)	3	
PO 304	Legislative Politics (POCC 101)	3	
PO 305	Judicial Politics (POCC 101)	3	
PO 306	Executive Politics (POCC 101)	3	
PO 309	Urban Politics (POCC 101 or POCC 103)	3	
PO 351	Public Administration (POCC 101)	3	
PO 361	U.S. Environmental Politics and Policy (POCC 101)	3	
PO 413	U.S. Civil Rights and Liberties (POCC 101)	3	
PO 423	American Political Theories (POCC 101)	3	
S 330	Social Stratification (S CC 100 or S CC 105)	3	
S 360	Political Sociology (S CC 100 or S CC 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>			
AP 350	Archaeology of North America (APCC 140)	3	
AP 412	Indians of North America (APCC 100 or APCC 200 or AP 413 or AP 414/ET 414, or written consent of instructor)	3	
AP 413	Indigenous Peoples Today (APCC 200 or AP 412 or AP 414/ET 414)	3	
AP 455	Great Plains Archaeology (APCC 140)	3	
E 179	Western American Literature	3	
E 234/	Native American Literature	3	
ET 234			
E 403	Nature Writing (one course in literature or COCC 301A-D or E 311A-C)	3	
E 437	Heritage of the West (one course in American history)	3	
E 438/	Contemporary Native American Literature	3	
ET 438			
E 439	Novel in the American West (E 179 or E CC 270)	3	
HY 470	American West to 1900	3	
HY 471	American West Since 1900	3	
HY 472	American Southwest	3	
PO 331	Politics and Society Along Mexican Border	3	

Course	Title (Prerequisite)	Cr	AUCC
S 341	Sociology of Rural Life (S CC 100 or S CC 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

The arts and humanities concentration emphasizes the study of many forms of creative human expression. This concentration includes course work in art, American studies, dance, English, foreign language, music, philosophy, speech communication, and theatre.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3-6 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
	U.S. public values and institutions ⁶	3	3F
	Electives	3	
	TOTAL	30	
SOPHOMORE			
	Additional communication ⁷	3	2A
	Biological/physical sciences ²	4	3A
	Global and cultural awareness ⁸	3	3E
	Health and wellness ⁹	2	3G
	Logical/critical thinking ¹⁰	3	2B
	Minor/certificate courses ¹¹	6	
	Arts and humanities electives ¹²	3	
	Electives ¹³	6	
	TOTAL	30	
JUNIOR			
	Minor/certificate courses ¹¹	9	
	Arts and humanities electives ¹²	15	
	Electives ¹³	6	
	TOTAL	30	
SENIOR			
	<i>Select one of the following:</i>		
LB 455/	Narrative Film as a Liberal Art ¹⁴ (senior standing)	3	4B
SP 455			
LB 456/	Documentary Film as a Liberal Art ¹⁴ (senior standing)	3	4B
JT 456			
	Other CLA 4B course ¹⁴	3	4B
LB 492	Liberal Arts Capstone Seminar	2	4A, 4C
	Minor/certificate courses ¹¹	6	
	Arts and humanities electives ¹²	6	
	Electives ¹³	13	
	TOTAL	30	
PROGRAM TOTAL = 120 credits¹⁵			

¹ From All-University Core Curriculum (AUCC) category 3B select two courses. One must have a prefix of ARCC, D CC, MUCC, or THCC and another prefix of E CC, ETCC, L CC, PLCC, or SPCC. 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: AUCC 100/AUCC 101 (AUCC 101 will also count for category 3F), HYCC 100/HYCC 101, HYCC 115/HYCC 215, HYCC 120/HYCC 220, HYCC 150/HYCC 151, HYCC 170/HYCC 171, HYCC 250/HYCC 251 or ETCC250/ETCC 251, HYCC 270/HYCC 271. Students may also select a pair of courses designed to achieve programmatic objectives, if approved by the adviser.

⁴ Select from the list of courses in category 1B in the AUCC.

⁵ Select from the list of courses in category 3C in the AUCC with the following prefixes: APCC, ECCC, JTCC, POCC, PYCC, or S CC.

⁶ Select from the list of courses in category 3F in the AUCC with any of the following prefixes: AUCC, ECCC, ETCC, HYCC, JTCC, PLCC, POCC, or S CC.

⁷ Select from the list of courses in category 2A in the AUCC.

⁸ Select from the list of courses in category 3E in the AUCC with any of the following prefixes: APCC, E CC, ECCC, ETCC, HYCC, L CC, LBCC, PFCC, PLCC, POCC, S CC, SACC, or SPCC.

⁹ Select from the list of courses in category 3G in the AUCC.

¹⁰ Select from the following subset of courses in category 2B in the AUCC: COCC 300, PLCC 110, SPCC 207, STCC 101, STCC 110, STCC 201, STCC 204, STCC 301, STCC 307 or EHCC 307, STCC 309.

¹¹ Students must complete a minor in the arts and humanities or one of the following interdisciplinary certificate programs: Asian Studies; Environmental Affairs; Ethnic Studies; Latin American 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.

¹² Students must complete 30 credits, 18 of which must be upper division, in at least two other prefixes from the following: AR, D, E, L, MU, SP, SP, TH, or ET or LB (if the course has an arts or humanities focus). A student must have at least 9 credits in one single prefix. Of the 30 total credits, 6 of the lower division credits are assumed to come from the 6 credits of arts and humanities listed in the freshman year. See note 1 above.

¹³ 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.

¹⁴ Either take LB 455/SP 455 or LB 456/JT 456 or any category 4B course in the College of Liberal Arts that is appropriate to the student's program of study.

¹⁵ 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 154 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. *The engineering science degree is not accredited by the Accreditation Board for Engineering and Technology (ABET).*

M CC 120A-B, M CC 121, M CC 124, M CC 125, and M CC 126 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			
C CC 111	General Chemistry I (M CC 118, M CC 121 or placement in M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent reg.)	1	3A
CE 108	Civil Engineering Principles I	3	
CE 109	Civil Engineering Principles II (CE 108)	3	
EG 192	Seminar	1	
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent reg. in M CC 124)	4	1B
M 229	Matrices and Linear Equations (M CC 141 or M CC 155 or M CC 160)	2	
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
	Arts/humanities ¹	6	3B
	Global and cultural awareness ²	3	3E
	TOTAL	32	
SOPHOMORE			
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	

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Course	Title (Prerequisite)	Cr	AUCC
COCC 150	College Composition (composition placement exam score of 3-6 or CO 130)	3	1A
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B
M 261	Calculus for Physical Scientists III (M CC 161)	4	
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent reg. in M CC 161 or M CC 255)	5	3A
SPCC 200	Public Speaking	3	2A1
	Historical perspectives ³	6	3D
	Social/behavioral sciences ⁴	3	3C
	U.S. public values and institutions ⁵	(3)	3F
	TOTAL	31	
JUNIOR			
CE 260	Engineering Mechanics-Statics (M CC 160, PHCC 141)	3	
CE 261	Engineering Mechanics-Dynamics (CE 260)	3	
M 340	Introduction to Ordinary Differential Equations (M CC 255 or M 261)	4	4A, 4B
ME 237	Introduction to Thermal Sciences (PHCC 142)	3	
STCC 309	Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B
	Minor or certificate ⁶	9	
	Arts and humanities electives ⁷	6	
	TOTAL	31	
SENIOR			
CE 300	Fluid Mechanics (CE 261 or CE 262, ME 237)	4	
EE 204	Introduction to Electrical Engineering (M CC 161, PHCC 142)	3	
	Health and wellness ⁸	2	3G
	Minor or certificate ⁶	12	
	Arts and humanities electives ^{8*}	6	
	TOTAL	27	
FIFTH YEAR			
<i>Select one of the following pairs of courses:</i>			
CE 408	Civil Engineering Design I (CE 309)	3	
CE 409	Civil Engineering Design II (CE 408)	3	4C
OR			
CH 451	Chemical Engineering Design I (CH 341, CH 420, CH 442/EV 442 or concurrent reg.)	3	4C
CH 452	Chemical Engineering Design II (CH 451)	3	4C
OR			
EE 401	Senior Design Project I (EE 312 with grade of C- or better, EE 332 with grade of C- or better and EE 342 with grade of C- or better or EE 343 with grade of C- or better)	3	
EE 402	Senior Design Project II (EE 401)	3	4C
OR			
ME 486A	Engineering Design Practicum I (ME 304)	3	4C
ME 486B	Engineering Design Practicum II (ME 486A)	3	4C
	Technical electives in engineering ⁹	27	
	TOTAL	33	

PROGRAM TOTAL = 154 credits

¹ From All-University Core Curriculum (AUCC) category 3B select two courses. One must have a prefix of ARCC, D CC, MUCC, or THCC and another a prefix of E CC, ETCC, PLCC, or SPCC. 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, however double count in the global and cultural awareness category.

² Select from the following subset of courses in category 3E in the AUCC: APCC 200, E CC 238, E CC 245, ECCC 211, ETCC 253, ETCC 256, HYCC 120, HYCC 216, HYCC 219, HYCC 220, HYCC 230, HYCC 238, L CC 192, L CC 215, L CC 250, L CC 255, LBCC 170, LBCC 171, PFCC 110, PLCC 170, POCC 131, POCC 241, S CC 205, SACC 482, SPCC 192. The HYCC courses, if selected here, cannot also be counted in category 3D.

³ Select one pair of courses from the following subset of courses in category 3D in the AUCC: AUCC 100/AUCC 101 (AUCC 101 will also count for category 3F), HYCC 100/HYCC 101, HYCC 150/HYCC 151, HYCC 170/HYCC 171, HYCC 250/HYCC 251 or ETCC 250/ETCC251. Students may also select a pair of courses designed to achieve programmatic objectives, if approved by the adviser.

⁴ Select from the list of courses in category 3C in the All-University Core Curriculum (AUCC) with the following prefixes: APCC, ECCC, JTCC POCC, PYCC, or S CC.

⁵ Select a course in category 3F that also fulfills another category in the AUCC. The courses that fulfill this category and also count for 3D are: AUCC 101, HYCC 150,

and HYCC 151. The courses that fulfill this category and also count for 3C are: JTCC 100, POCC 101, POCC 103, S CC 100, and S CC 105. Selection of any other course in the category will lengthen the program.

⁶ Students must complete a minor in the arts and humanities or one of the following interdisciplinary certificate programs: Asian Studies; Environmental Affairs; Ethnic Studies; Latin American 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.

⁷ Students must complete 12 upper-division credits in at least two arts and humanities prefixes, not including the minor. Arts and humanities prefixes are: AR, D, E, L, MU, PL, SP, TH, ET (if the course has an arts and humanities focus), LB 455.

⁸ Select from the list of courses in category 3G in the AUCC.

⁹ Select courses from departmental list.

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 three options: *Latin American, Asian, or European 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			
<i>Select one of the following courses:</i>			
APCC 200	Cultures and the Global System	3	3E
E CC 238	20 th Century Fiction	3	3E
E CC 245	World Drama	3	3E
ECCC 211	Gender in the Economy	3	3E
ETCC 253	Chicana/o History and Culture	3	3E
ETCC 256	Americans in a Changing World	3	3E
L CC 192	Modern Languages/Cultures: Italian/Japanese	3	3E
L CC 215	Translation Between Cultures and Languages	3	3E
L CC 250	Language, Literature, Culture in Translation	3	3E
L CC 255	Crossing Cultures	3	3E
LBCC 170	World Literatures to 1500	3	3E
LBCC 171	World Literatures – The Modern Period	3	3E
PFCC 110	Performing Arts Around the World	3	3E
PLCC 170	World Philosophies	3	3E
POCC 131	Current World Problems	3	3E
POCC 241	Comparative Government and Politics	3	3E
S CC 205	Contemporary Race-Ethnic Relations	3	3E
SACC 482V	Study Abroad ¹		3E
<i>Select one of the following courses:</i>			
ARCC 100	Introduction to the Visual Arts	3	3B
D CC 110	Understanding Dance	3	3B
E CC 140	The Study of Literature	3	3B
E CC 232	Introduction to Humanities	3	3B
E CC 242	Reading Shakespeare	3	3B
E CC 270	Introduction to American Literature	3	3B
E CC 276	Survey of British Literature I	3	3B
E CC 277	Survey of British Literature II	3	3B
ETCC 205	Ethnicity and the Media	3	3B
ETCC 240	Native American Cultural Expressions	3	3B
MUCC 100	Music Appreciation	3	3B
MUCC 111	Music Theory Fundamentals	3	3B
MUCC 231	Women in Music	3	3B
PLCC 100	Appreciation of Philosophy	3	3B
SPCC 100	Communication and Popular Culture	3	3B
SPCC 201	Rhetoric in Western Thought	3	3B

Course	Title (Prerequisite)	Cr	AUCC
THCC 141	Introduction to Theatre	3	3B

AUCC 100	Self/Community in American Culture, 1600-1877	3	3D
AUCC 101	Self/Community in American Culture Since 1877	3	3D, 3F
HYCC 100	Western Civilization, Pre-Modern	3	3D
HYCC 101	Western Civilization, Modern	3	3D
HYCC 150	U.S. History to 1876	3	3D, 3F
HYCC 151	U.S. History Since 1876	3	3D, 3F
HYCC 170	World History, Ancient-1500	3	3D
HYCC 171	World History, 1500-Present	3	3D
POCC 131	Current World Problems	3	3D
POCC 232	International Relations	3	3D
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
	Health and wellness ²	2	3G
	Mathematics ³	3	1B
	Electives	2-3	
	TOTAL	19-20	

SOPHOMORE			

Select one of the following courses:			
COCC 300	Writing Arguments (COCC 150)	3	2B
PLCC 110	Logic and Critical Thinking	3	2B
SPCC 207	Rhetoric and Argumentation	3	2B
STCC 101	Activity Based Statistics (math placement exam)	3	2B
STCC 110	Statistical Thinking: Concepts and Applications (math placement exam)	3	2B
STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
STCC 204	Statistics for Business Students (M CC 117 or M CC 120A-B)	3	2B
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
STCC 307/ EHCC 307	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B
STCC 309	Statistics for Engineers and Scientists (M CC 151 or M CC 255)	3	2B

Select one of the following courses:			
ECCC 204	Principles of Macroeconomics (ECCC 202 or EACC 202)	3	3F
ECCC 212	Racial Inequality and Discrimination	3	3F
ECCC 240/ EACC 240	Issues in Environmental Economics	3	3F
ETCC 100	Ethnicity in America	3	3F
ETCC 204	Ethnicity in Colorado	3	3F
HYCC 150	U.S. History to 1876	3	3F, 3D
HYCC 151	U.S. History Since 1876	3	3F, 3D
NRCC 320	Natural Resources History and Policy	3	3F
PLCC 103	Moral and Social Issues	3	3F
POCC 101	American Government and Politics	3	3F
POCC 103	State and Local Government and Politics	3	3F
S CC 100	General Sociology	3	3F, 3C
S CC 105	Social Problems	3	3F, 3C
L CC 200	Second Year Language I (L 107 or L 108 or placement exam)	3-5	2A3
	Biological/physical sciences ⁴	7	3A
	Social/behavioral sciences ⁵	3	3C
	TOTAL	19-21	

JUNIOR			
IN 300	Approaches to International Studies (nine credits from AUCC categories 3C, 3D, 3E, and/or 3F; one year of a foreign language)	3	4B

SENIOR			
IN 492A-C	Seminar ⁶	3	4A, 4C
CORE TOTAL = 44-47 credits⁷			

¹ Study Abroad; recommended in junior year.

² Select from the list of courses in category 3G in the All-University Core Curriculum (AUCC).

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

⁴ Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

⁵ Select from the list of courses in category 3C in the AUCC with one of the following prefixes: APCC, ECCC, JTCC, POCC, PYCC, or S CC.

⁶ Select subtopic according to option.

⁷ Select one of the following options – Asian studies, European studies, or Latin American 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			
L 105	First-Year Language I (no previous experience in language)	5	
[C, J] ¹			
L 107	First-Year Language II (L 105 or L 106)	5	
[C, J] ¹			
	TOTAL	10	
SOPHOMORE			
HYCC 120	Asian Civilizations I	3	3D or 3E
HYCC 220	Asian Civilizations II	3	3D or 3E
L CC 201	Second Year Language II (L CC 200 or placement exam)	5	2A3
[C, J] ¹			
	TOTAL	11	
JUNIOR			
	Track courses ³	18	
	Electives ⁴	9	
	TOTAL	27	
SENIOR			
	Track courses ³	3	
	Electives ⁴	22-25	
	TOTAL	25-28	
PROGRAM TOTAL = 120 credits			

¹ Chinese or Japanese.

² See the All-University Core Curriculum section of the catalog for an explanation of which language courses will satisfy category 2B requirement (if so allowed by the student's major).

³ Three different prefixes, 6 credits minimum from each track, for a total of 21 credits. *Track I—History and Politics of Asia:* HY 302, HY 305, HY 331, HY 335, HY 337, HY 339, HY 341, HY 344, HY 346, HY 348, HY 402, HY 403, HY 404, HY 460, IE 271, PO 445; *Track II—The Thought and Culture of Asia:* AP 312, AR 112, AR 316, E 356, L CC 250C or J, L 304J, L 305J, L 309, L 465B, L 496J, PL 106, PL 172, PL 309, PL 349, PL 360, PL 371, PL 379, PL 455.

⁴ 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.

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	First-Year Language I (no previous experience in language)	5	
[F,G,I,R,S] ¹			
L 107	First-Year Language II (L 105 or L 106)	5	
[F,G,I,R,S] ¹			
	TOTAL	10	
SOPHOMORE			
L CC 201	Second-Year Language II (L CC 200 or placement exam)	3-4	2A3
[F,G,I,R,S] ¹			
	Electives ²	6	
	TOTAL	9-10	

JUNIOR			

Select 6 credits from the following courses:			
HYCC 100	Western Civilization, Pre-Modern ³	3	
AND			
HYCC 101	Western Civilization, Modern ³	3	
OR			
	Two HY 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	

College of Liberal Arts

Course	Title (Prerequisite)	Cr	AUCC
	Electives ²	23-27	
	TOTAL	26-30	

PROGRAM TOTAL = 120 credits

¹ French, German, Italian, Russian, or Spanish.

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 HYCC 100 and HYCC 101 are used to fulfill the history sequence within the option, a course other than one of these two must be used to fulfill AUCC category 3D.

⁴ With approval of adviser.

⁵ Three different prefixes, 6 credits minimum from each track, for a total of 21 credits. *Track I—History and Politics of Europe:* EC 376, HY 304, HY 306, HY 306, HY 309, HY 310, HY 318, HY 326, HY 346, HY 410, HY 415, HY 416, HY 417, HY 418, HY 442, HY 423, HY 435, HY 438, HY 440, HY 442, HY 451, HY 452, HY 474, PO 341, PO 345, PO 420, PO 421; *Track II—The Thought and Cultures of Europe:* AP 324, AR 110, AR 111, AR 212, AR 410, AR 411, AR 412, AR 414, AR 415, AR 416, AR 417, AR 420, BG 350, E CC 276, E CC 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, E 477, ID 357, L 310, L 313, L 335 L 345, L 355, L 413, L 433A-B, L 434, L 437, L 441, L 450, L 452, L 453, L 454, L 460, L 465C, LA 120, MU 334, MU 335, PL 300, PL 301, PL 302, PL 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			
L 105S	First-Year Language I-Spanish (no previous study in language)	5	
L 107S	First-Year Language II-Spanish (L 105S or L 106S)	5	
	TOTAL	10	
SOPHOMORE			
HYCC 238	Latin America Since 1500	3	
L CC 201S	Second-Year Language II-Spanish (L CC 200S or placement exam)	3	
	Electives	6	
	TOTAL	12	
JUNIOR			
<i>Select one of the following courses:</i>			
HY 350	Mexico	3	
HY 352	Caribbean Civilization (HYCC 101 or HYCC 171 or HY 354)	3	
HY 354	Colonial Latin America (HYCC 101 or HYCC 171 or HYCC 238)	3	
HY 444	Revolutions in Latin America	3	
	Track courses ¹	18	
	Electives ²	6	
	TOTAL	27	
SENIOR			
	Track courses ¹	3	
	Electives ²	21-24	
	TOTAL	24-27	
PROGRAM TOTAL = 120 credits²			

¹ Three different prefixes, 6 credits minimum from each track, for a total of 21 credits. *Track I—Social Sciences:* AP 319, AP 332, AP 451, EA 460, PO 331, PO 446, PO 447, S 366; *Track II—Civilization, History, and Literature of Latin America:* AR 312, HY 350, HY 352, HY 444, L 310S, L 335S, L 336, L 345S, L 435, L 436, L 441S, L 445, L 449, L 452S, L 453S, L 454S, L 465A. If HY 350, HY 352, HY 354, or HY 444 is used for the history sequence, that course cannot double count as a Track II course.

² Minimum 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.

Social Sciences Concentration

The social sciences concentration focuses upon the study of human behavior, history, and social institutions. This concentration includes courses in anthropology, economics, ethnic studies, geography, history, technical journalism, political science, psychology, and sociology.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
	Arts and humanities ¹	3	3B
	Biological/physical sciences ²	4	3A
	Health and wellness ³	2	3G
	Historical perspectives ⁴	6	3D
	Mathematics ⁵	3	1B
	Social/behavioral sciences ⁶	3	3C
	U.S. public values and institutions ⁷	3	3F
	Electives ⁸	3	
	TOTAL	30	
SOPHOMORE			
	Minor/certificate courses ⁹	6	
	Additional communication ¹⁰	3	2A
	Arts and humanities ¹	3	3B
	Biological/physical sciences ²	3	3A
	Global and cultural awareness ¹¹	3	3E
	Logical/critical thinking ¹²	3	2B
	Social science electives ¹³	3	
	Electives ⁸	6	
	TOTAL	30	
JUNIOR			
	Minor/certificate courses ⁹	9	
	Social science electives ¹³	12	
	Electives ⁸	9	
	TOTAL	30	
SENIOR			
<i>Select one of the following:</i>			
LB 455/	Narrative Film as a Liberal Art ¹⁴ (senior standing)	3	4B
SP 455	standing)		
LB 456/	Documentary Film as a Liberal Art ¹⁴ (senior standing)	3	4B
JT 456	standing)		
	Other CLA 4B course ¹⁴	3	4B
LB 492	Liberal Arts Capstone Seminar	2	4A, 4C
	Minor/certificate courses ⁹	6	
	Social science electives ¹³	6	
	Electives ⁸	13	
	TOTAL	30	
PROGRAM TOTAL = 120 credits¹⁵			

¹ From All-University Core Curriculum (AUCC) category 3B select two courses. One must have a prefix of ARCC, D CC, MUCC, or THCC and the other a prefix of E CC, ETCC, L CC, PLCC, or SPCC. Any course counted here cannot double count in the global and cultural awareness category.

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 the list of courses in category 3G in the AUCC.

⁴ Select one pair of courses from the following subset of courses in category 3D in the AUCC: AUCC 100/AUCC 101 (AUCC 101 will also count for category 3F), HYCC 100/HYCC 101, HYCC 115/HYCC 215, HYCC 120/HYCC 220, HYCC 150/HYCC 151, HYCC 170/HYCC 171, HYCC 238/HY 354 (HY 354 does not count for category 3D), HYCC 250/HYCC 251 or ETCC 250/ETCC 251. Students may also select a pair of courses designed to achieve programmatic objectives, if approved by the adviser.

⁵ Select from the list of courses in category 1B in the AUCC.

⁶ Select from the list of courses in category 3C with the following prefixes: APCC, ECCC, JTCC, POCC, PYCC, or S CC.

⁷ Select from the list of courses in Category 3F in the AUCC with any of the following prefixes: AUCC, ECCC, ETCC, HYCC, JTCC, PLCC, POCC, or S CC.

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 Students must complete a minor in the social sciences, or one of the following interdisciplinary certificate programs: American Ethnicity; Asian Studies; Criminal Justice; Environmental Affairs; Latin American 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.

¹⁰ Select from the list of courses in category 2A in the AUCC.

¹¹ Select from the list of courses in category 3E in the AUCC with any of the following prefixes: APCC, AUCC, D CC, E CC, ECCC, ETCC, HYCC, L CC, LBCC, PFCC, PLCC, POCC, S CC, SACC, SPCC.

¹² Select from the list of courses in category 2B in the AUCC.

¹³ Students must complete 30 credits, 18 of which must be upper division in at least two other prefixes in the social sciences (AP, AU, EC, HY, JT, PO, PY, S, or ET or LB if the course has a social sciences focus). A student must have at least 9 credits in one single prefix. Of the 30 total credits, it is assumed that 9 credits will come from courses taken to fulfill AUCC categories 3C, 3D, and 3E, although it must be a social science prefix. If a separate course with a social science prefix is taken for 3F, it, too, can double count. If a course is used to double count in the minor or certificate program, it may not also be counted in the social science electives category.

¹⁴ Either take LB 455/SP 455 or LB 456/JT 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: PY 315, PY 320, PY 325.

¹⁵ Students must complete 120 credits, and a minimum total of 42 upper-division credits.

Social Sciences Concentration with Social Studies Licensure

The social sciences concentration with social studies licensure prepares students for teaching positions in public school 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 of this catalog for general information. Detailed information about the Educator Licensing Program and licensure requirements are available on the program's Web site (<http://teachered.colostate.edu/>) or in room 111 of the Education Building.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130) <i>Select one of the following courses:</i>	3	1A
E CC 140	The Study of Literature	3	3B
E CC 232	Introduction to Humanities	3	3B
E CC 242	Reading Shakespeare	3	3B
E CC 270	Introduction to American Literature	3	3B
E CC 275	Introduction to British Literature	3	3B
ETCC 205	Ethnicity and the Media	3	3B
ETCC 240	Native American Cultural Expressions	3	3B
PLCC 100	Appreciation of Philosophy	3	3B
SPCC 100	Communication and Popular Culture	3	3B
SPCC 201	Rhetoric in Western Thought	3	3B
GR 100	Introduction to Geography	3	
<i>Select one of the following pairs of courses:</i>			
HYCC 100	Western Civilization, Pre-Modern	3	3D
HYCC 101	Western Civilization, Modern	3	3D
OR			
HYCC 170	World History, Ancient-1500	3	3D
HYCC 171	World History, 1500-Present	3	3D
PLCC 110	Logical and Critical Thinking	3	2B
POCC 101	American Government and Politics	3	3C, 3F
	Biological/physical sciences ¹	4	3A
	Mathematics ²	3	1B
	Elective	3	
	TOTAL	31	
SOPHOMORE			
<i>Select one of the following courses:</i>			
ARCC 100	Introduction to the Visual Arts	3	3B
D CC 110	Understanding Dance	3	3B
MUCC 100	Music Appreciation	3	3B
MUCC 111	Music Theory Fundamentals	3	3B
MUCC 231	Women in Music	3	3B
THCC 141	Introduction to Theatre	3	3B

Course	Title (Prerequisite)	Cr	AUCC
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	
ECCC 204	Principles of Macroeconomics (ECCC 202 or EACC 202)	3	
GR 320	Cultural Geography (GR 100)	3	
HYCC 150	U.S. History to 1876	3	
HYCC 151	U.S. History Since 1876	3	
POCC 241	Comparative Government and Politics	3	3E
SPCC 200	Public Speaking	3	2A
	Biological/physical sciences ¹	3	3A
	Health and wellness ²	2	3G
	TOTAL	29	
JUNIOR			
APCC 100	Introductory Cultural Anthropology	3	
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology and Assessment (Completion of Phase 1 courses; BD 150 or CS 110 within three years or computer proficiency test; consent of Teacher Licensure Office)	2	
ED 340	Literacy and the Learner (completion of 30 credits of course work. Required background check through CDE, CBI, FBI)	3	
ED 350	Instruction I-Individualization/Management (EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 275, ED 340, concurrent registration in ED 350; admission to Teacher Licensure Program)	1	
	Non-U.S. history, upper-division ⁴	6	
	Upper-division U.S. history pre-1865 ⁵	3	
	Upper-division U.S. history post-1865 ⁶	3	
	Electives	6	
	TOTAL	33	
SENIOR			
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent registration in ED 486J)	4	
ED 465	Methods and Materials in Social Studies (admission to Teacher Licensure program)	4	
ED 485B	Student Teaching-Secondary (ED 450, ED 465)	11	4A
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
ED 493A	Seminar-Professional Relations (ED 426 or ED 450, ED 465, concurrent registration in ED 485A or B or C)	1	
ED 493B	Seminar-Assessment of Learning (ED 426 or ED 450, ED 465, concurrent registration in ED 485A or B or C or VE 485)	1	4B
LB 492	Liberal Arts Capstone Seminar	2	4C
	Upper-division political science/economics ⁷	3	
	TOTAL	27	
PROGRAM TOTAL = 120 credits			

¹ Select from the list of courses in category 3A in the All-University Core Curriculum (AUCC). One of the courses must have a laboratory component).

² Select from the list of courses in category 1B in the AUCC.

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

⁴ Students must complete six upper-division credits in non-U.S. history.

⁵ Any upper-division U.S. history pre-1876.

⁶ Any upper-division U.S. history post-1876.

⁷ Any upper-division course in political science or economics.

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 157 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. *The engineering science degree is not accredited by the Accreditation Board for Engineering and Technology (ABET).*

M CC 120A-B, M CC 121, M CC 124, M CC 125, and M CC 126 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			
C CC 111	General Chemistry I (M CC 118, M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent reg.)	1	3A
CE 108	Civil Engineering Principles I	3	
CE 109	Civil Engineering Principles II (CE 108)	3	
EG 192	Seminar	1	
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent reg. in M CC 124)	4	1B
M 229	Matrices and Linear Equations (M CC 141 or M CC 155 or M CC 160)	2	
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
	Health and wellness ¹	2	3G
	Historical perspectives ²	6	3D
	Social/behavioral sciences ³	3	3C
	TOTAL	34	
SOPHOMORE			
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
COCC 150	College Composition (composition placement exam score of 3-6 or CO 130)	3	1A
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B
M 261	Calculus for Physical Scientists III (M CC 161)	4	
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent reg. in M CC 161 or M CC 255)	5	3A
SPCC 200	Public Speaking	3	2A1
	Arts and humanities ⁴	6	3B
	Global and cultural awareness ⁵	3	3E
	U.S. public values and institutions ⁶	(3)	3F
	TOTAL	31	
JUNIOR			
CE 260	Engineering Mechanics-Statics (M CC 160, PHCC 141)	3	
CE 261	Engineering Mechanics-Dynamics (CE 260)	3	
M 340	Introduction to Ordinary Differential Equations (M CC 255 or M 261)	4	4A, 4B
ME 237	Introduction to Thermal Sciences (PHCC 142)	3	
STCC 309	Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B
	Minor or certificate ⁷	12	
	Social science electives ⁸	6	
	TOTAL	34	
SENIOR			
CE 300	Fluid Mechanics (CE 261 or CE 262, ME 237)	4	
EE 204	Introduction to Electrical Engineering (M CC 161 or PHCC 142)	3	
	Minor or certificate ⁷	9	
	Social science electives ⁸	6	
	Technical electives in engineering ⁹	6	
	TOTAL	28	
FIFTH YEAR			
<i>Select one of the following pairs of courses:</i>			
CE 408	Civil Engineering Design I (CE 309)	3	
CE 409	Civil Engineering Design II (CE 408)	3	4C
OR			

Course	Title (Prerequisite)	Cr	AUCC
CH 451	Chemical Engineering Design I (CH 341, CH 420, CH 442/EV 442 or concurrent reg.)	3	4C
CH 452	Chemical Engineering Design II (CH 451)	3	4C
OR			
EE 401	Senior Design Project I (EE 312 with a grade of C- or better, EE 332 with a grade of C- or better and EE 342 with a grade of C- or better or EE 343 with a grade of C- or better)	3	
EE 402	Senior Design Project II (EE 401)	3	4C
OR			
ME 486A	Engineering Design Practicum I (ME 304)	3	4C
ME 486B	Engineering Design Practicum II (ME 486A)	3	4C
			24
Technical electives in engineering ⁹			
TOTAL			30

PROGRAM TOTAL = 157 credits

- ¹ Select from the list of courses in category 3G of the All-University Core Curriculum (AUCC).
- ² Select one pair of courses from the following subset of courses in category 3D in the AUCC; AUCC 100/AUCC 101 (AUCC 101 will also count for category 3F), HYCC 100/HYCC 100, HYCC 120/HYCC 220, HYCC 150/HYCC 151, HYCC 170/HYCC 171, HYCC 238/HY 354 (HY 354 does not count for category 3D), HYCC 250/HYCC 251 or ETCC 250/ ETCC 251. Students may also select a pair of courses designed to achieve programmatic objectives, if approved by the adviser.
- ³ Select from the list of courses in category 3C in the AUCC with the following prefixes: APCC, ECCC, JTCC, POCC, PYCC, or S CC.
- ⁴ From AUCC category 3B select two courses. One must have a prefix of ARCC, D CC, MUCC, or THCC and another a prefix of E CC, ETCC, PLCC, or SPCC. Any course counted here cannot double count in the global and cultural awareness category.
- ⁵ Select from the following subset of courses in category 3E in the AUCC: APCC 200, E CC 238, E CC 245, ECCC 211, ETCC 253, ETCC 256, HYCC 120, HYCC 215, HYCC 219, HYCC 220, HYCC 230, HYCC 238, L CC 192, L CC 215, L CC 250, L CC 255, LBCC 170, LBCC 171, PFCC 110, PLCC 170, POCC 131, POCC 241, S CC 205, SACC 482, SPCC 192. The HYCC courses, if selected here, cannot also be counted in category 3D.
- ⁶ Select a course in category 3F that also fulfills another category in the AUCC. The courses that fulfill this category and also count for 3D are: AUCC 101, HYCC 150, and HYCC 151. The courses that fulfill this category and also count for 3C are: JTCC 100, POCC 101, POCC 103, S CC 100, and S CC 105. Selection of any other course in the category will lengthen the program.
- ⁷ Students must complete a minor in the social sciences, or one of the following interdisciplinary certificate programs: Asian Studies; Environmental Affairs; Ethnic Studies; Latin American 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.
- ⁸ Students must complete 12 upper-division credits in at least two social sciences prefixes, not including the minor. Social sciences prefixes are AP, AU, EC, HY, JT, PO, PY, S, ET (if the course has a social sciences focus), LB (456).
- ⁹ Select from department list.

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			
JTCC 100	Introduction to Mass Media	3	3C, 3F

Course	Title (Prerequisite)	Cr	AUCC
OR			
SPCC 100	Communication and Popular Culture	3	3B
UPPER DIVISION			
JT 415	Communications Law	3	
OR			
SP 349	Freedom of Speech	3	
<i>Select 15 credits from the following:</i>			
JT 311	History of Media	3	
JT 316/	Multiculturalism and the Media	3	
ET 316			
JT 411	Media Ethics and Issues	3	
JT 412	International Mass Communication	3	
JT 413	New Communication Technologies and Society	3	
SP 341	Evaluating Contemporary Television	3	
SP 342	Critical Media Studies	3	
SP 354	History and Appreciation of Film	3	
SP 355	Evaluating Contemporary Film (SP 354)	3	
SP 449	Law and Policy of Communication Technologies	3	
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

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. Field classes that involve the excavation of archaeological sites are offered during the summer. Graduates should be able to view the human condition with equal ability from its behavioral, biological, and historical perspectives. The well-rounded liberal arts education plus acquisition of important marketable skills including analytical ability, communication, and people skills, make anthropology graduates valuable in 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 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.

College of Liberal Arts

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
APCC 100	Introductory Cultural Anthropology	3	3C
OR			
APCC 200	Cultures and the Global System	3	3E
APCC 120	Human Origins and Variation	3	3A
APCC 121	Human Origins and Variation Laboratory (APCC 120 or concurrent registration)	1	3A
APCC 140	Introduction to Prehistory	3	3D
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
	Additional communication ¹	3	2A
	Health and wellness ²	2	3G
	Logic/critical thinking ³	3	2B
	Mathematics ⁴	3	1B
	U.S. public values and institutions ⁵	3	3F
	Elective	3	
	TOTAL	30	
SOPHOMORE			
	Arts and humanities ⁶	9	3B
	Biological and physical sciences ⁷	10-11	3A
	Global and cultural awareness ⁸	3	3E
	Social and behavioral science ⁹	6	
	Anthropology elective ⁹	3	
	TOTAL	31-32	
JUNIOR			
AP 400	History of Anthropological Theory (APCC 100 or APCC 200; APCC 140 or APCC 120 and APCC 121)	3	4B
<i>Select one of the following:</i>			
S 310	Quantitative Sociological Analysis (M CC 120A-B or M CC 117)	3	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	
STCC 307/ EHCC 307	Introduction to Biostatistics (M 118 or M CC 121)	3	
STCC 311	Statistics for Behavioral Sciences I (M CC 118 or M CC 121)	3	
	Social and behavioral sciences ⁹	3	
	Upper-division archaeology ⁹	3	
	Upper-division biological anthropology ⁹	3	
	Upper-division cultural anthropology ⁹	3	
	Anthropology electives ⁷	3	
	Electives	9	
	TOTAL	30	
SENIOR			
<i>Select one of the following:</i>			
AP 329	Cultural Change (APCC 100)	3	4A
AP 330	Human Ecology (APCC 100; APCC 120 or BY 220 or BZCC 101)	3	4A
AP 332	Peoples of the Caribbean (APCC 100 or APCC 200)	3	4A
AP 334	Narrative Traditions and Social Experience (APCC 100 or APCC 200 or E CC 140 or S CC 100, or written consent of instructor)	3	4A
AP 340	Medical Anthropology (APCC 100)	3	4A
AP 374	Human Biological Variation (APCC 120 or BZCC 101 or BZCC 110 or LSCC 102)	3	4A
AP 376	Evolution of Human Adaptation (APCC 120 or BZCC 110 or LSCC 102)	3	4A
AP 412	Indians of North America (APCC 100 or APCC 200 or AP 413 or AP 414/ET 414, or written consent of instructor)	3	4A
AP 450	Hunter-Gatherer Ecology (APCC 100; APCC 120 and APCC 121; APCC 140)	3	4A
AP 451	Andean Archaeology and Ethnohistory (APCC 100, APCC 140)	3	4A
AP 455	Great Plains Archaeology (APCC 140)	3	4A
AP 461	Archaeological Report Preparation (AP 460; written consent of instructor)	3	4A
AP 493	Capstone Seminar (concurrent registration in one of the following: AP 329, AP 330, AP 332, AP 334, AP 356, AP 374, AP 412, AP 450, AP 451, AP 455, AP 461)	1	4C
	Arts/humanities ⁹	3	
	Social/behavioral sciences ⁹	3	
	Anthropology elective ⁹	3	

Course	Title (Prerequisite)	Cr	AUCC
	Electives		15-16
	TOTAL		28-29

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 2A in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3G in the AUCC.

³ Select from the list of courses in category 2B in the AUCC.

⁴ Select three credits, except M CC 133, from the courses in category 1B in the AUCC.

⁵ Select from the list of courses in category 3F in the AUCC.

⁶ Select three credits from the list of courses in category 3B in the AUCC. See department advising manual for selection of the remaining six credits.

⁷ 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).

⁸ Select from the list of courses in category 3E in the AUCC.

⁹ See department advising manual for course selection. Cannot be the same class used to fulfill the 4A/4C requirement.

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
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LOWER DIVISION

APCC 100	Introductory Cultural Anthropology	3	3C
OR			
APCC 200	Cultures and the Global System	3	3E
APCC 120	Human Origins and Variation	3	3A
APCC 121	Human Origins and Variation Laboratory (APCC 120 or concurrent registration)	1	3A
APCC 140	Introduction to Prehistory	3	3D
	TOTAL	10	

UPPER DIVISION

	*Any combination of upper-division anthropology courses	12	
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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. A description of these programs may be found in the *Graduate and Professional Bulletin*.

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 (2.00) must be achieved in each upper-division art course in the student's concentration. The minimum scholastic average acceptable for graduation is 2.00 computed only for courses attempted at Colorado State.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
AR 110	History of Western Art I	3	
AR 111	History of Western Art II (AR 110)	3	
AR 135	Introduction to Drawing	3	
AR 136	Introduction to Figure Drawing (AR 135)	3	
AR 160	Foundations Painting	3	
AR 170	Foundations Sculpture	3	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
	Additional communication ¹	3	2A
	Health and wellness ²	2	3G
	Elective	2-3	
	TOTAL	28-29	
SOPHOMORE			
AR 212	History of Western Art III (AR 111)	3	
<i>Select three of the following courses:</i>			
AR 230	Photo Image Making I (AR 111, AR 136, AR 160, AR 170)	3	
AR 240	Pottery I (AR 111, AR 136, AR 160, AR 170 or written consent of instructor)	3	
AR 245	Metalsmithing and Jewelry I (AR 111, AR 136, AR 160, AR 170)	3	
AR 250	Fibers I (AR 110, AR 135, AR 160 or AR 170 or written consent of instructor)	3	
AR 255	Introduction to Graphic Design (AR 111, AR 136, AR 160, AR 170)	3	
AR 260	Painting I (AR 111, AR 136, AR 160, AR 170)	3	

College of Liberal Arts

Course	Title (Prerequisite)	Cr	AUCC
AR 265	Printmaking I-Intaglio and Relief (AR 110, AR 135, AR 160 or AR 170)	3	
AR 270	Sculpture (AR 111, AR 136, AR 160, AR 170)	3	
AR 235	Drawing Workshop I (AR 136)	3	
	Arts/humanities ³	3	3B
	Historical perspectives ⁴	3	3D
	Logical/critical thinking ⁵	3	2B
	Mathematics ⁶	3	1B
	Social/behavioral sciences ⁷	3	3C
	U.S. public values and institutions ⁸	3	3F
	TOTAL	33	
JUNIOR			
	Global and cultural awareness ⁹	3	3E
	Upper-division art history ¹⁰	6	4A, 4B
	TOTAL	9	
SENIOR			
	Biological/physical sciences ¹¹	7	3A
	Non-art electives	14-15	
	TOTAL	21-22	
PROGRAM TOTAL = 92 credits¹²			

¹ Select from the list of courses in category 2A in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3G in the AUCC.

³ Select from the list of courses (other than ARCC 100) in category 3B 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 2B in the AUCC.

⁶ Select from the list of courses in category 1B in the AUCC.

⁷ Select from the list of courses in category 3C in the AUCC.

⁸ Select from the list of courses in category 3F in the AUCC.

⁹ Select from list of courses in category 3E in the AUCC.

¹⁰ 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: AR 310, AR 311, AR 312, AR 314, AR 315, AR 316, AR 318, AR 319, AR 410, AR 411, AR 412, AR 414, AR 415, AR 416, or AR 417.

¹¹ Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

¹² 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			
AR 335	Drawing Workshop II (AR 235)	3	
AR 336	Drawing Workshop III (AR 335 or AR 365)	3	
	Art electives ¹	16	
	TOTAL	22	
SENIOR			
AR 435	Drawing Workshop IV (AR 336)	3	4C
AR 436	Drawing Workshop V (AR 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			
AR 350	Fibers II (AR 250)	4	
AR 351	Fibers III (AR 250)	4	
	Art electives ¹	12	
	TOTAL	20	

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
AR 450	Fibers IV (AR 350, AR 351)	4	4C
AR 451	Fibers V (AR 351 or AR 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			
AR 355	Typography and Design Systems (AR 255)	4	
AR 356	Illustration (AR 255, six credits in drawing)	4	
	Art electives ¹	12	
	TOTAL	20	
SENIOR			
AR 455	Advanced Typography and Design Systems (AR 160, AR 170, AR 255)	4	4C
AR 456	Advanced Illustration (AR 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			
AR 345	Metalsmithing and Jewelry II (AR 245)	4	
AR 346	Metalsmithing and Jewelry III (AR 245)	4	
	Art electives ¹	12	
	TOTAL	20	
SENIOR			
AR 445	Metalsmithing and Jewelry IV (AR 346)	4	4C
AR 446	Metalsmithing and Jewelry V (AR 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			
AR 360	Painting II (AR 260)	4	
AR 361	Painting III (AR 235, AR 260)	4	
	Art electives ¹	12	
	TOTAL	20	
SENIOR			
AR 460	Advanced Painting I (AR 360, AR 361)	4	4C
AR 461	Advanced Painting II (AR 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:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
AR 330	Photo Image Making II (AR 230 or portfolio review)	4	
AR 331	Photo Image Making III (AR 330)	4	
	Art electives ¹	12	
	TOTAL	20	
SENIOR			
AR 430	Advanced Photo Image Making I (AR 331)	4	4C
AR 431	Advanced Photo Image Making II (AR 430)	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

Pottery Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
AR 340	Pottery II (AR 240)	4	
AR 341	Pottery III (AR 340)	4	
	Art electives ¹	12	
	TOTAL	20	
SENIOR			
AR 440	Pottery IV (AR 341)	4	4C
AR 441	Pottery V (AR 440)	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

¹ At least eight upper-division credits.

Printmaking Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
AR 365	Printmaking II-Lithography (AR 136)	4	
AR 366	Printmaking III-Studio Workshop (AR 365)	4	
	Art electives ¹	12	
	TOTAL	20	
SENIOR			
AR 465	Printmaking IV-Studio Workshop (AR 366)	4	4C
AR 466	Printmaking V-Studio Workshop (AR 465)	4	4C
	TOTAL	8	
PROGRAM TOTAL = 120 credits			

¹ At least eight upper-division credits.

Sculpture Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
AR 370	Sculpture II (AR 270)	4	
AR 371	Sculpture III (AR 270)	4	
	Art electives ¹	12	
	TOTAL	20	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
SENIOR			
AR 470	Sculpture IV (AR 370, AR 371)	4	4C
AR 471	Sculpture V (AR 470)	4	4C
	TOTAL	8	

PROGRAM TOTAL = 120 credits

¹ At least eight upper-division credits.

Bachelor of Arts

The B.A. degree has three areas of concentration available to students – art education, art history, and studio.

Art Education Concentration

The art education concentration embraces the artist-teacher concept, which allows students to develop a studio concentration while preparing to teach art at the K-12 level. The program is comprehensive, meaning students take course work to prepare them to teach at the elementary and secondary school levels. The art education program enjoys good working relationships with school districts in the state of Colorado. Students integrate studio, art history, criticism, and aesthetics as they observe and teach – through a variety of experiences – in the public schools.

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://teachered.colostate.edu/>) or in room 111 of the Education Building.

A minimum grade of C (2.00) must be achieved in each upper-division art course in the student's concentration. The minimum scholastic average acceptable for graduation is 2.00 computed only for courses attempted at Colorado State.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
AR 110	History of Western Art I	3	
AR 111	History of Western Art II (AR 110)	3	
AR 135	Introduction to Drawing	3	
AR 136	Introduction to Figure Drawing (AR 135)	3	
AR 160	Foundations Painting	3	
AR 170	Foundations Sculpture	3	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
	Biological/physical sciences ¹	7	3A
	TOTAL	28	
SOPHOMORE			
AR 212	History of Western Art III (AR 111)	3	
AR 230	Photo Image Making I (AR 111, AR 136, AR 160, AR 170)	3	
AR 240	Pottery I (AR 111, AR 136, AR 160, AR 170 or written consent of instructor)	3	
AR 260	Painting I (AR 111, AR 136, AR 160, AR 170)	3	
AR 270	Sculpture I (AR 111, AR 136, AR 160, AR 170)	3	
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
SPCC 200	Public Speaking	3	2A1
	Global and cultural awareness ²	3	3E
	Logical/critical thinking ³	3	2B

College of Liberal Arts

Course	Title (Prerequisite)	Cr	AUCC
	Mathematics ⁴	3	1B
	Social/behavioral sciences ⁵	3	3C
	TOTAL	33	
JUNIOR			
AR 325	Concepts in Art Education (EDCC 275; admission to Teacher Licensure program)	3	
ED 331	Educational Technology (Completion of Phase I courses; BD 150 or CS 110 within 3 years or computer proficiency test; consent of Teacher Licensure Office)	2	
ED 340	Literacy and the Learner (completion of 30 credits of course work. Required background check through CDE, CBI, FBI)	3	
ED 350	Instruction I-Individualization/Management (EDCC 275, ED 340; concurrent registration in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 275, ED 340; concurrent registration in ED 350; admission to Teacher Licensure Program)	1	
	Arts/humanities ⁶	3	3B
	Health and wellness ⁷	2	3G
	Historical perspectives ⁸	3	3D
	Studio teaching emphasis ⁹	8	
	Upper-division art history ¹⁰	6	4B
	TOTAL	34	
SENIOR			
AR 326	Art Education Studio (EDCC 275, admission to Teacher Licensure Program)	4	
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent registration in ED 486J)	4	
ED 466	Methods and Assessment in K-12 Art Education (EDCC 275; admission to Teacher Licensure Program)	4	
ED 485A	Student Teaching-Elementary (ED 450, ED 466)	6	4A, 4C
ED 485B	Student Teaching-Secondary (ED 450, ED 466)	6	4A, 4C
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
ED 493A	Seminar-Professional Relations (ED 426 or ED 450 ED 466, concurrent registration in ED 485A or B or C)	1	4C
	TOTAL	26	

PROGRAM TOTAL = 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 from the list of courses in category 3E in the AUCC.

³ Select from the list of courses in category 2B in the AUCC.

⁴ Select 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 the list of courses in category 3B in the AUCC, except ARCC 100.

⁷ Select from the list of courses in category 3G in the AUCC.

⁸ Select from the list of courses in category 3D in the AUCC.

⁹ Select eight credits from one upper-division concentration area other than graphic design.

¹⁰ Select 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: AR 310, AR 311, AR 312, AR 314, AR 315, AR 316, AR 318, AR 319, AR 410, AR 411, AR 412, AR 414, AR 415, AR 416, or AR 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 (2.00) must be achieved in each upper-division art course in the student's concentration. The minimum scholastic average acceptable for graduation is 2.00 computed only for courses attempted at Colorado State.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
AR 110	History of Western Art I ¹	3	
AR 111	History of Western Art II (AR 110)	3	
AR 135	Introduction to Drawing	3	
AR 160	Foundations Painting	3	
AR 170	Foundations Sculpture	3	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
	Arts/humanities ²	3	3B
	Global and cultural awareness ³	3	3E
	Health and wellness ⁴	2	3G
	Logical/critical thinking ⁵	3	2B
	Elective	2-3	
	TOTAL	30-31	
SOPHOMORE			
<i>Select two courses from the following:</i>			
AR 112	History of Asian Art	3	
AR 113	Native Art Survey	3	
AR 230	Photo Image Making I (AR 111, AR 136, AR 160, AR 170)	3	
AR 240	Pottery I (AR 111, AR 136, AR 160, AR 170 or written consent of instructor)	3	
AR 245	Metalsmithing and Jewelry I (AR 111, AR 136, AR 160, AR 170)	3	
AR 250	Fibers I (AR 110, AR 135, AR 160 or AR 170; or written consent of instructor)	3	
AR 255	Introduction to Graphic Design (AR 111, AR 136, AR 160, AR 170)	3	
AR 260	Painting I (AR 111, AR 136, AR 160, AR 170)	3	
AR 265	Printmaking I-Intaglio and Relief (AR 110, AR 135, AR 160 or AR 170)	3	
AR 270	Sculpture I (AR 111, AR 136, AR 160, AR 170)	3	
AR 212	History of Western Art III (AR 111)	3	
	Historical perspectives ⁶	3	3D
	Mathematics ⁷	3	1B
	Second field ⁸	9	
	Social/behavioral sciences ⁹	3	3C
	U.S. public values and institutions ¹⁰	3	3F
	TOTAL	30	
JUNIOR			
L 120	Reading for Proficiency	3	
L CC 200	Second-Year Language I (L 107 or L 108 or placement exam)	3-5	2A3
PL 318	Aesthetics-Visual Arts	3	
	Second field ⁸	12	
	Art history upper-division electives ¹¹	9	4A, 4B
	TOTAL	30-32	
SENIOR			
AR 419	Historiography and Methodology of Art History (written consent of instructor)	3	4C
	Biological/physical sciences ¹²	7	3A
	Art electives, upper-division	4	
	Art history electives, upper-division ¹¹	12	4A, 4B
	Non-art electives	2-3	
	TOTAL	28-29	

PROGRAM TOTAL = 120-122 credits

¹ Transfer students who have taken or transferred in credit for ARCC 100 may use it in lieu of AR 110.

² Select three credits (other than ARCC 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 3G in the AUCC.

⁵ Select from the list of courses in category 2B in the AUCC.

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

⁷ Select from the list of courses in category 1B in the AUCC.

⁸ Select 21 credits from the same non-art prefix. Satisfy remaining upper-division non-art credits to total 14.

⁹ Select from the list of courses in category 3C in the AUCC.

¹⁰ Select from the list of courses in category 3F in the AUCC.

¹¹ 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: AR 310, AR 311, AR 312, AR 314, AR 315, AR 316, AR 318, AR 319, AR 410, AR 411, AR 412, AR 414, AR 415, AR 416, or AR 417.

¹² 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 (2.00) must be achieved in each upper-division art course in the student's concentration. The minimum scholastic average acceptable for graduation is 2.00 computed only for courses attempted at Colorado State.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
AR 110	History of Western Art I	3	
AR 111	History of Western Art II (AR 110)	3	
AR 135	Introduction to Drawing	3	
AR 136	Introduction to Figure Drawing (AR 135)	3	
AR 160	Foundations Painting	3	
AR 170	Foundations Sculpture	3	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
	Health and wellness ¹	2	3G
	Logical/critical thinking ²	3	2B
	Mathematics ³	3	1B
	Elective	2-3	
	TOTAL	31-32	
SOPHOMORE			
AR 212	History of Western Art III (AR 111)	3	
	<i>Select two of the following courses:</i>		
AR 230	Photo Image Making I (AR 111, AR 136, AR 160, AR 170)	3	
AR 240	Pottery I (AR 111, AR 136, AR 160, AR 170)	3	
AR 245	Metalsmithing and Jewelry I (AR 111, AR 136, AR 160, AR 170)	3	
AR 250	Fibers I (AR 110, AR 135, AR 160, or AR 170 or written consent of instructor)	3	
AR 255	Introduction to Graphic Design (AR 111, AR 136, AR 160, AR 170)	3	
AR 260	Painting I (AR 111, AR 136, AR 160, AR 170)	3	
AR 265	Printmaking I-Intaglio and Relief (AR 110, AR 135, AR 160, AR 170)	3	
AR 270	Sculpture I (AR 111, AR 136, AR 160, AR 170)	3	
	Arts/humanities ⁴	3	3B
	Global and cultural awareness ⁵	3	3E
	Historical perspectives ⁶	3	3D
	Social/behavioral sciences ⁷	3	3C
	U.S. public values and institutions ⁸	3	3F
	Non-art electives	6	
	TOTAL	30	
JUNIOR			
	Biological/physical sciences ⁹	7	3A
	Foreign language ¹⁰	10	2A3
	Upper division art history ¹¹	6	4A, 4B
	Upper division concentration ¹²	8	
	TOTAL	31	
SENIOR			
	<i>Select four credits from the following in the appropriate concentration:</i>		
AR 430	Advanced Photo Image Making I (AR 331)	4	4C
AR 431	Advanced Photo Image Making II (AR 430)	4	4C
AR 435	Drawing Workshop IV (AR 336)	3	4C
AR 436	Drawing Workshop V (AR 435)	3	4C
AR 440	Pottery IV (AR 341)	4	3C

Course	Title (Prerequisite)	Cr	AUCC
AR 441	Pottery V (AR 440)	4	4C
AR 445	Metalsmithing and Jewelry IV (AR 346)	4	4C
AR 446	Metalsmithing and Jewelry V (AR 346)	4	4C
AR 450	Fibers IV (AR 350, AR 351)	4	4C
AR 451	Fibers V (AR 351 or AR 450)	4	4C
AR 455	Advanced Typography and Design Systems (AR 160, AR 170, AR 255)	4	4C
AR 456	Advanced Illustration (AR 356)	4	4C
AR 460	Advanced Painting I (AR 360, AR 361)	4	4C
AR 461	Advanced Painting II (AR 460)	4	4C
AR 465	Printmaking IV-Studio Workshop (AR 366)	4	4C
AR 466	Printmaking V-Studio Workshop (AR 465)	4	4C
AR 470	Sculpture IV (AR 370, AR 371)	4	4C
AR 471	Sculpture V (AR 470)	4	4C
	Art electives ¹³	9	
	Non-art electives	14-15	
	TOTAL	27-28	

PROGRAM TOTAL = 120-124 credits

- ¹ Select from the list of courses in category 3G in the AUCC.
- ² Select from the list of courses in category 2B in the AUCC.
- ³ Select from the list of courses in category 1B in the AUCC.
- ⁴ Select three credits (other than ARCC 100) from category 3B 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 Select from the list of courses in category 3F in the AUCC.
- ⁹ Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.
- ¹⁰ Select from the list of courses in category 2A3 in the AUCC.
- ¹¹ 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: AR 310, AR 311, AR 312, AR 314, AR 315, AR 316, AR 318, AR 319, AR 410, AR 411, AR 412, AR 414, AR 415, AR 416, or AR 417
- ¹² Choose eight upper-division credits in one area of concentration in addition to the four credit capstone course.
- ¹³ 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
LOWER DIVISION			
ARCC 100	Introduction to the Visual Arts	3	3B
	OR		
AR 110	History of Western Art I	3	
AR 111	History of Western Art II (AR 110)	3	
AR 212	History of Western Art III (AR 111)	3	
	<i>Select one course from the following:</i>		
AR 135	Introduction to Drawing	3	
AR 160	Foundations Painting	3	
AR 170	Foundations Sculpture	3	
	TOTAL	12	
UPPER DIVISION			
AR	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.

Course	Title (Prerequisite)	Credits	AUCC
LOWER DIVISION			
ARCC 100	Introduction to the Visual Arts	3	3B
OR			
AR 110	History of Western Art I	3	
AR 111	History of Western Art II (AR 110)	3	
AR 212	History of Western Art III (AR 111)	3	
AR	200-level studio introduction ¹	3	
<i>Select one course from the following:</i>			
AR 135	Introduction to Drawing	3	
AR 160	Foundations Painting	3	
AR 170	Foundations Sculpture	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. A description of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF ECONOMICS

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Professor Ronnie J. Phillips, Chair

Associate Professor Charles Revier, Undergraduate

Coordinator

Professor Chuen-mei Fan, 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 Marxist economic thought.

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 2.0 (C) in each of the economics courses counted toward the major.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
<i>Select one of the following:</i>			
COCC 300	Writing Arguments (COCC 150)	3	2A2
COCC 301A-D	Writing in the Disciplines (COCC 150)	3	2A2
COCC 302	Writing Online (COCC 150)	3	2A2
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
<i>Select one of the following:</i>			
HYCC 100	Western Civilization, Pre-Modern	3	3D
HYCC 101	Western Civilization, Modern	3	3D
HYCC 150	U.S. History to 1876	3	3D
HYCC 151	U.S. History Since 1876	3	3D
HYCC 170	World History, Ancient-1500	3	3D
HYCC 171	World History, 1500-Present	3	3D
<i>Select one of the following pairs of course:</i>			
M CC 117	College Algebra in Content I (Math Placement Exam)	1	1B
M CC 118	College Algebra in Context II (M CC 117)	1	1B
OR			
M CC 120A	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 141	Calculus in Management Sciences (M CC 118 or M CC 121)	3	1B
	Arts/humanities ¹	3	3B
	Health and wellness ²	2	3G
	Electives	8	
	TOTAL	30	
SOPHOMORE			
ECCC 204	Principles of Macroeconomics (ECCC 202 or EACC 202)	3	3F
EC 304	Intermediate Macroeconomics (ECCC 204, M CC 141)	3	
EC 306	Intermediate Microeconomics (ECCC 204, M CC 141)	3	4A, 4B
<i>Select one course from the following:</i>			
EC 370	Comparative Economic Systems (ECCC 101 or ECCC 202 or EACC 202)	3	
EC 372	History of Economic Institutions and Thought (ECCC 101 or ECCC 202 or EACC 202)	3	
EC 376	Marxist Economic Thought (ECCC 101 or ECCC 202 or EACC 202)	3	
EC 379/	Economic History of the United States (ECCC 101 or ECCC 202 or EACC 202; or any 2 courses in American history)	3	
HY 379			

Course	Title (Prerequisite)	Cr	AUCC
EC 474	Recent Economic Thought (EC 304, EC 306)	3	
<i>Select one of the following courses:</i>			
STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
STCC 204	Statistics for Business Students (M CC 117 or M CC 120A-B)	3	2B
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
<i>Biological/physical sciences³</i>			
	Electives	7	3A
	TOTAL	30	
JUNIOR			
EC 335/	Introduction to Econometrics (ECCC 204 and STCC 201 or STCC 204 or STCC 301)	3	
EA 335	Additional social sciences ⁴	15	
	Economics ⁵	6	
	Electives	6	
	TOTAL	30	
SENIOR			
EC 492	Seminar	3	4A, 4B, 4C
	Additional arts/humanities ⁶	9	
	Economics ⁷	6	
	Electives ⁸	12	
	TOTAL	30	

PROGRAM TOTAL = 120 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 3G in the AUCC.

³ Select two courses (including one with a lab) from the list of courses in category 3A in the AUCC.

⁴ Select any 5 courses from department list. One must fulfill the AUCC global and cultural awareness requirement (category 3E) unless that requirement has been met in additional arts/humanities or electives.

⁵ Select any 2 EC courses (excluding EC 300).

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 additional social sciences or electives.

⁷ Select any 2 upper-division EC courses (excluding EC 300).

⁸ One elective course (3 credits) must fulfill the AUCC global and cultural awareness requirement (category 3E) unless that requirement has been met in additional arts/humanities or additional social sciences.

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 2.0 grade point average in all courses taken for the minor.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
ECCC 202*	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
ECCC 204	Principles of Macroeconomics (EACC 202 or ECCC 202)	3	3F
	TOTAL	6	
UPPER DIVISION			
EC 304*	Intermediate Macroeconomics (ECCC 204, M CC 141)	3	
EC 306*	Intermediate Microeconomics (ECCC 204, M CC 141)	3	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
EC*	Economics, numbered EC 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 financial economics.

A brochure describing the graduate program in economics is available from the department. Also refer to the *Graduate and Professional Bulletin*.

DEPARTMENT OF ENGLISH

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Professor Bruce Ronda, Chair
Associate Professor Ward Swinson, Undergraduate Coordinator
Professor Michael Palmquist, 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

In the creative writing concentration students study fiction and poetry, as well as the writing of literary nonfiction. The concentration is designed for students who wish to combine the study of creative writing with the study of literature.

For graduation, an English major must attain a minimum grade point average of 2.0 in upper-division English courses.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
<i>Select one pair of courses from the following:</i>			
AUCC 100	Self/Community in American Culture 1600-1877	3	3D
AUCC 101	Self/Community in American Culture Since 1877	3	3D, 3F
OR			
HYCC 100	Western Civilization, Pre-Modern	3	3D
HYCC 101	Western Civilization, Modern	3	3D
OR			

Course	Title (Prerequisite)	Cr	AUCC
HYCC 150	U.S. History to 1876	3	3D, 3F
HYCC 151	U.S. History Since 1876	3	3D, 3F
OR			
HYCC 170	World History, Ancient-1500	3	3D
HYCC 171	World History, 1500-Present	3	3D
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
SPCC 200	Public Speaking	3	2A1
	Arts/humanities ¹	3	3B
	Health and wellness ²	2	3G
	Mathematics ³	3	1B
	English elective	3	
	Elective	6	
	TOTAL	29	
SOPHOMORE			
E 210	Beginning Creative Writing (any lower level E prefix course)	3	
E 240	Introduction to Poetry	3	
E CC 270	Introduction to American Literature	3	3B or 3D
E CC 276	Survey of British Literature I	3	3B
OR			
E CC 277	Survey of British Literature II	3	3B
	Biological/physical sciences ⁴	7	3A
	Global and cultural awareness ⁵	3	3E
	Logical/critical thinking ⁶	3	2B
	Philosophy ⁷	3	
	Social/behavioral sciences ⁸	3	3C
	TOTAL	31	
JUNIOR			
COCC 300	Writing Arguments (COCC 150)	3	
OR			
COCC 301A-D	Writing in the Disciplines (COCC 150)	3	
<i>Select one of the following:</i>			
E 311A	Intermediate Creative Writing-Fiction (E 210 with grade of B or better)	3	
E 311B	Intermediate Creative Writing-Poetry (E 210 with grade of B or better)	3	
E 311C	Intermediate Creative Writing-Nonfiction (COCC 150; E 210 with grade B or better or JT 210)	3	
E 341	Principles of Literary Criticism (one course in literature)	3	4A, 4B
	U.S. public values and institutions ⁹	3	3F
	Second field ¹⁰	3	
	English elective ¹¹	3	
	Upper division English/composition ¹²	6	
	Electives	6	
	TOTAL	30	
SENIOR			
<i>Select one of the following:</i> ¹³			
E 412A	Creative Writing Workshop-Fiction (grade B or better in E 311A)	3	
E 412B	Creative Writing Workshop-Poetry (grade B or better in E 311B)	3	
E 412C	Creative Writing Workshop-Nonfiction (grade B or better in E 311A or E 311C)	3	
<i>Select one of the following:</i>			
E 460	Chaucer (E 341, and one other upper-division E prefix course)	3	4C
E 463	Milton (E 341, and one other upper-division E prefix course)	3	4C
E 465	Topics in Literature and Language (E 341 and one other upper-division E prefix course)	3	4C
E 470	Individual Author (E 341 and one other upper-division E prefix course)	3	4C
	Second field ¹⁰	9	
	Upper division English/composition ¹²	12	
	Electives	3	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

¹ Select from the list of courses in category 3B (but excluding E CC and PLCC prefix courses) in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3G in the AUCC.

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

⁴ Select two courses, one with lab, from 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 2B in the AUCC.

⁷ Select from the list of PL courses on English Department green sheet.

⁸ Select from the list of courses in category 3C in the AUCC.

⁹ Select from the list of courses in category 3F in the AUCC.

¹⁰ 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.

¹¹ Select any lower or upper level E prefix course.

¹² 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.

¹³ 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 programs Web site (<http://teachered.colostate.edu/>) or in room 111 of the Education Building.

For graduation, an English major must attain a minimum grade point average of 2.0 in upper-division English courses.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
E 240	Introduction to Poetry	3	
LBCC 170	World Literatures to 1500	3	3E
OR			
LBCC 171	World Literatures-The Modern Period	3	3E
SPCC 200	Public Speaking	3	2A1
	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			
COCC 301D	Writing in the Disciplines-Education (COCC 150)	3	
E CC 270	Introduction to American Literature	3	3B or 3D
E CC 276	Survey of British Literature I	3	3B
OR			
E CC 277	Survey of British Literature II	3	3B
E 342	Shakespeare I	3	
OR			
E 343	Shakespeare II	3	
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F

Course	Title (Prerequisite)	Cr	AUCC
ED 331	Educational Technology (Completion of Phase I courses; BD 150 or CS 110 within 3 years or computer proficiency test; consent of Teacher Licensure Office)	2	
ED 340	Literacy and the Learner (completion of 30 credits of course work. Required background check through CDE, CBI, FBI)	3	
	Biological/physical sciences ²	3	3A
	Health and wellness ⁵	2	3G
	Logical/critical thinking ⁶	3	2B
	Social/behavioral sciences ⁷	3	3C
	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 (COCC 301D)	3	
E 405	Adolescents Literature	3	
ED 350	Instruction I-Individualization/Management (EDCC 275; ED 340; concurrent registration in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 275, ED 340; concurrent registration in ED 350, admission to Teacher Licensure Program)	1	
ED 463	Methods in Teaching Language Arts (admission to Teacher Licensure Program) Upper-division English electives ⁸	4	
	TOTAL	9	
	TOTAL	32	
SENIOR			
E 402	Teaching Composition (COCC 301A or B or C or D)	3	
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent registration in ED 486J)	4	
ED 485B	Student Teaching-Secondary (ED 450, ED 463)	11	
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
ED 493A	Seminar-Professional Relations (ED 426 or ED 450, ED 463, concurrent registration in ED 485A or B or C)	1	
	English elective ⁹	3	
	Upper-division English elective ⁸	3	4C
	TOTAL	26	

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 3A in the AUCC. One must have a laboratory component.
³ Select one course from the following: AUCC 100, AUCC 101, HYCC 100, HYCC 101, HYCC 150, HYCC 151, HYCC 170, HYCC 171.
⁴ Select from the list of courses in category 1B in the AUCC.
⁵ Select from the list of courses in category 3G 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 The department requires Licensure majors to take 12 credits of upper-division E or CO prefix courses: 3 credits must be in literatures of the British Isles before 1830, or in American or European literatures before 1900; 3 credits must be in literatures of the British Isles after 1830 or in American or European literatures after 1900; 3 credits must be in either breakthroughs (ideological, racial, cultural, gendered) or genre courses. One course must be a capstone course (E 460, E 463, E 465, E 470), preferably taken in the senior year. One course must be a world literature course (E 337, E 353, E 356, E 452, E 455). See the departmental check sheet for the courses that fulfill these categories.
⁹ Any lower or upper-division E prefix course.

Language Concentration

The language concentration focuses on linguistics and TESL/TEFL. It is designed for students interested in all aspects of language and linguistics. It offers students the ability to study key theories in linguistics and second-language learning, functional aspects of language production and reception, and the impact of social and cultural contexts on language production and reception.

For graduation, an English major must attain a minimum grade point average of 2.0 in upper-division English courses.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one pair of courses from the following:</i>			
AUCC 100	Self/Community in American Culture, 1600-1877	3	3D
AUCC 101	Self/Community in American Culture Since 1877	3	3D, 3F
OR			
HYCC 100	Western Civilization, Pre-Modern	3	3D
HYCC 101	Western Civilization, Modern	3	3D
OR			
HYCC 150	U.S. History to 1876	3	3D, 3F
HYCC 151	U.S. History Since 1876	3	3D, 3F
OR			
HYCC 170	World History, Ancient-1500	3	3D
HYCC 171	World History, 1500-Present	3	3D
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
E CC 270	Introduction to American Literature	3	3B or 3D
SPCC 200	Public Speaking Arts/humanities ¹	3	2A1
	Foreign language ²	3-5	3B
	Health and wellness ³	2	3G
	Mathematics ⁴	3	1B
	Electives	2-5	
	TOTAL	30-31	
SOPHOMORE			
E 240	Introduction to Poetry	3	
E CC 276	Survey of British Literature I	3	3B
OR			
E CC 277	Survey of British Literature II	3	3B
	Biological and physical sciences ⁵	7	3A
	Foreign language ²	3-5	
	Global and cultural awareness ⁶	3	3E
	Logical/critical thinking ⁷	3	2B
	Philosophy ⁸	3	
	Social/behavioral science ⁹	3	3C
	Electives	0-2	
	TOTAL	30	
JUNIOR			
COCC 300	Writing Arguments (COCC 150)	3	
OR			
COCC 301A-D	Writing in the Disciplines (COCC 150)	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	
	U.S. public values and institutions ¹⁰	3	3F
	Electives	4	
	TOTAL	30	
SENIOR			
E 460	Chaucer (E 341, and one other upper-division E prefix course)	3	4C
OR			

Course	Title (Prerequisite)	Cr	AUCC
E 465	Topics in Literature and Language (E 341 and one other upper-division E prefix course)	3	4C

	Foreign language ²	5	
	Upper division English/composition ¹¹	15	
	Electives	6-7	
	TOTAL	29-30	

PROGRAM TOTAL = 120 credits

¹ Select from list of courses in category 3B (excluding E CC and PLCC 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.

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

⁴ Select from the list of courses in category 1B in the AUCC.

⁵ Select two courses, one with a lab, 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 Select from the list of courses in category 2B in the AUCC.

⁸ Select from the list of courses on English Department green sheet.

⁹ Select from the list of courses in category 3C in the AUCC.

¹⁰ Select from the list of courses in category 3F in the AUCC.

¹¹ 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 320A-D, E 324, E 412A-C, and E 465.

Literature Concentration

The literature concentration is for students who wish to focus on literature and literary theory. The English Department's strength in British, American, and world literature provides an interesting and challenging curriculum. Students will become familiar with major figures and forces, but also with non-traditional writers outside the established canon. Courses in literary theory, in addition to literature courses, 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 2.0 in upper-division English courses.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			

<i>Select one pair of courses from the following:</i>			
AUCC 100	Self/Community in American Culture 1600-1877	3	3D
AUCC 101	Self/Community in American Culture Since 1877	3	3D, 3F
OR			
HYCC 100	Western Civilization, Pre-Modern	3	3D
HYCC 101	Western Civilization, Modern	3	3D
OR			
HYCC 150	U.S. History to 1876	3	3D, 3F
HYCC 151	U.S. History Since 1876	3	3D, 3F
OR			
HYCC 170	World History, Ancient-1500	3	3D
HYCC 171	World History, 1500-Present	3	3D
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A

E 240	Introduction to Poetry	3	
E CC 270	Introduction to American Literature	3	3B or 3D
SPCC 200	Public Speaking	3	2A1
	Arts/humanities ¹	3	3B
	Health and wellness ²	2	3G
	Mathematics ³	3	1B
	Elective	3	
	TOTAL	29	
SOPHOMORE			
E CC 276	Survey of British Literature I	3	3B

Course	Title (Prerequisite)	Cr	AUCC
E CC 277	Survey of British Literature II	3	3B
	Biological/physical sciences ⁴	7	3A
	Global and cultural awareness ⁵	3	3E
	Logical/critical thinking ⁶	3	2B
	Philosophy ⁷	3	
	Social/behavioral sciences ⁸	3	3C
	English elective ⁹	3	
	Electives	3	
	TOTAL	31	

JUNIOR

COCC 300	Writing Arguments (COCC 150)	3	
OR			
COCC 301A-D	Writing in the Disciplines (COCC 150)	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	

	Second field ¹⁰	6	
	U.S. public values and institutions ¹¹	3	3F
	Upper-division English/composition elective ¹²	6	
	Electives	6	
	TOTAL	30	

SENIOR

<i>Select one of the following:</i>			
E 460	Chaucer (E 341, and one other upper-division E prefix course)	3	4C
E 463	Milton (E 341, and one other upper-division E prefix course)	3	4C
E 465	Topics in Literature and Language (E 341 and one other upper-division E prefix course)	3	4C
E 470	Individual Author (E 341 and one other upper-division E prefix course)	3	4C

	Second field ¹⁰	6	
	Upper-division electives ¹²	12	
	Electives	9	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 3B (excluding E CC and PLCC prefix courses) in the All-University Core Curriculum (AUCC).

² Select a three credit course from the list of courses in category 3G in the AUCC.

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

⁴ Select two courses, one having a lab, from the list of courses for 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 2B in the AUCC.

⁷ Select PL course from English Department green sheet list of courses.

⁸ Select from the list of courses in category 3C in the AUCC.

⁹ Select any lower or upper division E prefix course.

¹⁰ The department requires majors to complete a second field. This may be met by completing the equivalent of the second semester of the second year course in a foreign language or by completing 12 hours of upper division credit in a coherent field of study outside English.

¹¹ Select from the list of courses in category 3F in the AUCC.

¹² 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 2.0 in upper-division English courses.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one pair of courses from the following:</i>			
AUCC 100	Self/Community in American Culture 1600-1877	3	3D
AUCC 101	Self/Community in American Culture Since 1877	3	3D, 3F
OR			
HYCC 100	Western Civilization, Pre-Modern	3	3D
HYCC 101	Western Civilization, Modern	3	3D
OR			
HYCC 150	U.S. History to 1876	3	3D, 3F
HYCC 151	U.S. History Since 1876	3	3D, 3F
OR			
HYCC 170	World History, Ancient-1500	3	3D
HYCC 171	World History, 1500-Present	3	3D
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
E 240	Introduction to Poetry	3	
SPCC 200	Public Speaking	3	2A1
	Arts/humanities ¹	3	3B
	Health and wellness ²	2	3G
	Mathematics ³	3	1B
	Electives	7	
	TOTAL	30	
SOPHOMORE			
E CC 270	Introduction to American Literature	3	3B or 3D
E CC 276	Survey of British Literature I	3	3B
OR			
E CC 277	Survey of British Literature II	3	3B
	Biological/physical sciences ⁴	7	3A
	English elective ⁵	3	
	Global and cultural awareness ⁶	3	3E
	Logical/critical thinking ⁷	3	2B
	Philosophy ⁸	3	
	Social/behavioral sciences ⁹	3	3C
	Electives	2	
	TOTAL	30	
JUNIOR			
COCC 300	Writing Arguments (COCC 150)	3	
OR			
COCC 301A-D	Writing in the Disciplines (COCC 150)	3	
E 341	Principles of Literary Criticism (one course in literature)	3	4A, 4B
	Second field ¹⁰	6	
	U.S. public values and institutions ¹¹	3	3F
	Upper-division English/composition ¹²	6	
	Electives	9	
	TOTAL	30	
SENIOR			
CO 401	Advanced Composition (COCC 300 or COCC 301 A or B or C or D or COCC 302)	3	
E 406	Topics in Literacy	3	
<i>Select one of the following:</i>			
E 460	Chaucer (E 341, and one other upper-division E prefix course)	3	4C
E 463	Milton (E 341, and one other upper-division E prefix course)	3	4C
E 465	Topics in Literature and Language (E 341 and one other upper-division E prefix course)	3	4C
E 470	Individual Author (E 341 and one other upper-division E prefix course)	3	4C
	Second field ¹⁰	6	
	Upper-division electives ¹²	9	
	Electives	6	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

¹ Select from the list of courses in category 3B (but excluding E CC and PLCC prefix courses) in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3G in the AUCC.

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

⁴ Select two courses, one with a lab, from the list of courses for category 3A in the AUCC.

⁵ Select any lower or upper-division E prefix course.

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

⁷ Select from the list of courses in category 2B in the AUCC.

⁸ Select from the list of PL courses on English Department green sheet.

⁹ Select from the list of courses in category 3C in the AUCC.

¹⁰ 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.

¹¹ Select from the list of courses in category 3F in the AUCC.

¹² A total of 15 credits of upper-division electives in E and CO prefix courses. Three credits must be in designated writing courses (COCC 300, COCC 301A-D, COCC 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 2.0 grade point average in all English courses and a 2.0 grade point average in all upper-division English courses.

Minimum of 21 credits in courses in English, at least 12 of which must be upper division. COCC 150 and E 487A-B may not count toward the minor. COCC 300, COCC 301A-D, COCC 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.

A description of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF FOREIGN LANGUAGES AND LITERATURES

Office in Clark Building, Room C104
(970) 491-6141
<http://www.colostate.edu/depts/FLL>

Professor Sara M. Saz, Chair
Associate Professor Paola Malpezzi Price,
Undergraduate Coordinator
Associate Professor José Luis Suarez-Garcia, 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, Russian,

and Spanish. Basic courses may also be taken in Arabic, Chinese, Italian, and Latin.

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 L or L CC prefix.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
L 105F	First-Year French I (for students with no previous study in the language)	5	
L 107F	First-Year French II (L 105F or L 106F)	5	
	Arts/humanities ¹	3	3B
	Health and wellness ²	2	3G
	Historical perspectives ³	6	3D
	Social/behavioral sciences ⁴	3	3C
	Elective	3	
	TOTAL	30	
SOPHOMORE			
L CC 200F	Second-Year French I (L 107F or L 108F or placement exam)	3	2A3
L CC 201F	Second-Year French II (L CC 200F or placement exam)	3	2A3
	Additional communication ⁵	3	2A

College of Liberal Arts

Course	Title (Prerequisite)	Cr	AUCC
	Global and cultural awareness ⁶	3	3E
	Logical/critical thinking ⁷	3	2B
	Mathematics ⁸	3	1B
	Biological/physical sciences ⁹	7	3A
	U.S. public values and institutions ¹⁰	3	3F
	TOTAL	28	
JUNIOR			
L CC 300F	Reading and Writing for Communication (L CC 201F or L 208F)	3	2A3
L 310F	Approaches to Literature (L CC 300 or written consent of instructor)	3	
L 335F	Issues in Culture (L CC 201F or L 208F)	3	
<i>Select three of the following courses:</i>			
L 301F	Oral Communication-French (L CC 201F)	3	
L 313F	Introduction to Translation and Interpreting-French (L CC 300F or written consent of instructor)	3	
L 326F	French Phonetics (L CC 300F or concurrent registration)	3	
L 345F	Business French (L CC 300F)	3	
L 355F	20 th - Century French Literature (L 310F)	3	
L 413F	Advanced Translation and Interpreting-French (L 313F or written consent of instructor)	3	
L 433A	Advanced French/Francophone Culture Representations (L 335F) ¹¹	3	
L 433B	Advanced French/Francophone Culture Center and Margins (L 335F) ¹¹	3	
L 441F	Advanced Business French (L 345F or written consent of instructor)	3	
L 450F	Selected French Literary Movements and Periods (L CC 300F, L 310F)	3	
L 452F	Genre Studies in French (L CC 300F, L 310F)	3	
L 453F	Author Studies in French (L CC 300F, L 310F)	3	
L 454F	Topic Studies in French (L CC 300F, L 310F)	3	
L 460	French/Francophone Women Writers (L CC 300F, L 310F)	3	
	Electives	12	
	TOTAL	30	
SENIOR			
L 400F	Advanced Communication Skills (L CC 300F)	3	
L 433A	Advanced French/Francophone Culture Representations (L 335F)	3	4A
OR			
L 433B	Advanced French/Francophone Culture Center and Margins (L 335F)	3	4A
L 492F	Language, Literature and Society-French (L 310F and two 400-level courses; senior status)	3	4B, 4C
OR			
L 492X	Language, Literature and Society-General (L 310F, G, or S and two 400-level courses; senior status)	3	4B, 4C
	400-level French ¹²	3	
	Electives ¹³	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 from the list of courses in category 3G of the AUCC.

³ Select six credits of HYCC prefix courses from the list in category 3D of the AUCC.

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

⁵ Select from the list of approved courses in the department. Primary majors may select from 2A1 or 2A2 only. Secondary majors may satisfy the 2A AUCC requirement by using L CC 200 or L CC 201 from 2A3.

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

⁷ Select from the list of courses in category 2B in the AUCC.

⁸ Select from the list of courses in category 1B in the AUCC.

⁹ Select from the list of courses in category 3A in the AUCC.

¹⁰ Select from the list of courses in category 3F in the AUCC.

¹¹ Choose the course not used to satisfy the 4A requirement during the senior year.

¹² Select from list in junior year, or in place of the 400-level French course, students may choose a) L 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.

¹³ 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.

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 L or L CC prefix.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
L 105G	First-Year German I (for students with no previous study in the language)	5	
L 107G	First-Year German II (L 105G or L 106G)	5	
	Arts/humanities ⁴	3	3B
	Health and wellness ²	2	3G
	Historical perspectives ³	6	3D
	Social/behavioral sciences ⁴	3	3C
	Elective	3	
	TOTAL	30	
SOPHOMORE			
L CC 200G	Second-Year German I ⁵ (L 107G or L 108G or placement exam)	3	2A3
L CC 201G	Second-Year German II (L CC 200G or placement exam)	3	2A3
	Additional communication ⁵	3	2A
	Global and cultural awareness ⁶	3	3E
	Logical/critical thinking ⁷	3	2B
	Mathematics ⁸	3	1B
	Biological/physical sciences ⁹	7	3A
	U.S. public values and institutions ¹⁰	3	3F
	Electives	12	
	TOTAL	28	
JUNIOR			
L CC 300G	Reading and Writing for Communication (L CC 201G or L 208G)	3	2A3
L 310G	Approaches to Literature (L CC 201G or L 208G)	3	
L 335G	Issues in Culture (L CC 201G or L 208G)	3	
<i>Select three of the following courses:</i>			
L 301G	Oral Communication-German (L CC 201G)	3	
L 313G	Introduction to Translation and Interpreting-German (L CC 300G or written consent of instructor)	3	
L 326G	German Phonetics (L CC 300G or concurrent registration)	3	
L 345G	Business German (L CC 300 G)	3	
L 355G	20 th -Century German Literature (L 310G)	3	
L 413G	Advanced Translation and Interpreting-German (L 313G or written consent of instructor)	3	
L 441G	Advanced Business German (L 345G or written consent of instructor)	3	
L 450G	Selected German Literary Movements and Periods (L CC 300G, L 310G)	3	
L 452G	Genre Studies in German (L CC 300G, L 310G)	3	
L 453G	Author Studies in German (L CC 300G, L 310G)	3	
L 454G	Topic Studies in German (L CC 300G, L 310G)	3	
	Electives	12	
	TOTAL	30	
SENIOR			
L 400G	Advanced Communication Skills (L CC 300G)	3	
L 434	Advanced German Culture (L 335G)	3	4A
L 492G	Language, Literature and Society-German (L 310G and two 400-level courses; senior status)	3	4B, 4C
OR			
L 492X	Language, Literature and Society-General (L 310F, G, or S and two 400-level courses; senior status)	3	4B, 4C
	400-level German ¹¹	3	
	Electives ¹²	20	

Course	Title (Prerequisite)	Cr	AUCC
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 from the list of courses in category 3G of the AUCC.

³ Select six credits of HYCC prefix courses from the list in category 3D of the AUCC.

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

⁵ Select from the list of approved courses in the department. Primary majors may select from 2A1 and 2A2 only. Secondary majors may satisfy the 2A requirement by using L CC 200 or L CC 201.

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

⁷ Select from the list of courses in category 2B in the AUCC.

⁸ Select from the list of courses in category 1B in the AUCC.

⁹ Select from the list of courses in category 3A in the AUCC.

¹⁰ Select from the list of courses in category 3F in the AUCC.

¹¹ Select from list in junior year or in place of the 400-level German course, majors may choose a) L 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.

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 11.

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 L or L CC prefix.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
L 105S	First-Year Spanish I (for students with no previous study in the language)	5	
L 107S	First-Year Spanish II (L 105S or L 106S)	5	
	Arts/humanities ¹	3	3B
	Health and wellness ²	2	3G
	Historical perspectives ³	6	3D
	Social/behavioral sciences ⁴	3	3C
	Elective	3	
	TOTAL	30	
SOPHOMORE			
L CC 200S	Second-Year Spanish I ⁵ (L 107S or L 108S or placement exam)	3	2A3
L CC 201S	Second-Year Spanish II ⁵ (L CC 200S or placement exam)	3	2A3
	Additional communication ⁵	3	2A
	Global and cultural awareness ⁶	3	3E
	Logical/critical thinking ⁷	3	2B
	Mathematics ⁸	3	1B
	Biological/physical sciences ⁹	7	3A
	U.S. public values and institutions ¹⁰	3	3F
	TOTAL	28	
JUNIOR			
L CC 300S	Reading and Writing for Communication (L CC 201S or L 208S)	3	2A3
L 310S	Approaches to Literature (L CC 300 or written consent of instructor)	3	
L 335S	Issues in Culture (L CC 201S or L 208S)	3	
<i>Select two of the following courses:</i>			
L 301S	Oral Communications-Spanish (L CC 201S)	3	
L 312	Introduction to Spanish Linguistics (L CC 300S or concurrent reg.)	3	
L 313S	Introduction to Translation and Interpreting-Spanish (L CC 300S or written consent of instructor)	3	
L 326S	Spanish Phonetics (L CC 300S or concurrent reg.)	3	
L 336	Introduction to Spanish-American Civilization (L CC 201S or L 208S)	3	
L 345S	Business Spanish (L CC 300S)	3	
L 346	Spanish for Health Care (L CC 300S)	3	

Course	Title (Prerequisite)	Cr	AUCC
L 413S	Advanced Translation and Interpreting-Spanish (L 313S or written consent of instructor)	3	
L 435	Caribbean Culture in Hispanic Literature (L 335S) ¹¹	3	
L 436	Advanced Latin American Culture (L 335S) ¹¹	3	
L 437	Advanced Spanish Culture (L 335S) ¹¹	3	
L 441S	Advanced Business Spanish (L 345S or written consent of instructor)	3	
L 443	Spanish Theatre (L CC 300S, L 310S)	3	
L 445	Women Writers in the Hispanic Worlds (L CC 300S, L 310S)	3	
L 449	Spanish-American Literary Movements and Periods (L CC 300S, L 310S)	3	
L 452S	Genre Studies in Spanish (L CC 300S, L 310S)	3	
L 453S	Author Studies in Spanish (L CC 300S, L 310S)	3	
L 454S	Topic Studies in Spanish (L CC 300S, L 310S)	3	
L 470	Spanish Grammatical Constructions (L 400S)	3	
	Electives	15	
	TOTAL	30	
SENIOR			
L 400S	Advanced Communication Skills (L CC 300S)	3	
<i>Select one of the following courses:</i>			
L 435	Caribbean Culture in Hispanic Literature	3	4A
L 436	Advanced Latin American Culture (L 335S)	3	4A
L 437	Advanced Spanish Culture (L 335S)	3	4A
L 492S	Language, Literature and Society-Spanish (L 310S and two 400-level courses; senior status)	3	4B, 4C
OR			
L 492X	Language, Literature and Society-General (L 310F, G, or S and two 400-level courses; senior status)	3	4B, 4C
	400-level Spanish ¹²	6	
	Electives ¹³	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 from the list of courses in category 3G of the AUCC.

³ Select six credits of HYCC prefix courses from the list in category 3D of the AUCC.

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

⁵ Select from the list of approved courses in the department. Primary majors may select from 2A1 or 2A2 only. Secondary majors may satisfy the 2A requirement by using L CC 200 or L CC 201 (2A3).

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

⁷ Select from the list of courses in category 2B in the AUCC.

⁸ Select from the list of courses in category 1B in the AUCC.

⁹ Select from the list of courses in category 3A in the AUCC.

¹⁰ Select from the list of courses in category 3F in the AUCC.

¹¹ Choose the course not used to satisfy 4A during the senior year.

¹² Select from list in junior year, or in place of one of the two 400-level Spanish courses, majors may choose a) L 465A-C, or b) 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.

¹³ 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://teachered.colostate.edu/>) or in room 111 of the Education Building.

College of Liberal Arts

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 L or L CC prefix.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
L CC 200	Second Year Language I (L 107 or L 108 or placement)	3	2A3
L CC 201	Second Year Language II (L CC 200 or placement)	3	2A3
LB 192	College of Liberal Arts First Year Seminar	3	
SPCC 200	Public Speaking	3	2A1
	Biological/physical sciences ¹	4	3A
	Health and wellness ²	2	3G
	Historical perspectives ³	6	3D
	Mathematics ⁴	3	1B
	TOTAL	30	
SOPHOMORE			
COCC 300	Writing Arguments (COCC 150)	3	2A2
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology (Completion of Phase I courses; BD 150 or CS 110 within 3 years or computer proficiency test; consent of Teacher Licensure Office)	2	
L CC 300	Reading and Writing for Communication (L CC 201 or L 208)	3	
L 310	Approaches to Literature (F) and S) L CC 300 or written consent of instructor. G) L CC 201G or L 208G)	3	
L 326	Phonetics (L CC 300 or concurrent reg.)	3	
L 335	Issues in Culture (L CC 201 or L 208)	3	
	OR		
L 336	Introduction to Spanish-American Civilization (L CC 201S or L 208S)	3	
PLCC 110	Logic and Critical Thinking	3	2B
PYCC 100	General Psychology	3	3C
	Biological/physical sciences ¹	3	3A
	Global and cultural awareness ⁵	3	3E
	TOTAL	32	
JUNIOR			
ED 350	Instruction I: Individualization/Management (EDCC 275; ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 275, ED 340; concurrent reg. in ED 350; admission to Teacher Licensure Program)	1	
EDCC 430	Diversity and Communication (EDCC 275, admission to Teacher Licensure Program)	3	3E
L 312	Introduction to Spanish Linguistics (L CC 300S or concurrent reg.)	3	
	OR		
E 320A-D	Introduction to the Study of Language	3	
L 400	Advanced Communication Skills (L CC 300)	3	
	<i>Select one of the following courses:</i>		
L 433A-B	Advanced French/Francophone Culture (L 335F)	3	4A
L 434	Advanced German Culture (L 335G)	3	4A
L 435	Caribbean Culture in Hispanic Literature (L 335S)	3	4A
L 436	Advanced Latin American Culture (L 335S)	3	4A
L 437	Advanced Spanish Culture (L 335S)	3	4A
L	300- or 400-level language	6	
L	400-level language	3	
	Arts/humanities ⁶	3	3B
	U.S. public values and institutions ⁷	3	3F
	TOTAL	31	
SENIOR			
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. in ED 486J)	4	

Course	Title (Prerequisite)	Cr	AUCC
ED 462	Methods and Assessment in Teaching Languages (admission to Teacher Licensure Program; oral and written competency in the language endorsement area)	4	
ED 485B	Student Teaching-Secondary (ED 450, ED 462)	11	
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
ED 493A	Seminar-Professional Relations (ED 426 or ED 450, ED 462, concurrent reg. in ED 485 A or B or C)	1	
L 470	Spanish Grammatical Constructions (L 400S)	3	
	OR		
E 324	Teaching English as a Second Language (E 320A-D or E 322)	3	
L 492	Language, Literature, and Society (L 310 and two 400-level courses; senior status)	3	4B, 4C
	TOTAL	27	

PROGRAM TOTAL = 120 credits

¹ Select from list of courses in category 3A in the All-University Core Curriculum (AUCC). One course must have a laboratory component.

² Select from EXCC courses in category 3G in the AUCC.

³ Select from HYCC courses in category 3D in the AUCC.

⁴ Select from list of courses in category 1B in the AUCC.

⁵ Select from list of courses in category 3E in the AUCC.

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

⁷ Select from list of courses in category 3F 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 L or L CC 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 Russian

Minimum of 21 credits in Russian, 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* for more information.

DEPARTMENT OF HISTORY

Office in Clark Building, Room B357
(970) 491-6334
<http://www.colostate.edu/Depts/Hist/histhome.html>

Professor Ruth Alexander, 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 the conceptualized the world through religion and ideology. History provides a form of knowledge that people in all times and places have used to answer basic questions about the human predicament.

The history major is designed for students to enlarge their knowledge about the past, improve their ability to think logically and critically, and sharpen their powers of written and oral expression.

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			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
----- Select one pair of courses from the following:			
HYCC 100	Western Civilization, Pre-Modern	3	3D
HYCC 101	Western Civilization, Modern	3	3D
OR			
HYCC 100	Western Civilization, Pre-Modern	3	3D
HYCC 171	World History, 1500-Present	3	3D
OR			
HYCC 115	Islamic World to 1500	3	3D or 3E
HYCC 171	World History, 1500-Present	3	3D
OR			
HYCC 120	Asian Civilizations I	3	3D or 3E
HYCC 171	World History, 1500-Present	3	3D
OR			

College of Liberal Arts

Course	Title (Prerequisite)	Cr	AUCC
HYCC 170	World History, Ancient-1500	3	3D
HYCC 171	World History, 1500-Present	3	3D
HYCC 150	U.S. History to 1876	3	3F
OR			
HYCC 151	U.S. History Since 1876	3	3F
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	7	3A
	Health and wellness ³	2	3G
	Mathematics ⁴	3	1B
	Elective	2-3	
	TOTAL	29-30	
SOPHOMORE			
<i>Select one of the following courses not chosen above:</i>			
HYCC 115	Islamic World to 1500	3	3D or 3E
HYCC 120	Asian Civilizations I	3	3D or 3E
HYCC 215	Islamic World Since 1500	3	3D or 3E
HYCC 219	Africa: Pre-Colonial States and Empires	3	3E
HYCC 220	Asian Civilizations II	3	3D or 3E
HYCC 230	Medieval Europe	3	3D or 3E
HYCC 235	Slavic and East Central European Civilizations	3	3D or 3E
HYCC 238	Latin America Since 1500	3	3D or 3E
HY 354	Colonial Latin America (HYCC 101 or HYCC 171 or HYCC 238)	3	
	Additional communication ⁵	3	2A
	Logic/critical thinking ⁶	3	2B
	Social/behavioral sciences ⁷	3	3C
	Language and quantitative options ⁸	6-10	
	History electives ⁹	6	
	Electives	2-7	
	TOTAL	30-31	
JUNIOR			
	History, upper-division ^{10, 11}	3	4A
	History, upper-division non-U.S. ^{11, 12}	6	
	History, upper-division U.S. ¹¹	3	
	Electives	18	
	TOTAL	30	
SENIOR			
HY 492	Capstone Seminar ^{10, 12} (senior status or written consent of instructor)	3	4A, 4B, 4C
	History electives, upper-division ¹¹	9	
	Electives	18	
	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 3G in the AUCC.

⁴ Select from the list of courses in category 1B in the AUCC.

⁵ Select from the list of courses in category 2A in the AUCC.

⁶ Select from the list of courses in category 2B in the AUCC.

⁷ Select from the list of courses in category 3C in the AUCC.

⁸ Each history major must choose either the "Foreign Language Option" or the "Quantitative Option," (see below). The credit distribution for these options ranges from 9-16 depending on the specific courses taken, especially for those majors choosing the "Foreign Language Option."

⁹ Select two history courses, any level.

¹⁰ See approved list of upper-division history courses that may be used to fulfill the category 4A requirement

¹¹ Any student seeking to register for 300- or 400-level history courses must have completed 45 credits or have received written consent from the instructor.

¹² Select one upper-division course from two categories-Africa, East Asia, Europe, Latin America/Caribbean, Middle East, World.

Language Option

Course	Title (Prerequisite)	Credits	AUCC
SOPHOMORE			
	Foreign language option ¹	6-10	

¹ 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. See the All-University Core Curriculum section of the catalog for an explanation of which language courses will satisfy category 2A requirements.

Quantitative Option

In addition to the liberal arts concentration core courses, select a minimum of 9 credits from the following courses.

Three credits of statistics (ST) must be taken at the 300 level.

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
CSCC 153	Java Programming (M CC 118 with a C or better)	4	2B
STCC 101	Activity Based Statistics (Math Placement Exam)	3	2B
STCC 110	Statistical Thinking: Concepts and Application (Math Placement Exam)	3	2B
STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
STCC 204	Statistics for Business Students (M CC 117 or M CC 120A-B)	3	2B
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
ST 302	Design of Experiments (STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311)	3	
ST 303/	Introduction to Communications Principles (M 261)	3	
EE 303	Multiple Regression Analysis (M 229, STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311)	3	
ST 304	Sampling Techniques (STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311)	3	
STCC 307/	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B
EHCC 307			
STCC 309	Statistics for Engineers or Scientists (M CC 161 or M CC 255)	3	2B
ST 310	Data Analysis and Database Management Tools (STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311)	3	
STCC 311	Statistics for Behavioral Sciences I (M CC 118 or M CC 121)	3	
ST 312	Statistics for Behavioral Sciences II (STCC 311 or written consent of instructor)	3	
TOTAL			7-11

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://www.teachered.colostate.edu/>) or in room 111 of the Education Building.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
<i>Select one pair of courses from the following:</i>			
HYCC 100	Western Civilization, Pre-Modern	3	3D
HYCC 101	Western Civilization, Modern	3	3D
OR			
HYCC 100	Western Civilization, Pre-Modern	3	3D
HYCC 171	World History, 1500-Present	3	3D

Course	Title (Prerequisite)	Cr	AUCC
OR			
HYCC 115	Islamic World to 1500	3	3D or 3E
HYCC 171	World History, 1500-Present	3	3D
OR			
HYCC 120	Asian Civilizations I	3	3D or 3E
HYCC 171	World History, 1500-Present	3	3D
OR			
HYCC 170	World History, Ancient-1500	3	3D
HYCC 171	World History, 1500-Present	3	3D
SPCC 200	Public Speaking ¹	3	2A1
	Art/humanities ²	3	3B
	Biological/physical sciences ³	7	3A
	Health and wellness ⁴	2	3G
	Logic/critical thinking ⁵	3	2B
	Mathematics ⁶	3	1B
	TOTAL	30	
SOPHOMORE			
<i>Select two of the following courses:</i>			
ECCC 101	Economics of Social Issues	3	3C
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
ECCC 204	Principles of Macroeconomics (EACC 202 or ECCC 202)	3	3F
ECCC 211	Gender in the Economy	3	3E
ECCC 212	Racial Inequality and Discrimination	3	3F
ECCC 240/ EACC 240	Issues in Environmental Economics	3	3F
HYCC 150	U.S. History to 1876	3	3F
HYCC 151	U.S. History Since 1876	3	3F
<i>Select one of the following courses not chosen above:</i>			
HYCC 115	Islamic World to 1500	3	3D or 3E
HYCC 120	Asian Civilizations I	3	3D or 3E
HYCC 215	Islamic World Since 1500	3	3D or 3E
HYCC 219	Africa: Pre-Colonial States and Empires	3	3E
HYCC 220	Asian Civilizations II	3	3D or 3E
HYCC 230	Medieval Europe	3	3D or 3E
HYCC 235	Slavic and East Central European Civilizations	3	3D or 3E
HYCC 238	Latin America Since 1500	3	3D or 3E
HY 354	Colonial Latin America (HYCC 101 or HYCC 171 or HYCC 238)	3	
GR 100	Introduction to Geography	3	
GR 320	Cultural Geography (GR 100)	3	
POCC 101	American Government and Politics	3	3E, 3F
POCC 241	Comparative Government and Politics	3	3C or 3E
	History elective ⁷	3	
	TOTAL	30	
JUNIOR			
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology (Completion of Phase I courses; BD 150 or CS 110 within 3 years or computer proficiency test; consent of Teacher Licensure Office)	2	
ED 340	Literacy and the Learner (completion of 30 credits of course work. Required background check through CDE, CBI, FBI)	3	
ED 350	Instruction I-Individualization/Management (EDCC 275, ED 340; concurrent registration in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 275, ED 340, concurrent registration in ED 350; admission to Teacher Licensure Program)	1	
ED 465	Methods and Materials in Social Studies (admission to Teacher Licensure Program)	4	
<i>Select one of the following:</i>			
APCC 100	Introductory Cultural Anthropology	3	
PYCC 100	General Psychology	3	
S CC 100	General Sociology	3	
S CC 105	Social Problems	3	
	History, upper-division ⁸	3	4A
	Upper-division U.S. history ⁹	9	
	TOTAL	31	
SENIOR			
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent registration in ED 486J)	4	

Course	Title (Prerequisite)	Cr	AUCC
ED 485B	Student Teaching-Secondary (ED 450, ED 465)	11	
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
ED 493A	Seminar-Professional Relations (ED 426 or ED 450, ED 465, concurrent registration in ED 485A or B or C)	1	
HY 492	Capstone Seminar ¹⁰ (senior status or written consent of instructor, history majors only)	3	4A, 4B, 4C
	Upper-division non-U.S. history ¹¹	9	
	TOTAL	29	

PROGRAM TOTAL = 120 credits

¹ Students must earn a B in SPCC 200 for it to count toward certification.

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

⁵ Select from the list of courses in category 2B in the AUCC.

⁶ Select from the list of courses in category 1B in the AUCC.

⁷ One history course, any level.

⁸ See approved list of upper-division history courses that may be used to fulfill the category 4A requirement.

⁹ One course pre-1876; one course post-1876; one student's choice.

¹⁰ To count toward the major, the course must be completed with a grade of C or better.

¹¹ Students must take one upper-division course from three of the following categories-Africa, East Asia, Europe, Latin America/Caribbean, Middle East, World.

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. A description of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF JOURNALISM AND TECHNICAL COMMUNICATION

Office in Clark Building, Room C225
(970) 491-6310
www.colostate.edu/Depts/TJ

Professor Garrett J. O'Keefe, Chair
Professor Greg Luft, Undergraduate Coordinator
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 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 JT or JTCC prefix.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
----- <i>Select one course from the following:</i>			
COCC 300	Writing Arguments (COCC 150)	3	2A2
COCC 301A-D	Writing in the Disciplines (COCC 150)	3	2A2
COCC 302	Writing Online (COCC 150)	3	2A2
L CC 200	Second-Year Language I (L 107 or L 108 or placement)	3-5	2A3
L CC 201	Second-Year Language II (L CC 200 or placement exam)	3-5	2A3
L CC 300	Reading and Writing for Communication (L CC 201 or L 208)	3	2A3
SPCC 200	Public Speaking	3	2A1
JTCC 100	Introduction to Mass Media	3	
	Biological/physical sciences ¹	7	3A
	Health and wellness ²	2	3G
	Mathematics ³	3	1B
	Electives	2-3	
	TOTAL	23-26	
SOPHOMORE			
JT 210	Newswriting ⁴ (satisfactory performance on typing and diagnostic tests)	3	
JT 211	Computer-Mediated Visual Communication (JT 192 or JT 210)	3	
	Arts/humanities ⁵	9-12	3B
	Global and cultural awareness ⁶	3	3E
	Historical perspectives ⁷	3	3D
	Logical/critical thinking ⁸	3	2B
	Social/behavioral sciences ⁹	9	3C
	U.S. public values and institutions ¹⁰	3	3F
	TOTAL	36-39	
JUNIOR			
----- <i>Select one course from the following:¹¹</i>			
JT 311	History of Media	3	

Course	Title (Prerequisite)	Cr	AUCC
JT 316/	Multiculturalism and the Media	3	
ET 316			
JT 411	Media Ethics and Issues	3	
JT 412	International Mass Communication	3	
JT 413	New Communication Technologies and Society ¹¹	3	
JT 414	Media Effects	3	
JT 471	Communication Research Methods (one statistics course)	3	

	Arts/humanities ⁵	0-3	3B
	Electives ¹²	(0-13)	
	TOTAL	3-6	
SENIOR			
JT 415	Communications Law	3	4B
	Option area ¹³	21	
	TOTAL	24	
PROGRAM TOTAL = 89-92 credits¹⁴			

¹ Select a total of seven credits from category 3A in the All-University Core Curriculum (AUCC), including one laboratory course.

² Select from the list of courses in category 3G in the AUCC.

³ Select any course or combination of courses in category 1B in the AUCC.

⁴ JT 192 fulfills the requirement for JT 210. Students cannot receive credit for both JT 192 and JT 210. Students who take JT 192 must take an additional 3 credits of journalism to replace the credits for JT 210.

⁵ Select three credits from category 3B in the AUCC. Select an additional nine credits from either the AUCC list or see department advising manual for course selection.

⁶ Select from the list of courses in category 3E in the AUCC from courses with the following prefixes: APCC, ECCC, L CC, LBCC, PLCC, or S CC.

⁷ Select from the list of courses in category 3D in the AUCC from courses with the following prefixes: APCC, AUCC, ETCC, HYCC, or PLCC.

⁸ Select any STCC course in category 2B in the AUCC.

⁹ Select three courses from three different prefixes of the following: AP/APCC, AU/AUCC, EC/ECCC, ET/ETCC, HY/HYCC, PO/POCC, PY/PYCC, or S/S CC. At least one course must be chosen from category 3C in the AUCC or see department. Students in the news-editorial concentration should select POCC 101 which will double count with category 3F.

¹⁰ Select any course in category 3F in the AUCC with the following prefixes: AUCC, ECCC, ETCC, HYCC, PLCC, or POCC. Some courses in this category may be used to satisfy another AUCC requirement. Students in the news-editorial concentration should select POCC 101 or POCC 103 which will double count with category 3C.

¹¹ Computer-Mediated Communication students are required to take JT 413.

¹² Technical Journalism students must take a total of 65 credits in either the College of Liberal Arts or the College of Natural Sciences. This total does not include JT/JTCC courses.

¹³ See department advising manual for Option Area choices.

¹⁴ In order to complete a major in technical journalism, select a concentration from the following list: computer-mediated communication, news-editorial, public relations, specialized communication, or television news and video production.

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 JT or JTCC prefix.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
	Elective	3	
JUNIOR			
JT 310	Copy Editing and Production (JT 192 or JT 210; JT 211)	4	
JT 326	Online Journalism (JT 192 or JT 210; JT 211)	3	

Course	Title (Prerequisite)	Cr	AUCC
JT 335	Digital Photojournalism	3	

Select one of the following: ¹			
JT 320	Reporting (JT 192 or JT 210; JT 211) ²	3	
JT 340	Video Editing ³	3	
JT 350	Public Relations ⁴	3	
JT 361	Writing for Specialized Magazines ⁵ (JT 192 or JT 210; JT 211)	3	

	Electives	3-6	
	TOTAL	16-19	
SENIOR			
JT 372	Web Design and Management (JT 192 or JT 210; JT 211)	3	

Select one pair of courses from the following:			
JT 345	Electronic Field Production ³ (JT 340)	3	
JT 440	Advanced Electronic Media Production ³ (JT 345 or JT 372)	3	
OR			
JT 351	Public Relations Practices ⁴ (JT 192 or JT 210; JT 211 and JT 350)	3	
JT 450	Public Relations Cases ⁴ (JT 310, JT 351)	3	
OR			
JT 361	Writing for Specialized Magazines ² (JT 192 or JT 210; JT 211)	3	
JT 420	Advanced Reporting ² (JT 320)	3	
OR			
JT 420	Advanced Reporting ² (JT 320)	3	
JT 460	Media Management ⁶	3	
OR			
JT 420	Advanced Reporting ² (JT 320)	3	
JT 461	Writing about Science, Health, and Environment ² (JT 192 or JT 210; JT 211)	3	
OR			
JT 461	Writing about Science, Health, and Environment ⁵ (JT 192 or JT 210; JT 211)	3	
JT 465	Technical/Specialized Editing ⁵ (JT 461 or JT 464)	3	
OR			
JT 464	Technical Writing (JT 310, JT 361)	3	
JT 465	Technical/Specialized Editing ⁵ (JT 461 or JT 464)	3	

	TOTAL	9	
PROGRAM TOTAL = 120 credits			

¹ Students must complete one of four 9-credit JT specialty areas during their junior and senior year: news-editorial journalism, public relations, specialized communication, or television news and video communication.

² Students in the news-editorial specialty area take JT 320; JT 420; and a choice of JT 361, JT 460, or JT 461.

³ Students in the television news and video communication specialty area take JT 340, JT 345, and JT 440.

⁴ Students in the public relations specialty area take JT 350, JT 351, and JT 450.

⁵ Students in the specialized communications specialty area take JT 361; JT 461 or JT 464; and JT 465

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 JT or JTCC prefix.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
POCC 101	American Government and Politics	3	3C, 3F
POCC 103	State and Local Government and Politics	3	3C, 3F
	TOTAL	6	

JUNIOR			
Select two of the following courses:			

College of Liberal Arts

Course	Title (Prerequisite)	Cr	AUCC
JT 326	Online Journalism (JT 192 or JT 210; JT 211)	3	
JT 335	Digital Photojournalism	3	
JT 361	Writing for Specialized Magazines (JT 192 or JT 210; JT 211)	3	
JT 372	Web Design and Management (JT 192 or JT 210; JT 211)	3	
JT 460	Media Management	3	
JT 461	Writing about Science, Health, and Environment (JT 192 or JT 210; JT 211)	3	
JT 487	Internship	3	
JT 310	Copy Editing and Production (JT 192 or JT 210; JT 211)	4	
JT 320	Reporting (JT 192 or JT 210; JT 211)	3	
	Electives	1-3	
	TOTAL	14-16	
SENIOR			
JT 411	Media Ethics and Issues ¹	3	
JT 420	Advanced Reporting (JT 320)	3	4A, 4C
	Electives	2-3	
	TOTAL	8-9	
PROGRAM TOTAL = 120 credits			

¹ If JT 411 has been completed to fulfill the concept core requirement under the technical journalism core, one of the following must be selected: JT 311, JT 316/ET 316, JT 412, JT 413, JT 414, or JT 471.

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 JT or JTCC prefix.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one of the following:</i>			
EACC 202	Agricultural and Resource Economics	3	3C
ECCC 101	Economics of Social Issues	3	3C
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
JUNIOR			
BK 305	Fundamentals of Marketing (ECCC 101 or ECCC 202 or EACC 202)	3	
BN 305	Fundamentals of Management	3	
<i>Select one of the following:</i>			
JT 320	Reporting (JT 192 or JT 210; JT 211)	3	
JT 326	Online Journalism (JT 192 or JT 210; JT 211)	3	
JT 361	Writing for Specialized Magazines (JT 192 or JT 210; JT 211)	3	
JT 372	Web Design and Management (JT 192 or JT 210; JT 211)	3	
JT 461	Writing about Science, Health, and Environment (JT 192 or JT 210; JT 211)	3	
JT 310	Copy Editing and Production (JT 192 or JT 210; JT 211)	4	
JT 350	Public Relations	3	
JT 351	Public Relations Practices (JT 192 or JT 210; JT 211 and JT 350)	3	
	Electives	1-3	
	TOTAL	20-22	
SENIOR			
JT 450	Public Relations Cases (JT 310, JT 351)	3	4A, 4C
	Journalism elective	2-3	
	TOTAL	5-6	
PROGRAM TOTAL = 120 credits			

Specialized 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 JT or JTCC prefix.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select three credits from the following:</i>			
JT 326	Online Journalism (JT 192 or JT 210; JT 211)	3	
JT 335	Digital Photojournalism	3	
JT 342	Writing for Specialized Electronic Media (JT 192 or JT 210; JT 211)	3	
JT 350	Public Relations	3	
JT 372	Web Design and Management (JT 192 or JT 210; JT 211)	3	
JT 460	Media Management	3	
JT 487	Internship	3	
JT 310	Copy Editing and Production (JT 192 or JT 210; JT 211)	4	
JT 361	Writing for Specialized Magazines (JT 192 or JT 210; JT 211)	3	
	Electives	10-12	
	TOTAL	20-22	
SENIOR			
JT 461	Writing about Science, Health, and Environment (JT 192 or JT 210; JT 211)	3	
OR			
JT 464	Technical Writing (JT 310, JT 361)	3	
JT 465	Technical/Specialized Editing (JT 461 or JT 464)	3	4A, 4C
	Journalism electives	2-3	
	TOTAL	8-9	
PROGRAM TOTAL = 120 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 JT or JTCC prefix.

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
<i>Select one of the following courses:</i>			
JT 326	Online Journalism (JT 192 or JT 210; JT 211)	3	
JT 341	Broadcast News (JT 192 or JT 210; JT 211)	3	
JT 342	Writing for Specialized Electronic Media (JT 192 or JT 210; JT 211)	3	
JT 340	Videotape Editing (JT 211)	3	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JT 345	Electronic Field Production (JT 340) Electives	3 10-13	
	TOTAL	19-22	
SENIOR			
<i>Select one of the following courses:</i>			
JT 372	Web Design and Management (JT 192 or JT 210; JT 211)	3	
JT 435	Documentary Video Production (JT 345)	3	
JT 441	Advanced Television News Production (JT 341)	3	
JT 487V	Internship	1-3	
JT 544	Corporate and Institutional Media Production	3	
JT 440	Advanced Electronic Media Production (JT 345 or JT 372)	3	4A, 4C
	Journalism elective	3	
	TOTAL	9	

PROGRAM TOTAL = 120 credits

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*.

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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A

College of Liberal Arts

Course	Title (Prerequisite)	Cr	AUCC
MU 117	Music Theory I (MUCC 111 or satisfactory completion of placement exam)	4	
MU 118	Music Theory II (MU 117)	4	
MUCC 131	Introduction to Music History and Literature	3	3B
MU 172	Freshman Voice Studio ¹	2	
OR			
MU 272A-V	Applied Music Instruction ¹	2	
MU	Ensemble ²	2	
SPCC 200	Public Speaking	3	2A
	Health and wellness ³	2	3G
	Mathematics ⁴	3	1B
	Electives	3	
	TOTAL	29	
SOPHOMORE			
MU 217	Music Theory III (MU 118)	4	
MU 218	Music Theory IV (MU 217)	4	
MU 252A-G	Instrumental Techniques ⁵	4	
MU 272A-V	Applied Music Instruction ¹	2	
MU 273	Composition Instruction (MU 118 and MUCC 131)	2	
MU	Ensemble ²	2	
PYCC 100	General Psychology	3	3C
	Historical perspectives/U.S. public values and institutions ⁶	3	3D, 3F
	Logical/critical thinking ⁷	3	2B
	Electives	3	
	TOTAL	30	
JUNIOR			
MU 252A-G	Instrumental Techniques ⁵	4	
MU 311	Counterpoint I (MU 217)	2	
OR			
MU 312	Counterpoint II (MU 217)	2	
MU 334	Music History I (MU 118, MUCC 100 or MUCC 131)	3	4A, 4B
MU 335	Music History II (MU 118, MUCC 100 or MUCC 131)	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 ⁸	3	3B
	Music electives	3	
	Electives	3	
	TOTAL	33	
SENIOR			
MU 311	Counterpoint I (MU 217) ⁹	2	
OR			
MU 312	Counterpoint II (MU 217) ⁹	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 ¹⁰	7	3A
	Global and cultural awareness ¹¹	3	3E
	Music electives	3	
	Electives	3	
	TOTAL	28	
PROGRAM TOTAL = 120 credits¹²			

¹ First-year voice students take MU 172 for 2 semester, 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 from the list of courses in category 3G in the All-University Core Curriculum (AUCC).

⁴ Select from the list of courses in category 1B in the AUCC.

⁵ Select two sections each semester from MU 252A-G.

⁶ Select a course from the list in category 3D (Historical Perspectives) of the AUCC that is also on the list for category 3F (U.S. Public Values and Institutions).

⁷ Select from the list of courses in category 2B in the AUCC.

⁸ Select from the list of courses in category 3B in the AUCC.

⁹ Select course not taken in the junior year.

¹⁰ Select two courses (one with a laboratory) from the list of courses in category 3A in the AUCC.

¹¹ Select from the list of courses in category 3E in the AUCC.

¹² 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 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://teachered.colostate.edu/>) or in room 111 of the Education Building.

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			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
MU 117	Music Theory I (MUCC 111 or satisfactory completion of placement exam)	4	
MU 118	Music Theory II (MU 117)	4	
MUCC 131	Introduction to Music History and Literature	3	3B
MU	Ensembles ¹	2	
	Historical perspectives ²	3	3D
	Logical/critical thinking ³	3	2B
	Mathematics ⁴	3	1B
	TOTAL	25	
SOPHOMORE			
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
MU 217	Music Theory III (MU 118)	4	
MU 218	Music Theory IV (MU 217)	4	
MU 272A-V	Applied Music Instruction ⁵ (concurrent registration in any music ensemble)	2	
MU 286	Practicum-Music Education	1	
MU 425	Jazz Pedagogy	2	
MU	Ensembles ¹	2	
PYCC 100	General Psychology	3	3C
SPCC 200	Public Speaking	3	2A1
	Biological/physical sciences ⁶	3	3A
	TOTAL	27	
JUNIOR			
ED 331	Educational Technology (Completion of Phase I courses; BD 150 or CS 110 within 3 years or computer proficiency test; consent of Teacher Licensure Office)	2	
ED 340	Literacy and the Learner (completion of 30 credits of course work. Required background check through CDE, CBI, FBI)	3	

Course	Title (Prerequisite)	Cr	AUCC
ED 350	Instruction I-Individualization/ Management (EDCC 275; ED 340; concurrent registration in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 275, ED 340, concurrent registration in ED 350, admission to Teacher Licensure Program)	1	
ED 475	Elementary School Music Methods (MU 217, admission to Teacher Licensure program)	4	
MU 334	Music History I (MU 118; MUCC 100 or MUCC 131)	3	4A, 4B
MU 335	Music History II (MU 118; MUCC 100 or MUCC 131)	3	4A, 4B
MU 411	Orchestration (MU 218)	3	
MU 416	Stylistic Analysis (MU 218)	3	
MU 472A-V	Applied Music Instruction (MU 272A-V; concurrent registration in any music ensemble; successful completion of upper-division qualifying exam)	2	
MU	Ensembles ¹	2	
	Elective	1	
	TOTAL	30	
SENIOR			
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent registration in ED 486J)	4	
ED 485A	Student Teaching-Elementary (ED 450, ED 475)	6	
ED 485B	Student Teaching-Secondary (ED 450 and ED 476 or ED 477)	6	
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
ED 493A	Seminar-Professional Relations (ED 426 or ED 450, ED 475 and ED 476 or ED 477, concurrent registration in ED 485A or B or C)	1	
MU 471	Recital (written consent of instructor)	1	4C
MU 472A-V	Applied Music Instruction (MU 272A-V; concurrent registration in any music ensemble; successful completion of upper-division qualifying exam)	1	
MU	Ensemble ¹	1	
	Biological/physical sciences ⁶	4	3A
	Global and cultural awareness ⁷	3	3E
	TOTAL	28	
CORE TOTAL = 110 credits⁸			

¹ Wind and percussion majors must take MU 204 (Marching Band) twice during their four year program.
² Select from list of courses in category 3D in the All-University Core Curriculum (AUCC).
³ Select from list of courses in category 2D in the AUCC.
⁴ Select from list of courses in category 2C1B in the AUCC.
⁵ Two semesters.
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.
⁸ In order to complete the concentration, one of the following options must also be completed: instrumental or vocal.

Instrumental Option

In addition to the music education concentration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
MU 251	Voice Techniques	1	
MU 252A	Instrumental Techniques-Low Brass	1	
MU 252D	Instrumental Techniques-Double Reeds and Flute	1	
MU 252F	Instrumental Techniques-High Strings	1	
MU 252G	Instrumental Techniques-Percussion	1	
MU 272A-V	Applied Music Instruction ¹ (concurrent registration in any music ensemble)	2	
	TOTAL	7	

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
MU 252B	Instrumental Techniques-High Brass	1	
MU 252C	Instrumental Techniques-Clarinet and Saxophone	1	
MU 252E	Instrumental Techniques-Low Strings	1	
MU 356	Instrumental Conducting and Literature	2	
	TOTAL	5	
JUNIOR			
MU 420	Marching Band Techniques (MU 204, MU 356)	2	
	Health and wellness ²	2	3G
	TOTAL	4	
SENIOR			
ED 477	Instrumental Methods for Secondary Schools (MU 217, admission to Teacher Licensure program)	2	
PROGRAM TOTAL = 128 credits			

¹ Major instrument; two semesters except senior year.
² Select from the list of courses in category 3G in the All-University Core Curriculum (AUCC).

Vocal Option

In addition to the music education concentration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
MU 172	Freshman Voice Studio ¹	2	
MU 252A	Instrumental Techniques-Low Brass ²	1	
MU 252D	Instrumental Techniques-Double Reeds and Flute ²	1	
MU 252F	Instrumental Techniques-High Strings ²	1	
MU 252G	Instrumental Techniques-Percussion	1	
	TOTAL	3-6	
SOPHOMORE			
MU 252B	Instrumental Techniques-High Brass ²	1	
MU 252C	Instrumental Techniques-Clarinet and Saxophone ²	1	
MU 252E	Instrumental Techniques-Low Strings ²	1	
MU 265A	Singers Diction-German/English	1	
MU 265B	Singers Diction-French/Italian (MU 265A)	1	
	Health and wellness ³	2	3G
	TOTAL	4-7	
JUNIOR			
MU 355	Choral Conducting and Literature	2	
MU 466	Song Literature	2	
MU 467	Vocal Pedagogy	2	
	TOTAL	6	
SENIOR			
ED 476	Choral Methods for Secondary Schools (MU 217), admission to Teacher Licensure Program)	2	
PROGRAM TOTAL = 128 credits			

¹ Two semesters.
² Vocal majors take MU 252A or B; C or D; E or F.
³ Select from the list of courses in category 3G in the All-University Core Curriculum (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. 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			
C CC 103	Chemistry in Context	3	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
MU 117	Music Therapy I (MUCC 111 or satisfactory completion of placement exam)	4	
MU 118	Music Theory II (MU 117)	4	
MUCC 131	Introduction to Music History and Literature	3	3B
MU 155	Guitar Class I	2	
MU 241	Introduction to Music Therapy	3	
MU 172	Freshman Voice Studio ¹ (concurrent registration in any music ensemble)	2	
OR			
MU 272A-V	Applied Music Instruction ¹ (concurrent registration in any music ensemble)	2	
MU 272A-V	Applied Music Instruction ¹ (concurrent registration in any music ensemble)	2	
PYCC 100	General Psychology	3	3C
	Ensemble ²	2	
	Mathematics ³	3	1B
	TOTAL	32	
SOPHOMORE			
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	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 272A-V	Applied Music Instruction ¹ (concurrent registration in any music ensemble)	2	
OT 215	Medical Terminology	1	
PLCC 100	Appreciation of Philosophy	3	3B
SPCC 200	Public Speaking	3	2A1
	Ensemble ²	2	
	Health and wellness ⁴	2	3G
	Historical perspectives ⁵	3	3D, 3F
	TOTAL	33	
JUNIOR			
BS 300	Principles of Human Anatomy and Physiology (BZCC 101 or BZCC 110 or LSCC 102; C CC 103 or C CC 107 or C CC 111)	4	
BS 345	Functional Neuroanatomy (BS 300)	4	
MU 157	Voice Class I ⁶	2	
OR			
MU 265A	Singers Diction-German/English ⁶	1	
AND			
MU 265B	Singers Diction-French/Italian ⁶ (MU 265A)	1	
MU 335	Music History II (MU 118; MUCC 100 or MUCC 131)	3	4A, 4B
MU 342	Psychology of Music (PYCC 100)	3	
MU 440	Music Therapy Methods I (MU 241, BS 300)	3	
MU 443	Music Therapy Methods II (admission to professional curriculum)	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	
PY 320	Abnormal Psychology (PYCC 100)	3	
	Ensemble ⁷	1	
	TOTAL	28	

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
MU 343	Research Methods in Music Therapy (STCC 201)	3	
MU 355	Choral Conducting and Literature	2	
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	
PY 452	Cognitive Psychology (PYCC 100 or written consent of instructor)	1	
OR			
PY 454A	Physiological Psychology (PYCC 100 or written consent of instructor)	3	
STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
	Global and cultural awareness ⁸	3	3E
	Music electives	2	
	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 Ensemble (2 semesters).

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

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

⁵ Select a course from the list of courses in category 3D that is also on the list of courses in category 3F OR select from AUCC 101, HYCC 150, HYCC 151, or NRCC 320.

⁶ Instrumental majors must select MU 157; voice majors must select MU 265A and MU 265B.

⁷ Ensemble (1 semester).

⁸ 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			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
MU 117	Music Theory I (MUCC 111 or satisfactory completion of placement exam)	4	
MU 118	Music Theory II (MU 117)	4	
MUCC 131	Introduction to Music History and Literature	3	3B
MU	Ensemble ¹	2	
MU	Public Speaking ²	3	2A1
SPCC 200	Health and wellness ³	2	3G
	Mathematics (Math Placement Exam) ⁴	3	1B

Course	Title (Prerequisite)	Cr	AUCC
TOTAL		24	
SOPHOMORE			
MU 217	Music Theory III (MU 118)	4	
MU 218	Music Theory IV (MU 217)	4	
MU	Ensemble ¹	2	
PYCC 100	General Psychology	3	3C
	Historical perspectives/U.S. public values and institutions ⁵	3	3D, 3F
	Logical/critical thinking ⁶	3	2B
TOTAL		19	
JUNIOR			
MU 311	Counterpoint I (MU 217)	2	
OR			
MU 312	Counterpoint II ⁸ (MU 217)	2	
MU 334	Music History I (MU 118; MUCC 100 or MUCC 131)	3	4A, 4B
MU 335	Music History II (MU 118; MUCC 100 or MUCC 131)	3	4A, 4B
MU 355	Choral Conducting and Literature ⁸	2	
OR			
MU 356	Instrumental Conducting and Literature ⁹	2	
MU 416	Stylistic Analysis (MU 218)	3	
MU 471	Recital ¹⁰ (written consent of instructor)	1	
MU 472A-V	Applied Music Instruction ¹¹ (MU 272A-V; successful completion of upper-division qualifying exam; concurrent registration in any music ensemble)	4	
MU	Ensemble ¹	2	
	Arts/humanities ¹²	3	3B
	Music electives	3	
TOTAL		26	
SENIOR			
MU 411	Orchestration ¹³ (MU 218)	3	
MU 471	Recital (written consent of instructor)	1	4C
MU 472A-V	Applied Music Instruction ¹¹ (MU 272A-V; successful completion of upper division qualifying examination; concurrent reg. in any music ensemble)	4	
MU	Ensemble ¹⁴	2	
OR			
MU 407	Accompanying ¹⁵ (MU 272I)	1	
	Biological/physical sciences ¹⁶	7	3A
	Global and cultural awareness ¹⁷	3	3E
	Music electives	3	
TOTAL		22-23	
PROGRAM TOTAL = 91-92 credits¹⁸			

¹ Two semesters.

² Not required for the voice option.

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

⁴ Select from the list of courses in category 1B in the AUCC.

⁵ Select a course from the list in category 3D (Historical Perspectives) of the AUCC that is also on the list for category 3F (U.S. Public Values and Institutions).

⁶ Select from the list of courses in category 2B in the AUCC.

⁷ MU 312 is required for the organ and string pedagogy options.

⁸ MU 355 is required for the organ and voice options. Neither MU 355 nor MU 356 is required for the piano pedagogy option.

⁹ MU 356 is required for the orchestral instrument and string pedagogy options.

¹⁰ Junior recital not required for the piano pedagogy and string pedagogy options.

¹¹ Two semesters; major instrument or voice.

¹² Select from the list of courses in category 3B in the AUCC.

¹³ Not required for the piano pedagogy or voice options.

¹⁴ Not required for the piano and piano pedagogy options.

¹⁵ For the piano and piano pedagogy options only.

¹⁶ Select two courses (one of which must have a laboratory component) from the list in category 3A of the AUCC.

¹⁷ Select from the list of courses in category 3E of the AUCC.

¹⁸ 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 registration in any music ensemble)	2-4	
	Electives	2-4	
TOTAL		6	
SOPHOMORE			
MU 272A-V	Applied Music Instruction ¹ (concurrent registration in any music ensemble)	4	
	Electives	7	
TOTAL		11	
JUNIOR			
	Electives	4	
SENIOR			
	Electives	7-8	
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 registration in any music ensemble)	2-4	
	Electives	2-4	
TOTAL		6	
SOPHOMORE			
MU 272H	Applied Music Instruction-Organ ¹ (concurrent registration in any music ensemble)	4	
	Foreign language ¹	10	
TOTAL		14	
JUNIOR			
	Electives	4-5	
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 registration in any music ensemble)	2-4	
	Electives	2-4	
TOTAL		6	
SOPHOMORE			
MU 272I	Applied Music Instruction-Piano ¹ (concurrent registration in any music ensemble)	4	
	Foreign language ¹	10	
TOTAL		14	
JUNIOR			
	Electives	3	

College of Liberal Arts

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
MU 465	Keyboard Literature	2	
	Electives	3-4	
	TOTAL	5-6	
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 registration in any music ensemble)	4	
	Electives	4	
	TOTAL	6	
SOPHOMORE			
MU 272I	Applied Music Instruction-Piano ¹ (concurrent registration in any music ensemble)	4	
	Foreign language ¹	10	
	TOTAL	14	
JUNIOR			
MU 495G	Independent Study-Pedagogy	3	
PY 260	Child Psychology (PYCC 100)	3	
OR			
PY 465	Adolescent Psychology (PYCC 100)	3	
	TOTAL	6	
SENIOR			
MU 465	Keyboard Literature	2	
MU 495G	Independent Study-Pedagogy	3	
	Electives	3	
	TOTAL	8	
PROGRAM TOTAL = 125-126 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 registration in any music ensemble)	2	
	Electives	4	
	TOTAL	6	
SOPHOMORE			
MU 272K-P	Applied Music Instruction ¹ (concurrent registration in any music ensemble)	2-4	
	Electives	7-9	
	TOTAL	11	
JUNIOR			
MU 272K-P	Applied Music Instruction ² (concurrent registration in any music ensemble)	1	
MU 495G	Independent Study-Pedagogy	2	
PY 260	Child Psychology (PYCC 100)	3	
OR			
PY 465	Adolescent Psychology (PYCC 100)	3	
	TOTAL	6	
SENIOR			
MU 495E	Independent Study-Music Literature	2	
	Electives	3-4	
	TOTAL	5-6	
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 120	Dance Techniques I	2	
MU 172	Freshman Voice Studio ¹	2	
TH 151	Acting I	3	
	Foreign language (German)	5	
	TOTAL	12	
SOPHOMORE			
MU 272Q	Applied Music Instruction-Voice ¹ (concurrent registration 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	1	
MU 466	Song Literature	2	
MU 467	Vocal Pedagogy (MU 265A and MU 265B; concurrent registration in MU 472QV)	2	
	Electives	3	
	TOTAL	8	
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			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
MU 117	Music Theory I (MUCC 111 or satisfactory completion of placement exam)	4	
MU 118	Music Theory II (MU 117)	4	
MUCC 131	Introduction to Music History and Literature	3	3B
MU 172	Freshman Voice Studio ¹ (concurrent registration in any music ensemble)	2	
OR			
MU 272A-V	Applied Music Instruction ¹ (concurrent registration in any music ensemble)	2	
	Ensemble ²	2	
	Health and wellness ³	2	3G
	Logical/critical thinking ⁴	3	2B
	Mathematics ⁵	3	1B
	Electives	3	
	TOTAL	29	

Course	Title (Prerequisite)	Cr	AUCC
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 registration in any music ensemble)	2	
SPCC 200	Public Speaking	3	2A1
	Ensemble ²	2	
	Foreign language ²	6	
	Option ⁶	6	
	Electives	3	
	TOTAL	30	
JUNIOR			
MU 334	Music History I (MU 118; MUCC 100 or MUCC 131)	3	4A, 4B
MU 335	Music History II (MU 118; MUCC 100 or MUCC 131)	3	4A, 4B
	Arts/humanities ⁷	3	3B
	Biological/physical sciences ⁸	3	3A
	Historical perspectives ⁹	3	3D
	Option ⁶	6	
	Music theory, upper-division	2	
	U.S. public values and institutions ¹⁰	3	3F
	Music electives ¹¹	3	
	Electives ¹²	3-6	
	TOTAL	32-35	
SENIOR			
MU 471	Recital (written consent of instructor)	1	4C
	OR		
MU 499	Thesis (music majors only)	1	4C
	Biological/physical sciences ⁸	4	3A
	Global and cultural awareness ¹³	3	3E
	Option ⁶	9	
	Social/behavioral sciences ¹⁴	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 from the list of course in category 3G in the All-University Core Curriculum (AUCC).

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

⁵ Select from the list of courses in category 1B in the AUCC.

⁶ A coherent field of study outside the field of music, including at least 12 upper-division credits.

⁷ Select from the list of courses in category 3B in the AUCC.

⁸ Select from the list of courses in category 3A. One course must have a laboratory component.

⁹ Select from the list of courses in category 3D in the AUCC. If a course is selected that is cross-listed with category 3F, it may be double-counted, in which case three additional elective credits must be taken.

¹⁰ Select from the list of courses in category 3F in the AUCC. A course that is cross-listed with category 3C or 3D may be double-counted, in which case three additional elective credits must be taken.

¹¹ Select from the following history and literature, theory, composition or orchestration; applied music-performance; maximum of 4 credits in ensemble.

¹² Students must take 6 credits of electives if the course selected for either category 3D or 3F also fulfills the requirement for the other category.

¹³ Select from the list of course in category 3E in the AUCC.

¹⁴ Select from the list of courses in category 3C of the AUCC. If a course is selected that is cross-listed with category 3F, it may be double-counted, in which case three additional elective credits must be taken.

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			
MUCC 100	Music Appreciation	3	3B
	OR		
MUCC 131	Introduction to Music History and Literature	3	3B
MU 117*	Music Theory I (MUCC 111 or satisfactory completion of placement exam)	4	
MU 118	Music Theory II (MU 117)	4	
	TOTAL	11	
UPPER DIVISION			
MU 334	Music History I (MU 118; MUCC 100 or MUCC 131)	3	
MU 335	Music History II (MU 118; MUCC 100 or MUCC 131)	3	
MU*	Music	6	
	TOTAL	12	
PROGRAM TOTAL = 23 credits without prerequisites			

* 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. A description of these programs may be found in the *Graduate and Professional Bulletin*.

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			
BZCC 101	Humans and Other Animals	3	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
LB 192	College of Liberal Arts First-Year Seminar	3	
TH 160	Graphic Expression for the Theatre	3	
	Arts and humanities ¹	3	3B
	Dance techniques-ballet ²	6	
	Dance techniques-modern ³	2	
	Dance techniques-jazz ³	2	
	Health and wellness ⁴	2	3G
	Logical/critical thinking ⁵	3	2B
	Mathematics ⁶	3	1B
	TOTAL	33	
SOPHOMORE			
C CC 103	Chemistry in Context	3	3A
C CC 104	Chemistry in Context Laboratory (C CC 103 or concurrent registration)	1	3A
D 226	Dance Choreography I (D 121A or B or C)	2	
D 325	Dance Production (TH 161)	3	
S CC 100	General Sociology	3	3C, 3F
SPCC 200	Public Speaking	3	2A1
TH 161	Technical Theatre I (TH 160)	3	
	Dance techniques-ballet ²	6	
	Dance techniques-modern ³	2	
	Dance techniques-jazz ³	2	
	Historical perspectives ⁷	3	3D
	TOTAL	31	

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
BS 300	Principles of Human Anatomy and Physiology (BZCC 101 or BZCC 110 or LSCC 102; C CC 103 or C CC 107 or C CC 111)	4	
D 324	Teaching Creative Movement for Children	2	
D 326	Choreography II (D 221 A or B or C)	2	
D 427	Dance History I	3	4A
EX 207	Anatomical Kinesiology (LSCC 102)	3	
TH 263	Costume and Makeup I (TH 160)	3	
	Dance techniques-ballet ²	6	
	Dance techniques-modern ³	3	
	Dance techniques-jazz ³	2	
	TOTAL	28	
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)	3	4C
D 486V	Practicum (D 221 A or B or C; D 324, D 424)	3	
D 491V	Workshop	4	
	Dance techniques-ballet ²	6	
	Dance techniques-modern ³	3	
	Global and cultural awareness ⁸	3	3E
	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 appropriate level course (one each semester).
³ Select appropriate level course.
⁴ Select from the list of courses in category 3G in the AUCC.
⁵ Select from the list of courses in category 2B in the AUCC.
⁶ Select from the list of courses in category 1B in the AUCC.
⁷ Select from the list of courses in category 3D in the AUCC.
⁸ Select 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 theatre concentration consists of classroom and laboratory study as well as practical experience with productions of the experimental and main stages. Consistent with the program’s generalist philosophy, students are required to take courses in all of the basic theatrical disciplines. Core courses are required in acting, graphic expression and design, technical theatre, directing, costume and makeup, and history of theatre. Courses in art, music, or dance are required, depending on your interests. Senior students are required to do a special project in an area of personal interest. Projects include directing a full-length play, designing or lighting a main stage production, presenting an acting recital, or writing a major research paper.

An exciting new prospect for the pursuit of a degree in the performing arts at Colorado State is the commitment to build the University Center for the Arts. This state-of-the-art facility will create a vibrant learning environment and showcase of the performing and creative arts and will significantly enhance the current classrooms, studios, and performance venues in music, theatre, dance, and the visual arts.

The theatre program produces a six-show academic season and multiple student-produced projects. Among the practical experience opportunities for students are the improv team, a CAD lab featuring integrated computer visualization technology, and the unique Summer Outdoor Café Theatre. Creative and Performing Arts Awards are available for talented and qualified students.

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.

Potential Occupations

Talent and training are the main factors for success in acting. A pleasing voice, good diction, physical attractiveness, imagination, charm and ability to understand people are also valued. Earning a living solely by working in the performing arts is rare. Most artists also depend upon other arts-related jobs or second careers. For many, success is based on creative work rather than on money and status. Theatre and dance majors often select a second major such as business or education to enhance their job prospects.

Experience acquired through extracurricular performances or internships is highly recommended to enhance practical training and development. Students who go on for advanced study at the graduate level can obtain more responsible positions.

Possible career opportunities include, but are not limited to: film actor/actress; announcer; choral performer; comedian; commercial actor; magician; musician; mime; dramatic reader; stunt performer; impersonator; costume designer; makeup artist; sound designer; choreographer; playwright; librettist; light designer; lyricist; composer; scene/set designer; grip; wardrobe manager; wig dresser; voice over; theatre technician; set carpenter; fashion coordinator; follow spot operator; house electrician; stage manager; props manager; producer; musical director.

Students selecting a concentration in theatre should contact the Director of the Program in Theatre, 220 Johnson Hall, for additional information.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
THCC 141	Introduction to Theatre ¹	3	3B
OR			
TH 192	From Page to State: Freshman Theatre Seminar ²	3	
TH 151	Acting I	3	
TH 160	Graphic Expression for the Theatre	3	
TH 161	Technical Theatre I (TH 160)	3	
TH 286	Practicum	2	
	Allied arts ³	3	3B

Course	Title (Prerequisite)	Cr	AUCC
	Biological/physical science ⁴	3	3A
	Health and wellness ⁵	2	3G
	Mathematics ⁶	3	1B
	U.S. public values and institutions ⁷	3	3F
	TOTAL	31	
SOPHOMORE			
TH 255	Directing I (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	
	Allied arts ³	3	
	Biological/physical sciences ⁴	4	3A
	Global and cultural awareness ⁸	3	3E
	Historical perspectives ⁹	3	3D
	Logical/critical thinking ¹⁰	3	2B
	Social/behavioral sciences ¹¹	3	3C
	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 ¹²	4	
	Additional communication ¹³	3	2A
	Directed study ¹⁴	6	
	Upper division focus ¹⁵	6	
	Electives	5	
	TOTAL	30	
SENIOR			
TH 470A-D	Applied Theatre Production ¹²	2	
TH 499	Thesis ¹⁶ (TH 341, TH 342)	3	4C
	Directed study ¹⁴	6	
	Upper division focus ¹⁵	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 Choose two courses from two different prefixes from the following list: ARCC 100, AR 110, AR 111, D CC 110, MUCC 100, PFCC 110.
⁴ Select from list of approved courses in Category 3A of the AUCC. One course must have a laboratory component.
⁵ Select from list of approved courses in category 3G of the AUCC.
⁶ Select from a list of approved courses in category 1B of the AUCC.
⁷ Select from list of approved courses in category 3F of the AUCC.
⁸ Select from list of approved courses in category 3E of the AUCC.
⁹ Select from list of approved courses in category 3D of the AUCC.
¹⁰ Select from list of approved courses in category 2B of the AUCC.
¹¹ Select from list of approved courses in category 3C of the AUCC.
¹² Students must take at least two different subtopics in TH 470A-D.
¹³ Select from list of approved courses in category 2A of the AUCC.
¹⁴ Students must complete a second major, minor, or an adviser approved upper division 12 credit area of study.
¹⁵ Choose three courses from the following list: D 325, TH 351, TH 355, TH 361, TH 363, TH 365, TH 475.
¹⁶ Students must secure a faculty adviser in the junior year.

Minors in Theatre

Acting/Directing Minor

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
THCC 141	Introduction to Theatre	3	3B
TH 151	Acting I	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	Acting II (TH 151)	3	
TH 355	Directing II (TH 255)	3	
	TOTAL	12	
PROGRAM TOTAL = 21 credits			

Design/Technical Theatre Minor

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LOWER DIVISION			
THCC 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	
----- <i>Select two courses from the following:</i>			
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 = 26 credits			

DEPARTMENT OF PHILOSOPHY

Office in Eddy Hall, Room 243
(970) 491-6315

<http://www.colostate.edu/Depts/Philosophy/>

Professor Ron Williams, Chair

Associate Professor Philip Cafaro, 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- (1.67) in each philosophy course required for the major or minor in philosophy. The minimum scholastic average acceptable for graduation is 2.00 computed only for courses attempted at Colorado State.

Philosophy Core Courses

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A

Course	Title (Prerequisite)	Cr	AUCC
PL 192	Conceptions of the Good Life	3	
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	7	3A
	Health and wellness ³	2	3G
	Historical perspectives ⁴	3	3D
	Logical/critical thinking ⁵	3	2B
	Social/behavioral sciences ⁶	3	3C
	TOTAL	27	
SOPHOMORE			
	Additional communication ⁷	3-5	2A
	Global and cultural awareness ⁸	3	3E
	Mathematics ⁹	3	1B
	U.S. public values and institutions ¹⁰	3	3F
	Electives	9	
	TOTAL	21-23	
JUNIOR			
	Electives	18	
SENIOR			
	Electives ¹¹	13-15	
CORE TOTAL = 81 credits¹²			

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 3G 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 2B 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 2A in the AUCC.

⁸ Select from the list of courses in category 3E in the AUCC.

⁹ Select from the list of courses in category 1B in the AUCC.

¹⁰ Select from the list of courses in Category 3F in the AUCC.

¹¹ 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.

¹² 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>			
PLCC 100	Appreciation of Philosophy	3	3B
PLCC 103	Moral and Social Problems	3	3F
PL 105	Introduction to Philosophy	3	
PLCC 120	History and Philosophy of Scientific Thought	3	3D
OR			
PLCC 170	World Philosophies	3	3E
	TOTAL	6	
SOPHOMORE			
PL 205	Introduction to Ethics (sophomore standing or higher or written consent of instructor)	3	
PL 206	Knowledge and Existence-An Introduction (sophomore standing or higher or written consent of instructor)	3	
PL 210	Introduction to Formal Logic (sophomore standing or higher or written consent of instructor)	3	
	TOTAL	9	
JUNIOR			
PL 300	Ancient Greek Philosophy (PL 205 or PL 206 or PL 210)	3	4A
PL 301	17 th and 18 th Century European Philosophy (PL 206 or PL 210 or PL 300)	3	4A
PL 302	19 th -Century Philosophy (PL 301)	3	
OR			
PL 409	20 th -Century Philosophy (PL 301) Upper-division philosophy	3	
	TOTAL	12	

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
PL 425	Epistemology (PL 210 or PL 300 or PL 301)	3	
PL 435	Metaphysics (PL 210 or PL 300 or PL 301)	3	
PL 447	Ethical Theory (PL 205 or PL 300 or PL 301)	3	
PL 462	Capstone Seminar (Senior standing and any two of the following courses: PL 300, PL 301, PL 302, PL 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			
PL 106	Wisdom of the East-Oriental Philosophy	3	
OR			
PL 172	Religions of the East	3	
PLCC 170	World Philosophies	3	3E
PL 171	Religions of the West	3	
	TOTAL	9	
SOPHOMORE			
PL 205	Introduction to Ethics (sophomore standing or higher or written consent of instructor)	3	
OR			
PL 206	Knowledge and Existence-An Introduction (sophomore standing or higher or written consent of instructor)	3	
PL 210	Introduction to Formal Logic (sophomore standing or higher or written consent of instructor)	3	
PL 270	Issues in the Study of Religion (sophomore standing or higher or written consent of instructor)	3	
	TOTAL	9	
JUNIOR			
PL 300	Ancient Greek Philosophy (PL 205 or PL 206 or PL 210)	3	4A
PL 301	17 th and 18 th Century European Philosophy (PL 206 or PL 210 or PL 300)	3	4A
<i>Select one of the following:</i>			
PL 355	Philosophy of Religion (PL 106 or PL 171 or PL 172 or PL 270)	3	
PL 370	Contemporary Western Religious Thought (PL 106 or PL 171 or PL 172 or PL 270)	3	
PL 372	Meaning and Truth in Religion (PL 106 or PL 171 or PL 172 or PL 270)	3	
PL 375	Science and Religion (PL 106 or PL 171 or PL 172 or PL 270)	3	
<i>Select one of the following:</i>			
PL 349	Philosophy of Tao and Zen (written consent of instructor)	3	
PL 360	Topics in Oriental Philosophy (Sophomore standing or higher or written consent of instructor)	3	
PL 371	Contemporary Eastern Religious Thought	3	
PL 379	Mysticism East and West (PL 106 or PL 171 or PL 172 or PL 270)	3	
	TOTAL	12	
SENIOR			
PL 425	Epistemology (PL 210 or PL 300 or PL 301)	3	
OR			
PL 435	Metaphysics (PL 210 or PL 300 or PL 301)	3	
<i>Select one of the following:</i>			
PL 447	Ethical Theory (PL 205 or PL 300 or PL 301)	3	
OR			

Course	Title (Prerequisite)	Cr	AUCC
PL 463	Seminar in Religious Studies	3	
PL 462	Capstone Seminar (senior standing and any two of the following courses: PL 300, PL 301, PL 302, PL 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			
PLCC 120	History and Philosophy of Scientific Thought	3	3D
TOTAL		3	
SOPHOMORE			
PL 205	Introduction to Ethics (sophomore standing or higher or written consent of instructor)	3	
PL 206	Knowledge and Existence-An Introduction (Sophomore standing or higher or written consent of instructor)	3	
PL 210	Introduction to Formal Logic (sophomore standing or higher or written consent of instructor)	3	
	Science and technology elective ¹	3	
TOTAL		12	
JUNIOR			
PL 300	Ancient Greek Philosophy (PL 205 or PL 206 or PL 210)	3	4A
OR			
PL 301	17 th and 18 th Century European Philosophy (PL 206 or PL 210 or PL 300)	3	4A
PL 302	19 th -Century Philosophy (PL 301)	3	
OR			
PL 409	20 th -Century Philosophy (PL 301)	3	
PL 325	Philosophy of Natural Science (PL 210, one course in natural sciences)	3	
OR			
PL 327	Philosophy of Behavioral Sciences (PL 105 or PLCC 120 or PL 205 or PL 206 or PL 210 or any upper-division course in philosophy)	3	
PL 345	Environmental Ethics (Sophomore standing or higher or written consent of instructor)	3	
OR			
PL 375	Science and Religion (PL 106 or PL 171 or PL 172 or PL 270)	3	
TOTAL		12	
SENIOR			
PL 410	Formal Logic (PL 210 or CS 270)	3	
OR			
PL 415	Logic and Scientific Method	3	
PL 425	Epistemology (PL 210 or PL 300 or PL 301)	3	
PL 435	Metaphysics (PL 210 or PL 300 or PL 301)	3	
PL 462	Capstone Seminar (senior standing and any two of the following course: PL 300, PL 301, PL 302, PL 409)	3	4B, 4C
TOTAL		12	

PROGRAM TOTAL = 120 credits

¹Three 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- (1.67) in each philosophy course required for the major or minor in philosophy. The minimum scholastic average acceptable for graduation is 2.00 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>			
PLCC 100	Appreciation of Philosophy	3	3B
PLCC 103	Moral and Social Problems	3	3F
PL 105	Introduction to Philosophy	3	
PLCC 120	History and Philosophy of Scientific Thought	3	3D
PLCC 170	World Philosophies	3	3E
PL 205	Introduction to Ethics (sophomore standing or higher or written consent of instructor)	3	
OR			
PL 206	Knowledge and Existence-An Introduction (sophomore standing or higher or written consent of instructor)	3	
PL 210	Introduction to Formal Logic (sophomore standing or higher or written consent of instructor)	3	
TOTAL		9	
UPPER DIVISION			
PL 300	Ancient Greek Philosophy (PL 205 or PL 206 or PL 210)	3	
PL 301	17 th and 18 th Century European Philosophy (PL 206 or PL 210 or PL 300)	3	
PL 425	Epistemology (PL 210 or PL 300 or PL 301)	3	
OR			
PL 435	Metaphysics (PL 210 or PL 300 or PL 301)	3	
PL 447	Ethical Theory (PL 205 or PL 300 or PL 301)	3	
OR			
PL 462	Capstone Seminar (senior standing and any 2 of the following: PL 300, PL 301, PL 302, PL 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>			
PL 106	Wisdom of the East-Oriental Philosophy	3	
PL 171	Religions of the West	3	
PL 172	Religions of the East	3	
PL 205	Introduction to Ethics (Sophomore standing or higher or written consent of instructor)	3	
OR			
PL 206	Knowledge and Existence-An Introduction (sophomore standing or higher or written consent of instructor)	3	
PL 270	Issues in the Study of Religion (sophomore standing or higher or written consent of instructor)	3	
TOTAL		9	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
UPPER DIVISION			
PL 300	Ancient Greek Philosophy (PL 205 or PL 206 or PL 210)	3	
OR			
PL 301	17 th and 18 th Century European Philosophy (PL 206 or PL 210 or PL 300)	3	
PL 106	Wisdom of the East-Oriental Philosophy	3	
PL 171	Religions of the West	3	
<i>Select one course from the following:</i>			
PL 349	Philosophy of Tao and Zen (written consent of instructor)	3	
PL 360	Topics in Oriental Philosophy (sophomore standing or higher or written consent of instructor)	3	
PL 371	Contemporary Eastern Religious Thought	3	
PL 379	Mysticism East and West (PL 106 or PL 171 or PL 172 or PL 270)	3	
<i>Select one course from the following:</i>			
PL 355	Philosophy of Religion (PL 106 or PL 171 or PL 172 or PL 270)	3	
PL 370	Contemporary Western Religious Thought (PL 106 or PL 171 or PL 172 or PL 270)	3	
PL 372	Meaning and Truth in Religion (PL 106 or PL 171 or PL 172 or PL 270)	3	
PL 375	Science and Religion (PL 106 or PL 171 or PL 172 or PL 270)	3	
PL 447	Ethical Theory (PL 205 or PL 300 or PL 301)	3	
OR			
PL 462*	Capstone Seminar (senior standing and any two of the following: PL 300, PL 301, PL 302, PL 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, political philosophy, history of philosophy, metaphysics, aesthetics, and epistemology.

A description of this program may be found in the *Graduate and Professional Bulletin*.

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 with in 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- (1/67) in each of the Political Science (PO) courses counted toward meeting the requirement of the major.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
POCC 101	American Government and Politics	3	3F
POCC 103	State and Local Government and Politics	3	3C
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	4	3A
	Health and wellness ³	2	3G
	Logical/critical thinking ⁴	3	2B
	Mathematics ⁵	3	1B
	Electives	6	
	TOTAL	30	
SOPHOMORE			
	<i>Select from the following:</i>		
ECCC 101	Economics of Social Issues	3	3C
	OR		
ECCC 202	Principles of Microeconomics ⁶ (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
	AND		
ECCC 204	Principles of Macroeconomics ⁶ (ECCC 202 or EACC 202)	3	3F
POCC 232	International Relations	3	3D
POCC 241	Comparative Government and Politics	3	3E
	Additional communications ⁷	3	2A
	Biological/physical sciences ⁸	3	3A
	Political science, upper-division ⁹	3	
	Support option ¹⁰	3-6	
	Electives	6-9	
	TOTAL	30-33	
JUNIOR			
	Political science, upper-division ⁹	9	
	Support option ¹⁰	6-12	

Course	Title (Prerequisite)	Cr	AUCC
	Electives	9-12	
	TOTAL	27-30	
SENIOR			
PO 492	Capstone Seminar (upper-division course in at least 4 sub-fields of political science)	3	4A, 4B, 4C
	Political science, upper-division ⁹	9	4A, 4B
	Support option ¹⁰	6-12	
	Electives ¹¹	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 any course with a laboratory component from the list of courses in category 3A in the AUCC.
- ³ Select from the list of courses in category 3G in the AUCC.
- ⁴ Select from the list of courses in category 2B in the AUCC.
- ⁵ Select from the list of courses in category 1B in the AUCC.
- ⁶ EC/ECCC 202 and EC/ECCC 204 should be taken by students who plan to take advanced courses in economics.
- ⁷ Select from the list of courses in categories 2A1, 2A2, or 2A3 in the AUCC.
- ⁸ Select from the list of courses in category 3A in the AUCC.
- ⁹ 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. PO 320 must be completed by students choosing the Methods Support Option. Credits earned in PO 495 may not be used to satisfy this requirement. A maximum of three credits earned in PO 486 may be used to satisfy this requirement.
- ¹⁰ 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] – PO 320 and STCC 301; 6 credits from among PLCC 120, PL 327, and PL 415; 3 credits from among ST 302, STCC 304, and ST 305; 6 credits from among the following: AP 441, EC 335/EA 335, S 310 and S 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.
- ¹¹ 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			
POCC 101	American Government and Politics	3	3C, 3F
	<i>Select two courses from the following:</i>		
POCC 103	State and Local Government and Politics	3	3C, 3F
POCC 232	International Relations	3	3C or 3D
POCC 241	Comparative Government and Politics	3	3C or 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 PO 486 and PO 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. A full description of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF SOCIOLOGY

Office in Clark Building, Room B258
(970) 491-6045

<http://www.colostate.edu/Depts/Sociology/>

Professor Louis E. Swanson, Jr., Chair
Associate Professor Mike Lacy, Director of Graduate Studies

Associate Professor John Brouillette, Director of Undergraduate 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 studies, religious studies, or Russian, Eastern and Central European studies.

Learning Outcomes

Students will:

- Critically analyze 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.

- Critically analyze 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).
- Critically analyze 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 your 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- (1.67) in each sociology course counted toward the concentration, and in PO 413 and SW 371B or SW 371C, if these courses are counted toward the concentration.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
<i>Select one of the following pairs of courses:</i>			
M CC 117	College Algebra in Context I (Math Placement Exam)	1	1B
M CC 118	College Algebra in Context II (M CC 117)	1	1B
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
S CC 100	General Sociology	3	3C, 3F
OR			
S CC 105	Social Problems	3	3C, 3F
S 253	Introduction to Criminal Justice (S CC 100 or S CC 105)	3	
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	3-4	3A
	Health and wellness ³	2-3	3G
	Social/behavioral sciences ⁴	3	
	Electives	5-6	
	TOTAL	28-31	
SOPHOMORE			
	Additional communication ⁵	3	2A
	Biological/physical sciences ⁶	3-4	3A
	Global and cultural awareness ⁷	3	3E
	Historical perspectives ⁸	3	3D
	Logical/critical thinking ⁹	3	2B
	Social/behavioral sciences ⁴	6	
	Electives	9	
	TOTAL	30-31	
JUNIOR			
S 301	Development of Sociological Thought (S CC 100 or S CC 105)	3	
OR			
S 302	Contemporary Sociological Theory (S CC 100 or S CC 105)	3	
S 310	Quantitative Sociological Analysis (M CC 120A-B or M CC 117)	3	
S 311	Methods of Sociological Inquiry (S CC 100 or S CC 105)	3	4A, 4B
S 313	Computer Methods in Sociology (S 310 or written consent of instructor)	1	
S 352	Criminology (S CC 100 or S CC 105)	3	
OR			
S 372	Sociology of Deviance (S CC 100 or S CC 105)	3	
S 354	Law Enforcement and Society (S 253)	3	
	Social/behavioral sciences ⁴	12	

Course	Title (Prerequisite)	Cr	AUCC
	Electives	3	
	TOTAL	31	
SENIOR			
PO 413	U.S. Civil Rights and Liberties (POCC 101)	3	
OR			
S 355	Sociology of Law (S 253)	3	
<i>Select one of the following:</i>			
S 358	Correctional Organizations (S 253)	3	
SW 371B	Social Work-Juvenile Offenders	3	
SW 371C	Social Work-Adult Offenders	3	
S 403	Capstone Seminar (S 301 or S 302; S 310, S 311, S 313)	3	4C
OR			
S 487	Internship (S 301 or S 302; S 310, S 311, S 313)	43	4C
AND			
S 492	Seminar (S 301 or S 302; S 310, S 311, S 313; concurrent registration in S 487)	1	4C
	Electives ¹⁰	17-22	
	TOTAL	27-31	
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. One course must have a laboratory component.
- ³ Select from the list of courses in category 3G in the AUCC.
- ⁴ Select from a department list of approved courses.
- ⁵ Select from the list of courses in category 2A in the AUCC.
- ⁶ Select a minimum of 7 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 in the AUCC.
- ⁸ Select from the list of courses in category 3D in the AUCC.
- ⁹ Select from the list of courses in category 2B in the AUCC.
- ¹⁰ Select enough elective credits to bring program total to 120 credits. A minimum of 42 upper-division credits is required as well.

General Sociology Concentration

Sociology majors in the general sociology concentration must achieve a minimum grade of C- (1.67) in each of the sociology courses counted toward the concentration.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
<i>Select one of the following pairs of courses:</i>			
M CC 117	College Algebra in Context I (Math Placement Exam)	1	1B
M CC 118	College Algebra in Context II (M CC 117)	1	1B
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
S CC 100	General Sociology	3	3C, 3F
OR			
S CC 105	Social Problems	3	3C, 3F
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	3-4	3A
	Health and wellness ³	2-3	3G
	Social/behavioral sciences ⁴	3	
	Sociology electives ⁵	3	
	Electives	5-6	
	TOTAL	28-31	
SOPHOMORE			
	Additional communication ⁶	3	2A
	Biological/physical sciences ²	3-4	3A
	Global and cultural awareness ⁷	3	3E
	Historical perspectives ⁸	3	3D

Course	Title (Prerequisite)	Cr	AUCC
	Logical/critical thinking ⁹	3	2B
	Social/behavioral sciences ¹⁰	6	
	Sociology electives ⁵	6	
	Electives	3	
	TOTAL	30-31	
JUNIOR			
S 301	Development of Sociological Thought (S CC 100 or S CC 105)	3	
OR			
S 302	Contemporary Sociological Theory (S CC 100 or S CC 105)	3	
S 310	Quantitative Sociological Analysis (M CC 120A-B or M CC 117)	3	
S 311	Methods of Sociological Inquiry (S CC 100 or S CC 105)	3	4A, 4B
S 313	Computer Methods in Sociology (S 310 or written consent of instructor)	1	
	Social/behavioral sciences ¹⁰	12	
	Upper division sociology	3	
	Electives	3-7	
	TOTAL	28-32	
SENIOR			
S 403	Capstone Seminar (S 310, S 311; S 301 or S 302; S 313)	3	4C
OR			
S 487	Internship (S 301 or S 302, S 310, S 311, S 313)	3	4C
AND			
S 492	Seminar (S 301 or S 302; S 310, S 311; S 313, concurrent reg. in S 487)	1	4C
	Upper division sociology	3	
	Electives ¹¹	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 the list of courses in category 3G in the AUCC.

⁴ Select from a department list of approved courses.

⁵ Select courses representing the major areas of sociology.

⁶ Select from the list of courses in category 2A in the AUCC.

⁷ Select from the list of courses in category 3E in the AUCC.

⁸ Select from the list of courses in category 3D in the AUCC.

⁹ Select from the list of courses in category 2B in the AUCC.

¹⁰ Select from a department list of approved courses.

¹¹ Select enough elective credits to bring program total to 120 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			
S CC 100	General Sociology	3	3C, 3F
OR			
S CC 105	Social Problems	3	3C, 3F
S 253	Introduction to Criminal Justice (S CC 100 or S CC 105)	3	
	TOTAL	6	
UPPER DIVISION			
S 301	Development of Sociological Thought (S CC 100 or S CC 105)	3	
OR			
S 302	Contemporary Sociological Theory (S CC 100 or S CC 105)	3	

Course	Title (Prerequisite)	Cr	AUCC
S 311	Methods of Sociological Inquiry (S CC 100 or S CC 105)	3	
<i>Choose one course from three of the following five categories:</i>			
Category I			
S 352	Criminology (S CC 100 or S CC 105)	3	
S 372	Sociology of Deviance (S CC 100 or S CC 105)	3	
Category II			
S 354	Law Enforcement and Society (S 253)	3	
Category III			
PO 413*	Civil Rights and Liberties (POCC 101)	3	
S 355	Sociology of Law (S 253)	3	
Category IV			
S 358	Correctional Organizations (S 253)	3	
SW 371B	Social Work with Juvenile Offenders	3	
SW 371C	Social Work with Adult Offenders	3	
Category V			
S 464	Environmental Justice (S CC 100 or S CC 105)	3	
	TOTAL	15	
PROGRAM TOTAL = 21 credits			

* Additional course work may be required because of prerequisites.

Minor in 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			
S CC 100	General Sociology	3	3C, 3F
OR			
S CC 105	Social Problems	3	3C, 3F
UPPER DIVISION			
S 301	Development of Sociological Thought (S CC 100 or S CC 105)	3	
OR			
S 302	Contemporary Sociological Theory (S CC 100 or S CC 105)	3	
S 311	Methods of Sociological Inquiry (S CC 100 or S CC 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*. 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 Denny Phillips, 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			
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
POCC 101	American Government and Politics	3	3C, 3F
SPCC 100	Communications and Popular Culture	3	3B
SPCC 200	Public Speaking	3	2A1
	Biological/physical sciences ¹	7	3A
	Health and wellness ²	2	3G
	Historical perspectives ³	3	3D
	Mathematics ⁴	3	1B
	Elective	3	
	TOTAL	30	
SOPHOMORE			
SPCC 201	Rhetoric in Western Thought	3	3B
SPCC 207	Rhetoric and Argumentation	3	2B
	Global and cultural awareness ⁵	3	3E

Course	Title (Prerequisite)	Cr	AUCC
	Historical perspectives ⁶	9	
	Social/behavioral sciences ⁷	9	
	Written communication ⁸	3	
	TOTAL	30	

JUNIOR

	Arts/humanities ⁹	12	
	Social/behavioral sciences ⁷	3	
	Speech electives ¹⁰	15	
	TOTAL	30	

SENIOR

Select one of the following courses:

SP 311	Historical Speeches on American Issues	3	4A, 4B
SP 341	Evaluating Contemporary Television	3	4A, 4B
SP 342	Critical Media Studies	3	4A, 4B
SP 355	Evaluating Contemporary Film (SP 354)	3	4A, 4B
SP 411	Contemporary Speeches on American Issues	3	4A, 4B
SP 412	Evaluating Contemporary Rhetoric	3	4A, 4B
SP 450	Capstone Seminar	2	4C
	Speech electives ¹⁰	9	
	Electives ¹¹	16	
	TOTAL	30	

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

³ Select one HYCC-prefix course from the list of courses in category 3D in the AUCC.

⁴ Select from the list of courses in category 1B in the AUCC.

⁵ Select any course in category 3E in the AUCC. This course cannot be double-counted in any other AUCC category.

⁶ Nine additional courses from HY-prefix courses. Including AUCC category 3D course taken above, student must have six credits world history and six credits U.S. history. See departmental list for courses in each category.

⁷ Select a total of 12 credits from the following prefixes: AP, EC, ET, HY, JT, PO, PY, or S.

⁸ Select either an additional CO course or any course in category 2A2 in the AUCC.

⁹ Select twelve credits from the following prefixes: AR, D, E, ET, L, MU, PL, or TH.

¹⁰ Select a total of 24 credits of SP prefix courses with the following restrictions: Maximum credit for SP 215 and SP 315 combined is three credits. Credit for SP 384, SP 387, SP 495 cannot be applied in this category.

¹¹ Select credits to total 120.

Communication Studies Concentration

Course	Title (Prerequisite)	Cr	AUCC
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SENIOR

Select twelve credits from the following:

SP 205	Group Communication (SPCC 200)	3	
SP 217	Nonverbal Communication	3	
SP 305	Intercultural Communication	3	
SP 306	Co-Cultural Communication	3	
SP 309	Conflict Management and Communication	3	
SP 310	Interpersonal Communication Skills	3	
SP 317	Women and Communication	3	
SP 409	Studies in Persuasion	3	
SP 417	Communication, Language, and Thought	3	
SP 427	Communication in Organizations	3	
SP 505	Ethnography of Communication (Graduate standing or SP 306 and 12 additional 300-400 level credits in speech)	3	
SP 510	Theories of Interpersonal Communication (Graduate standing or SP 310 and 12 additional 300-400 level credits in speech)	3	
SP 530	Communication Research Methods (Graduate standing or 15 300-400 level credits in speech)	3	
	B.A. Core requirements ¹	108	
	TOTAL	120	

PROGRAM TOTAL = 120 credits

¹ 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
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SENIOR

Select twelve credits from the following:

SP 341	Evaluating Contemporary Television	3	
SP 342	Critical Media Studies	3	
SP 346	Virtual Culture and Communication (SPCC 100 or SP 342)	3	
SP 347	Visual Rhetoric (SPCC 100 or SP 342)	3	
SP 349	Freedom of Speech	3	
SP 354	History and Appreciation of Film	3	
SP 355	Evaluating Contemporary Film (SP 354)	3	
SP 356	Rhetoric of Documentary Film (SP 354)	3	
SP 447	Television-Radio Programming and Management	3	
SP 449	Law and Policy of Communication Technologies	3	
SP 454	Chicano/a Film and Video	3	
SP 546	Media Criticism (Graduate standing or SP 341 or SP 342 and 152 additional 300-400 level credits in Speech)	3	
	B.A. Core requirements ¹	108	
	TOTAL	120	

PROGRAM TOTAL = 120 credits

¹ 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
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SENIOR

Select twelve credits from the following:

SP 311	Historical Speeches on American Issues	3	
SP 317	Women and Communication	3	
SP 401	Rhetoric in Contemporary Social Movements	3	
SP 409	Studies in Persuasion	3	
SP 411	Contemporary Speeches on American Issues	3	
SP 412	Evaluating Contemporary Rhetoric	3	
SP 415	Rhetoric and Civility (SP/SPCC 201 and SPCC 207)	3	
SP 417	Communication, Language, and Thought	3	
SP 420	Political Communication	3	
SP 503	Transformations in Rhetorical Theory (SP/SPCC 201 or graduate status)	3	
SP 512	Rhetorical Criticism (fifteen 300-400 level credits in speech and/or English)	3	
SP 523	Feminist Theories of Discourse (graduate standing or SP 317 or WS 200 and 12 additional 300-400 level credits in speech)	3	
	B.A. Core requirements ¹	108	
	TOTAL	120	

PROGRAM TOTAL = 120 credits

¹ 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://teachered.colostate.edu/>) or in room 111 of the Education Building.

College of Liberal Arts

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
POCC 101	American Government and Politics	3	3C, 3F
SPCC 100	Communication and Popular Culture	3	3B
SPCC 200	Public Speaking	3	2A
THCC 141	Introduction to Theatre	3	3B
	Biological/physical sciences ¹	7	3A
	Health and wellness ²	2	3G
	Mathematics ³	3	1B
	Elective	3	
	TOTAL	30	
SOPHOMORE			
E CC 270	Introduction to American Literature	3	3B
E CC 276	Survey of British Literature I	3	3B
OR			
E CC 277	Survey of British Literature II	3	3B
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
Select one of the following courses:			
ETCC 250/ HYCC 250	African American History, 1619-1865	3	3D
ETCC 251/ HYCC 251	African American History Since 1865	3	3D
ETCC 252/ HYCC 252	Asian American History	3	3D
ETCC 255/ HYCC 255	Native American History	3	3D
HYCC 100	Western Civilization, Pre-Modern	3	3D
HYCC 101	Western Civilization, Modern	3	3D
HYCC 150	U.S. History to 1876	3	3D, 3F
HYCC 151	U.S. History Since 1876	3	3D, 3F
HYCC 170	World History, Ancient-1500	3	3D
HYCC 171	World History, 1500-Present	3	3D
HYCC 230	Medieval Europe	3	3D or 3E
SPCC 201	Rhetoric in Western Thought	3	3B
SPCC 207	Rhetoric and Argumentation	3	2B
	Global and cultural awareness ⁴	3	3E
	Option courses ⁵	8-10	
	TOTAL	29-31	
JUNIOR			
COCC 301A-D	Writing in the Disciplines (COCC 150)	3	2A2
E 402	Teaching Composition (COCC 301A or B or C or D)	3	
E 405	Adolescents' Literature	3	
ED 331	Educational Technology (Completion of Phase I courses; -BD 150 or CS 110 within 3 years or computer proficiency test; consent of Teacher Licensure Office)	2	
ED 340	Literacy and the Learner (completion of 30 credits of course work. Required background check through CDE, CBI, FBI)	3	
ED 350	Instruction I-Individualization/Management (EDCC 275, ED 340; concurrent registration in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 275, ED 340, concurrent registration in ED 350; admission to Teacher Licensure Program)	1	
ED 463	Methods in Teaching Language Arts (admission to Teacher Licensure Program)	4	
	English elective ⁶	3	
	Option courses ⁵	6-8	
	TOTAL	31-33	
SENIOR			
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent registration in ED 486J)	4	
ED 485B	Student Teaching-Secondary (ED 450, ED 463)	11	
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	

Course	Title (Prerequisite)	Cr	AUCC
ED 493A	Seminar-Professional Relations (ED 426 or ED 450, ED 463, concurrent registration in ED 485A or B or C)	1	
SP 450	Capstone Seminar	2	4C
	Option courses ⁵	9	
	TOTAL	28	

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 3G in the AUCC.

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

⁴ Select from the list of courses in category 3E in the AUCC. Can be double counted as a major requirement, but not as another AUCC requirement.

⁵ Student must also complete one of the following options: speech or theatre.

⁶ Three credit elective with E prefix.

Speech Option

Course	Title (Prerequisite)	Cr	AUCC
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SOPHOMORE

SP 205	Group Communication (SPCC 200)	3	
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OR

SP 310	Interpersonal Communication Skills	3	
	Speech electives ¹	6	
	Elective	1	
	TOTAL	10	

JUNIOR

Select one of the following courses:

SPCC 192	Introduction to Intercultural Communication	3	3E
SP 305	Intercultural Communication	3	
SP 306	Co-Cultural Communication	3	
SP 300	Advanced Public Speaking (SPCC 200)	3	

OR

SP 303	Business and Professional Speaking (SPCC 200)	3	
	TOTAL	6	

SENIOR

SP 311	Historical Speeches on American Issues	3	4A, 4B
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OR

SP 411	Contemporary Speeches on American Issues	3	4A, 4B
	Speech electives ¹	6	
	TOTAL	9	

OPTION TOTAL = 25 credits

¹ Any two 3-credit courses with SP prefix.

Theatre Option

Course	Title (Prerequisite)	Cr	AUCC
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SOPHOMORE

TH 151	Acting I	3	
TH 160	Graphic Expression for the Theatre	3	
TH 255	Directing I (TH 151)	3	
	TOTAL	9	

JUNIOR

TH 286	Practicum	1	
TH 341	History of Theatre I	3	4A, 4B

OR

TH 342	History of Theatre II	3	4A, 4B
	Theatre electives ¹	3	
	TOTAL	7	

SENIOR

	Theatre electives ¹	9	
	TOTAL	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 program of study leads to a master of arts degree. Students pursue course work in rhetoric, communication, and media theory. Students choose other course work in rhetorical and media criticism; intercultural and interpersonal organizational communication; public address; feminist theories of discourse; law and policy of communication technologies; film; freedom of speech; and persuasion and conflict theory.

A description of these programs may be found in the *Graduate and Professional Bulletin*.

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 Resources

Office in Natural Resources Building, Room 101
(970) 491-6675
www.cnr.colostate.edu

Associate Professor Joyce Berry, Dean
Associate Professor Sally Sutton, Interim Associate Dean
Professor R. Dennis Child, Associate Dean

UNDERGRADUATE MAJORS

Fishery Biology
Forestry
Geology
Natural Resource Recreation and Tourism
Natural Resources Management
Rangeland Ecology
Watershed Science
Wildlife Biology

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.

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 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 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/us/studyabroad.

Graduate Programs

Master of science and doctor of philosophy degree programs are offered in each department. Programs leading to the professional degree, master of forestry, are offered in the Department of Forest, Rangeland, and Watershed Stewardship. A description of these programs may be found in the *Graduate and Professional Bulletin*.

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 FISHERY AND WILDLIFE BIOLOGY

Office in Wagar Building, Room 136
(970) 491-5020
<http://www.cnr.colostate.edu/FWB/>

Professor H. Randall Robinette, Head

Two majors are offered for careers in fish or wildlife biology, management, conservation, administration, or research. Fish and wildlife are interpreted broadly to include all wild vertebrate animals. Emphasis is given to fish and wildlife in integrated resource management, to applications of technology, and to socioeconomic considerations.

Major in Fishery Biology

Associate Professor Brett Johnson, in charge

A fishery biology degree prepares students for careers in fish biology, fish management, aquaculture, or aquatic ecology, fishery research, or graduate studies. The fishery biology program at Colorado State University is a nationally ranked program located in an ideal setting for the study of fisheries and resource management issues. The faculty is wide ranging in expertise, and innovative in teaching and research methods. A variety of specializations is possible including aquaculture, fisheries management, aquatic ecology, and fish biology. 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.

The fishery biology curriculum provides a solid foundation in the natural sciences, plus specific requirements in organismal and suborganismal biology, aquatic ecology, fishery biology, and ecosystem management. Additionally, up to 25 elective credits can be used to develop expertise in one of several specialties. Aquaculture, the propagation of fish, emphasizes fish culture, genetics, fish physiology, nutrition, microbiology, engineering, and water quality. Fisheries management includes electives in aquatic ecology, watershed science, computer modeling, natural resources policy, and public relations. Those interested in aquatic ecology or fish biology should select electives to obtain a broad background in math, chemistry, physics, and upper-division biology courses. A summer field training program at the Pingree Park mountain campus gives students an on-site, hands-on look at resource ecology and the measurement of its components. Students are also required to complete at least 160 hours of employment related to fishery biology.

Learning Outcomes

Students will:

- Demonstrate mathematical, statistical, and study design knowledge and skills required for careers in fishery management and conservation.
- Demonstrate a mastery of fundamental fishery biology techniques and ecological concepts and principles and how they apply to conservation and 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

Federal and state agencies that manage natural resources offer most of the employment opportunities in fishery biology. These agencies include the U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, U.S. Environmental Protection Agency, U.S. Bureau of Reclamation, National Marine Fisheries Service, and state departments of wildlife, fish and game, and natural resources. Along with a strong technical foundation, cooperation, speaking, and writing skills are necessary to resolve difficult issues which natural resource personnel may face in the following areas: conservation education and interpretation, harvest management, administration, research, law enforcement, habitat enhancement, fishery census, statistical analyses, and resolution of human-wildlife problems. Participation in internships, volunteer activities, or cooperative education opportunities is highly recommended to enhance practical training and development. A master of science degree is usually required to be competitive for career-level positions.

Some examples of possible careers include, but are not limited to: fishery biologist; fishery manager; aquaculturist; aquatic ecologist; consultant; researcher; educator.

M CC 120A-B and M CC 121 are considered review courses by the Department of Fishery and Wildlife 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 (2.0) is required in all biological, mathematical/statistical, physical science, fishery and wildlife biology, and natural resource courses used to meet graduation requirements for the fishery biology major and wildlife biology major. The minimum applies to courses taken as substitutions for meeting these requirement. The minimum scholastic average acceptable for graduation is 2.0, computed only for courses attempted at Colorado State University.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one of the following sets of courses:</i>			
BZCC 110	Principles of Animal Biology	3	
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	
BZCC 120	Principles of Plant Biology	4	
OR			
LSCC 102	Attributes of Living Systems (high school chemistry)	4	
LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	
<i>Select one of the following sets of courses:¹</i>			
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent registration)	1	3A
OR			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A

Course	Title (Prerequisite)	Cr	AUCC
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent registration in M CC 155 or M CC 160)	3	
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
FW 100	Wildlife Fundamentals (concurrent registration in FW 192 for freshmen)	2	
FW 192	Wildlife Inquiries ²	1	
M CC 155	Calculus for Biological Scientists I ³ (M CC 124, M CC 125)	4	1B
OR			
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
SPPC 200	Public Speaking	3	2A1
	Health and wellness ⁴	2	3G
	TOTAL	28-31	
SOPHOMORE			
BY 320	Ecology (one course in biology; M CC 141, M CC 155 or M CC 160)	3	
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent registration)	1	
FW 204	Introduction to Fishery Biology (FW 100)	3	
NR 220	Natural Resources Ecology and Measurements (LS 103 or BZCC 120; M CC 121)	5	
<i>Select one pair of the following courses:^{1,3}</i>			
PHCC 110	Descriptive Physics	3	3A
PHCC 111	Descriptive Physics Laboratory (PHCC 110 or concurrent registration)	1	3A
OR			
PHCC 121	General Physics I (concurrent registration in M CC 125)	5	3A
PHCC 122	General Physics II (PHCC 121)	5	3A
	Depth elective ^{1,6}	0-4	
	Arts/humanities ⁷	3	3B
	Global and cultural awareness ⁸	3	3E
	Social/behavioral sciences ⁹	3	3C
	TOTAL	33-35	
JUNIOR			
<i>Select one of the following:</i>			
BZ 212	Animal Biology-Invertebrates (LS 103 or BZCC 110 and BZCC 111)	4	
BZ 214	Animal Biology-Vertebrates (LS 103 or BZCC 111)	4	
BZ 329	Herpetology (BZ 214)	3	
BZ 330	Mammalogy (LS 103 or BZCC 111)	3	
BZ 335	Ornithology (LS 103 or BZCC 111)	3	
FW 300	Ichthyology (LS 103 or BZCC 111)	2	
FW 301	Ichthyology Laboratory (FW 300 or concurrent registration)	1	
FW 360	Principles of Vertebrate Management (BY 220 or BY 320; M CC 141 or M CC 155 or M CC 160)	3	
NRCC 320	Natural Resources History and Policy	3	3D, 3F
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
OR			
STCC 307/	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B
EHCC 307	Suborganismal elective ¹⁰	9-11	
	Electives	3-7	
	TOTAL	30-31	
SENIOR			
<i>Select 3-4 credits from the following:</i>			
BI 445	Aquatic Insects (LS 103 or BZCC 111)	4	
BZ 471	Stream Biology and Ecology (BY 220)	3	
AND			
BZ 472	Stream Biology and Ecology Laboratory (BZ 471 or concurrent registration)	1	
BZ 474	Limnology (BY 220)	3	
FW 370	Design of Fish and Wildlife Projects (FW 360; NR 220; STCC 301 or STCC 307/EHCC 307)	3	
FW 400	Fish Ecology (BY 220 or BY 320, FW 300, FW 370)	3	
OR			
FW 402	Fish Culture (FW 204, FW 300; FW 301)	4	

Course	Title (Prerequisite)	Cr	AUCC
FW 401	Fishery Science (FW 300; STCC 301 or STCC 307/EHCC 307; M CC 141 or M CC 155 or M CC 160)	3	4A, 4B
NR 420	Integrated Ecosystem Management (Senior standing: BY 320, NR 220, and NR/NRCC 320)	4	4C
	Ecosystem management elective ¹¹	6	
	Electives	3-7	
	TOTAL	27-29	

PROGRAM TOTAL = 120-125 credits

¹ Students must select one area of depth: chemistry, computer science, mathematics or statistics, or physics. Students selecting the chemistry area of depth should take the combination of C CC 111, C CC 112, and C 113.

² First year students must take FW 100 and FW 192.

³ M CC 117- M CC 125 are considered review courses by the Department of Fishery and Wildlife Biology. Credits in these courses, either by examination or completion, may not be used toward a degree in this department.

⁴ Select from the list of courses in category 3G in the All-University Core Curriculum (AUCC).

⁵ Students selecting the physics area of depth must take PHCC 121 and PHCC 122.

⁶ Students in the mathematics/statistics depth area select from: M 229, M CC 255, ST 302, ST 304, ST 305, ST 321 or additional courses off of the department advising list. Students in the computer science depth area select from CSCC 153, NR 322, NR 323, or additional classes from the department advising list.

⁷ Select from the list of courses in category 3B in the AUCC.

⁸ Select from the list of courses in category 3E in the AUCC.

⁹ Select from the list of courses in category 3C in the AUCC.

¹⁰ Choose 3 courses from the following list: BY 310, BY 311, SC 330 or BZ 346, MB 300, FW 405 or BZ 401.

¹¹ Choose 1 course from List A and 1 course from List B. List A: EACC 240 or ECCC 240 or NR 400 or RR 330; List B: F 311 or RS 331 or WRCC 304.

Minor in Fishery Biology

Students majoring in wildlife biology, 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			
BY 220*	Fundamentals of Ecology (one course in biology; M CC 124 or M CC 141 or M CC 155 or M CC 160)	3	
OR			
BY 320*	Ecology (one course in biology; M CC 141 or M CC 155 or M CC 160)	3	
<i>Select one of the following pairs of courses:</i>			
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
OR			
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	
	TOTAL	7-11	

LOWER OR UPPER DIVISION			
<i>Select one course from the following:</i>			
FW 204*	Introduction to Fishery Biology (FW 100)	3	
FW 360*	Principles of Vertebrate Management (BY 220 or BY 320; M CC 141 or M CC 155 or M CC 160)	3	
FW 370*	Design of Fish and Wildlife Projects (FW 360, NR 220; STCC 301 or STCC 307 or EHCC 307)	3	
	TOTAL	3	

UPPER DIVISION			
FW 300	Ichthyology (BZCC 111 or LS 103)	2	
FW 301	Ichthyology Laboratory (FW 300 or concurrent registration)	1	
<i>Select two courses from the following:</i>			
FW 400	Fish Ecology (BY 220 or BY 320, FW 300, FW 370)	3	

Course	Title (Prerequisite)	Cr	AUCC
FW 401*	Fishery Science (FW 300; STCC 301 or STCC 307/EHCC 307; M CC 141 or M CC 155 or M CC 160)	3	
FW 402	Fish Culture (FW 204, FW 300; FW 301)	4	
	Adviser-approved aquatic course	3-4	
	TOTAL	12-	
		14	

PROGRAM TOTAL = 22-28 credits without prerequisites

*Additional course work may be required because of prerequisites.

Major in Wildlife Biology

Associate Professor Ken Wilson, in charge

A wildlife biology degree prepares students for careers in conservation, ecology, management, research, or graduate students. The Colorado State University wildlife biology program is a nationally ranked program located in an ideal setting for the study of wildlife and resource management issues. The faculty is wide ranging in expertise, and innovative in teaching and research methods. A variety of specializations are possible including conservation biology, management of game or nongame wildlife, biometrics, ecology, nutrition, international wildlife, public relations, administration, and human-wildlife interactions. 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.

The wildlife biology curriculum includes integrated management of all resources, public relations in natural resources, computer applications, and wildlife ecology and management. 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 measurements of its components. Electives may be used to prepare for one or more of many wildlife specialties, education, law, veterinary medicine, or graduate school.

Learning Outcomes

Students will:

- Demonstrate mathematical, statistical, and study design knowledge and skills required for careers in wildlife management and conservation.
- Demonstrate a mastery of fundamental wildlife biology techniques and ecological concepts and principles and how they apply to conservation and 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 the product.

Potential Occupations

Federal and state agencies that manage natural resources offer most of the employment opportunities in wildlife. These agencies include the 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, and state departments of wildlife and natural resources. Along with a strong technical foundation, cooperation, speaking, and writing skills are necessary to resolve difficult issues which natural resource personnel may face, including: conservation education and interpretation, harvest management, administration, research, law enforcement, habitat enhancement, wildlife sampling, statistical analyses, and resolution of human-wildlife problems. 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. Wildlife biology is also excellent preparation for veterinary school.

Some examples of career opportunities include, but are not limited to: wildlife biologist; conservation biologist; wildlife rehabilitation specialist; wildlife manager; research scientist/associate, educator.

M CC 120A-B and M CC 121 are considered review courses by the Department of Fishery and Wildlife 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 (2.0) is required in all biological, mathematical/statistical, physical science, fishery and wildlife biology, and natural resource courses used to meet graduation requirements for the fishery biology major and wildlife biology major. The minimum applies to courses taken as substitutions for meeting these requirements. The minimum scholastic average acceptable for graduation is 2.0, computed only for courses attempted at Colorado State University.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one of the following sets of courses:</i>			
BZCC 110	Principles of Animal Biology	3	
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	
BZCC 120	Principles of Plant Biology	4	
OR			
LSCC 102	Attributes of Living Systems (high school chemistry)	4	
LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	
<i>Select one of the following sets of courses:¹</i>			
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent registration)	1	3A
OR			

Course	Title (Prerequisite)	Cr	AUCC
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent registration in M CC 155 or M CC 160)	3	
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
FW 100	Wildlife Fundamentals ² (concurrent registration in FW 192)	2	
FW 192	Wildlife Inquiries ² (FW 100 or concurrent registration)	1	
M CC 155	Calculus for Biological Scientists I ³ (M CC 124, M CC 125)	4	1B
OR			
M CC 160	Calculus for Physical Scientists ³ (M/M CC 126; concurrent registration in M/M CC 124)	4	1B
SPCC 200	Public Speaking	3	2A1
	Arts/humanities ⁴	3	3B
	TOTAL	<u>29-32</u>	
SOPHOMORE			
BY 320	Ecology (one course in biology; M CC 141, M CC 155 or M CC 160)	3	
BZ 223	Plant Identification (LS 103 or BZCC 120)	3	
C 245	Fundamentals of Organic Chemistry ^{1,5} (C/C CC 107 or C 113)	4-5	
FW 360	Principles of Vertebrate Management (BY 220 or BY 320; M CC 141 or M CC 155 or M CC 160)	3	
NR 220	Natural Resources Ecology and Measurements (LS 103 or BZCC 120; M CC 121)	5	
<i>Select one pair of the following courses:^{1,5}</i>			
PHCC 110	Descriptive Physics	3	3A
PHCC 111	Descriptive Physics Laboratory (PHCC 110 or concurrent registration)	1	3A
OR			
PHCC 121	General Physics I (concurrent registration in M CC 125)	5	3A
PHCC 122	General Physics II (PHCC 121)	5	3A
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
OR			
	Geology elective ⁷	4	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
OR			
STCC 307/	Introduction to Biostatistics (M CC 118	3	2B
EHCC 307	or M CC 121)		
	Quantitative depth elective ^{1,8}	0-4	
	TOTAL	<u>30-35</u>	
JUNIOR			
<i>Select one of the following:</i>			
BZ 220	Introduction to Evolution (BZCC 110 and BZCC 111 or BZCC 120 or LS 103)	4	
BZ 350	Molecular and General Genetics (LSCC 102, one course in statistics)	4	
LS 201A	Introductory Genetics-Applied Genetics (LSCC 102 or college-level biology course)	3	
LS 201B	Introductory Genetics-Molecular Genetics (LSCC 102 or college-level biology course)	3	
MB 450	Microbial Genetics (MB 300; BC 351 or BC 401 or concurrent registration)	3	
SC 330	Principles of Genetics (BZCC 110 or BZCC 120 or LSCC 102)	3	
<i>Select one of the following:</i>			
COCC 301A-D	Writing in the Disciplines (COCC 150)	3	2A2
E 403	Nature Writing ⁹ (1 course in literature or COCC 301A-D or E 311A-C)	3	

Course	Title (Prerequisite)	Cr	AUCC
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
FW 370	Design of Fish and Wildlife Projects (FW 360; NR 220; STCC 301 or STCC 307/EHCC 307)	3	4A, 4B
	Biological elective ¹⁰	3-4	
	Natural resource elective ¹¹	3-4	
	Organismal electives ¹²	6	
	Global and cultural awareness ¹³	3	3E
	Electives ¹⁴	3-6	
	TOTAL	30	
SENIOR			
FW 471	Wildlife Data Collection and Analysis (FW 370, NR 220)	4	4C
NRCC 320	Natural Resources History and Policy	3	3D, 3F
NR 400	Public Relations in Natural Resources (NRCC 320)	3	4A, 4B
NR 420	Integrated Ecosystem Management (Senior standing; BY 320, NR 220 and NRCC 320)	4	4C
	Health and wellness ¹⁵	2	3G
	Social/behavioral sciences ¹⁶	3	3C
	Wildlife management/stewardship electives ¹⁷	5-7	
	Electives ¹⁴	0-4	
	TOTAL	26-28	
PROGRAM TOTAL = 120 credits			

¹ Students must select one area of depth: chemistry, quantitative, or physics. Students selecting the chemistry area of depth should take the combination of C CC 111, C CC 112, and C CC 113.

² First year students must take FW 100 and FW 192.

³ M CC 117-M CC 125 are considered review courses by the Department of Fishery and Wildlife Biology. Credits in these courses, either by examination or completion, may not be used toward a degree in this department.

⁴ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC).

⁵ Students in the chemistry area of depth must also take C 246.

⁶ Student selecting the physics area of depth must take PHCC 121 and PHCC 122.

⁷ Select G CC 120, G CC 122, or G CC 124 and G CC 121 (lab) for a total of 4 credits or G 150 (4 credits). Note that G 150 is primarily taken by geology majors.

⁸ Students interested in mathematics select from M 229, M CC 255. Students interested in statistics select from ST 302, ST 304, ST 305, ST 321. Students interested in computer science select from C SCC 153, NR 319, NR 322, NR 323. Or select additional courses from the department advising list.

⁹ E 403 does not satisfy AUCC category 2A2 requirement. If you have not satisfied this requirement (e.g., with SPCC 200) then you must take COCC 301 or JTCC 300.

¹⁰ Students must select one course in ecology/evolution, suborganismal biology or organismal biology. Students interested in ecology/evolution select from BZ 220, BZ 300, BZ 315, BZ 346, BZ 450, BZ 471, BZ 474, BZ 478, F 311, FW 400, or RS 331. Students interested in suborganismal biology select from AN 320, BY 310, BY 311, BZ 401, MB 300 or PA 315A-B. Students interested in organismal biology select from courses listed in footnote 10, or additional courses from the department advising list. NOTE: The course cannot be used to satisfy other wildlife biology major requirements.

¹¹ Students taking LSCC 102 and LS 103 should take one of the following botany courses to ensure qualification for federal positions as a wildlife biologist: BI 308, BI 361, BZ 302, BZ 321, BZ 325, BZ 331, BZ 332, BZ 333, BZ 338, BZ 440, BZ 450, F 210, F 311, RS 331, or RS 420. Otherwise, choose an additional course from footnotes 10, 12, or 16 or NR 319, NR 322, NR 323, NR 422. NOTE: The course cannot be used to satisfy other wildlife biology major requirements.

¹² Select one course from list A and one from list A or list B. List A: BZ 330 or BZ 335. List B: BI 302 and BI 303, BI 445, BZ 212, BZ 214, BZ 329, BZ 424/BI 424; FW 300 and FW 301, or additional courses from the department advising list.

¹³ Select from the list of courses in category 3E in the AUCC.

¹⁴ Select enough elective credits to bring the total number of credits to the minimum of 60 in your sophomore year, 90 in your junior year, and 120 to graduate.

¹⁵ Select from the list of courses in category 3G in the AUCC.

¹⁶ Select from the list of courses in category 3C in the AUCC.

¹⁷ Select one course from list A and one from list A or list B. Combination of courses must equal at least 5 credits. List A: FW 375, FW 469, FW 477, FW 565, NR 300. List B: F 424, FW 401, FW 402, FW 420, NR 440, RR 330, RR 439, RS 400, RS 478, WRCC 304, WR 418, or additional courses from the department advising list.

Graduate Programs in Fishery and Wildlife Biology

Graduate programs lead to the master of science and doctor of philosophy degrees. A description of these programs may be found in the *Graduate and Professional Bulletin*.

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.cnr.colostate.edu/frws/

Professor Edward F. Redente, Head

Major in Forestry

Professor Frederick W. Smith, in charge

In the modern world, forests need professional management to ensure that these valuable resources are available for the benefit of present and future generations. With this objective in mind, the Department of Forest, Rangeland, and Watershed Stewardship provides forestry education that spans the entire range of experiences necessary to build skills for the forestry profession. Curricula include a broad background in the biological, physical, and management sciences, followed by professional forestry courses. Sophomores or juniors spend a month or more at the Pingree Park mountain campus for field studies in forest ecology, plant and animal identification, wildland fire measurements, forest mapping, and forest measurements.

Four concentrations are available in the forestry major – forest biology, forest fire science, forest management, and forestry-business.

Learning Outcomes

Students will:

- Accurately communicate their knowledge of forestry and natural resources, both verbally and in written form.
- Demonstrate learning of subject areas outside their major study focus, including but are not restricted to, 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 students 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.

With the exception of the natural resources management major, M CC 117, M CC 118, M CC 120A-B, M CC 121, M CC 124, M CC 125, and M CC 126 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			
BZCC 120	Principles of Plant Biology	4	3A
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
F 210	Forest Ecogeography (BZCC 120)	3	
SPCC 200	Public Speaking	3	2A1
	Health and wellness ¹	2	3G
	Electives	2	
	TOTAL	22	
SOPHOMORE			
BY 320	Ecology (one course in biology; M CC 141 or M CC 155 or M CC 160)	3	
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
	TOTAL	10	
JUNIOR			
F 311	Forestry Ecology (BY 220 or BY 320)	3	
F 321	Forest Biometry (STCC 201 or STCC 301, NR 220)	3	

Course	Title (Prerequisite)	Cr	AUCC
F 322	Economics of the Forest Environment (ECCC 202 or EACC 202 or ECCC 240 or EACC 240)	3	
F 325	Silviculture (F 230, F 311, NR 220)	3	
NRCC 320	Natural Resources History and Policy	3	3D, 3F
	TOTAL	15	
SENIOR			
NR 420	Integrated Ecosystem Management (Senior standing; BY 320, NR 220 and NRCC 320)	4	4C
CORE TOTAL = 51 credits²			

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

² 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:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
	Arts/humanities ¹	3	3B
	TOTAL	7	
SOPHOMORE			
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
F 230	Forestry Field Measurements	2	
NR 220	Natural Resources Ecology and Measurements (BZCC 120 or LS 103; M CC 121)	5	
PHCC 121	General Physics I (concurrent registration in M CC 125)	5	
	Global and cultural awareness ²	3	3E
	TOTAL	19	
JUNIOR			
BZ 440	Plant Physiology (BZCC 120 or LS 103; C 245 or concurrent registration)	3	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
	Field experience ³	0	
	Electives	17	
	TOTAL	23	
SENIOR			
BI 365	Integrated Tree Health Management (BZCC 120 or LSCC 102)	4	4A
F 493	Seminar in Forestry (senior standing)	1	4B
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
	Biology electives ⁴	12	
	TOTAL	20	
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 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 as a forest management tool. Students learn how to control wildfires and how prescribed fires can enhance habitat, prepares 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:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
M CC 141	Calculus in Management Sciences ¹ (M CC 118 or M CC 121)	3	1B
PHCC 110	Descriptive Physics Elective	3	3A
	TOTAL	<u>3</u>	
SOPHOMORE			
AT 350	Introduction to Weather and Climate	2	
F 224	Wildland Fire Measurements	1	
F 230	Forestry Field Measurements	2	
NR 220	Natural Resources Ecology and Measurements (BZCC 120 or LS 103; M CC 121)	5	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121) Arts/humanities ²	3	2B
	TOTAL	<u>3</u>	3B
		16	
JUNIOR			
BI 365	Integrated Tree Health Management (BZCC 120 or LSCC 102)	4	
COCC 300	Writing Arguments (COCC 150)	3	2A2
F 324	Fire Effects and Adaptations (BY 220 or BY 320)	3	
F 330	Timber Harvesting and the Environment (F 230 or F 321)	3	
F 425	Forest Fire Behavior (fire experience)	2	
NR 319	Geospatial Applications in Natural Resources (Junior standing) Field experience ³	4	
	Electives	0	
	TOTAL	<u>2</u>	
		21	
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	Forest Fire Management (F 224 or written consent of instructor)	3	4B
F 493	Seminar in Forestry (senior standing)	1	
NR 425	Sustainability of Renewable Resources (F 325 or written consent of instructor)	3	
NR 444	Fire Economics and Policy (ECCC 202 or EACC 202 or written consent of instructor) Global and cultural awareness ⁴	3	3E
	Electives	3	
	TOTAL	<u>4</u>	
		23	
PROGRAM TOTAL = 120 credits			

¹ Students considering graduate study in forest fire science should substitute M CC 155- M CC 255 or M CC 160- M CC 161 for M CC 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:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
M CC 125	Numerical Trigonometry (M CC 118 or M CC 121 or placement)	1	
M CC 141	Calculus in Management Sciences (M CC 118 or M CC 121) Elective	3	1B
	TOTAL	<u>3</u>	
		7	
SOPHOMORE			
F 230	Forestry Field Measurements	2	
F 331	Wood Products in Society	3	
NR 220	Natural Resources Ecology and Measurements (BZCC 120 or LS 103; M CC 121)	5	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121) Arts/humanities ¹	3	2B
	Global and cultural awareness ²	3	3B
	TOTAL	<u>3</u>	3E
		19	
JUNIOR			
F 330	Timber Harvesting and the Environment (F 230 or F 321)	3	
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
NR 319	Geospatial Applications in Natural Resources (Junior standing) Field experience ³	4	
	Electives	0	
	TOTAL	<u>5</u>	
		15	
SENIOR			
BI 365	Integrated Tree Health Management (BZCC 120 or LSCC 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	Forest Fire Management (F 224 or written consent of instructor)	3	
F 493	Seminar in Forestry (senior standing)	1	4B
NR 425	Sustainability of Renewable Resources (F 325 or written consent of instructor) Electives	3	
	TOTAL	<u>10</u>	
		28	
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:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
M CC 141	Calculus in Management Sciences (M CC 118 or M CC 121)	3	1B
SOPHOMORE			
STCC 204	Statistics for Business Students (M CC 117 or M CC 120A-B)	3	2B
	Arts/humanities ¹	3	3B
	TOTAL	6	
JUNIOR			
BA 205	Fundamentals of Accounting	3	
BK 305	Fundamentals of Marketing (ECCC 101 or ECCC 202 or EACC 202)	3	
F 330	Timber Harvesting and the Environment (F 230 or F 321)	3	
F 331	Wood Products in Society	3	
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
	Global and cultural awareness ²	3	3E
	Field experience ³	0	
	Electives	12	
	TOTAL	30	
SENIOR			
BF 305	Fundamentals of Finance (BA 205, ECCC 204)	3	
BGCC 205	Fundamentals of Business Law	3	3F
BI 365	Integrated Tree Health Management (BZCC 120 or LSCC 102)	4	
BN 301	Production Fundamentals (STCC 204 or STCC 301)	3	
BN 305	Fundamentals of Management ⁴	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	Forest Fire Management (F 224 or written consent of instructor)	3	
F 493	Seminar in Forestry (senior standing)	1	4B
NR 425	Sustainability of Renewable Resources (F 325 or written consent of instructor)	3	
	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 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 BN 320.

Major in Natural Resources Management

Professors Daniel E. Binkley and Ingrid C. Burke, 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.

M CC 117, M CC 118, M CC 120A-B, M CC 121, and M CC 125 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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BZCC 110	Principles of Animal Biology	3	3A
BZCC 120	Principles of Plant Biology	4	3A
C CC 107	Fundamentals of Chemistry (M CC 117 of M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent reg.)	1	3A
M CC 141	Calculus in Management Sciences (M CC 118 or M CC 121)	3	1B
OR			
M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
SPCC 200	Public Speaking	3	2A1
	Arts/humanities ¹	3	3B
	Global and cultural awareness ²	3	3E
	Health and wellness ³	2	3G
	Electives	2	
	TOTAL	28-29	

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
BY 220	Fundamentals of Ecology (one course in biology; M CC 124 of M CC 141 or M CC 155 or M CC 160)	3	
OR			
BY 320	Ecology (one course in biology; M CC 141, M CC 155 or M CC 160)	3	
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B, or M CC 121 or M CC 141 or M CC 160)	3	3C
F 210	Forest Ecogeography (BZCC 120)	3	
G CC 120	Exploring Earth: Physical Geology	3	3A
OR			
G CC 124	Geology of Natural Resources	3	3A
G CC 121	Introductory Geology Laboratory (G CC 120 or G CC 122 or G CC 124 or concurrent registration in G CC 120 or G CC 122 or G CC 124)	1	3A
NR 220	Natural Resources Ecology and Measurements (BZCC 120 or LS 103; M CC 121)	5	
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
OR			
STCC 307/ EHCC 307	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B
	Minor ⁴	3	
	TOTAL	31	
JUNIOR			
<i>Select one of the following courses:</i>			
BZ 471	Stream Biology and Ecology (BY 220)	3	
F 311	Forest Ecology (BY 220 or BY 320)	3	
RS 300	Principles of Range Management (BZCC 120 or LS 103)	3	
<i>Select one of the following courses:</i>			
COCC 300	Writing Arguments (COCC 150)	3	2A2
COCC 301B	Writing in the Disciplines-Science (COCC 150)	3	2A2
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
EA 340/ EC 340	Introduction to Economics of Natural Resources (EACC 202 or ECCC 202)	3	
OR			
F 322	Economics of the Forest Environment (ECCC 202 or EACC 202 or ECCC 240 or EACC 240)	3	
NR 319	Geospatial Application in Natural Resources (junior standing)	4	
NRCC 320	Natural Resources History and Policy	3	3D, 3F
NR 326	Forest Vegetation Management (NR 220)	3	
	Minor ⁴	6	
	Electives	5	
	TOTAL	30	
SENIOR			
<i>Select two of the following courses:</i>			
FW 360	Principles of Vertebrate Management (BY 220 or BY 320; M CC 141 or M CC 155 or M CC 160)	3	
RS 351	Range Plant Production and Decomposition (BY 220, RS 300, SC 240)	3	
<i>Social and political dimensions⁵</i>			
NR 400	Public Relations in Natural Resources (NRCC 320)	3	4A, 4B
NR 420	Integrated Ecosystem Management	4	4C
NR 421	Natural Resources Sampling (STCC 201 or STCC 301; NR 220)	3	
WRCC 304	Principles of Watershed Management	3	3A
OR			
WR 416	Land Use Hydrology (SC 240, STCC 201)	3	
	Minor ⁴	12	
	Summer field experience ⁶	0	
	TOTAL	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 Select from the list of courses in category 3G in the AUCC.

⁴ Students must complete the requirements for a minor in any discipline, or the interdisciplinary studies program in either conservation biology or environmental affairs.

⁵ Select one of the following courses: HY 464, PL 345, PO 361, S 320.

⁶ Each student is required to complete a summer of acceptable field experience.

Major in Rangeland Ecology

Professor Wayne C. Leininger, in charge

The major in rangeland ecology emphasizes interdisciplinary study of, and research on, 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, alpine communities, and coastal marshes. Colorado is an ideal setting for the study of rangeland ecology and management with shortgrass prairie to the east and high elevation grasslands and riparian areas to the west.

Students are prepared to manage the animal, soil, and vegetation resources on rangelands primarily for state and federal land management 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

Rangeland scientists are trained to manage lands that produce herbage for all grazing animals, for aesthetic values, and for watershed enhancement. Knowledgeable in ecosystem structure, rangeland scientists possess an understanding of the functions of the ecosystem with respect to nutrient cycling, energy flows among feeding levels, and animal requirements for food and shelter. These scientists are also trained to assess rehabilitation potential following drastic disturbances and to develop procedures for land reclamation and management. Rangeland scientists often work closely with other specialists in wildlife, hydrology, forestry, soils, agronomy, recreation, and other disciplines.

Rangelands occupy nearly one-half of the world's land surface, and employment opportunities for graduates in this major are diverse and excellent. The profession offers an opportunity to work full time with natural resources, the improvement of environmental quality, and the basic problems for ecology. Because of growing interest in all aspects of the environment, the demand for additional rangeland scientists is expected to increase by 33 percent in the next decade. In the U.S., most rangeland scientists work for federal and state governments; while private industry, colleges and universities, and international agencies are increasing employing rangeland scientists.

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.

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 manger; international rangeland specialist.

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.

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			
BY 220	Fundamentals of Ecology ¹ (one course in biology, M CC 124 or M CC 141 or M CC 155 or M CC 160)	3	
BZCC 120	Principles of Plant Biology	4	3A
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
EACC 202	Agricultural and Resource Economics ²	3	3C
F 230	Forestry Field Measurements	2	
M CC 141	Calculus in Management Sciences (M CC 118 or M CC 121) ¹	3	1B
	Arts/humanities ³	3	3B
	Health and wellness ⁴	2	3G
	Electives	2	
	TOTAL	33	
SUMMER SESSION			
NR 220	Natural Resources Ecology and Measurements (BZCC 120 or LS 103; M CC 121)	5	
SOPHOMORE			
BZ 223	Plant Identification (BZCC 120 or LS 103)	3	
F 210	Forest Ecogeography (BZCC 120)	3	
FW 360	Principles of Vertebrate Management (BY 220 or BY 320; M CC 141 or M CC 155 or M CC 160)	3	
RS 300	Principles of Range Management (BZCC 120 or LS 103)	3	
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
SPCC 200	Public Speaking	3	2A1
STCC 307/	Introduction to Biostatistics ⁵ (M CC 118 or	3	2B
EHCC 307	M CC 121)		
WRCC 304	Principles of Watershed Management	3	3A
	TOTAL	25	
JUNIOR			
F 311	Forest Ecology (BY 220 or BY 320)	3	
F 322	Economics of the Forest Environment (ECCC 202 or EACC 202 or ECCC 240/EACC 240)	3	
F 325	Silviculture (F 230, F 311, NR 220)	3	
NR 367	Concepts in Vertebrate Nutrition (C 245)	2	
RS 331	Rangeland Ecogeography (RS 300, BZ 223 or F 210 or NR 220)	3	
RS 332	Range Measurements (STCC 201 or STCC 301 or STCC 307/EHCC 307; RS 300 or concurrent registration; NR 220 or RS 331)	2	
RS 351	Range Plant Production and Decomposition (BY 220, RS 300, SC 240)	3	4A, 4B
RS 420	Grass Taxonomy (BZ 223 or written consent of instructor)	3	
RS 452	Range Animal-Habitat Interactions (NR 367, RS 300 or RS 320/SC 320)	2	4B
	Global and cultural awareness ⁶	3	3E
	TOTAL	27	
SENIOR			
AN 372	Sheep Production (AN 250, AN 310, AN 320, AN 330)	3	
OR			
AN 478	Beef Production and Management (AN 250, AN 310, AN 320, AN 330)	3	
F 321	Forest Biometry (STCC 201 or STCC 301; NR 220)	3	
NRCC 320	Natural Resources History and Policy	3	3D, 3F
NR 322	Introduction to Geographic Information Systems	4	
RS 400	Rangeland Improvements (RS 300 or RS 320/SC 320)	2	
RS 470	Rangeland Economics and Analysis (EACC 202, RS 300)	2	4A
RS 471	Rangeland Planning and Grazing Management (RS 470 or concurrent registration)	2	4C
RS 472	Rangeland Ecosystem Planning (RS 471)	4	

Course	Title (Prerequisite)	Cr	AUCC
SC 440	Pedology (SC 240)	4	
	Elective	3	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

¹ M CC 120, M CC 121, and M CC 124 are considered review courses; credits in these courses may not be used toward completion of a degree in rangeland ecology, but are enforced prerequisites for M CC 141 and BY 220.

² EACC 202 may be substituted for EACC 202.

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 3G in the AUCC.

⁵ STCC 301 may be substituted for STCC 307/EHCC 307.

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

Rangeland Management Concentration

Rangeland management focuses on multi-use rangeland management issues and techniques.

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			
BY 220	Fundamentals of Ecology (one course in biology, M CC 124 or M CC 141 or M CC 155 or M CC 160)	3	
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	
M CC 141	Calculus in Management Sciences ¹ (M CC 118 or M CC 121)	3	1B
	Health and wellness ²	2	3G
	Electives	3	
	TOTAL	30	
SOPHOMORE			
AN 300E	Topics in Animal Sciences-Family Ranching (AN 101 or AN 102)	1	
BZ 223	Plant Identification (BZCC 120 or LS 103)	3	
EACC 202	Agricultural and Resource Economics ³	3	3C
EA 310	Agricultural Marketing (EACC 202 or ECCC 202)	3	
NR 224/	Integrated Resource Management I (A	3	
A 224	192A-B)		
RS 300	Principles of Range Management (BZCC 120 or LS 103)	3	
RS 331	Rangeland Ecogeography (RS 300, BZ 223 or F 210 or NR 220)	3	
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
SPCC 200	Public Speaking	3	2A1
STCC 307/	Introduction to Biostatistics ⁴ (M CC 118 or	3	2B
EHCC 307	M CC 121)		
	Elective	2	
	TOTAL	31	
JUNIOR			
BZ 440	Plant Physiology (BZCC 120 or LS 103; C 245 or concurrent registration)	3	
FW 360	Principles of Vertebrate Management (BY 220 or BY 320; M CC 141 or M CC 155 or M CC 160)	3	
NRCC 320	Natural Resources History and Policy	3	3D, 3F
NR 424/	Integrated Resource Management II (NR	3	
A 424	224/A 224)		
RS 351	Range Plant Production and Decomposition (BY 220, RS 300, SC 240)	3	4A, 4B

College of Natural Resources

Course	Title (Prerequisite)	Cr	AUCC
RS 420	Grass Taxonomy (BZ 223 or written consent of instructor)	3	
RS 452	Range Animal-Habitat Interactions (NR 367, RS 300 or RS 320/SC 320)	2	4B
S 341	Sociology of Rural Life (S CC 100 or S CC 105)	3	
WRCC 304	Principles of Watershed Management Arts/humanities ⁵	3	3A 3B
	TOTAL	29	
SENIOR			
AN 372	Sheep Production (AN 250, AN 310, AN 320, AN 330)	3	
OR			
AN 478	Beef Production and Management (AN 250, AN 310, AN 320, AN 330)	3	
EA 305	Agricultural and Resource Enterprise Analysis (EACC 202 or ECCC 202)	3	
EA 478	Agricultural Policy (EACC 202 or ECCC 202 or EACC 240 or ECCC 240)	3	
NR 367	Concepts in Vertebrate Nutrition (C 245)	2	
NR 383/A 383	U.S. Travel-Integrated Resource Management	2	
RS 400	Rangeland Improvements (RS 300 or RS 320/SC 320)	2	
RS 470	Rangeland Economics and Analysis (EACC 202, RS 300)	2	4A
RS 471	Rangeland Planning and Grazing Management (RS 470 or concurrent registration)	2	4C
RS 472	Rangeland Ecosystem Planning (RS 471)	4	4C
SC 440	Pedology (SC 240)	4	
	Global and cultural awareness ⁶	3	3E
	TOTAL	30	

PROGRAM TOTAL = 120 credits

¹ M CC 120, M CC 121, and M CC 124 are considered review courses; credit in these courses may not be used toward completion of a degree in rangeland ecology, but are enforced prerequisites for M CC 141 and BY 220.

² Select from the list of courses in category 3G in the All-University Core Curriculum (AUCC).

³ ECCC 202 may be substituted for EACC 202.

⁴ STCC 301 may be substituted for STCC 307/EHCC 307.

⁵ Select 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.

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			
BY 220	Fundamentals of Ecology (one course in biology, M CC 124 or M CC 141 or M CC 155 or M CC 160)	3	
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	
M CC 141	Calculus in Management Sciences (M CC 118 or M CC 121) ¹	3	1B
	Health and wellness ²	2	3G
	Electives	2	
	TOTAL	29	

Course	Title (Prerequisite)	Cr	AUCC
SUMMER SESSION			
NR 220	Natural Resources Ecology and Measurements (BZCC 120 or LS 103; M CC 121)	5	
SOPHOMORE			
BZ 223	Plant Identification (BZCC 120 or LS 103)	3	
EACC 202	Agricultural and Resource Economics ³	3	
RS 300	Principles of Range Management (BZCC 120 or LS 103)	3	
RS 331	Rangeland Ecogeography (RS 300, BZ 223 or F 210 or NR 220)	3	
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
SPCC 200	Public Speaking	3	2A1
STCC 307/EHCC 307	Introduction to Biostatistics ⁴ (M CC 118 or M CC 121)	3	2B
	Social/behavioral sciences ⁵	3	3C
	TOTAL	25	
JUNIOR			
BZ 440	Plant Physiology (BZCC 120 or LS 103; C 245 or concurrent registration)	3	
FW 360	Principles of Vertebrate Management (BY 220 or BY 320; M CC 141 or M CC 155 or M CC 160)	3	
NR 322	Introduction to Geographic Information Systems	4	
RS 332	Range Measurements (STCC 201 or STCC 301 or STCC 307/EHCC 307; RS 300 or concurrent registration; NR 220 or RS 331)	2	
RS 351	Range Plant Production and Decomposition (BY 220, RS 300, SC 240)	3	4A, 4B
RS 420	Grass Taxonomy (BZ 223 or written consent of instructor)	3	
RS 452	Range Animal-Habitat Interactions (NR 367, RS 300 or RS 320/SC 320)	2	4B
SC 350	Soil Fertility Management (SC 240)	3	
WR 416	Land Use Hydrology (SC 240, STCC 201) Arts/humanities ⁶	3	3B
	TOTAL	29	
SENIOR			
<i>Select two of the following courses:</i>			
EH 446	Environmental Toxicology (C 245 or C 346)	3	
PL 345	Environmental Ethics (sophomore standing or higher or written consent of instructor)	3	
SC 442	Forest and Range Soils (SC 240)	3	
SC 455	Soil Microbiology (MB 300 or SC 240)	3	
SC 470	Soil Physics (SC 240)	3	
NRCC 320	Natural Resources History and Policy	3	3D, 3F
RS 400	Rangeland Improvements (RS 300 or RS 320/SC 320)	2	
RS 470	Rangeland Economics and Analysis (EACC 202, RS 300)	2	4A
RS 471	Rangeland Planning and Grazing Management (RS 470 or concurrent registration)	2	4C
RS 472	Rangeland Ecosystem Planning (RS 471)	4	4C
RS 478	Restoration Ecology (BY 220 or BZ 450 or F 311; SC 240)	3	4A
SC 440	Pedology (SC 240)	4	
WR 418	Land Use and Water Quality (C CC 107, WR 416)	3	
	Global and cultural awareness ⁷	3	3E
	TOTAL	32	

PROGRAM TOTAL = 120 credits

¹ M CC 120, M CC 121, and M CC 124 are considered review courses; credits in these courses may not be used toward completion of a degree in rangeland ecology, but are enforced prerequisites for M CC 141 and BY 220.

² Select from the list of courses in category 3G in the All-University Core Curriculum (AUCC).

³ ECCC 202 may be substituted for EACC 202.

⁴ STCC 301 may be substituted for STCC 307/EHCC 307.

⁵ Select from the list of courses in category 3C in the AUCC.

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.

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			
BY 220	Fundamentals of Ecology (one course in biology, M CC 124 or M CC 141 or M CC 155 or M CC 160)	3	
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	
M CC 155	Calculus for Biological Scientists I ¹ (M CC 124, M CC 125)	4	1B
	Health and wellness ²	2	3G
	Electives	2	
	TOTAL	30	
SUMMER SESSION			
NR 220	Natural Resources Ecology and Measurements (BZCC 120 or LS 103; M CC 121)	5	
SOPHOMORE			
BZ 223	Plant Identification (BZCC 120 or LS 103)	3	
EACC 202	Agricultural and Resource Economics ³	3	3C
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	
RS 300	Principles of Range Management (BZCC 120 or LS 103)	3	
RS 331	Rangeland Ecogeography (RS 300, BZ 223 or F 210 or NR 220)	3	
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
SPCC 200	Public Speaking	3	2A1
STCC 307/	Introduction to Biostatistics ⁴ (M CC 118 or	3	2B
EHCC 307	M CC 121)		
	Global and cultural awareness ⁵	3	3E
	TOTAL	30	
JUNIOR			
AT 350	Introduction to Weather and Climate	2	
AT 351	Introduction to Weather and Climate Laboratory (AT 350 or concurrent registration)	1	
BZ 440	Plant Physiology (BZCC 120 or LS 103; C 245 or concurrent registration)	3	
FW 360	Principles of Vertebrate Management (BY 220 or BY 320; M CC 141 or M CC 155 or M CC 160)	3	
NR 322	Introduction to Geographic Information Systems	4	
RS 332	Range Measurements (STCC 201 or STCC 301 or STCC 307/EHCC 307; RS 300 or concurrent registration; NR 220 or RS 331)	2	
RS 351	Range Plant Production and Decomposition (BY 220, RS 300, SC 240)	3	4A, 4B
RS 452	Range Animal-Habitat Interactions (NR 367, RS 300 or RS 320/SC 320)	2	4B
WRCC 304	Principles of Watershed Management	3	3A
	Arts/humanities ⁶	3	3B
	Elective	1	
	TOTAL	27	
SENIOR			
BZ 450	Plant Ecology (BZ 223 or BZ 325)	4	
NRCC 320	Natural Resources History and Policy	3	3D, 3F
NR 367	Concepts in Vertebrate Nutrition (C 245)	2	

Course	Title (Prerequisite)	Cr	AUCC
RS 400	Rangeland Improvements (RS 300 or RS 320/SC 320)	2	
RS 470	Rangeland Economics and Analysis (EACC 202, RS 300)	2	4A
RS 471	Rangeland Planning and Grazing Management (RS 470 or concurrent registration)	2	4C
RS 472	Rangeland Ecosystem Planning (RS 471)	4	4C
RS 495	Independent Study-Rangeland Ecosystem	2	
SC 440	Pedology (SC 240)	4	
	Electives	3	
	TOTAL	28	

PROGRAM TOTAL = 120 credits

¹ M CC 120, M CC 121, and M CC 124 are considered review courses; credit in these courses may not be used toward completion of a degree in rangeland ecology, but are enforced prerequisites for M CC 141 and BY 220.

² Select from the list of courses in category 3G in the All-University Core Curriculum (AUCC).

³ ECCC 202 may be substituted for EACC 202.

⁴ STCC 301 may be substituted for STCC 307/EHCC 307.

⁵ Select from the list of courses in category 3E in the AUCC.

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

Major in Watershed Science

Professor John D. Stednick, in charge

In Colorado, and many other localities around the world, the management and allocation of fresh water resources rank among the most important political and development issues. All civilizations throughout history, including our own, have always been vitally dependent upon the availability of uncontaminated ground water. Watershed science is the interdisciplinary study of the natural processes of human activities that affect water resources on a basin or catchment scale. The program requires a solid grounding in the physical and natural sciences in preparation for the upper-division courses in topics such as land use hydrology, land use and water quality, eolian and fluvial transport processes, and watershed analysis.

Learning Outcomes

Students will demonstrate:

- Understanding of the key concepts in watershed science, a familiarity and understanding of commonly-used models, and an ability to analyze complex data. Demonstrations include the following: 1) knowledge of surface water hydrology, including the ability to quantify a design storm, development of a water balance, and use of runoff prediction tools; 2) knowledge of erosion processes and sediment pool design; 3) knowledge and use of conceptual, empirical, and physically-based models; and 4) demonstrate an ability to collect, analyze, and assess the validity of complex data.
- Ability to individually write a comprehensive technical report.
- Ability to orally present the results of their work within the capstone and display the following skills: 1) organization of the presentation, including the ability to

focus on key issues; 2) ability to clearly communicate technical content; 3) use of quality graphics and technology; and 4) confidence and delivery of 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. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

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			
BZCC 104	Basic Concepts of Plant Life	3	3A
OR			
LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent registration in M CC 155 or M CC 160)	3	
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
G 150	Physical Geology for Scientists and Engineers	4	
OR			
GR 210	Physical Geography ¹	3	
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
M CC 125	Numerical Trigonometry (M CC 118 or M CC 121 or placement)	1	1B
M CC 126	Analytical Trigonometry (M CC 125 or placement)	1	1B
M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
OR			
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
OR			
	Health and wellness ²	2	3G
	Social/behavioral sciences ³	3	3C
	Elective	2	
	TOTAL	31-33	
SOPHOMORE			
<i>Select one of the following courses:</i>			
BY 220	Fundamentals of Ecology (one course in biology; M CC 124 or M CC 141 or M CC 155 or M CC 160)	3	

Course	Title (Prerequisite)	Cr	AUCC
BY 320	Ecology (one course in biology, M CC 141, M CC 155 or M CC 160)	3	
NR 220	Natural Resources Ecology and Measurements (BZCC 120 or LS 103; M CC 121)	5	
COCC 301A-D	Writing in the Disciplines (COCC 150)	3	2A2
OR			
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B
OR			
M CC 255	Calculus for Biological Scientists II (M CC 155; concurrent registration in M CC 126)	4	1B
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
SPCC 200	Public Speaking	3	2A1
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
	Global and cultural awareness ⁴	3	3E
	Historical perspectives ⁵	3	3D
	U.S. public values and institutions ⁶	(3)	3F
	TOTAL	31-33	
JUNIOR			
CE 322/	Basic Hydrology ¹ (CE 300 or CH 331 or WR 416, STCC 301 or STCC 309 or CE 308; or written consent of instructor)	3	
EV 322			
SC 322	Principles of Microclimatology (BY 220 or NR 220; PHCC 141)	3	
WR 416	Land Use Hydrology ¹ (SC 240, STCC 201)	3	4B
WR 417	Watershed Measurements ¹ (concurrent registration in WR 416)	2	
WR 418	Land Use and Water Quality ¹ (C CC 107, WR 416)	3	
WR 419	Water Quality Laboratory for Wildland Managers (concurrent registration in WR 418)	2	
WR 420	Watershed Field Practicum (concurrent registration in WR 416 and WR 417 or written consent of instructor)	2	
WR 474	Snow Hydrology (WR 416 or CE 322/EV 322)	3	
	Arts/humanities ⁷	3	3B
	Electives ⁸	5	
	TOTAL	29	
SENIOR			
G 452	Hydrogeology (G CC 120 or G 150 or GR 210; PHCC 141; M CC 161 or M CC 255 or written consent of instructor)	4	
G 454	Geomorphology (G CC 120 or G 150 or GR 210; M CC 155 or M CC 160)	4	
GR 342	Geography of Water Resources ¹	3	
<i>Select one of the following courses:</i>			
SC 440	Pedology (SC 240)	4	
SC 442	Forest and Range Soils (SC 240)	3	
WR 465	Eolian and Fluvial Transport Processes (PHCC 141 or written consent of instructor)	4	
SC 470	Soil Physics (SC 240)	3	
SC 471	Soil Physics Laboratory (SC 470 or concurrent registration)	1	
WR 440	Watershed Problem Analysis (CE 322/EV 322, WR 416)	3	4A, 4B, 4C
	Electives ⁸	3-8	
	TOTAL	25-29	
PROGRAM TOTAL = 120 credits			

¹ Partially satisfies requirements of the Water Resources Interdisciplinary Studies Program. (Refer to CSU Catalog.)

² Select from the list of courses in category 3G in the AUCC.

³ Select from the list of courses in category 3C in the AUCC. Course selected to satisfy either 3C or 3D should also satisfy 3F.

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. Course selected to satisfy either 3C or 3D should also satisfy 3F.

⁶ Select from the list of courses in category 3F that also satisfies either category 3C or 3D.

⁷ Select from the list of courses in category 3B in the AUCC.

⁸ 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 (BZCC 120)	3	
UPPER DIVISION			
BI 365*	Integrated Tree Health Management (BZCC 120 or LSCC 102)	4	
OR			
F 424*	Forest Fire Management (F 224 or written consent of instructor)	3	
F 311*	Forest Ecology (BY 220 or BY 320)	3	
F 321*	Forest Biometry (STCC 201 or STCC 301; NR 220)	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>			
BY 220*	Fundamentals of Ecology (one course in biology; M CC 124 or M CC 141 or M CC 155 or M CC 160)	3	
BZ 223*	Plant Identification (BZCC 120 or LS 103)	3	
F 210*	Forest Ecogeography (BZCC 120)	3	
NR 220*	Natural Resources Ecology and Measurements (BZCC 120 or LS 103; M CC 121)	5	
SC 240*	Introductory Soil Science (C CC 107 or C CC 111)	4	
UPPER DIVISION			
RS 300*	Principles of Range Management (BZCC 120 or LS 103)	3	

OR

Course	Title (Prerequisite)	Cr	AUCC
RS 320*	Forage and Range Management (one course in biological sciences)	3	
SC 320*			
RS 331	Rangeland Ecogeography (RS 300, BZ 223 or F 210 or NR 220)	3	
RS 332*	Range Measurements (STCC 201 or STCC 301 or STCC 307/EHCC 307; RS 300 or concurrent registration; NR 220 or RS 331)	2	
<i>Select a minimum of five credits from the following:</i>			
RS 351	Range Plant Production and Decomposition (BY 220, RS 300, SC 240)	3	
RS 400	Rangeland Improvements (RS 300 or RS 320/SC 320)	2	
RS 452*	Range Animal-Habitat Interactions (NR 367, RS 300 or RS 320/SC 320)	2	
RS 470*	Rangeland Economics and Analysis (EACC 202, RS 300)	2	
RS 471	Rangeland Planning and Grazing Management (RS 470 or concurrent registration)	2	
RS 472	Rangeland Ecosystem Planning (RS 471)	4	
RS 478	Restoration Ecology (BY 220 or BZ 450 or F 311; SC 240)	3	
TOTAL		13	

PROGRAM TOTAL = 22 credits without prerequisites

¹ SC 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			
CSCC 153*	Java Programming (M CC 118 with a C or better)	4	2B
LOWER DIVISION OR UPPER DIVISION			
<i>Select a minimum of four credits from the following:¹</i>			
CS 200*	Algorithms and Data Structures (CSCC 153 with a C or better, CS 166/M 166 with a C or better, M CC 160 with a C or better)	4	
GR 100	Introduction to Geography	3	
GR 210	Physical Geography	3	
NR 401*	Techniques in Public Relations (SPCC 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	
ST 305*	Sampling Technique (STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311)	3	
ST 312*	Statistics for Behavioral Sciences II (STCC 311 or written consent of instructor)	3	
ST 460*	Applied Multivariate Analysis (ST 304)	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 or written consent of instructor)	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 College of Natural Resources. Advice on the selection of minor electives is available in the department.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
G 150	Physical Geology for Scientists and Engineers	4	
OR			
GR 210	Physical Geography	3	
UPPER DIVISION			
G 454*	Geomorphology (G CC 120 or G 150 or GR 210; M CC 155 or M CC 160) <i>Select at least 7-9 credits from the following:</i>	4	
CE 423	Groundwater Engineering (CE 300 or CH 331 or WR 416)	3	
CE 440	Nonpoint Source Pollution (one course in soil science, hydrology, or fluid mechanics)	3	
G 452*	Hydrogeology (G CC 140 or G 150 or GR 210; PHCC 141; M CC 161 or M CC 255 or written consent of instructor)	4	
G 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 (PHCC 141 or written consent of instructor)	4	
WR 474	Snow Hydrology (WR 416 or CE 322/EV 322)	3	
WR 416*	Land Use Hydrology (SC 240, STCC 201)	3	
WR 418*	Land Use and Water Quality (C CC 107, WR 416)	3	
TOTAL		17-19	
PROGRAM TOTAL = 21-22 credits without prerequisites			

* 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 forestry; master of science degrees in forest sciences, rangeland ecosystem science, and watershed science; and doctor philosophy degrees in forest sciences and rangeland ecosystem science. A description of these programs is available in the *Graduate and Professional Bulletin*.

DEPARTMENT OF GEOSCIENCES

Office in Natural Resources Building, Room 322
(970) 491-5661
<http://www.cnr.colostate.edu/geo/>

Professor Judith Hannah, 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 problems 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 field 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 field 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 arising 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.

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.

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			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111, M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent registration in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112, C 113 or concurrent registration)	1	
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
<i>Select one of the following:</i>			
COCC 300	Writing Arguments (COCC 150)	3	2A2
COCC 301B	Writing in the Disciplines-Science (COCC 150)	3	2A2
SPCC 200	Public Speaking	3	2A1
<i>Select four credits from the following:</i>			
G CC 120	Exploring Earth: Physical Geology	3	
AND			
G CC 121	Introductory Geology Laboratory (G CC 120 or G CC 122 or G CC 124 or concurrent registration in G CC 120 or G CC 122 or G CC 124)	1	
G 150	Physical Geology for Scientists and Engineers	4	

Course	Title (Prerequisite)	Cr	AUCC
G 154	Historical and Analytical Geology (G CC 120 or G CC 122 or G 150)	4	
M CC 125	Numerical Trigonometry (M CC 118 or M CC 121 or placement)	1	1B
M CC 126	Analytic Trigonometry (M CC 125 or placement)	1	1B
NR 322	Introduction to Geographic Information Systems	4	
	Health and wellness ¹	2	3G
	Elective	2	
	TOTAL	33	
SOPHOMORE			
G 232	Mineralogy (G CC 120 or G 150; C CC 111 and M CC 124 or concurrent registration, concurrent registration in G 332; or written consent of instructor)	3	
G 332	Optical Mineralogy (G 232 or concurrent registration or written consent of instructor)	2	
G 364	Igneous and Metamorphic Petrology (G 232)	4	4B
M CC 155	Calculus for Biological Scientists I ² (M CC 124, M CC 125)	4	1B
M CC 255	Calculus for Biological Scientists II (M CC 155, concurrent registration in M CC 126)	4	1B
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
	Global and cultural awareness ³	3	3E
	Historical perspectives ⁴	3	3D
	Social/behavioral sciences ⁵	3	3C
	U.S. public values and institutions ⁶	(3)	3F
	TOTAL	31	
JUNIOR			
G 344	Stratigraphy and Sedimentology (G 154)	4	4A
G 372	Structural Geology (G 154, M CC 125, concurrent registration in PHCC 141)	4	4B
G 376	Geologic Field Methods (G 344, G 372 or concurrent registration)	3	4A, 4C
G 454	Geomorphology (G CC 120 or G 150 or GR 210; M CC 155 or M CC 160)	4	
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 151 or M CC 255)	5	3A
OR			
SC 470	Soil Physics (SC 240)	3	
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
	Arts/humanities ⁷	3	3B
	TOTAL	28-30	
SUMMER SESSION			
G 436	Geology Summer Field Course (G 364, G 376)	6	4C
SENIOR			
<i>Select a total of 4 credits from the following:</i>			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
G 366	Sedimentary Petrology and Geochemistry (C 113, G 154, G 364)	4	4A, 4B
G 446	Environmental Geology (G 454 or concurrent registration)	3	
G 452	Hydrogeology (G CC 120 or G 150 or GR 210; PHCC 141; M CC 161 or M CC 255 or written consent of instructor)	4	
	Sociopolitical elective ⁸	3	
	Technical elective ⁹	3	
	Electives	0-1	
	TOTAL	21-22	
PROGRAM TOTAL = 120-121 credits			

College of Natural Resources

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

² M CC 160, M CC 161, and M 261 may be substituted for M CC 151 and M CC 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. Course selected to satisfy either 3D or 3C should also satisfy 3F.

⁵ Select from the list of courses in category 3C in the AUCC. Courses elected to satisfy either 3C or 3D should also satisfy 3F.

⁶ Select from the list of courses in category 3F that can also satisfy either 3C or 3D.

⁷ Select from the list of courses in category 3B in the AUCC.

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.

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
M CC 255	Calculus for Biological Scientists II (M CC 155, concurrent registration in M CC 126)	4	1B
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
	Global and cultural awareness ³	3	3E
	Historical perspectives ⁴	3	3D
	Social/behavioral sciences ⁵	3	3C
	U.S. public values and institutions ⁶	(3)	3F
	TOTAL	31	
JUNIOR			
COCC 300	Writing Arguments (COCC 150)	3	2A2
OR			
COCC 301B	Writing in the Disciplines-Science (COCC 150)	3	2A2
G 344	Stratigraphy and Sedimentology (G 154)	4	4A
G 372	Structural Geology (G 154, M CC 125, concurrent registration in PHCC 141)	4	4B
G 376	Geologic Field Methods (G 344, G 372 or concurrent registration)	3	4A, 4C
G 454	Geomorphology (G CC 120 or G 150 or GR 210; M CC 155 or M CC 160)	4	
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A
OR			
SC 470	Soil Physics (SC 240)	3	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
	Arts/humanities ⁷	3	3B
	TOTAL	27-29	
SUMMER SESSION			
G 436	Geology Summer Field Course (G 364, G 376)	6	4C
SENIOR			
<i>Select a total of 4 credits from the following:</i>			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
G 366	Sedimentary Petrology and Geochemistry (C 113, G 154, G 364)	4	4A, 4B
	Geology electives ⁸	6	
	Technical elective ⁹	3	
	Electives	4-6	
	TOTAL	21-23	

PROGRAM TOTAL = 120 credits

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

² M CC 160, M CC 161, and M 261 may be substituted for M CC 151 and M CC 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. Course selected to satisfy either 3D or 3C should also satisfy 3F.

⁵ Select from the list of courses in category 3C in the AUCC. Courses elected to satisfy either 3C or 3D should also satisfy 3F.

⁶ Select from the list of courses in category 3F that can also satisfy either 3C or 3D.

⁷ Select from the list of courses in category 3B in the AUCC.

⁸ Select upper-division geology course with upper-division prerequisite and/or G 342. Written adviser approval required.

⁹ Select upper-division science or engineering course, excluding geology, from departmental advising list.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111, M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent registration in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112, C 113 or concurrent registration)	1	
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CQ 130)	3	1A
<i>Select four credits from the following:</i>			
G CC 120	Exploring Earth: Physical Geology	3	
AND			
G CC 121	Introductory Geology Laboratory (G CC 120 or G CC 122 or G CC 124 or concurrent registration in G CC 120 or G CC 122 or G CC 124)	1	
G 150	Physical Geology for Scientists and Engineers	4	
G 154	Historical and Analytical Geology (G CC 120 or G CC 122 or G 150)	4	
M CC 125	Numerical Trigonometry (M CC 118 or M CC 121 or placement)	1	1B
M CC 126	Analytic Trigonometry (M CC 125 or placement)	1	1B
NR 322	Introduction to Geographic Information Systems	4	
SPCC 200	Public Speaking	3	2A1
	Health and wellness ¹	2	3G
	Elective	2	
	TOTAL	33	
SOPHOMORE			
G 232	Mineralogy (G CC 120 or G 150; C CC 111 and M CC 124 or concurrent registration, concurrent registration in G 332; or written consent of instructor)	3	
G 332	Optical Mineralogy (G 232 or concurrent registration or written consent of instructor)	2	
G 364	Igneous and Metamorphic Petrology (G 232)	4	4B
M CC 155	Calculus for Biological Scientists I ² (M CC 124, M CC 125)	4	1B

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 College of Natural Resources. The geology minor adviser can provide advice on the selection of minor electives.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
Required:			

Select four credits from the following:			
G CC 120	Exploring Earth: Physical Geology	3	3A
AND			
G CC 121	Introductory Geology Laboratory (G CC 120 or G CC 122 or G CC 124 or concurrent registration in G CC 120 or G CC 122 or G CC 124)	1	
G 150	Physical Geology for Scientists and Engineers	4	
G 154	Historical and Analytical Geology (G CC 120 or G CC 122 or G 150)	4	
		8	
Recommended:			
G 232*	Mineralogy ¹ (G CC 120 or G 150; C CC 111 and M CC 124 or concurrent registration; concurrent registration in G 332; or written consent of instructor)	3	
UPPER DIVISION			

Select 10 credits from the following:			
G 332	Optical Mineralogy (G 232 or concurrent registration or written consent of instructor)	2	
G 342	Paleontology (G 154)	3	
G 344	Stratigraphy and Sedimentology (G 154)	4	
G 364	Igneous and Metamorphic Petrology (G 232)	4	
G 372*	Structural Geology (G 154, M CC 125 concurrent registration in PHCC 141)	4	
G 376	Geologic Field Methods (G 344; G 372 or concurrent registration)	3	
G 446*	Environmental Geology (G 454 or concurrent registration)	3	
G 452*	Hydrogeology (G CC 120 or G 150 or GR 210; PHCC 141; M CC 161 or M CC 255 or written consent of instructor)	4	
G 454*	Geomorphology (G CC 120 or G 150 or GR 210; M CC 155 or M CC 160)	4	
		2	
Upper division geology ²			
TOTAL		12	
PROGRAM TOTAL = 21 credits without prerequisites			

¹ If G 232 is not taken, any one additional geology credit, 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 resources degrees. A description of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF NATURAL RESOURCE RECREATION AND TOURISM

Office in Forestry Building, Room 233

(970) 491-6591

<http://www.cnr.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

The Department of Natural Resource Recreation and Tourism offers a high quality program accredited by the National Recreation and Park Association. Graduates possess technical skills in problem solving, systems planning, integrative team decision making, quantitative analysis, oral and verbal communications, and computer operations. Additionally, graduates are familiar with the historic evolution of environmental conservation and develop an appreciation for how their discipline contributes to environmental stewardship. Four concentrations are offered – environmental communication, global tourism, natural resource tourism, and parks and protected area management.

Learning Outcomes

Students will demonstrate:

- Written and oral communication skills, with a focus on writing skills. Student writing and speaking will embody characteristics that represent attention to high quality communication skills, including substance of the issue addressed, organization of the paper or presentation, mechanics, or evidence.
- Research and analytical skills. These skills will include the ability to generate a problem statement, associated research questions, data acquisition methodologies, synthesis of related information and the development of management implications and conclusions.
- Planning skills. This will involve an ability to implement the planning process, including setting goals and objectives, acquiring relevant background information, synthesizing information, conceptualizing ideas, constructing alternative courses of action, making recommendations and considering ways of evaluating decisions.

Potential Occupations

Graduates work in a variety of federal, state, and local resource management agencies, nonprofit environmental conservation and education organizations, and private commercial recreation enterprises. Competition can be intense for full time/permanent positions in highly attractive natural resource locations, although ample opportunities exist to gain experience through seasonal/temporary and volunteer work. Participation in a high quality, pre-approved internship is required for the degree. Additional cooperative education opportunities are highly recommended to enhance your practical training and development. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

The following are some of the career opportunities available to natural resource recreation and tourism majors with an environmental communication concentration: public involvement coordinator; interpretive writer, planner, consultant; outdoor education specialist; nature photographer; exhibit developer/evaluator; environmental/conservation education/visitor information specialist; interpretive ranger; naturalist; nature center manager; museum interpreter/educator; public relations/affairs specialist; park ranger. Examples of opportunities available to graduate 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			
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
RR 100	Foundations of Recreation and Tourism Arts/humanities ¹	3	3B
	Biological/physical sciences ²	7	3A
	Health and wellness ³	2	3G
	Social/behavioral sciences ⁴	3	3C
	U.S. public values and institutions ⁵	3	3F
	Elective	2	
	TOTAL	29	
SOPHOMORE			
BY 220	Fundamentals of Ecology (1 course in biology; M CC 124 or M CC 141 or M CC 155 or M CC 160)	3	
<i>Select two of the following courses:</i>			
F 311	Forest Ecology (BY 220 or BY 320)	3	
FW 200	Wildlife Conservation (M CC 118 or M CC 121)	3	
NR 300	Biological Diversity (NR 120A or B or one course in biology)	3	
RS 300	Principles of Range Management (BZCC 120 or LS 103)	3	
WRCC 304	Principles of Watershed Management	3	
JTCC 300	Professional and Technical Communication (COCC 150)	3	
NR 220	Natural Resource Ecology and Measurements (BZCC 120 or LS 103; M CC 121)	5	
RR 231	Principles Parks/Protected Area Management	3	
RR 261	Principles of Interpretation	3	
RR 270	Principles of Natural Resource Tourism	3	
SPCC 200	Public Speaking	3	2A
STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
OR			
STCC 204	Statistics for Business Students (M CC 117 or M CC 120A-B)	3	2B
	Global and cultural awareness ⁶	3	3E
	TOTAL	35	
JUNIOR			
<i>Select three of the following courses:</i>			
JT 335	Digital Photojournalism	3	
JT 340	Video Editing (JT 211)	3	
JT 342	Writing for Specialized Electronic Media (JT 192 or JT 210; JT 211)	3	
SP 205	Group Communication (SPCC 200)	3	
SP 300	Advanced Public Speaking (SPCC 200)	3	
SP 309	Conflict Management and Communication	3	
JT 350	Public Relations	3	
NRCC 320	Natural Resources History and Policy	3	3D, 3F
NR 387	Internship I	1	
RR 330	Social Aspects of Natural Resource Management	3	4A
RR 363	Outdoor Recreation Programming (RR 231 or RR 261 or RR 270)	3	
RR 375	Budgeting and Revenue Resources (RR 231 or RR 261 or RR 270)	3	
RR 376	Recreation Measurements (STCC 201)	3	
	TOTAL	28	
SENIOR			
<i>Select two of the following courses:</i>			
JT 413	New Communication Technologies and Society	3	
JT 461	Writing about Science, Health, and Environment (JT 192 or JT 210; JT 211)	3	
NR 365	Environmental Education (BY 220, RR 100)	3	
RR 371	Techniques in Interpretation (RR 261)	3	
	Environmental communication elective ⁷	3	
NR 400	Public Relations in Natural Resources (NRCC 320)	3	4B, 4C

Course	Title (Prerequisite)	Cr	AUCC
PY 340	Organizational Psychology (PYCC 100, STCC 201; concurrent registration in PY 341)	3	
PY 341	Organizational Psychology Laboratory (PY 250; concurrent registration in PY 340; departmental statistics requirement)	1	
RR 487	Internship	5	
	Natural resource elective ⁷	7	
	Social/natural science elective ⁷	3	
	TOTAL	28	

PROGRAM TOTAL = 120 credits⁸

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 3A of the AUCC. One course must have a laboratory component.

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

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

⁵ Select from the list of courses in category 3F of the AUCC.

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

⁷ With adviser's approval, select from list of courses available in the department.

⁸ To meet graduation requirements, 42 credits must be from 300- and 400-level courses.

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.

L 105, First Year Language I, and L 106, First Year Language Review, 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			
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
L 107	First Year Language II (L 105 or L 106)	5	
OR			
L 108	Intensive Language I (A in L 105 or L 106 and written consent of instructor or placement exam)	5	
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
NR 120A-B	Environmental Conservation	3-4	
SPCC 200	Public Speaking	3	2A1
	Biological/physical sciences ¹	7	3A
	Health and wellness ²	2	3G
	Elective	2	
	TOTAL	31-32	
SOPHOMORE			
BA 205	Fundamentals of Accounting	3	
BGCC 205	Fundamentals of Business Law	3	3F
L CC 200	Second Year Language I (L 107 or L 108 or placement exam)	3	

Course	Title (Prerequisite)	Cr	AUCC
L CC 201	Second Year Language II (L CC 200 or placement exam)	3	
RM 101	Hospitality Industry	3	
RM 200	Resort Operations (RM 101 or written consent of instructor)	3	
RR 270	Principles of Natural Resource Tourism	3	
STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
	Arts/humanities ³	3	3B
	TOTAL	27	

JUNIOR

BK 305	Fundamentals of Marketing (ECCC 101 or ECCC 202 or EACC 202)	3	
BN 305	Fundamentals of Management	3	
<i>Select one of the following:</i>			
COCC 300	Writing Arguments (COCC 150)	3	2A2
COCC 301A-D	Writing in the Disciplines (COCC 150)	3	2A2
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
L CC 300	Reading and Writing for Communication (L CC 201 or L 208)	3	

OR

L 304	Third-Year Language I (L CC 201 or placement exam)	3	
L 305	Third-Year Language II (L 304 or placement exam)	3	

OR

L 335	Issues in Culture (L CC 201 or L 208)	3	
NRCC 320	Natural Resources History and Policy	3	3D, 3F
NR 387	Internship I	1	
RR 320	International Issues-Recreation and Tourism	3	
RR 370	Managing Tourism in the E-Commerce Era (RR 270)	3	
RR 376	Recreation Measurements (STCC 201)	3	
	Global and cultural awareness ⁴	0	3E
	TOTAL	28	

SENIOR

BK 365	International Marketing (BK 300 or BK 305)	3	
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OR

BN 475	International Business Management (BF 300 or BF 305; BK 300 or BK 305; BN 305 or BN 320)	3	
NR 300	Biological Diversity (NR 120A or B or one course in biology)	3	
RM 350	Restaurant and Resort Marketing (RM 101)	3	
RR 442	Tourism Planning (RR 270)	3	4B, 4C
RR 470	Tourism Impacts (RR 270)	3	4A
RR 471	Starting and Managing Tourism Enterprise (RR 231 or RR 261 or RR 270)	3	
RR 487	Internship	4	
RR 499	Senior Thesis	3	
	Upper-division language electives	9	
	TOTAL	34	

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

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

⁴ This requirement is automatically satisfied by studying abroad with SACC 482V.

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.

College of Natural Resources

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
RR 100	Foundations of Recreation and Tourism	3	
SPCC 200	Public Speaking	3	2A1
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	7	3A
	Health and wellness ³	2	3G
	Elective	2	
	TOTAL	29	
SOPHOMORE			
BA 205	Fundamentals of Accounting	3	
BGCC 205	Fundamentals of Business Law	3	3F
<i>Select one of the following:</i>			
COCC 300	Writing Arguments (COCC 150)	3	2A2
COCC 301A-D	Writing in the Disciplines (COCC 150)	3	2A2
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
RM 101	Hospitality Industry	3	
RR 231	Principles Parks/Protected Area Management	3	
RR 261	Principles of Interpretation	3	
RR 270	Principles of Natural Resource Tourism	3	
STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
	Guided elective ⁴	3	
	TOTAL	27	
JUNIOR			
BK 305	Fundamentals of Marketing (ECCC 101 or ECCC 202 or EACC 202)	3	
BN 305	Fundamentals of Management	3	
JT 350	Public Relations	3	
OR			
NR 400	Public Relations in Natural Resources (NRCC 320)	3	
NRCC 320	Natural Resources History and Policy	3	3D, 3F
NR 387	Internship I	1	
RR 376	Recreation Measurements (STCC 201)	3	
	Global and cultural awareness ⁵	3	3E
	Guided electives ⁴	6	
	Electives	6	
	TOTAL	31	
SENIOR			
RR 330	Social Aspects of Natural Resource Management	3	
RR 363	Outdoor Recreation Programming (RR 231 or RR 261 or RR 270)	3	
RR 375	Budgeting and Revenue Resources (RR 231 or RR 261 or RR 270)	3	
RR 442	Tourism Planning (RR 270)	3	4B, 4C
RR 470	Tourism Impacts (RR 270)	3	4A
RR 471	Starting and Managing Tourism Enterprise (RR 231 or RR 261 or RR 270)	3	
RR 487	Internship	5	
	Guided electives ⁴	10	
	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 3A in the AUCC. One course must have a laboratory component.

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

⁴ Select from departmental list of approved courses.

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.

M CC 120A-B is considered a review course; credit in this course 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>			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
G CC 130	Earth System Science	3	3A
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
PYCC 100	General Psychology	3	3C
RR 100	Foundations of Recreation and Tourism	3	
SPCC 200	Public Speaking	3	2A1
	Arts/humanities ¹	3	3B
	Health and wellness ²	2	3G
	Elective	2	
	TOTAL	31	
SOPHOMORE			
BY 220	Fundamentals of Ecology (one course in biology; M CC 124 or M CC 141 or M CC 155 or M CC 160)	3	
COCC 301A-D	Writing in the Disciplines (COCC 150)	3	2A2
OR			
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
M CC 141	Calculus in Management Sciences (M CC 118 or M CC 121)	3	1B
NR 220	Natural Resources Ecology and Measurements (BZCC 120 or LS 103; M CC 121)	5	
RR 231	Principles Parks/Protected Area Management	3	
RR 261	Principles of Interpretation	3	
RR 270	Principles of Natural Resource Tourism	3	
STCC 201	General Statistics (M CC 117 or M CC 120A-B)	3	2B
	Global and cultural awareness ³	3	3E
	TOTAL	29	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
FW 360	Principles of Vertebrate Management (BY 220 or BY 320; M CC 141 or M CC 155 or M CC 160)	3	
NRCC 320	Natural Resources History and Policy	3	3D, 3F
NR 322	Introduction to Geographic Information Systems	4	
OR			
NR 323	Remote Sensing of Natural Resources	3	
NR 387	Internship I	1	
RR 330	Social Aspects of Natural Resource Management	3	4A
RR 331	Management of Parks and Protected Areas (RR 231, RR 330)	3	4B
RR 363	Outdoor Recreation Programming (RR 231 or RR 261 or RR 270)	3	
RR 375	Budgeting and Revenue Resources (RR 231 or RR 261 or RR 270)	3	
RR 376	Recreation Measurements (STCC 201)	3	
	Guided electives ⁴	4	
	TOTAL	29-30	
SENIOR			
NR 300	Biological Diversity (NR 120A or B or one course in biology)	3	
NR 420	Integrated Ecosystem Management (Senior standing; BY 320, NR 220 and NRCC 320)	4	4C
NR 440	Land Use Planning	3	
NR 460	Wilderness Management (BY 220, NR 300, RR 431 or written consent of instructor)	3	
OR			
RR 439	Open Space and Natural Area Management (NR 440 or RR 431)	3	
RR 431	Park and Protected Area Management (RR 231, RR 330)	3	
RR 487	Internship	5	
	Guided electives ⁴	9-10	
	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 3G in the AUCC.

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

⁴ Select from department list of approved courses

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 RR 487, are correspondence courses. Registration for these courses I 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
UPPER DIVISION			
RR 450	Wilderness Philosophy and Ethic Development	3	
RR 451	National Wilderness Preservation System (RR 450)	3	
RR 452	Management of the Wilderness Resources (RR 451)	4	
RR 453	Management of Recreation Resources (RR 451)	3	
RR 454	Wilderness Management Planning (RR 451)	3	
RR 455	Wilderness Management Skills and Projections (RR 451)	3	
RR 487	Internship	3	
	TOTAL	22	

PROGRAM TOTAL = 22 credits

Graduate Programs in Recreation Resources

Programs lead to the master of science and doctor of philosophy degrees. A description of these programs may be found in the *Graduate and Professional Bulletin*.

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 Peter K. Dorhout, Associate Dean
Dr. John C. McGrew, Assistant Dean

UNDERGRADUATE MAJORS

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 9 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 COCC 150. If biology is chosen as one of the science courses, it is strongly recommended that general chemistry also be taken.

Life Sciences 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.international.colostate.edu/us/studyabroad.

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*, 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* graduate 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, biology/natural resource education; chemistry education; general science education; geology education; and physics education.

The program includes science courses in a concentration such as biology, geology, physics, chemistry, etc.; and 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.

Biology Education 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 program's Web site (<http://teacher.colostate.edu/>) or in room 111 of the Education Building.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select 8 credits from the following sets of courses:</i>			
BZCC 110	Principles of Animal Biology	3	3A

College of Natural Sciences

Course	Title (Prerequisite)	Cr	AUCC
BZCC 111	Animal Biology Laboratory (BZCC 100 or concurrent registration)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160).	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent registration)	1	
M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
	Arts/humanities ¹	3	3B
	Written communication ²	3	1A
	Elective	1	
	TOTAL	28	
SOPHOMORE			
BZ 220	Introduction to Evolution (BZCC 110 and BZCC 111 or BZCC 120 or LS 103)	3	
	<i>Select one of the following:</i>		
BZ 350	Molecular and General Genetics (LSCC 102, one course in statistics)	4	
BZ 455	Human Heredity and Birth Defects (BZCC 111 or LS 103)	3	
SC 330	Principles of Genetics (BZCC 110 or BZCC 120 or LSCC 102)	3	
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent registration)	1	
	<i>Select one of the following pairs of courses:</i>		
PHCC 121	General Physics I (concurrent registration in M CC 125)	5	3A
PHCC 122	General Physics II (PHCC 121)	5	3A
	OR		
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
	Biological science electives	6	
	TOTAL	30-31	
JUNIOR			
	<i>Select one of the following pairs of courses:</i>		
AACC 100	Introduction to Astronomy	3	3A
AACC 101	Astronomy Laboratory (AACC 100 or concurrent registration)	1	3A
	OR		
G CC 120	Exploring Earth: Physical Geology	3	3A
G CC 121	Introductory Geology Laboratory (G CC 120 or G CC 122 or G CC 124 or concurrent registration in G CC 120 or G CC 122 or G CC 124)	1	3A
BY 310	Cell Biology (one semester of organic chemistry or concurrent registration; two semesters of introductory biology)	4	
BY 311	Developmental Biology (BY 310 or written consent of instructor)	4	
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology and Assessment (Completion of Phase 1 courses; BD 150 or CS 110 within three years or computer proficiency test; consent of Teacher Licensure Office)	2	

Course	Title (Prerequisite)	Cr	AUCC
ED 350	Instruction I-Individualization/Management (EDCC 275; ED 340; concurrent registration in ED 386, admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 275, ED 340, concurrent registration in ED 350, admission to Teacher Licensure program)	1	
EDCC 430	Diversity and Communication (EDCC 275; admission to Teacher Licensure Program)	3	3D
	Additional communication ³	3	2A
	Historical perspectives ⁴	3	3D
	Social/behavioral sciences ⁵	3	3C
	TOTAL	33	
SENIOR			
BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 3436 or concurrent registration in C 3436)	4	
BC 352	Principles of Biochemistry Laboratory (BC 351 or BC 401 or concurrent registration, 2 credits of college chemistry laboratory)	1	
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent registration in ED 486J)	4	
ED 460	Methods and Materials in Teaching Science (admission to Teacher Licensure Program)	4	
ED 485B	Student Teaching-Secondary (ED 450, ED 460)	11	4A, 4C
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
ED 493A	Seminar-Professional Relations (ED 426 or ED 450, ED 460, concurrent registration in ED 485A or B or C)	1	4C
ED 493B	Seminar-Assessment of Learning (ED 450 or ED 426, ED 460, concurrent registration in ED 4485A or B or C or VE 485)	1	4B
	Health and wellness ⁶	2	3G
	TOTAL	29	
PROGRAM TOTAL = 120-122 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 1A in the AUCC.

³ Select from list of courses in category 2A 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 3G in the AUCC.

Biology/Natural Resources Education 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 program's Web site (<http://teachered.colostate.edu/>) or in room 111 of the Education Building.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A

Course	Title (Prerequisite)	Cr	AUCC	Course	Title (Prerequisite)	Cr	AUCC
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent registration)	1	3A	ED 460	Methods and Materials in Teaching Science (admission to Teacher Licensure program)	4	
G CC 120	Exploring Earth: Physical Geology	3	3A	ED 485B	Student Teaching-Secondary (ED 450; ED 460)	11	4A, 4C
G CC 121	Introductory Geology Laboratory (G CC 120 or G CC 122 or G CC 124 or concurrent registration in G CC 120 or G CC 122 or G CC 124)	1	3A	ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B	ED 493A	Seminar-Professional Relations (ED 426 or ED 450; ED 460, concurrent registration in ED 485A or B or C)	1	4C
	Arts/humanities ¹	3	3B	ED 493B	Seminar-Assessment of Learning (ED 426 or ED 450, ED 460, concurrent registration in ED 485A or B or C or VE 485)	1	4B
	Written communication ²	3	1A				
	Elective	2					
	TOTAL	28					
SOPHOMORE							
BY 220	Fundamentals of Ecology (one course in biology; M CC 124 or M CC 141 or M CC 155 or M CC 160)	3		MB 300	General Microbiology (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 345 or concurrent registration)	3	
	Select four credits from the following:				Health and wellness ⁷	2	3G
BI 302	Applied and General Entomology	2			Electives	0-2	
	AND				TOTAL	27-29	
BI 303A	General Entomology Laboratory (BI 302 or concurrent registration)	2		PROGRAM TOTAL = 120-121 credits			
BZ 212	Animal Biology-Invertebrates (BZCC 110 and BZCC 111 or LS 103)	4		¹ Select from list of courses in category 3B in the All-University Core Curriculum (AUCC).			
BZ 214	Animal Biology-Vertebrates (BZCC 111 or LS 103)	4		² Select from list of courses in category 1A in the AUCC.			
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4		³ Select from the following: EACC 240 or ECCC 240, FW 360, GR 210, NR 220, RR 100, RS 300, WRCC 304.			
C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent registration)	1		⁴ Select from list of courses in category 2A in the AUCC.			
NR 120A-B	Environmental Conservation (B) participation in University Honors Program)	3-4		⁵ Select from list of courses in category 3D in the AUCC.			
PHCC 110	Descriptive Physics	3	3A	⁶ Select from list of courses in category 3C in the AUCC.			
PHCC 111	Descriptive Physics Laboratory (PHCC 110 or concurrent registration)	1	3A	⁷ Select from list of courses in category 3G in the AUCC.			
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4					
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B				
	Directed electives ³	6					
	TOTAL	32-33					
JUNIOR							
BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent registration in C 346)	4					
BZ 220	Introduction to Evolution (BZCC 110 and BZCC 111 or BZCC 120 or LS 103)	3					
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F				
ED 331	Educational Technology and Assessment (Completion of Phase 1 courses; BD 150 or CS 110 within three years or computer proficiency test; consent of Teacher Licensure Office)	2					
ED 350	Instruction I-Individualization/Management (EDCC 275, ED 340; concurrent registration in ED 386; admission to Teacher Licensure Program)	3					
ED 386	Practicum-Instruction I (EDCC 275, ED 340, concurrent registration in ED 350; admission to Teacher Licensure Program)	1					
EDCC 430	Diversity and Communication (EDCC 275; admission to Teacher Licensure Program)	3	3E				
	Additional communication ⁴	3	2A				
	Historical perspectives ⁵	3	3D				
	Social/behavioral sciences ⁶	3	3C				
	Directed elective ³	3-5					
	TOTAL	31-33					
SENIOR							
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent registration in ED 486J)	4					

Chemistry Education 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 program's Web site (<http://teachered.colostate.edu/>) or in room 111 of the Education Building.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
	Select one of the following sets of courses:		
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
	OR		
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animal and Plants (LSCC 102)	4	
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent registration)	1	
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B
	Written communication ¹	3	1A
	Elective	2	
	TOTAL	30	

College of Natural Sciences

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
C 261	Fundamentals of Inorganic Chemistry (C 113)	3	
C 345	Organic Chemistry I (C 113, C 114)	4	
C 346	Organic Chemistry II (C 345)	4	
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141; concurrent registration in M CC 161 or M CC 255)	5	3A
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
	Additional communication ²	3	2A
	Arts/humanities ³	3	3B
	TOTAL	30	

JUNIOR			
<i>Select four credits from the following:</i>			
AACC 100	Introduction to Astronomy	3	3A
AND			
AACC 101	Astronomy Laboratory (AACC 100 or concurrent registration)	1	3A
G CC 120	Exploring Earth: Physical Geology	3	3A
AND			
G CC 121	Introductory Geology Laboratory (G CC 120 or G CC 122 or G CC 124 or concurrent registration in G CC 120 or G CC 122 or G CC 124)	1	3A
C 331	Quantitative Analysis (C 113)	3	
C 332	Quantitative Analysis Laboratory (C 114; and C 335 or concurrent registration)	2	
OR			
C 334	Quantitative Analysis Laboratory (C 114; C 331 or concurrent registration)	1	
C 471	Physical Chemistry for Biological Sciences (C 113; M CC 161 or M CC 255; PHCC 122 or PHCC 142)	4	
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology and Assessment (Completion of Phase 1 courses; BD 150 or CS 110 within three years or computer proficiency test; consent of Teacher Licensure Office)	2	
ED 350	Instruction I-Individualization/Management (EDCC 275, ED 340; concurrent registration in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 275, ED 340, concurrent registration in ED 350, admission to Teacher Licensure Program)	1	
EDCC 430	Diversity and Communication (EDCC 275; admission to Teacher Licensure Program)	3	3E
	Historical perspectives ⁴	3	3D
	Social/behavioral science ⁵	3	3C
	TOTAL	30-31	

SENIOR			
BC 301	Survey of Biochemistry (C 245)	3	
OR			
BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent registration in C 346)	4	
BC 352	Principles of Biochemistry Laboratory (BC 351 or BC 401 or concurrent registration, 2 credits of college chemistry laboratory)	1	
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent registration in ED 486J)	4	
ED 460	Methods and Materials in Teaching Science (admission to Teacher Licensure Program)	4	
ED 485B	Student Teaching-Secondary (ED 450, ED 460)	11-12	4A, 4C
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
ED 493A	Seminar-Professional Relations (ED 426 or ED 450; ED 460, concurrent registration in ED 485A or B or C)	1	4C

Course	Title (Prerequisite)	Cr	AUCC
ED 493B	Seminar-Assessment of Learning (ED 426 or ED 450, ED 460, concurrent registration in ED 485A or B or C or VE 485)	1	4B
	Health and wellness ⁶	2	3G
	Electives	0-2	
	TOTAL	30	

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 in the AUCC.

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 3G in the AUCC.

General Science Education 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 program's Web site (<http://teachered.colostate.edu/>) or in room 111 of the Education Building.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one of the following sets of courses:</i>			
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
OR			
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animal and Plants (LSCC 102)	4	
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent registration)	1	
<i>Select one of the following pairs of courses:</i>			
M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
M CC 255	Calculus for Biological Scientists II (M CC 155; concurrent registration in M CC 126)	4	1B
OR			
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124; M CC 160)	4	1B
	Written communication ¹	3	1A
	Elective	2	
	TOTAL	30	
SOPHOMORE			
G CC 120	Exploring Earth: Physical Geology	3	3A
G CC 121	Introductory Geology Laboratory (G CC 120 or G CC 122 or G CC 124 or concurrent registration in G CC 120 or G CC 122 or G CC 124)	1	3A
<i>Select one of the following pairs of courses:</i>			
PHCC 121	General Physics I (concurrent registration in M CC 125)	5	3A
PHCC 122	General Physics II (PHCC 121)	5	3A
OR			

Course	Title (Prerequisite)	Cr	AUCC	Course	Title (Prerequisite)	Cr	AUCC
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A	FRESHMAN			
PHCC 142	Physics for Scientists and Engineers II (PHCC 141; concurrent registration in M CC 161 or M CC 255)	5	3A	AACC 100	Introduction to Astronomy	3	3A
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B	OR			
	Arts/humanities ²	3	3B	NR 272	Oceanography I	3	
	Social/behavioral sciences ³	3	3C	C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
	Requirement for minor ⁴	9		C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
	TOTAL	32		G CC 120	Exploring Earth: Physical Geology	3	
JUNIOR				AND			
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F	G CC 121	Introductory Geology Laboratory	1	
ED 331	Educational Technology and Assessment (Completion of Phase 1 courses; BD 150 or CS 110 within three years or computer proficiency test; consent of Teacher Licensure Office)	2		OR			
ED 350	Instruction I-Individualization/Management (EDCC 275; ED 340; concurrent registration in ED 386; admission to Teacher Licensure Program)	3		G 150	Physical Geology for Scientists and Engineers	4	
ED 386	Practicum-Instruction I (EDCC 275, ED 340, concurrent registration in ED 350, admission to Teacher Licensure program)	1		G 154	Historical and Analytic Geology (G CC 120 or G CC 122 or G 150)	4	
EDCC 430	Diversity and Communication (EDCC 275; admission to Teacher Licensure Program)	3	3E	M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
	Additional communication ⁵	3	2A	OR			
	Health and wellness ⁶	2	3G	M CC 160	Calculus for Physical Scientists I (M CC 126, concurrent registration in M CC 124)	4	1B
	Historical perspectives ⁷	3	3D	AND			
	Requirement for minor ⁴	12			Arts/humanities ¹	3	3B
	TOTAL	32			Social/behavioral science ²	3	3C
SENIOR					Written communication ³	3	1A
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent registration in ED 486J)	4			Elective	2	
ED 460	Methods and Materials in Teaching Science (admission to Teacher Licensure Program)	4			TOTAL	31	
ED 485B	Student Teaching-Secondary (ED 450, ED 460)	11	4A, 4C	SOPHOMORE			
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1		<i>Select 4 credits from the following:</i>			
ED 493A	Seminar-Professional Relations (ED 426 or ED 450, ED 460, concurrent registration in ED 485A or B or C)	1	4C	BZCC 110	Principles of Animal Biology	3	3A
ED 493B	Seminar-Assessment of Learning (ED 426 or ED 450, ED 460, concurrent registration in ED 485A or B or C or VE 485)	1	4B	AND			
	Electives	4		BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
	TOTAL	26		LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
PROGRAM TOTAL = 120 credits				C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
				C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent registration)	1	
				G 232	Mineralogy (G CC 120 or G 150, C CC 111, M CC 124 or concurrent registration; concurrent registration in G 332; or written consent of instructor)	3	
				G 454	Geomorphology (G CC 120 or G 150 or GR 210; M CC 155 or M CC 160)	4	
				PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
					Additional communication ³	3	2A
					Historical perspectives ⁵	3	3D
					G elective (select from list in junior year)	3-4	
					TOTAL	29-30	
				JUNIOR			
				BZCC 120	Principles of Plant Biology	4	3A
				OR			
				LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	
				EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
				ED 331	Educational Technology and Assessment (Completion of Phase 1 courses; BD 150 or CS 110 within three years or computer proficiency test; consent of Teacher Licensure Office)	2	
				ED 350	Instruction I-Individualization/Management (EDCC275, ED 340; concurrent registration in ED 386; admission to Teacher Licensure Program)	3	
				ED 386	Practicum-Instruction I (EDCC 275, ED 340, concurrent registration in ED 350, admission to Teacher Licensure Program)	1	
				EDCC 430	Diversity and Communication (EDCC 275; admission to Teacher Licensure Program)	3	3E
				<i>Select two of the following courses:</i>			
				G 342	Paleontology (G 154)	3	
				G 344	Stratigraphy and Sedimentology (G 154)	4	
				G 364	Igneous and Metamorphic Petrology (G 232)	4	

¹ Select from list of courses in category 1A in the AUCC.

² Select from list of course in category 3B in the AUCC.

³ Select from list of course in category 3C in the AUCC.

⁴ Students must complete a minor in one of the following areas-chemistry, physics, biology, earth-space science, environmental science, mathematics. Consult with School of Education on selection of minor.

⁵ Select from list of courses in category 2A in the AUCC.

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

⁷ Select from list of courses in category 3D in the AUCC.

Geology Education 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 program's Web site (<http://teachered.colostate.edu/>) or in room 111 of the Education Building.

College of Natural Sciences

Course	Title (Prerequisite)	Cr	AUCC
G 372	Structural Geology (G 154, M CC 125, concurrent registration in PHCC 141)	4	
G 446	Environmental Geology (G 454 or concurrent registration)	3	
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B
OR			
M CC 255	Calculus for Biological Scientists II (M CC 155; concurrent registration in M CC 126)	4	1B
PHCC 142	Physics for Scientists and Engineers II (PHCC 141; concurrent registration in M CC 161 or M CC 255)	5	3A
TOTAL		31-33	
SENIOR			
AT 350	Introduction to Weather and Climate	2	
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent registration in ED 486J)	4	
ED 460	Methods and Materials in Teaching Science (admission to Teacher Licensure Program)	4	
ED 485B	Student-Teaching-Secondary (ED 450, ED 460)	11	4A, 4C
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
ED 493A	Seminar-Professional Relations (ED 426 or ED 450; ED 460, concurrent registration in ED 485A or B or C)	1	4C
ED 493B	Seminar-Assessment of Learning (ED 426 or ED 450, ED 460, concurrent registration in ED 485A or B or C or VE 485)	1	4B
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121) Health and wellness ⁶	3 2	2B 3G
TOTAL		29	
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 in the AUCC.

⁵ Select from list of courses in category 3D in the AUCC.

⁶ Select from list of courses in category 3G 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			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher.	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
M CC 120A-B	College Algebra I (math placement exam)	1	1B

Course	Title (Prerequisite)	Cr	AUCC
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B
M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
M CC 125	Numerical Trigonometry (M CC 118 or M CC 121 or placement)	1	1B
M CC 126	Analytic Trigonometry (M CC 125 or placement)	1	1B
	Additional communication ¹	3	2A
	Minor ²	9	
	Elective	3	
TOTAL		28	

SOPHOMORE

C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent registration in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent registration)	1	

Select one of the following pairs of courses:

M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
M CC 255	Calculus for Biological Scientists II (M CC 155, concurrent registration in M CC 126)	4	1B

OR

M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B

PHCC 141	Physics for Scientists and Engineers I (M CC 126, M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141; concurrent registration in M CC 161 or M CC 255)	5	3A
	Logical/critical thinking ³	3	2B
	Minor ²	6	
TOTAL		31	

JUNIOR

	Arts/humanities ⁴	3	3B
	Biological/physical sciences ⁵	3	3A
	Global and cultural awareness ⁶	3	3E
	Health and wellness ⁷	2	3G
	Historical perspectives ⁸	3	3D
	Minor ²	15	
	Social/behavioral sciences ⁹	3	3C
	U.S. public values and institutions ¹⁰	(3)	3F
TOTAL		32	

SENIOR

	Building foundations/perspectives ¹¹	3	4B
	Capstone course ¹²	3	4C
	Using competencies ¹³	3	4A
	Minor ²	12	
	Electives ¹⁴	8	
TOTAL		29	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 2B in the All-University Core Curriculum (AUCC).

² Declare and complete two minors from the following list: biochemistry, chemistry, computer science, geology, mathematics, physics, statistics.

³ Select from the list of courses in category 2B in the AUCC.

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

⁸ Select from the list of courses in category 3D in the AUCC.

⁹ Select from the list of courses in category 3C in the AUCC.

¹⁰ Select from the list of courses in category 3F in the AUCC. Some of these courses will also satisfy the requirement for another category.

¹¹ 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.

¹² 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.

¹³ 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.

¹⁴ Majors must take enough electives to total 120 credits. Of the 120 credits, 42 must be upper-division (300- and 400-level) credits.

Physics Education 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 program's Web site (<http://teacher.ed.colostate.edu/>) or in room 111 of the Education Building.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160).	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent registration)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
	Social/behavioral sciences ¹	3	3C
	Elective	2	
	TOTAL	30	
SOPHOMORE			
AACC 100	Introduction to Astronomy	3	3A
AACC 101	Astronomy Laboratory (AACC 100 or concurrent registration)	1	3A
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
M 261	Calculus for Physical Scientists III (M CC 161)	4	
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A
PH 314	Introduction to Modern Physics (PHCC 141; concurrent registration in M 261)	4	4A, 4B
	Additional communication ²	3	2A
	Health and wellness ³	2	3G
	TOTAL	30	
JUNIOR			
CSCC 151	C++ for Scientists and Engineers (M CC 124, M CC 126)	4	2B
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology and Assessment (Completion of Phase 1 courses; BD 150 or CS 110 within three years or computer proficiency test; consent of Teacher Licensure Office)	2	
EDCC 430	Diversity and Communication (EDCC 275; admission to Teacher Licensure Office)	3	3E
PH 245	Introduction to Electronics (PHCC 142, M CC 161)	3	
PH 315	Modern Physics Laboratory (concurrent registration in PH 314)	2	4A, 4B
PH 361	Physical Thermodynamics (PHCC 142, M 261)	3	4A, 4B
	Arts/humanities ⁴	3	3B
	Historical perspectives ⁵	3	3D
	Electives	5	
	TOTAL	31	

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
ED 350	Instruction I-Individualization/Management (EDCC 275, ED 340; concurrent registration in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 275, ED 340, concurrent registration in ED 350, admission to Teacher Licensure Program)	1	
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent registration in ED 486J)	4	
ED 460	Methods and Materials in Teaching Science (admission to Teacher Licensure Program)	4	
ED 485B	Student Teaching-Secondary (ED 450, ED 460)	11	4A, 4C
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
ED 493A	Seminar-Professional Relations (ED 426 or ED 450, ED 460, concurrent registration in ED 485A or B or C)	1	4C
PH 353	Optics and Waves (M 261, PHCC 142)	4	4A, 4B
	TOTAL	29	
PROGRAM TOTAL = 120 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 in the AUCC.

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

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.

DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOLOGY

*Office in Molecular and Radiological Sciences Building,
Room 316
(970) 491-5602
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*Professor Norman Curthoys, Chair
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Coordinator*

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, and heart disease, 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, structure, 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, internships, and advanced research-oriented laboratory classes during the junior and senior years provide opportunities for experiential learning and working closely with the faculty.

Learning Outcomes

Students will:

- Demonstrate a command of the basic concepts of chemistry, biology, biochemistry, and molecular 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; 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.

M CC 120A-B, M CC 121, M CC 124, M CC 125, and M CC 126 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 2.0 must be earned for all required biochemistry, LS, and NS prefix lecture and laboratory courses. This minimum average includes the original grade for any repeated course.

Course	Title (Prerequisite)	Cr	AUCC
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent registration)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	
----- <i>Select one pair of the following:</i>			
M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
M CC 255	Calculus for Biological Scientists II (M CC 155; concurrent registration in M CC 126)	4	1B
OR			
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B
		3	3B-3F
TOTAL		33	
SOPHOMORE			
C 345	Organic Chemistry I (C 113, C 114)	4	
C 346	Organic Chemistry II (C 345)	4	
LSCC 201B	Introductory Genetics (LSCC 102 or college-level introductory biology course)	3	
LS 202B	Introductory Genetics Recitation (concurrent registration in LSCC 201B)	1	
LS 203	Introductory Genetics Laboratory (LSCC 201A or concurrent registration or LSCC 201B or concurrent registration)	1	
LS 210	Introductory Eukaryotic Cell Biology (LSCC 102; C CC 111, C CC 112 or concurrent registration)	3	
LS 211	Eukaryotic Cell Biology Recitation (LS 210 or concurrent registration)	1	
LS 212	Introductory Cell Biology Laboratory (C CC 112; LS 210 or concurrent registration)	1	
		5	3A
PHCC 121	General Physics I (Concurrent registration in M CC 125)	5	3A
OR			
PHCC 141	Physics for Scientists and Engineers I (M CC 126, M/M CC 155 or M CC 160)	5	3A
		3	2A
		3	3B-3F
		2	3G
TOTAL		31	
JUNIOR			
BC 401	Comprehensive Biochemistry I (C 245 or C 345 or concurrent registration in C 345; M CC 155 or M CC 160)	3	4A
BC 403	Comprehensive Biochemistry II (BC 401)	3	4B
BC 404	Comprehensive Biochemistry Laboratory (BC 401 or concurrent registration; C 246 or C 344; LS 212)	2	4B
C 331	Quantitative Analysis (C 113)	3	
C 334	Quantitative Analysis Laboratory (C 114; C 331 or concurrent registration)	1	
		5	3A
PHCC 122	General Physics II (PHCC 121)	5	3A
OR			
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A
		3	2B
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
OR			
STCC 307/	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B
EHCC 307	Bioscience elective ²	3-4	
		3	3B-3F

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BC 192	Biochemistry Freshman Seminar	2	

Course	Title (Prerequisite)	Cr	AUCC	Course	Title (Prerequisite)	Cr	AUCC
	Electives	2-3		BC 404*	Comprehensive Biochemistry Laboratory (BC 401 or concurrent registration; C 246 or C 344; LS 212)	2	
	TOTAL	29		BC 441	3D Molecular Models for Biochemistry (BC 401 or concurrent registration)	1	
SENIOR							
<i>Select four credits from one or more of the following:</i>							
BC 406A	Protein Biochemistry (BC 404)	2		BC 493	Senior Seminar (BC 401 or concurrent registration)	1	
BC 406B	Molecular Genetics (BC 404)	2		BC 463*	Molecular Genetics (BC 401 or concurrent registration or BC 351; LSCC 201B)	3	
BC 406C	Cellular Biochemistry (BC 404)	2		BC 465*	Molecular Regulation of Cell Function (LS 210; BC 403 or concurrent registration or BC 351)	3	
BC 408	Techniques in Structural Biology (BC 404; C 471 or C 474)	2			TOTAL	12	
BC 475	Mentored Research (BC 404)	3		PROGRAM TOTAL = 21 credits without prerequisites			
BC 487A	Internship (BC 401, BC 403, BC 404 with minimum GPA of 2.0; written consent of instructor)	Var.		*Additional work may be required because of prerequisites.			
BC 487B	International Internship (BC 401, BC 463, BC 495 (1 credit in lab of CSU mentor); selection by departmental committee)	Var.					
BC 495	Independent Study (minimum GPA of 3.0 and consent of laboratory mentor)	Var.					
BC 498	Research (written consent of research mentor and department chair)	1-6					
BC 499	Thesis (written consent of department chair)	3					
BC 463	Molecular Genetics (BC 401 or concurrent registration or BC 351; LSCC 201B)	3	4C				
BC 465	Molecular Regulation of Cell Function (LS 210; BC 403 or concurrent registration or BC 351)	3					
BC 493	Senior Seminar (BC 401 or concurrent registration)	1	4A, 4C				
C 471	Physical Chemistry for Biological Sciences (C 113; M CC 161 or M CC 255; PHCC 122 or PHCC 142)	4					
	Bioscience elective ⁴	3-4					
	Category 3 course ¹	6	3B-3F				
	Electives	2-3					
	TOTAL	27					
PROGRAM TOTAL = 120 credits							

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

² Select from the list of courses in category 2A in the AUCC.

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

⁴ 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			
LSCC 201B*	Introductory Genetics (LSCC 102 or college-level introductory biology course)	3	3A
LS 202B	Introductory Genetics Recitation (Concurrent registration in LSCC 201B)	1	
LS 210	Introductory Eukaryotic Cell Biology (LSCC 102; C CC 111, C CC 112 or concurrent registration)	3	
LS 211	Eukaryotic Cell Biology Recitation (LS 210 or concurrent registration)	1	
LS 212	Eukaryotic Cell Biology Laboratory (C CC 112; LS 210 or concurrent registration)	1	
	TOTAL	9	
UPPER DIVISION			
BC 401*	Comprehensive Biochemistry I (C 245 or C 345 or concurrent registration in C 345; M CC 155 or M CC 160)	3	
BC 403	Comprehensive Biochemistry II (BC 401)	3	

Graduate Programs in Biochemistry

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*.

DEPARTMENT OF BIOLOGY

Office in Anatomy-Zoology Building, Room E106
(970) 491-7011

<http://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.)

The curriculum includes a two-semester introductory biology sequence, cell biology, developmental biology, ecology, and genetics. Required courses in the physical sciences include a minimum of one year in introductory

chemistry, and at least one course in organic chemistry, physics, and one in biochemistry, including labs in each. 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.

Learning Outcomes

Students will:

- Interpret scientific data
- Demonstrated 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.

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 2.0 computed only for courses attempted at Colorado State.

M CC 120, M CC 121, M CC 124, and M CC 125 are considered review courses; credits in these courses may not be used toward a degree in the majors in biological science or zoology.

Biological Science Concentration

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one of the following sets of courses:</i>			
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
OR			
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112 and C 113 or concurrent registration)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
OR			
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
		3	2A
		3	3B
		2	
TOTAL		32	

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
BY 310	Cell Biology (one semester of organic chemistry or concurrent registration; two semesters of introductory biology)	4	
BY 311	Developmental Biology (BY 310 or written consent of instructor)	4	
BZ 220	Introduction to Evolution (BZCC 110 and BZCC 111 or BZCC 120 or LS 103)	3	

C 245	Select one of the following sets of courses: Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent registration)	1	
OR			
C 345	Organic Chemistry I (C 113, C 114)	4	
C 346	Organic Chemistry II (C 345)	4	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
OR			
STCC 307/ EHCC 307	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B

	Arts/humanities ²	3	3B
	Health and wellness ³	2	3G
	Historical perspectives ⁴	3	3D
	Social/behavioral sciences ⁵	3	3C
	TOTAL	30-33	
JUNIOR			
BZ 350	Molecular and General Genetics (LSCC 102; one course in statistics)	4	4A, 4B

Select one of the following pairs of courses:			
PHCC 121	General Physics I (concurrent registration in M CC 125)	5	3A
PHCC 122	General Physics II (PHCC 121)	5	3A
OR			
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A

	Arts/humanities ²	3	3B
	U.S. public values and institutions ⁶	(3)	3F
	Selected field ⁷	6	
	Additional fields ⁸	3	
	Elective	3	
	TOTAL	29	
SENIOR			
BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent registration in C 346)	4	
OR			
BC 401	Comprehensive Biochemistry I (C 245 or C 345 or concurrent registration in C 345; M CC 155 or M CC 160)	3	
AND			
BC 403	Comprehensive Biochemistry II (BC 401)	3	
BY 320	Ecology (one course in biology; M CC 141 or M CC 155 or M CC 160)	3	4C
OR			
BZ 450	Plant Ecology (BZ 223 or BZ 325)	4	4C

	Global and cultural awareness ⁹	3	3E
	Selected field ⁷	6	
	Additional field ⁸	3	
	Electives	10	
	TOTAL	29-32	

PROGRAM TOTAL = 120-126 credits

¹ Select from list of courses in category 2A 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 3G in the AUCC.

⁴ Select from the list of courses in category 3D in the AUCC. Course selected for either category 3D or 3C should also be listed in category 3F.

⁵ Select from the list of courses in category 3C in the AUCC. Course selected for either category 3D or 3C should also be listed in category 3F.

⁶ Select from the list of courses in category 3F in the AUCC. Course selected must also be listed in category 3C or 3D.

⁷ The Biology Department maintains a list of current selected fields. Twelve credits must be taken from one field.

⁸ 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.

⁹ 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 majors also take liberal arts and communications courses to give breadth to their education.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			

Select one of the following sets of courses:			
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
OR			
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	

C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112 and C 113 or concurrent registration)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A

M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
OR			
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B

	Additional communication ⁷	3	2A
	Arts/humanities ²	3	3B
	Elective	2	
	TOTAL	32	
SOPHOMORE			
BZ 220	Introduction to Evolution (BZCC 110 and BZCC 111 or BZCC 120 or LS 103)	3	

C 245	Select one of the following sets of courses: Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	

College of Natural Sciences

Course	Title (Prerequisite)	Cr	AUCC
C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent registration)	1	
OR			
C 345	Organic Chemistry I (C 113, C 114)	4	
C 346	Organic Chemistry II (C 345)	4	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
OR			
STCC 307/ EHCC 307	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B
<i>Select two of the following courses:</i>			
AT 350	Introduction to Weather and Climate	2	
G CC 122	The Blue Planet: Geology of Our Environment	3	3A
GR 210	Physical Geography	3	
SC 240	Introductory Soil Science (C CC 107 or C CC 111)	4	

	Health and wellness ³	2	3G
	Historical perspectives ⁴	3	3D
	Social/behavioral sciences ⁵	3	3C
	Electives	3	
	TOTAL	27-32	
JUNIOR			
BY 310	Cell Biology (1 semester of organic chemistry or concurrent registration; 2 semesters of introductory biology)	4	
BZ 350	Molecular and General Genetics (LSCC 102; one course in statistics)	4	4A, 4B
BZ 450	Plant Ecology (BZ 223 or BZ 325)	4	4C

<i>Select one of the following pairs of courses:</i>			
PHCC 121	General Physics I (concurrent registration in M CC 125)	5	3A
PHCC 122	General Physics II (PHCC 121)	5	3A
OR			
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A

	Global and cultural awareness ⁶	3	3E
	U.S. public values and institutions ⁷	(3)	3F
	Electives	3	
	TOTAL	28	
SENIOR			
BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent registration in C 346)	4	
OR			
BC 401	Comprehensive Biochemistry I (C 245 or C 345 or concurrent registration in C 345; M CC 155 or M CC 160)	3	
AND			
BC 403	Comprehensive Biochemistry II (BC 401)	3	
BZ 325	Plant Systematics (BZ 220)	4	
BZ 331	Developmental Plant Anatomy (BZCC 120 or LS 103; C 245 or C 346; BZ 350 or concurrent registration)	4	

<i>Select at least two courses from the following:</i>			
BZ 332	Introductory Phycology (BZCC 120 or LSCC 102 or LS 103)	4	
BZ 333	Introductory Mycology (BZCC 120 or LS 103 or written consent of instructor)	4	
BZ 338	Comparative Morphology of Vascular Plants (BZCC 120 or LS 103)	4	
BZ 440	Plant Physiology (BZCC 120 or LS 103; C 245 or concurrent registration)	3	
BZ 441	Plant Physiology Laboratory (BZ 440 or concurrent registration)	2	
	Electives ⁸	1-8	
	TOTAL	28-33	

PROGRAM TOTAL = 120 credits

¹ Select from list of courses in category 2A 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 3G in the AUCC.

⁴ Select from the list of courses in category 3D in the AUCC. Course selected for either category 3C or 3D should also be listed in category 3F.

⁵ Select from the list of courses in category 3C in the AUCC. Course selected for either category 3C or 3D should also be listed in category 3F.

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

⁷ Select from the list of courses in category 3F in the AUCC. The course selected must also be listed in either category 3C or 3D.

⁸ 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 Department of Biology offers a minor in botany 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
LOWER DIVISION			
BZCC 120	Principles of Plant Biology	4	3A
OR			
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	

	TOTAL	8	

UPPER DIVISION

Minimum of 10 credits of BZ courses specified for the botany major. A minimum of 7 additional credits from BZ courses or other courses approved by the department.

PROGRAM TOTAL = 25 credits without prerequisites

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, and one in biochemistry, including labs in each. A calculus and statistics course is also required. In addition, students select

a minimum of 16 credits of zoology courses in their chosen areas of concentration.

Learning Outcomes

Students will:

- Interpret scientific data
- Demonstrate strong organizational and laboratory skills
- Define scientific hypotheses and design experiments to test them
- Work effectively in groups
- Demonstrate strong writing and oral communication skills

Potential Occupations

This major prepares students to work in various areas of zoology, such as research or private industry, or to begin graduate school or professional studies. Career opportunities include medical biotechnology, research technician, protective agencies such as shelters and refuges, trainers and handlers, animal-related business, aquatic/marine biologists, exotic animal specialists, and wildlife conservation. It is an appropriate major for students planning to attend medical or veterinary school. Graduates often pursue advanced degrees to carry out basic research or advance into leadership positions in industry. Participation in internships, laboratory, or research opportunities is highly recommended encouraged by the department to enhance practical training and development.

Careers for zoology majors include, but are not limited to: aquarium and museum curator/director; zoo keeper; animal trainer and instructor; science librarian; environmental technician; fish and wildlife technician; veterinary technician/assistant; marine bacteriologist, 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 2.0 computed only for courses attempted at Colorado State.

M CC 120, M CC 121, M CC 124, and M CC 125 are considered review courses; credits in these courses may not be used toward a degree in the majors in biological science, or zoology.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
<i>Select one of the following sets of courses:</i>			
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
OR			
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112 and C 113 or concurrent registration)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
OR			
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
	Additional communication ¹	3	2A
	Social/behavioral sciences ²	3	3C
	Elective	2	
	TOTAL	32	
SOPHOMORE			
BZ 212	Animal Biology-Invertebrates (BZCC 110 and BZCC 111 or LS 103)	4	
BZ 214	Animal Biology-Vertebrates (BZCC 111 or LS 103)	4	
BZ 220	Introduction to Evolution (BZCC 110 and BZCC 111 or BZCC 120 or LS 103)	3	
<i>Select one of the following sets of courses:</i>			
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent registration)	1	
OR			
C 345	Organic Chemistry I (C 113, C 114)	4	
C 346	Organic Chemistry II (C 345)	4	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
OR			
STCC 307/ EHCC 307	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B
	Arts/humanities ³	3	3B
	Global and cultural awareness ⁴	3	3E
	Health and wellness ⁵	2	3G
	Historical perspectives ⁶	3	3D
	TOTAL	30-33	
JUNIOR			
BY 310	Cell Biology (1 semester of organic chemistry or concurrent registration; 2 semesters of introductory biology)	4	
BZ 350	Molecular and General Genetics (LSCC 102; one course in statistics)	4	4A, 4B

College of Natural Sciences

Course	Title (Prerequisite)	Cr	AUCC
----- Select one of the following pairs of courses:			
PHCC 121	General Physics I (concurrent registration in M CC 125)	5	3A
PHCC 122	General Physics II (PHCC 121)	5	3A
OR			
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A

	Social/behavioral sciences ²	3	3C
	U.S. public values and institutions ⁷	(3)	3F
	Upper-division zoology courses ⁸	6	
	Electives	2	
	TOTAL	29	
SENIOR			
BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent registration in C 346)	4	
OR			
BC 401	Comprehensive Biochemistry I (C 245 or C 345 or concurrent registration in C 345; M CC 155 or M CC 160)	3	
AND			
BC 403	Comprehensive Biochemistry II (BC 401)	3	
BY 320	Ecology (one course in biology, M CC 141 or M CC 155 or M CC 160)	3	4C
	Upper-division zoology courses ⁸	9	
	Electives ⁹	8-13	
	TOTAL	26-29	

PROGRAM TOTAL = 120 credits

¹ Select from list of courses in category 2A in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3C in the AUCC. The course selected in either category 3C or 3D should also be listed in category 3F.

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 3G in the AUCC.

⁶ Select from the list of courses in category 3D in the AUCC. The course selected in either category 3D or 3C should also be listed in category 3F.

⁷ Select from the list of courses in category 3F in the AUCC. The course selected must also be listed in either category 3C or 3D.

⁸ A minimum of 15 upper-division zoology credits must be taken. A list of acceptable courses is available in the Biology Department.

⁹ Select enough elective credits to bring total number of credits to 120; 42 credits must be in courses numbered 300 or above.

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 (BZCC 110 and BZCC 111 or LS 103)	4	
BZ 214	Animal Biology-Vertebrates (BZCC 111 or LS 103)	4	
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (LSCC 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. Descriptions of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF CHEMISTRY

Office in Chemistry Building, Room B101

(970) 491-6381

<http://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 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.

M CC 120A-B, M CC 121, M CC 124, M CC 125, and M CC 126 are considered review courses for chemistry majors. Credits for these courses may not be used toward the 120-128 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

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C C 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent registration)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B
	Additional communication ¹	3	2A
	Biological sciences ²	4	3A
	Health and wellness ³	2	3G
	Elective	2	
	TOTAL	31	
SOPHOMORE			
C 261	Fundamentals of Inorganic Chemistry (C 113)	3	
C 345	Organic Chemistry I (C 113, C 114)	4	
C 346	Organic Chemistry II (C 345)	4	
M 261	Calculus for Physical Scientists III (M CC 161)	4	
PHCC 141	Physics for Scientists and Engineers I (M CC 126, M CC 155 or M CC 160)	5	3A

Course	Title (Prerequisite)	Cr	AUCC
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A
	TOTAL	25	
JUNIOR			
C 332	Quantitative Analysis Laboratory (C 114 and C 335 or concurrent registration)	2	
C 335	Introduction to Analytical Chemistry (C 113 with grade of C or better; C 332 or concurrent registration)	3	4A
C 474	Physical Chemistry I (C 113, M 261, PHCC 142)	3	
C 476	Physical Chemistry II (C 474)	3	4B
	Global and cultural awareness ⁴	3	3E
	Historical perspectives ⁵	3	3D
	Social/behavioral sciences ⁶	3	3C
	TOTAL	20	
SENIOR			
C 493	Seminar (C 474)	2	4C

CORE TOTAL = 78 credits⁷

¹ Select from the list of courses in category 2A in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 3A in the AUCC with BZCC or LSCC prefixes. Must include a lab.

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

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

⁵ Select from the list of courses in category 3D in the AUCC.

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

⁷ To complete the B.S. in chemistry, students must also complete one of the following concentration-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:

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
OR			
STCC 309	Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B
	Arts/humanities ¹	3	3B
	TOTAL	6	
JUNIOR			
C 440	Advanced Organic Chemistry Laboratory (C 346)	2	4B
C 478	Physical Chemistry Laboratory (C 471 or C 474 and C 332 or C 334 or CH 333)	2	
	U.S. public values and institutions ²	3	3F
	Electives	5	
	TOTAL	12	
SENIOR			
BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent registration in C 346)	4	
OR			
BC 401	Comprehensive Biochemistry I (C 245 or C 345 or concurrent registration in C 345; M CC 155 or M CC 160)	3	
C 431	Instrumental Analysis (C 332 or C 334; C 471 or C 474 or concurrent registration)	4	
C 461	Inorganic Chemistry (C 261; C 476 or concurrent registration)	3	
C 462	Inorganic Chemistry Laboratory (C 461 or concurrent registration)	2	

College of Natural Sciences

Course	Title (Prerequisite)	Cr	AUCC
	Advanced science electives ³	6-7	
	Electives	13	
	TOTAL	32	

PROGRAM TOTAL = 128 credits

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

² Select from the list of courses in category 3F in the AUCC.

³ 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:

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
	Logical/critical thinking ¹	3	2B
	Mathematics-based requirement ²	3	
	TOTAL	6	

JUNIOR

C	431	Instrumental Analysis (C 332 or C 334; C 471 or C 474 or concurrent registration)	4	
OR				
C	478	Physical Chemistry Laboratory (C 471 or C 474; and C 332 or C 334 or CH 333)	2	
C	440	Advanced Organic Chemistry Laboratory (C 346)	2	
OR				
C	462	Inorganic Chemistry Laboratory (C 461 or concurrent registration)	2	
		Arts/humanities ³	3	3B
		TOTAL	7-9	

SENIOR

		Advanced science electives ⁴	6-8	
		U.S. public values and institutions ⁵	3	3F
		Electives	18	
		TOTAL	27-29	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 2B in the AUCC.

² Additional mathematics, 300-level M, CS, or ST course.

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

⁴ Additional advanced science courses (300+) to make a total of 10 credits when combined with the choice of C 431 or C 478.

⁵ Select from the list of courses in category 3F in the AUCC.

Minor in Chemistry

The Chemistry Department offers a minor in chemistry to interested students from other disciplines. The program serves to broaden the academic background of students seeking employment in the biosciences and related fields.

A minimum grade of C is required in all of the chemistry courses required for the minor in chemistry.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
C CC	111*	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4 3A
C CC	112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1 3A
C	113*	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3
C	114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent registration)	1
		TOTAL	9

Course	Title (Prerequisite)	Cr	AUCC
UPPER DIVISION			
C	331	Quantitative Analysis (C 113)	3
C	332*	Quantitative Analysis Laboratory (C 114 and C 335 or concurrent registration)	2
OR			
C	334	Quantitative Analysis Laboratory (C 114; C 331 or concurrent registration)	1
C	345	Organic Chemistry I (C 113, C 114)	4
C	346	Organic Chemistry II (C 345)	4
C	471*	Physical Chemistry for Biological Sciences (C 113; M CC 161 or M CC 255; PHCC 122 or PHCC 142)	4
OR			
C	474*	Physical Chemistry I (C 113, M 261, PHCC 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, inorganic, organic, and physical chemistry. A description of these programs may be found in the *Graduate and Professional Bulletin*. A graduate program brochure is available from the department.

DEPARTMENT OF COMPUTER SCIENCE

Office in University Services Center, Room 211

(970) 491-5792

<http://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, computer organization, data structures, discrete 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 upon graduation.

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 COCC 150 and in all mathematics, statistics, computer science, and departmental Group II courses which are required for graduation.

M CC 117, M CC 118, M CC 120A-B, M CC 121, M CC 124, M CC 125, and M CC 126 are considered review courses; credits in these courses may not be used toward a degree in the computer science major.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
CSCC 153	Java Programming (M CC 118 with a C or better)	4	2B
CS 166/M 166	Discrete Structures (CSCC 153 with a C [2.0] or better; M CC 124)	4	
M CC 160	Calculus for Physical Scientists I ¹ (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B
CS 192	First Year Seminar in Computer Science	2	
	Biological/physical sciences ²	7	3A
	Electives ³	3	
	TOTAL	31	
SOPHOMORE			
CS 200	Algorithms and Data Structures (CSCC 153 with a C or better; CS 166/M 166 with a C or better, M CC 160 with a C or better)	4	
CS 253	Problem Solving with C++ (CS 166/M 166 with a C or better, CS 200 with a C or better, CS 270 with a C or better or EE 251 with a C or better)	4	
CS 270	Computer Organization (CS 166/M 166 with a C or better, M CC 124 with a C or better, concurrent registration in CS 200)	4	
M 229	Matrices and Linear Equations (M CC 141 or M CC 155 or M CC 160)	2	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
OR			
STCC 309	Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B
	Additional communication ⁴	3	2A
	Arts/humanities ⁵	3	3B
	Health and wellness ⁶	2	3G
	Social/behavioral sciences ⁷	3	3C
	Electives ³	2	
	TOTAL	30	
JUNIOR			
CS 301	Foundations of Computer Science (CS 166/M 166 with a C or better, CS 200 with a C or better, M CC 161 with a C or better, M 229 with a C or better and concurrent registration in CS 253)	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, STCC 301 with a C or better or STCC 309 with a C or better)	4	
	Additional science ⁸	5	
	Global and cultural awareness ⁹	3	3E
	Historical perspectives ¹⁰	3	3D
	U.S. public values and institutions ¹¹	3	3F
	Upper division electives ¹²	2	
	TOTAL	28	
SENIOR			
<i>Select one course from the following:</i>			
CS 410	Introduction to Computer Graphics (CS 314 with a C or better, M 229 with a C or better)	4	4A
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 475	Parallel Programming (CS 370 with a C or better)	4	4A
	Building foundations ¹³	9	4B
	Capstone experience ¹⁴	12	4C
	Electives ³	6	
	TOTAL	31	
PROGRAM TOTAL = 120 credits			

¹ Precalculus math (M CC 120, M CC 121, M CC 124, M CC 125, M CC 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: BZCC 110 and BZCC 111, BZCC 120, C CC 107 and C CC 108, C CC 111 and C CC 112, G CC 120 and G CC 121, LSCC 102, PHCC 141.

³ Any course, except IMP math.

⁴ Select from the list of courses in category 2A of the All-University Core Curriculum (AUCC).

⁵ Select from the list of courses in category 3B of the AUCC.

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

⁷ Select from the list of courses in category 3C of the AUCC.

⁸ 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, AT 350, AT 351, BZ 220, C 113, and C 114, CE 260, G 154, LSCC 201, PHCC 142, PY 352, SC 330, SC 331.

⁹ Select from the list of courses in category 3E of the AUCC.

¹⁰ Select from the list of courses in category 3D of the AUCC.

¹¹ Select from the list of courses in category 3F of the AUCC.

¹² Choose two credits of courses numbered 300 or above.

¹³ Select three courses from the CS Department Group II list.

¹⁴ 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 470, and CS 475.

Computational Statistics Concentration

Students interested in combining an interest in statistics with computer science can pursue a computational statistics concentration under the computer science major. Students take advanced statistics courses along with computer science in preparation for a career using computer software to solve difficult statistical problems. Careers may be found in the insurance industry, government office, and scientific laboratories, among other organizations.

A minimum grade of C is required in COCC 150 and in all mathematics, statistics, computer science, and departmental Group II courses which are required for graduation.

M CC 117, M CC 118, M CC 120A-B, M CC 121, M CC 124, M CC 125, and M CC 126 are considered review courses; credits in these courses may not be used toward a degree in the computer science major.

Course	Title (Prerequisite)	Cr	AUCC
	Social/behavioral sciences ⁷	3	3C
	Electives ³	2	
	TOTAL	30	
JUNIOR			
CS 301	Foundations of Computer Science (CS 166/M 166 with a C or better, CS 200 with a C or better, M CC 161 with a C or better, M 229 with a C or better and concurrent registration in CS 253)	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, STCC 301 with a C or better or STCC 309 with a C or better)	4	
ST 304	Multiple Regression Analysis (M 229, STCC 301 or STCC 307 or EHCC 307 or STCC 309 or STCC 311)	3	
ST 321	Elementary Probabilistic/Stochastic Modeling (M CC 155 or M CC 160; knowledge of a computer language)	3	
OR			
ST 460	Applied Multivariate Analysis (ST 304)	3	
	Additional science ⁸	5	
	U.S. public values and institutions ⁹	3	3F
	Electives ¹⁰	5	
	TOTAL	31	
SENIOR			
<i>Select one course from the following:</i>			
CS 410	Introduction to Computer Graphics (CS 314 with a C or better, M 229 with a C or better)	4	4A
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 475	Parallel Programming (CS 370 with a C or better)	4	4A
<i>Select two of the following courses:</i>			
CS 414	Object-Oriented Design (CS 314 with a C or better)	4	
CS 420	Introduction to Analysis of Algorithms (CS 301 with a C or better)	4	
CS 430	Database Systems (CS 314 with a C or better)	4	
CS 453	Introduction to Compiler Construction (CS 253 with a C or better, CS 301 with a C or better)	4	
CS 457	Computer Networks and the Internet (CS 370 with a C or better)	4	
CS 470	Computer Architecture (CS 370)	4	
ST 310	Data Analysis and Database Management Tools (STCC 301 or STCC 307 or EHCC 307 or STCC 309 or STCC 311)	3	
ST 472	Statistical Consulting (ST 310 or concurrent registration or written consent of instructor)	3	4B, 4C
	Global and cultural awareness ¹¹	3	3E
	Historical perspectives ¹²	3	3D
	Electives ³	4	
	TOTAL	28	

PROGRAM TOTAL = 120 credits

¹ Precalculus math (M CC 120, M CC 121, M CC 124, M CC 125, M CC 126) are considered review courses, and do not count toward a degree in computer science.

² Select two courses from two different departments (with lab, if lab is a separate course) from the following list: BZCC 110 and BZCC 111, BZCC 120, C CC 107 and C CC 108, C CC 111 and C CC 112, G CC 120 and G CC 121, PHCC 141, PHCC 142.

³ Any course, except IMP math.

⁴ Select from the list of courses in category 2A in the All-University Core Curriculum (AUCC).

⁵ Select from the list of courses in category 3B of the AUCC.

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

⁷ Select from the list of courses in category 3C of the AUCC.

⁸ Select a minimum of 5 credits from the approved department list for satisfying category 3A in the AUCC, or from the following courses, AA 301, AT 350, AT 351, C 113, C 114, CE 260, G 154, LSCC 102, PHCC 142, PY 352, PY 353, SC 330, SC 331.

⁹ Select from list of courses in category 3F in the AUCC.

¹⁰ Three credits must come from courses numbered 300 or above.

¹¹ Select from list of courses in category 3E in the AUCC.

¹² Select from list of courses in category 3D in the AUCC.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
CSCC 153	Java Programming (M CC 118 with a C or better)	4	2B
CS 166/M 166	Discrete Structures (CSCC 153 with a C or better; M CC 124)	4	
M CC 160	Calculus for Physical Scientists I ¹ (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B
M 192	First-Year Seminar in Mathematical Sciences	1	
AND			
ST 192	First-Year Seminar in Mathematical Sciences	1	
OR			
NS 192	Introductory Seminar	2	
	Biological/physical sciences ²	7	3A
	Electives ³	3	
	TOTAL	31	
SOPHOMORE			
CS 200	Algorithms and Data Structures (CSCC 153 with a C or better; CS 166/M 166 with a C or better, M CC 160 with a C or better)	4	
CS 253	Problem Solving with C++ (CS 166/M 166 with a C or better, CS 200 with a C or better, CS 270 with a C or better or EE 251 with a C or better)	4	
CS 270	Computer Organization (CS 166/M 166 with a C or better, M CC 124 with a C or better, concurrent registration in CS 200)	4	
M 229	Matrices and Linear Equations (M CC 141 or M CC 155 or M CC 160)	2	
STCC 309	Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B
	Additional communication ⁴	3	2A
	Arts/humanities ⁵	3	3B
	Health and wellness ⁶	2	3G

Minor in Computer Science

The minor in computer science offers the students a core of courses in computer hardware and software to support their major field of study.

A minimum grade of C is required in all courses required for the minor, and their prerequisites.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
CSCC 153*	Java Programming (M CC 118 with a C or better)	4	2D
CS 166/ M 166*	Discrete Structures (CSCC 153 with a C or better; M CC 124)	4	
CS 200	Algorithms and Data Structures (CSCC 153 with a C or better; CS 166/M 166 with a C or better; M CC 160 with a C or better)	4	
CS 270*	Computer Organization (CS 166/M 166 with a C or better; M CC 124 with a C or better; concurrent registration in CS 200)	4	
	TOTAL	14-16	
UPPER DIVISION			
CS	Courses numbered 300 or above*	12	
PROGRAM TOTAL = 26-28 credits without prerequisites			

*Additional course work may be required because of prerequisites; all prerequisites *must* be completed.

Graduate Programs in Computer Science

Master of science and doctor of philosophy degree programs in computer science are offered emphasizing either theoretical or practical aspects of computer science. A description of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF MATHEMATICS

Office in Weber Building, Room 101
(970) 491-1303
<http://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, their problem solving skills, and their ability to combine knowledge and skills in productive ways. Core mathematics subjects include three semesters of 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; tax auditor; risk analyst; tax auditor; risk analyst; 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.

M CC 117, M CC 118, M CC 120A-B, M CC 121, M CC 124, M CC 125, and M CC 126 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 M CC 315, M 340, and mathematics courses ending in -80 to -99.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	
M 192	First-Year Seminar in Mathematical Sciences	1	
M 229	Matrices and Linear Equations (M CC 141 or M CC 155 or M CC 160)	2	
ST 192	First Year Seminar in Mathematical Sciences	1	
	Additional communication ¹	3	2A
	Arts/humanities ²	3	3B
	Global and cultural awareness ³	3	3E
	Health and wellness ⁴	2	3G
	Historical perspectives ⁵	3	3D
	TOTAL	29	
SOPHOMORE			
BA 210	Introduction to Financial Accounting	3	
CSCC 153	Java Programming (M CC 118 with a C or better).	4	2B
ECCC 202	Principles of Microeconomics (M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160)	3	3C
ECCC 204	Principles of Macroeconomics (ECCC 202 or EACC 202)	3	3F
M 261	Calculus for Physical Scientists III (M CC 161)	4	
M 345	Differential Equations (M 229; M CC 161 or M CC 255)	4	
STCC 309	Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B
	Biological/physical sciences ⁶	5	3A
	TOTAL	29	
JUNIOR			
BF 300	Principles of Finance (BA 205 or BA 210, ECCC 204)	3	
BF 311	Investments-Fixed Income Securities (BF 300 or BF 305)	3	
BF 370	Financial Management-Theory and Applications (BF 300 or BF 305)	3	
EC 335/EA 335	Introduction to Econometrics (ECCC 204 and STCC 201 or STCC 204 or STCC 301)	3	
M 369	Linear Algebra (M CC 161, M 229)	3	4A
ST 321	Elementary Probabilistic-Stochastic Modeling (M CC 155 or M CC 160; knowledge of a computer language)	3	
ST 420	Probability and Mathematical Statistics I (M CC 255 or M 261)	3	
ST 430	Probability and Mathematical Statistics II (ST 420)	3	
	Electives	8	
	TOTAL	32	

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
BF 342	Risk Management and Insurance (BF 300 or BF 305)	3	
BGCC 205	Fundamentals of Business Law	3	3F
M 317	Advanced Calculus of One Variable (M CC 161)	4	4B
M 417	Advanced Analysis (M 261, M 317, M 369)	3	4C
M 495	Independent Study ⁷	1	
	Biological/physical sciences ⁶	5	3A
	Electives ⁸	11	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 2A 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 3E in the AUCC.

⁴ Select from the list of courses in category 3G 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 3A in the AUCC. One course must have a laboratory component.

⁷ Preparation for Exam I.

⁸ 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.

M CC 117, M CC 118, M CC 120A-B, M CC 121, M CC 124, M CC 125, and M CC 126 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 M CC 315, M 340, and mathematics courses ending in -80 to -99.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	
M 192	First-Year Seminar in Mathematical Sciences	1	
M 229	Matrices and Linear Equations (M CC 141 or M CC 155 or M CC 160)	2	
ST 192	First-Year Seminar in Mathematical Sciences	1	
	Additional communication ¹	3	2A
	Arts/humanities ²	3	3B
	Health and wellness ³	2	3G
	Historical perspectives ⁴	3	3D
	Social/behavioral sciences ⁵	3	3C
	TOTAL	29	

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
CSCC 153	Java Programming (M CC 118 with a C or better)	4	2B
CS 166/ M 166	Discrete Structures (CSCC 153 with a C or better; M CC 124)	4	
OR			
M 301	Introduction to Combinatorial Theory (M CC 160)	3	
M 261	Calculus for Physical Scientists III (M CC 161)	4	
M 345	Differential Equations (M 229; M CC 161 or M CC 255)	4	
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A
<i>Select from the following:</i>			
ST 302	Design of Experiments (STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311)	3	
ST 304	Multiple Regression Analysis (M 229, STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311)	3	
ST 321	Elementary Probabilistic-Stochastic Modeling (M CC 155 or M CC 160; knowledge of a computer language)	3	
STCC 309	Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B
TOTAL		31-32	
JUNIOR			
M 350	Introduction to Numerical Analysis I (M 340 or M 345, knowledge of programming language)	4	
M 351	Introduction to Numerical Analysis II (M 350)	4	
M 369	Linear Algebra (M CC 161 or M 229)	3	4A
	Biological/physical sciences ⁶	3	3A
	Global and cultural awareness ⁷	3	3E
	Mathematics sciences ⁸	3	
	Related area ⁹	6	
	U.S. public values and institutions ¹⁰	3	3F
	Electives	2	
TOTAL		31	
SENIOR			
M 317	Advanced Calculus of One Variable (M CC 161)	4	4B
<i>Select one of the following pairs of courses:</i>			
M 332	Partial Differential Equations (M 340 or M 345)	3	
M 417	Advanced Analysis (M 261, M 317, M 369)	3	
OR			
M 360	Mathematics of Information Security (M 229)	3	
M 460	Information and Coding Theory (M 360, M 369 and ST 321)	3	
M 435	Projects in Applied Mathematics (M 229, M 340 or M 345 or M 355; preparedness to do programming in a standard language)	3	4C
	Mathematical sciences ⁸	3	
	Related area ⁹	6	
	Electives	6-7	
TOTAL		28-29	
PROGRAM TOTAL = 120 credits			

¹ Select from the list of courses in category 2A 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 3G in the AUCC.

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

⁵ Select from the list of courses in category 3C in the AUCC.

⁶ Select from the list of courses (in a department other than Physics) in category 3A in the AUCC.

⁷ Select from the list of courses in category 3E in the AUCC.

⁸ Select from upper-division M, CS, ST courses, except those ending in -80 to -99.

⁹ A coherent set of courses outside the Mathematics Department in which mathematics is applied, approved by the concentration coordinator.

¹⁰ Select from the list of courses in category 3F in the AUCC.

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, through 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.

M CC 117, M CC 118, M CC 120A-B, M CC 121, M CC 124, M CC 125, and M CC 126 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 M CC 315, M 340, and mathematics courses ending in -80 to -99.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
<i>Select one of the following:</i>			
COCC 300	Writing Arguments (COCC 150)	3	2A2
COCC 301A-D	Writing in the Disciplines (COCC 150)	3	2A2
COCC 302	Writing Online (COCC 150)	3	2A2
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
SPCC 200	Public Speaking	3	2A1
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	
M 192	First-Year Seminar in Mathematical Sciences	1	
M 229	Matrices and Linear Equations (M CC 141 or M CC 155 or M CC 160)	2	
ST 192	First-Year Seminar in Mathematical Sciences	1	
	Arts/humanities ¹	3	3B
	Health and wellness ²	2	3G
	Historical perspectives ³	3	3D
	Social/behavioral sciences ⁴	3	3C
TOTAL		29	
SOPHOMORE			
CSCC 153	Java Programming (M CC 118 with a C or better)	4	2B
CS 166/ M 166	Discrete Structures (CSCC 153 with a C or better; M CC 124)	4	
OR			
M 301	Introduction to Combinatorial Theory (M CC 160)	3	
M 261	Calculus for Physical Scientists III (M CC 161)	4	
M 331	Introduction to Mathematical Modeling (M CC 161 or concurrent registration, M 229 or concurrent registration)	3	
M 345	Differential Equations (M 229; M CC 161 or M CC 255)	4	
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A
STCC 309	Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B
TOTAL		31-32	

College of Natural Sciences

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
CS 200	Algorithms and Data Structures (CSCC 153 with a C or better; CS 166/M 166 with a C or better, M CC 160 with a C or better)	4	
M 332	Partial Differential Equations (M 340 or M 345)	3	
M 350	Introduction to Numerical Analysis I (M 340 or M 345; knowledge of programming language)	4	
M 351	Introduction to Numerical Analysis II (M 350)	4	
M 369	Linear Algebra (M CC 161, M 229)	3	4A
ST 321	Elementary Probabilistic-Stochastic Modeling (M CC 155 or M CC 160; knowledge of a computer language)	3	
	Biological/physical sciences ⁵	3-5	3A
	Global and cultural awareness ⁶	3	3E
	U.S. public values and institutions ⁷	3	3F
	TOTAL	<u>30-32</u>	
SENIOR			
M 317	Advanced Calculus of One Variable (M CC 161)	4	4B
----- <i>Select one of the following courses:</i>			
M 417	Advanced Analysis (M 261, M 317, M 369)	3	
M 419	Introduction to Complex Variables (M 261)	3	
M 460	Information and Coding Theory (M 360, M 369, and ST 321)	3	
M 435	Projects in Applied Mathematics (M 229, M 340 or M 345 or M 355; preparedness to do programming in a standard language)	3	4C
	Electives	<u>17-20</u>	
	TOTAL	<u>27-30</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 3G 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 3A 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 3F in the AUCC.

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.

M CC 117, M CC 118, M CC 120A-B, M CC 121, M CC 124, M CC 125, and M CC 126 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 M CC 315, M 340, and mathematics courses ending in -80 to -99.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	
M 192	First-Year Seminar in Mathematical Sciences	1	
M 229	Matrices and Linear Equations (M CC 141 or M CC 155 or M CC 160)	2	
ST 192	First-Year Seminar in Mathematical Sciences	1	
	Additional communication ¹	3	2A
	Arts/humanities ²	3	3B
	Health and wellness ³	2	3G
	Historical perspectives ⁴	3	3D
	Social/behavioral sciences ⁵	3	3C
	TOTAL	<u>29</u>	
SOPHOMORE			
CSCC 153	Java Programming (M CC 118 with a C or better)	4	2B
M 261	Calculus for Physical Scientists III (M CC 161)	4	
M 369	Linear Algebra (M CC 161, M 229)	3	4A
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141; concurrent registration in M CC 161 or M CC 255)	5	3A
STCC 309	Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B
	Global and cultural awareness ⁶	3	3E
	U.S. public values and institutions ⁷	3	3F
	TOTAL	<u>30</u>	
JUNIOR			
M 360	Mathematics of Information Security (M 229)	3	
OR			
M 366	Introduction to Abstract Algebra (M CC 161)	3	
	Biological/physical sciences ⁸	3	3A
	Mathematical sciences ⁹	7	
	Electives ¹⁰	<u>17</u>	
	TOTAL	<u>30</u>	
SENIOR			
M 317	Advanced Calculus of One Variable (M CC 161)	4	4B
----- <i>Select one of the following:</i>			
M 417	Advanced Analysis (M 261, M 317, M 369)	3	
M 419	Introduction to Complex Variables (M 261)	3	
M 460	Information and Coding Theory (M 360, M 369 and ST 321)	3	
M 466	Groups, Rings, and Fields (M 366, M 369)	3	
M 417	Advanced Analysis ¹¹ (M 261, M 317, M 369)	3	4C
OR			
M 466	Groups, Rings, and Fields ¹¹ (M 388, M 369)	3	4C
	Mathematical sciences ⁹	5	
	Electives ¹⁰	<u>16</u>	
	TOTAL	<u>31</u>	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 2A 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 3G in the AUCC.

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

⁵ Select from the list of courses in category 3C in the AUCC.

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

⁷ Select from the list of courses in category 3F in the AUCC.

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 M CC 315 and those ending in -80 to -99. (b) Upper-division M, CS, or ST courses, except those ending in -80 to -99.

¹⁰ Enough upper-division elective credits must be taken to bring the total of upper-division credits to 42.

¹¹ 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 the proofs-oriented course in advanced calculus required in the other concentrations.

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://teachered.colostate.edu/>) or in room 111 of the Education Building.

A minimum grade of C is required in all mathematics, statistics, and computer science courses which are required for graduation.

M CC 117, M CC 118, M CC 120A-B, M CC 121, M CC 124, M CC 125, and M CC 126 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 M CC 315, M 340, and mathematics courses ending in -80 to -99.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B
M 192	First-Year Seminar in Mathematical Sciences	1	
M 229	Matrices and Linear Equations (M CC 141 or M CC 155 or M CC 160)	2	
ST 192	First-Year Seminar in Mathematical Sciences	1	
	Arts/humanities ¹	3	3B
	Global and cultural awareness ²	3	3E
	Health and wellness ³	2-3	3G
	Historical perspectives ⁴	3	3D
	Social/behavioral sciences ⁵	3	3C
	TOTAL	29-30	
SOPHOMORE			
CSCC 153	Java Programming (M CC 118 with a C or better)	4	2B
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology (Completion of Phase I courses; BD 150 or CS 110 within 3 years or computer proficiency test; consent of Teacher Licensure Office)	2	
ED 340	Literacy and the Learner (completion of 30 credits of course work. Required background check through CDE, CBI, FBI)	3	
M 261	Calculus for Physical Scientists III (M CC 161)	4	
M 369	Linear Algebra (M CC 161, M 229)	3	4A
SPCC 200	Public Speaking	3	2A1

Select nine to ten credits from the following set of courses:

Course	Title (Prerequisite)	Cr	AUCC
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent registration)	1	
OR			
PHCC 121	General Physics I (concurrent registration in M CC 125)	5	3A
PHCC 122	General Physics II (PHCC 121)	5	3A
OR			
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141; concurrent registration in M CC 161 or M CC 255)	5	3A
		TOTAL	31-32

JUNIOR

ED 350	Instruction I-Individualization/Management (EDCC 275, ED 340; concurrent registration in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 275; ED 340, concurrent registration in ED 350; admission to Teacher Licensure program)	1	
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent registration in ED 486J)	4	
ED 464	Methods and Materials in Teaching Mathematics (18 credits in mathematics, admission to Teacher Licensure program)	4	
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
M 317	Advanced Calculus of One Variable (M CC 161)	4	4B
M 330	Discrete Mathematics for Educators (M CC 161, ED 331)	3	
M 366	Introduction to Abstract Algebra (M CC 161)	3	
STCC 309	Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B
	Mathematical sciences elective ⁶	3	
	TOTAL	29	

SENIOR

ED 485B	Student Teaching-Secondary (ED 450, ED 464)	11	
ED 493A	Seminar-Professional Relations (ED 426 or ED 450, ED 464, concurrent registration in ED 485A or B or C)	1	
M 425	History of Mathematics (ED 331 and 2 of the following courses: M 317, M 366, M 369)	3	4C
M 470	Euclidean and Non-Euclidean Geometry (M 229, M 261)	3	
	Natural sciences ⁷	3-4	
	Electives	7-10	
	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 3G in the AUCC.

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

⁵ Select from the list of courses in category 3C in the AUCC.

⁶ Select from ST 420, ST 430, or upper-division mathematics courses except M CC 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.

Mathematics of Information Concentration

A minimum grade of C is required in all mathematics, statistics, and computer science courses which are required for graduation.

M CC 117, M CC 118, M CC 120A-B, M CC 121, M CC 124, M CC 125, and M CC 126 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 M CC 315, M 340, and mathematics courses ending in -80 to -99.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition placement exam score of 3-6 or CO 130)	3	1A
EE 102	Digital Circuit Logic	4	
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent reg. in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124; M CC 160)	4	
M 192	First-Year Seminar in Mathematical Sciences	1	
M 229	Matrices and Linear Equations (M CC 141 or M CC 155 or M CC 160)	2	
ST 192	First-Year Seminar in Mathematical Sciences	1	
	Additional communication ¹	3-5	2A
	Arts and humanities ²	3	3B
	Historical perspectives ³	3	3D
	Social/behavioral sciences ⁴	3	3C
	TOTAL	31-33	
SOPHOMORE			
CSCC 153	Java Programming (M CC 118 with a C or better)	4	
EE 251	Introduction to Microprocessors (EE 102 with grade of C- or better)	4	
M 261	Calculus for Physical Scientists III (M CC 161)	4	
M 345	Differential Equations (M 229 and M CC 161 or M CC 255)	4	
ST 304	Multiple Regression Analysis (M 229; STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311)	3	
STCC 309	Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B
	Global and cultural awareness ⁵	3	3E
	Health and wellness ⁶	2	3G
	U.S. public values and institutions ⁷	3	3F
	TOTAL	30	
JUNIOR			
CS 200	Algorithms and Data Structures (CSCC 153 with a C or better, CS 166/M 166 with a C or better, M CC 160 with a C or better)	4	
EE 311	Linear Systems Analysis I (EE 202 with grade of C- or better and M 340 or M 345)	3	
M 301	Introduction to Combinatorial Theory (M CC 160)	3	
M 317	Advanced Calculus of One Variable (M CC 161)	4	4B
M 369	Linear Algebra (M CC 161, M 229)	3	4A
ST 321	Elementary Probabilistic-Stochastic Modeling (M CC 155 or M CC 160; knowledge of a computer language)	3	
	Biological/physical science ⁸	7	3A
	Electrical engineering/mathematical science elective ⁹	3	
	TOTAL	30	
SENIOR			
EE 421	Telecommunications I (EE 303/ST 303 with grade of C- or better, EE 312 with grade of C- or better)	3	
M 360	Mathematics of Information Security (M 229)	3	

Course	Title (Prerequisite)	Cr	AUCC
M 460	Information and Coding Theory (M 360, M 369, and ST 321)	3	4C
	Electrical engineering/mathematical science electives ⁹	9	
	Electives	9-11	
	TOTAL	27-29	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 2A 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 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 from the list of courses in category 3G in the AUCC.

⁷ Select from the list of courses in category 3F in the AUCC.

⁸ 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.

⁹ Select a total of 12 credits from (A) and (B), with 6 or more coming from (A): (A) upper-division mathematics courses except M CC 315 and those ending in -80 to -99; (B) upper-division EE, CS, M, or ST 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.

M CC 117, M CC 118, M CC 120A-B, M CC 121, M CC 124, M CC 125, and M CC 126 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 M CC 315, M 340, and mathematics courses ending in -80 to -99.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent registration I M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B
M 192	First-Year Seminar in Mathematical Sciences	1	
ST 192	First-Year Seminar in Mathematical Sciences	1	
	Additional communications ¹	3	2A
	Global and cultural awareness ²	3	3E
	Health and wellness ³	2	3G
	Historical perspectives ⁴	3	3D
	Electives	6	
	TOTAL	30	

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
CSCC 153	Java Programming (M CC 118 with a C or better)	4	2B
M 229	Matrices and Linear Equations (M CC 141 or M CC 155 or M CC 160)	2	
M 261	Calculus for Physical Scientists III (M CC 161)	4	
----- <i>Select one of the following:</i>			
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
STCC 307/ EHCC 307	Introduction to Biostatistics (M CC 118, M CC 121)	3	2B
STCC 309	Statistics for Engineers and Scientists (M CC 118 or M CC 161 or M CC 255)	3	2B

	Biological/physical sciences ⁵	7	3A
	U.S. public values and institutions ⁶	3	3F
	Electives	7	
	TOTAL	30	
JUNIOR			
M 317	Advanced Calculus of One Variable (M CC 161)	4	
ST 302	Design of Experiments (STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311)	3	
ST 304	Multiple Regression Analysis (M 229, STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311)	3	
----- <i>Select one of the following:</i>			
ST 305	Sampling Techniques (STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311)	3	
ST 321	Elementary Probabilistic-Stochastic Modeling (M CC 155 or M CC 160; knowledge of a computer language)	3	
ST 460	Applied Multivariate Analysis (ST 304)	3	

	Arts/humanities ⁷	3	3B
	Social/behavioral sciences ⁸	3	3C
	Upper division CS/M/ST electives ⁹	6	
	Electives	5	
	TOTAL	30	
SENIOR			
M 369	Linear Algebra (M CC 161, M 229)	3	
ST 310	Data Analysis and Database Management Tools (STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311)	3	
ST 420	Probability and Mathematical Statistics I (M CC 255 or M 261)	3	
ST 430	Probability and Mathematical Statistics II (ST 420)	3	4A
ST 472	Statistical Consulting (ST 310 or concurrent registration or written consent of instructor)	3	4A,4B,4C
	Upper division CS/M/ST elective ⁹	3	
	Electives	12	
	TOTAL	30	
PROGRAM TOTAL = 120 credits			

¹ Select from the list of courses in category 2A1 or 2A2 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 3G 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 3A in the AUCC.

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

⁷ Select from the list of courses 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 pursuit of their personal interests or in support of their personal interests or in support of their major area of study.

A minimum grade of C is required in all mathematics, statistics, and computer science courses required for the minor in mathematics.

Course	Title (Prerequisite)	Cr	AUCC
----- <i>Select one of the following pairs of courses:</i>			
M CC 141*	Calculus in Management Sciences (M CC 118 or M CC 121)	3	1B
M CC 315	Mathematics for Economists (M CC 141)	4	1B
OR			
M CC 155*	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
M CC 255*	Calculus for Biological Scientists II (M CC 155; concurrent registration in M CC 126)	4	1B
OR			
M CC 160*	Calculus for Physical Scientists I (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161*	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B

	Upper-division mathematics ^{1*}	9	
	Electives in computer science, mathematics, or statistics ^{2*}	Var	
PROGRAM TOTAL = 23 credits minimum without prerequisites			

*Additional course work may be required because of prerequisites.

¹ M CC 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 M 229 or M 261 or upper-division courses in mathematics, statistics, or computer science. M CC 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. A description of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF PHYSICS

Office in Engineering Building, Room 124
(970) 491-6206
<http://www.physics.colostate.edu/>

Professor David A. Krueger, 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 predicting floods and earthquakes, 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 graduate 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.

M CC 117, M CC 118, M CC 120A-B, M CC 121, M CC 124, M CC 125, and M CC 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.

Majors must achieve a minimum grade of C- in all specific courses listed in the Core Program for freshman and sophomore years, in COCC 301A-D or JTCC 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

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
CSCC 153	Java Programming (M CC 118 with a C or better)	4	2B
M CC 160	Calculus for Physical Scientists I ¹ (M CC 126; concurrent registration in M CC 124)	4	1B
M CC 161	Calculus for Physical Scientists II (M CC 124, M CC 160)	4	1B
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141; concurrent registration in M CC 161 or M CC 255)	5	3A
	Biological/physical sciences ²	3	
	Elective	2	
	TOTAL	30	
SOPHOMORE			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
M 261	Calculus for Physical Scientists III (M CC 161)	4	
M 340	Introduction to Ordinary Differential Equations (M CC 255 or M 261)	4	
PH 245	Introduction to Electronics (M CC 161, PHCC 142)	3	
PH 314	Introduction to Modern Physics (PHCC 142, concurrent registration in M 261)	4	4A, 4B
PH 315	Modern Physics Laboratory (concurrent registration in PH 314)	2	4A, 4B
	Health and wellness ³	2	3G
	Logical/critical thinking ⁴	3	2B
	Social/behavioral sciences ⁵	3	3C
	TOTAL	30	
JUNIOR			
COCC 301A-D	Writing in the Disciplines (COCC 150)	3	2A2
OR			
JTCC 300	Professional and Technical Communication (COCC 150)	3	2A2
PH 341	Mechanics (M 340, PHCC 141)	4	4A, 4B
PH 351	Electricity and Magnetism (M 340, PHCC 142)	4	4A, 4B
PH 353	Optics and Waves (M 261, PHCC 142)	4	4A, 4B
PH 361	Physical Thermodynamics (M 261, PHCC 142)	3	4A, 4B
	Arts/humanities ⁶	3	3B
	Global and cultural awareness ⁷	3	3E
	Historical perspectives ⁸	3	3D
	U.S. public values and institutions ⁹	(3)	3F
	Electives	3	
	TOTAL	30	
SENIOR			
PH 325	Advanced Physics Laboratory (PH 315, concurrent registration in JTCC 300)	2	4C
PH 451	Introductory Quantum Mechanics I (M 340, PH 314)	3	4A, 4B

Course	Title (Prerequisite)	Cr	AUCC
PH 492	Seminar	1	4C
	Electives	6	
	TOTAL	12	

PROGRAM TOTAL = 102 credits¹⁰

NOTE: Majors must achieve a minimum grade of C- in each specific course listed in the Core Program with prefixes PH, M, C, CO, CS, or JT. Majors must also achieve a minimum grade of C- in the biological science courses used to satisfy AUCC category 3A.

¹ M CC 120A-B, M CC 121, M CC 124, M CC 125, and M CC 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 BC, BY, BZ, or SC.

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

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

⁵ Select from the list of courses in category 3C in the AUCC.

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

⁷ Select from the list of courses in category 3E in the AUCC.

⁸ Select from the list of courses in category 3D in the AUCC.

⁹ Select from the list of courses in category 3F. Some of these courses will also satisfy the requirement for another category.

¹⁰ 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. Four options are available: 1) The electronics, semiconductors, and optics option is designed for students interested in rapidly changing technology or in areas that overlap the boundaries of traditional engineering disciplines. 2) The computers option focuses on the application of modern computer technology to problems in physics. 3) 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. 4) The medical physics option prepares students for further study in health physics – a field in increasing demand as theoretical advances are applied to medical research and practice.

In addition to the physics core courses, the following must be completed:

Course	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:

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
PH 452	Introductory Quantum Mechanics II ¹ (PH 451)	3	4B
PH 462	Statistical Physics ¹ (M 340, PH 314, PH 361) Technical electives ¹	3	4B
	TOTAL	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.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
PHCC 141*	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142*	Physics for Scientists and Engineers II (PHCC 141, concurrent registration in M CC 161 or M CC 255)	5	3A
	TOTAL	10	
UPPER DIVISION			
PH 314*	Introduction to Modern Physics (PHCC 142, concurrent registration in M 261)	4	
----- <i>Select a minimum of 8 credits from the following, including at least five credits of PH courses:</i>			
AA 301*	Astrophysics I (M CC 124, M CC 126; PHCC 110 or PHCC 121 or PHCC 141)	5	
AA 302*	Astrophysics II (M CC 124, M CC 126; PHCC 110 or PHCC 121 or PHCC 141)	5	
AA 303*	Astrophysics III (M CC 124, M CC 126; PHCC 110 or PHCC 121 or PHCC 141)	5	
PH 315	Modern Physics Laboratory (concurrent reg. in PH 314)	2	
PH 325*	Advanced Physics Laboratory (PH 315, concurrent registration in JTCC 300)	2	
PH 341*	Mechanics (M 340, PHCC 141)	4	
PH 351*	Electricity and Magnetism (M 340, PHCC 142)	4	
PH 353*	Optics and Waves (M 261, PHCC 141)	4	
PH 451*	Introductory Quantum Mechanics I (M 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. A description of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF PSYCHOLOGY

Office in Clark Building, Room B219
(970) 491-6364

<http://www.colostate.edu/Depts/Psychology>

Professor Ernest L. Chavez, Chair

Major in Psychology

Psychology is one of the most popular and versatile majors providing a preprofessional education in the social science tradition. The major emphasizes a strong background in the natural sciences, including mathematics, biology, chemistry, and human anatomy, and the arts, 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 human and animal behavior with a substantial emphasis on psychological methods, measurement, and testing.
- Demonstrate knowledge of psychological principles and concepts across several basic content areas.
- Engage in analytical and critical thinking, and to 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 liberal arts and sciences 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 the liberal arts and sciences 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).

All psychology majors must obtain a minimum grade of C in each of the following required courses for the major: PYCC 100, PY 250, PY 370, PY 371, PY 401, and STCC 301 or STCC 311.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent registration)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
CS 110	Personal Computing	4	
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
----- <i>Select one of the following pairs of courses:</i>			
M CC 117	College Algebra in Context I (Math Placement Exam)	1	1B
M CC 118	College Algebra in Context II (M CC 117)	1	1B
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	1B
M CC 121	College Algebra II (M CC 120A-B or placement)	1	1B

M CC 124	Logarithmic and Exponential Function (M CC 118 or M CC 121 or placement)	1	1B
PLCC 100	Appreciation of Philosophy	3	3B
PYCC 100	General Psychology	3	3C

Course	Title (Prerequisite)	Cr	AUCC
S CC 100	General Sociology Elective TOTAL	3 2 30	3C, 3F
SOPHOMORE			
PY 250	Experimental Psychology (PYCC 100)	4	
SPCC 200	Public Speaking Arts/humanities ¹ Global and cultural awareness ² Health and wellness ³ Historical perspectives ⁴ Social/behavioral sciences ⁵ Electives TOTAL	3 3 3 2-3 3 3 9-10 31	2A1 3B 3E 3G 3D 3C
JUNIOR			
BS 300	Principles of Human Anatomy and Physiology (BZCC 101 or BZCC 110 or LSCC 102; C CC 103 or C CC 107 or C CC 111)	4	
COCC 300	Writing Arguments (COCC 150)	3	2B
<i>Select two of the following:</i>			
PY 260	Child Psychology (PYCC 100)	3	
PY 315	Social Psychology (PYCC 100)	3	4B
PY 320	Abnormal Psychology (PYCC 100)	3	4B
PY 325	Psychology of Personality (PYCC 100)	3	4B
<i>Select one of the following:</i>			
PY 317	Social Psychology Laboratory (PY 250; concurrent registration in PY 315)	2	4A
PY 341	Organizational Psychology Laboratory (PY 250, concurrent registration in PY 340, departmental statistics requirement)	1	4A
PY 441	Industrial Psychology Laboratory (PY 250, concurrent registration in PY 440, departmental statistics requirement)	1	4A
<i>Select one of the following pairs of courses:</i>			
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
ST 302	Design of Experiments (STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311)	3	
OR			
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
ST 310	Data Analysis and Data Base Management Tools (STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311)	3	
OR			
ST 310	Data Analysis and Data Base Management Tools (STCC 301 or STCC 307/ EHCC 307 or STCC 309 or STCC 311)	3	
STCC 311	Statistics for Behavioral Sciences I (M CC 118 or M CC 121)	3	2B
OR			
STCC 311	Statistics for Behavioral Sciences I (M CC 118 or M CC 121)	3	2B
ST 312	Statistics for Behavioral Sciences II (STCC 311 or written consent of instructor)	3	
<i>Psychology elective</i> ⁶			
	Social/behavioral sciences ⁵	0-3	
	Electives	3	3C
	TOTAL	9	
		32-33	
SENIOR			
PY 352	Psychology of Learning (PYCC 100 or written consent of instructor)	3	
OR			
PY 452	Cognitive Psychology (PYCC 100 or written consent of instructor)	3	
PY 370	Psychological Measurement and Testing (PYCC 100, STCC 301 or STCC 311, concurrent registration in PY 371)	3	
PY 371	Psychological Measurement and Testing Laboratory (concurrent registration in PY 370)	1	4A
PY 401	History and Systems of Psychology (PYCC 100, PL 105 or PLCC 120)	3	4C

Course	Title (Prerequisite)	Cr	AUCC
<i>Select one of the following:</i>			
PY 453	Cognitive Psychology Laboratory (PY 250; PY 452 or concurrent registration)	2	4A
PY 455A-B	Physiological Psychology Laboratory (PY 250; concurrent registration in PY 454A or B)	2	4A
PY 457	Sensation and Perception Laboratory (PY 250; PY 456 or concurrent registration)	2	4A
<i>Select one of the following:</i>			
PY 454A	Physiological Psychology (PYCC 100 or written consent of instructor)	3	
PY 454B	Physiological Psychology (PY 250)	3	
PY 456	Sensation and Perception (PY 250)	3	
	Arts/humanities ¹	3	3B
	Electives	10	
	TOTAL	28	

PROGRAM TOTAL = 120-121 credits

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Courses in multiple categories will not count for more than one requirement.
² Select from the list of courses in category 3E in the AUCC. Courses in multiple categories will not count for more than one requirement.
³ Select from the list of courses in category 3G in the AUCC. Courses in multiple categories will not count for more than one requirement. If PYCC 228 is selected, it may also count for the psychology elective in the junior year.
⁴ Select from the list of courses in category 3D in the AUCC. Courses in multiple categories will not count for more than one requirement.
⁵ Select any course in category 3C in the AUCC except JTCC 100, SWCC 110, and HDCC 101. Courses in multiple categories will not count for more than one requirement.
⁶ PYCC 228, Psychology of Human Sexuality, will fulfill this elective category and AUCC category 3G, Health and Wellness.

Graduate Programs in Psychology

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*.

DEPARTMENT OF STATISTICS

*Office in Statistics Building, Room 102
 (970) 491-5269 or 491-7277
<http://www.stat.colostate.edu>*

*Professor Richard A. Davis, Chair
 Associate Professor Jennifer A. Hoeting, Undergraduate Coordinator
 Professor F. Jay Breidt, 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 or the computational statistics concentration in the Department of Computer Science.

Minor in Statistics

Students must select at least 21 credits from the list of required courses below and elective courses for 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Students in the biological and social sciences who are interested in applications of statistical methods should take STCC 301 (or STCC 307/EHCC 307 or STCC 311) and ST 321. Students in the physical sciences who are interested in applications of statistical methods should take STCC 309 and ST 321. Students interested in statistical theory should take ST 420 and ST 430.			
ST	321* Elementary Probabilistic-Stochastic Modeling (M CC 155 or M CC 160; knowledge of a computer language)	3	
OR			
ST	420* Probability and Mathematical Statistics I (M CC 255 or M 261)	3	
<i>Select one of the following courses:</i>			
STCC	301* Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
STCC	307/ Introduction to Biostatistics (M CC	3	2B
EHCC	307 118 or M CC 121)		
STCC	309* Statistics for Engineers and Scientists (M CC 161 or M CC 255)	3	2B
STCC	311* Statistics for Behavioral Sciences I (M CC 118 or M CC 121)	3	2B
ST	302 Design of Experiments (STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311)	3	
ST	304* Multiple Regression Analysis (M 229, STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311)	3	
ST	305 Sampling Techniques (STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311)	3	
ST	430 Probability and Mathematical Statistics II (ST 420)	3	
ST	460 Applied Multivariate Analysis (ST 304)	3	
			6
			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. A description of these programs may be found in the *Graduate and Professional Bulletin*.

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

College of Veterinary Medicine and Biomedical Sciences

*Office in Anatomy-Zoology Building, Room W102
(970) 491-7051
<http://www.cvmb.colostate.edu>*

*Professor Lance Perryman, Dean
Professor Kenneth Blehm, Associate Dean
Professor Martin J. Fettman, Associate Dean
Professor Torrance Nett, Associate Dean
Associate Professor Sherry McConnell, Assistant Dean*

UNDERGRADUATE MAJORS

*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, 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 two undergraduate programs leading to the bachelor of science with majors in 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.

Biomedical Sciences Open Option

Biomedical Sciences Open Option is a program offered by the College of Veterinary Medicine and Biomedical Sciences for students who are in their first two years of undergraduate work at Colorado State. The program 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 environmental health and microbiology degree programs as well as the preveterinary medicine requirements.

After completion of the open option curriculum, or at any time during the course of study, students will select a major leading to the bachelor's degree. Those who select the environmental health or microbiology majors can complete degree requirements in two additional years, as described by the departments. The program also prepares students for most other majors in 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 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.international.colostate.edu/us/studyabroad.

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 relicensure. 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 (CVMBS) 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.

For detailed information about graduate programs, refer to the individual departments or write to the department concerned. See also the *Graduate and Professional Bulletin*.

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 selected 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.cvmbs.colostate.edu/cvmbs/prmp.html. 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 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 completing the pre-veterinary requirements will do as a part of a baccalaureate program that is finished prior to the start of the professional 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 small part of each class.

Specific courses offered at Colorado State which currently fulfill the pre-veterinary requirements are listed in the following section. It should be noted that these courses could be used to meet the basic science and All-University Core Curriculum requirements for numerous baccalaureate programs offered at Colorado State University.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select 4 credits from the following courses:</i>			
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
BZCC 120	Principles of Plant Biology	4	3A
OR			
LS 103	Biology of Organisms-Animal and Plants (LSCC 102)	4	
<i>Select one of the following sets of courses:</i>			
C CC 107	Fundamentals of Chemistry (M CC 117 or M CC 120A-B or placement in M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C CC 107 or concurrent registration)	1	3A
OR			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent registration)	1	

Course	Title (Prerequisite)	Cr	AUCC
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	1A
M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
	Arts/humanities ¹	3	3B
	Historical perspectives ²	3	3D
	Social/behavioral sciences ³	3	3C
	TOTAL	<u>29-33</u>	
SOPHOMORE			
BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent registration in C 346)	4	
<i>Select one of the following courses:</i>			
BZ 346	Population and Evolutionary Genetics (BZ 220, M CC 155, STCC 301 or STCC 307/EHCC 307)	3	
BZ 350	Molecular and General Genetics (LSCC 102; one course in statistics)	4	
BZ 455	Human Heredity and Birth Defects (BZCC 111 or LS 103)	3	
MB 450	Microbial Genetics (MB 300; BC 351 or BC 401 or concurrent registration)	3	
SC 330	Principles of Genetics (BZCC 110 or BZCC 120 or LSCC 102)	3	
<i>Select one of the following sets of courses:</i>			
C 245	Fundamentals of Organic Chemistry (C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C CC 108 or C CC 112 or C 114; C 245 or concurrent registration)	1	
OR			
C 345	Organic Chemistry I (C 113, C 114)	4	
C 346	Organic Chemistry II (C 345)	4	
PHCC 121	General Physics I (concurrent registration in M CC 125)	5	3A
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
OR			
STCC 307/ EHCC 307	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B
	Additional communication ⁴	3	2A
	Global and cultural awareness ⁵	3	3E
	Health and wellness ⁶	2-3	3G
	U.S. public values and institutions ⁷	3	3F
	TOTAL	<u>31-36</u>	
PROGRAM TOTAL =59-69 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.

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

⁴ Select from the list of courses in category 2A1, 2A2, or 2A3 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 3G in the AUCC.

⁷ Select from the list of courses in category 3F in the AUCC.

DEPARTMENT OF BIOMEDICAL SCIENCES

Office in Physiology Building, Room 102
www.cvmb.colostate.edu/bms

Professor Barbara Sanborn, Head

Anatomy Section:

Anatomy/Zoology Building, Room W103
(970) 491-5847

Physiology Section:

Physiology Building, Room 102
(970) 491-6187

The department offers undergraduate instruction in animal and human physiology, animal and human anatomy, neuroscience, pharmacology, endocrinology, cardiopulmonary physiology, and core courses in human health and disease, drugs and the human body, and sexuality and health. The department offers an undergraduate minor in biomedical sciences.

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 are selected to complement the student's education goals and interests.

Course	Title (Prerequisite)	Cr	AUCC
REQUIRED COURSES			
BS 300*	Principles of Human Anatomy and Physiology (BZCC 101 or BZCC 110 or LSCC 102; C CC 103 or C CC 107 or C CC 111)	4	
OR			
BS 360*	Fundamentals of Physiology (LS 210)	4	
<i>Select one of the following courses:</i>			
BS 301*	Human Gross Anatomy ¹ (BZCC 110 or LSCC 102)	5	
BS 305*	Domestic Animal Gross Anatomy ¹ (LSCC 102 or BZCC 110)	4	
BS 330	Microscopic Anatomy ¹ (BS 300 or BS 360)	4	
<i>Select one of the following courses:</i>			
BS 325	Cellular Neurobiology ¹ (BS 300 or BY 310)	3	
BS 345	Functional Neuroanatomy ¹ (BS 300)	4	
BS 365	Nerve and Muscle-Toxins, Trauma, and Disease ¹ (BS 300 or BY 310)	3	
TOTAL		11-13	
ELECTIVE COURSES			
BS 200	Concepts in Human Anatomy and Physiology (BS 300 or concurrent registration)	1	

Course	Title (Prerequisite)	Cr	AUCC
BS 301	Human Gross Anatomy (BZCC 110 or LSCC 102)	5	
BS 302	Laboratory in Principles of Physiology (BS 300 or concurrent registration)	2	
BS 305*	Domestic Animal Gross Anatomy (LSCC 102 or BZCC 110)	4	
BS 325	Cellular Neurobiology (BS 300 or BY 310)	3	
BS 330	Microscopic Anatomy (BS 300 or BS 360)	4	
BS 345	Functional Neuroanatomy (BS 300)	4	
BS 365	Nerve and Muscle-Toxins, Trauma, and Disease (BS 300 or BY 310)	3	
BS 384	Supervised College Teaching (BS 300)	Var	
BS 420	Cardiopulmonary Physiology (BS 300)	3	
BS 430	Endocrinology (BS 300)	3	
BS 450	Pharmacology (BS 300 or written consent of instructor)	3	
BS 495	Independent Study	Var	
BS 531	Domestic Animal Dissection	3	
BS 575	Human Anatomy Dissection (BS 301 and written consent of instructor)	4	
BY 310*	Cell Biology (one semester of organic chemistry or concurrent registration; two semesters of introductory biology)	4	
BY 311	Development Biology (BY 310 or written consent of instructor)	4	
TOTAL		78-10	
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. A description of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF CLINICAL SCIENCES

Office in Veterinary Teaching Hospital, 300 West Drake Road, Room A201
(970) 297-1274

www.cvmb.colostate.edu/clinsci

Professor G. 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. Elective courses provide students the opportunity to select areas such as large animal reproduction, zoological medicine, and a variety of other veterinary specialties.

No undergraduate major is offered.

Graduate Programs in Clinical Sciences

Graduate programs in medicine or surgery 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. A description of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF ENVIRONMENTAL AND RADIOLOGICAL HEALTH SCIENCES

Office in Environmental Health Building, Room 122
(97) 491-7038
<http://www.cvmbs.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, academic institutions, private industry, and graduate study in medicine, veterinary medicine, and related biomedical 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 the 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, majors 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.

M CC 117, M CC 118, M CC 120A-B, M CC 121, M CC 124, M CC 125, and M CC 126 are considered review courses in the major.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
BS 192	First Year Seminar in Biomedical Sciences	1	
BZCC 110	Principle of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent registration)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
EHCC 110/ BSCC 110	Human Health and Environmental Perspective (high school biology)	3	3G
EH 220	Environmental Health (BZCC 101 or BZCC 104 or BZCC 110 or BZCC 120 or LSCC 102 or concurrent registration)	3	
EH 230	Environmental Health Field Methods (EH 220, high school chemistry)	3	
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
	Social/behavioral sciences ¹	3	3C
	U.S. public values and institutions ²	3	3D, 3F
	TOTAL	31	
SOPHOMORE			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent registration in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112; C 113 or concurrent registration)	1	
EHCC 307/ STCC 307	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B
PHCC 121	General Physics I (concurrent registration in M CC 125)	5	3A
PHCC 122	General Physics II (PHCC 121)	5	3A
	Additional communication ³	3	2A
	Arts/humanities ⁴	3	3B
	Global and cultural awareness ⁵	3	3E
	TOTAL	31	

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
BS 300	Principles of Human Anatomy and Physiology (BZCC 101 or BZCC 110 or LSCC 102; C CC 103 or C CC 107 or C CC 111)	4	
C 345	Organic Chemistry I (C 113, C 114)	4	
C 346	Organic Chemistry II (C 345)	4	
EH 320	Environmental Health Water Quality (EH 230, MB 300 or concurrent registration)	3	4A
EH 332	Principles of Epidemiology (EHCC 307/STCC 307; MBCC 149 or MB 300)	3	
EH 350	Industrial Hygiene and Air (BS 300, EH 230)	3	
EH 492	Environmental Health Seminar	1	
MB 300	General Microbiology (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 345 or concurrent registration)	3	
MB 302	General Microbiology Laboratory (MB 300 or concurrent registration)	2	
R 300	Introduction to Radiation Biology (LSCC 102, PHCC 121)	3	
	TOTAL	30	
SENIOR			
BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent registration in C 346)	4	
EH 410	Environmental Health Waste Management (C 346, EH 230)	3	4B
EH 430	Human Disease and the Environment (EH 320, EH 446)	3	
EH 446	Environmental Toxicology (C 245 or C 346)	3	
EH 460	Environmental Health Program Management (EH 320)	2	
EH 487V	Internship-Environmental Health Program electives ⁶	7	4C
	TOTAL	6	
		28	
PROGRAM TOTAL = 120 credits			

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

² Select course that is in both category 3D and 3F of the AUCC.

³ Select from the list of courses in category 2A1, 2A2, or 2A3 in 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 Must be related to major and approved by an EH 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, 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. A description of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF MICROBIOLOGY, IMMUNOLOGY, AND PATHOLOGY

Office in Microbiology Building, Room B116
(970) 491-6136
www.cvmb.colostate.edu/mip/

Professor Jeffrey Wilusz, 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 too small to be seen with the naked eye, including bacteria, viruses, algae, protozoa, and fungi. 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. 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			
C CC 111	General Chemistry I (M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C CC 107 or C CC 111; M CC 124, M CC 141 or M CC 155 or M CC 160 or concurrent reg. in M CC 155 or M CC 160)	3	
C 114	General Chemistry Laboratory II (C CC 112, C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3-6 or CO 130)	3	1A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
M CC 155	Calculus for Biological Scientists I (M CC 124, M CC 125)	4	1B
OR			
M CC 160	Calculus for Physical Scientists I (M CC 126; concurrent reg. in M CC 124)	4	1B
SPCC 200	Public Speaking Biology elective ² Elective	3 3-5 2	2A1
TOTAL		28-30	
SOPHOMORE			
C 345	Organic Chemistry I (C 113, C 114)	4	
C 346	Organic Chemistry II (C 345)	4	
MB 300	General Microbiology (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 345 or concurrent reg.)	3	4B
MB 302	General Microbiology Laboratory (MB 300 or concurrent reg.)	2	4B

Course	Title (Prerequisite)	Cr	AUCC
MB 342	Immunology (MB 300; C 245 or C 340 or C 341 or C 345)	4	
STCC 301	Introduction to Statistical Methods (M CC 118 or M CC 121)	3	2B
OR			
STCC 307/ EHCC 307	Introduction to Biostatistics (M CC 118 or M CC 121)	3	2B
	Arts/humanities ³	3	3B
	U.S. public values and institutions ⁴	3	3F
	Electives	6	
TOTAL		32	
JUNIOR			
BC 351	Principles of Biochemistry (BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent reg. in C 346)	4	
MB 351	Medical Bacteriology (MB 342)	3	
Select one pair of the following courses:			
PHCC 121	General Physics I (concurrent reg. in M CC 125)	5	3A
PHCC 122	General Physics II (PHCC 121)	5	3A
OR			
PHCC 141	Physics for Scientists and Engineers I (M CC 126; M CC 155 or M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PHCC 141, concurrent reg. in M CC 161 or M CC 255)	5	3A
TOTAL		30	
OR			
	Historical perspectives ⁵	3	3D
	Microbiology electives ⁶	5	
	Electives	4	
TOTAL		29	
SENIOR			
MB 400A-G	Capstones in Microbiology (MB 342; MB 351 or MB 420 or concurrent registration in MB 351 or MB 420.)	2	4C
OR			
MB 498	Research (MB 301 or MB 302)	2-3	4C
MB 420	Medical and Molecular Virology (MB 342; BC 351 or BC 401 or concurrent reg.)	4	4A
MB 443	Microbial Physiology (MB 300; BC 351 or BC 401)	4	4A
MB 450	Microbial Genetics (MB 300; BC 351 or BC 401 or concurrent reg.)	3	
	Global and cultural awareness ⁷	3	3E
	Health and wellness ⁸	2	3G
	Social/behavioral sciences ⁹	3	3C
	Microbiology electives ¹⁰	5	
	Electives ¹¹	2-5	
TOTAL		29-31	
PROGRAM TOTAL = 120 credits			

¹ A number of additional courses will work for this category; refer to categories 2B1, 2B2, and 2B 3 of the All-University Core Curriculum (AUCC).

² Select three to five credits from approved list in department.

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

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

⁵ Select from the list of courses in category 3D in the AUCC.

⁶ Select from approved list in department. Two chosen courses must be laboratory courses.

⁷ Select from the list of courses in category 3E in the AUCC.

⁸ Select from the list of courses in category 3G in the AUCC.

⁹ Select from the list of courses in category 3C in the AUCC.

¹⁰ Select from list in the department.

¹¹ Student may take 2-5 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

College of Veterinary Medicine and Biomedical Sciences

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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
UPPER DIVISION			
MB 300*	General Microbiology (C 245 or C 345 or concurrent registration; LSCC 102 or BZCC 110 or BZCC 120)	3	
MB 302	General Microbiology Laboratory (MB 300 or concurrent registration)	2	
MB 342	Immunology (MB 300; C 245 or C 340 or C 341 or C 345)	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>			
MB 351	Medical Bacteriology (MB 342)	3	
OR			
MB 420	Medical and Molecular Virology (MB 342; BC 351 or BC 401 or concurrent registration)	4	
MB 443*	Microbial Physiology (MB 300; BC 351 or BC 401)	4	
OR			
MB 450*	Microbial Genetics (MB 300; BC 351 or BC 401 or concurrent registration)	3	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
<i>Select four to six credits, including one laboratory course, from the following:</i>			
MB 275	Microcomputing Applications in Microbiology	2	
MB 334	Food Microbiology (LS 205 or MB 300)	3	
MB 343	Immunology Laboratory (MB 301 or MB 302; MB 342 or concurrent registration)	2	
MB 350	Microbial Diversity (MB 300)	3	
MB 351	Medical Bacteriology (MB 342)	3	
MB 352	Medical Bacteriology Laboratory (MB 301 or MB 302; MB 351 or concurrent registration)	3	
MB 420*	Medical and Molecular Virology (MB 342; BC 351 or BC 401 or concurrent registration)	4	
MB 425	Virology and Cell Culture Laboratory (MB 301 or MB 302; MB 420 or concurrent registration)	2	
MB 432	Aquatic Microbiology (MB 301 or MB 302)	4	
MB 436	Industrial Microbiology (LS 206 or MB 301 or MB 302)	4	
MB 443*	Microbial Physiology (MB 300; BC 351 or BC 401)	4	
MB 450*	Microbial Genetics (MB 300; BC 351 or BC 401 or concurrent registration)	3	
MB 462/	Parasitology and Vector Biology (BZCC	5	
BZ 462/	110 or LS 103; MB 301 or MB 302 or LS		
BI 462*	206 or BZ 212)		
MB 498	Research (MB 301 or MB 302)	Var	
PROGRAM TOTAL = 21 credits without prerequisites			

*Additional course work may be required because of prerequisites.

Graduate Programs in Microbiology, Immunology and Pathology

The department offers graduate programs leading to master of science, doctor of philosophy, and combined doctor of veterinary medicine/doctor of philosophy degrees. A description of these programs may be found on the departmental Web site or in the *Graduate and Professional Bulletin* (www.colostate.edu/Depts/Grad/Categories.html).

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 catalog listing

KEY TO COURSES OF INSTRUCTION

1 2 3 4 5 6
 | | | | | |
 +*COCC 150 03(3-0-0). College Composition. (AUCC 1A). F, S, SS.

7
 |
 Prerequisite: Composition Placement Examination score of 3 to 6 or CO 130.

Expository and argumentative writing emphasizing purpose and audience; writing and reading processes; development of ideas; coherence; effective style. (S, Ω, GT-subcode)

8 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 2004 and alternate years thereafter.
- Offered in 2005 and alternate years thereafter.
- + Certain field trips are a required part of this course and incur additional expense to the student. See also the Tuition, Fees, Expenses, and Adjustments section in this catalog.

2. COURSE PREFIXES

Courses offered by colleges, departments, or units are indicated by the following course prefixes. To aid in identifying courses approved for inclusion in categories 1, 2, and 3 of the All-University Core Curriculum (AUCC), those courses have “CC” added to the course prefix.

Adult Education.....	AD
Aerospace Studies (Air Force ROTC).....	AS
Agricultural and Resource Economics.....	EA
Agricultural and Bioresource Engineering (see Civil Engineering).....	CE
Agriculture.....	A
American Studies.....	AU
Anatomy and Neurobiology (see Biomedical Sciences).....	BS

Animal Science.....	AN
Anthropology.....	AP
Apparel and Merchandising.....	AM
Art.....	AR
Astronomy.....	AA
Atmospheric Science.....	AT
Bioagricultural Sciences and Pest Management.....	BI
Biochemistry and Molecular Biology.....	BC
Biological Science (see also Life Science).....	BY
Biomedical Engineering.....	BE
Biomedical Sciences.....	BS
Biotechnology.....	BH
Botany.....	BZ
Business Accounting.....	BA
Business Finance and Real Estate.....	BF
Business General.....	BG
Business Information Systems.....	BD
Business Management.....	BN
Business Management Science.....	BQ
Business Marketing.....	BK
Cell and Molecular Biology.....	CM
Chemical Engineering.....	CH
Chemistry.....	C
Civil Engineering.....	CE
Clinical Sciences.....	VS
Composition.....	CO
Computer Science.....	CS
Construction Management.....	MC
Consumer and Family Studies.....	CF
Dance.....	D
Design and Merchandising.....	DM
Earth Resources (see Geosciences or Watershed Science).....	G or WR
Ecology.....	EY
Economics.....	EC
Education.....	ED
Education, Adult.....	AD
Education, Higher.....	HE
Education, Vocational.....	VE
Electrical and Computer Engineering.....	EE
Engineering.....	EG
Engineering Science.....	ES
English.....	E
Entomology (see Bioagricultural Sciences and Pest Management).....	BI
Environmental Engineering.....	EV
Environmental Health.....	EH
Equine Science (see Animal Science).....	AN
Ethnic Studies.....	ET
Exercise Science, Health and.....	EX
Family Studies.....	HD
Fishery and Wildlife Biology.....	FW
Food Science and Human Nutrition.....	FN
Food Technology.....	FT
Foreign Languages and Literatures.....	L
Forest Sciences.....	F
Geography.....	GR
Geology (see Geosciences).....	G

Courses of Instruction

Geosciences	G
Graduate School	GS
Health and Exercise Science.....	EX
Higher Education.....	HE
History.....	HY
Home Economics (see Consumer and Family Studies).....	CF
Honors.....	HP
Horticulture	H
Human Development and Family Studies	HD
Human Sciences	HS
Interior Design.....	ID
International Education	IE
International Studies.....	IN
Intra-University	IU
Journalism, Technical.....	JT
Key Academic Community	KA
Landscape Architecture.....	LA
Languages and Literatures, Foreign	L
Liberal Arts	LB
Library Information.....	LI
Life Science.....	LS
Manufacturing Technology and Construction Management (see Construction Management)	MC
Mathematics	M
Mechanical Engineering.....	ME
Microbiology.....	MB
Military Science (Army ROTC).....	MS
Music.....	MU
Natural Resource Recreation and Tourism.....	RR
Natural Resources.....	NR
Natural Sciences	NS
Neurobiology.....	NB
Nutrition	FN
Occupational Therapy	OT
Pathology.....	PA
Performing Arts.....	PF
Philosophy.....	PL
Physical Education (see Health and Exercise Science).....	EX
Physics.....	PH
Physiology (see Biomedical Sciences).....	BS
Plant Disease (see Bioagricultural Sciences and Pest Management).....	BI
Political Science	PO
Psychology	PY
Radiological Health Sciences.....	R
Rangeland Ecosystem Science	RS
Restaurant/Resort Management.....	RM
Social Work.....	SW
Sociology.....	S
Soil and Crop Sciences.....	SC
Speech Communication.....	SP
Statistics	ST
Study Abroad.....	SA
Technical Journalism.....	JT
Theatre.....	TH
Veterinary Medicine.....	VM
Vocational Education	VE
Watershed Science.....	WR
Weed Science (see Bioagricultural Sciences and Pest Management).....	BI
Wildlife Biology.....	FW
Women's Studies.....	WS
Zoology	BZ

3. COURSE NUMBERING

Course numbering is based on the content level of material presented in a course.

- 100-299 Courses primarily for freshman and sophomore students.
- 300-499 Courses primarily for junior and senior students. Acceptable for graduate credit for students holding bachelor's degrees when approved by the student's graduate committee.
- 500-599 Courses primarily for students enrolled in master's 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. ALL-UNIVERSITY CORE CURRICULUM CATEGORY (i.e., AUCC 1A)

As noted above, courses that have been approved for inclusion in categories 1, 2, or 3 of the All-University Core Curriculum (AUCC) are indicated in the Courses of Instruction by "CC" added to the departmental prefix. In

order to further aid students in identifying which category a particular course may fulfill, this notation is included in the course listing.

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 *Core Competencies*
 - 2A Additional Communication
 - 2B Logic/Critical Thinking
- 3 *Foundations and Perspectives*
 - 3A Biological/Physical Sciences
 - 3B Arts/Humanities
 - 3C Social/Behavioral Sciences
 - 3D Historical Perspectives
 - 3E Global and Cultural Awareness
 - 3F U.S. Public Values and Institutions
 - 3G Health and Wellness

6. TERM

- F Taught fall semester
- S Taught spring semester
- SS Taught summer session

The courses listed are those which are scheduled to be offered during the terms indicated. Since the frequency of class offerings is determined by the department in accordance with program needs, students should consult the official, applicable on-line class schedule (available on RAMweb) to be offered in a given term.

The following types of courses do not 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.

7. PREREQUISITES

The class schedule for each term is the best source for determining current prerequisites.

Students are expected to meet all course prerequisites prior to registration for a specific class, or acquire the instructor's permission.

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.

8. COURSE FEES (\$)

Certain courses carry a special fee which is assessed at the time a student registers for courses. For a list of current course fees, refer to http://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 student and/or by term within the fee range specified at http://www.provost.colostate.edu/index.asp?url=ug_studies.

9. NONTRADITIONAL COURSE OFFERING (Ω -O, C, T, or V)

This symbol (Ω) indicates the course has been approved to be offered in a nontraditional format, usually as a distance course (on-line, 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.

10. STATE GUARANTEED TRANSFER (GT-subcode)

Certain Colorado State University courses have been approved by the Colorado Commission on Higher Education (CCHE) 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 a complete listing of the courses approved statewide, visit the CCHE web site at <http://www.state.co.us/cche/gened/gtpathways/transfer/index.pdf>.

AGRICULTURE COURSES (A)

College of Agricultural Sciences

A CC 116/IECC 116 03(3-0-0). Plants and Civilizations. (AUCC 3E). F, S. Credit not allowed for both A CC 116 and IECC 116.

Worldwide origin of plants and products as basis for food, spices, perfumes, medicine, art, mythology, religion, wars, exploration, slavery.

A 140 03(1-0-2). Technology in Agriculture. F.

Computer concepts and terminology. PC operating systems, Web tools, e-mail, presentation technology, word processing, spreadsheet, and database. (Ω-O)

A 192A-B 02(0-0-2). Orientation to Agricultural Systems. A) F. (\$) B) S.

Freshman inquiry course in agriculture. Information and skills necessary to succeed in majors in the agricultural sciences.

A 224/NR 224 03(2-0-1). Integrated Resource Management I. F. Prerequisite: A 192A-B. Credit not allowed for both A 224 and NR 224.

Introduction to integrated ranch system concepts through describing complex organizations and building decisions support systems.

A 244E 02(1-2-0). Small Gas Engine Repair and Maintenance. F, S, SS. Offered only off-campus. (Ω)

A CC 270/IECC 270 03(3-0-0). World Interdependence- Population and Food. (AUCC 3E). S. Credit not allowed for both A CC 270 and IECC 270.

Survey of world population and food; emphasis on understanding the problems and opportunities in a world context.

A 300 02(2-0-0). Issues in Agriculture. F.

Scientific, technical, cultural, and social issues facing agriculture, and their interrelationships. (Ω-O)

A 320A-F 01(0-2-0). Computer Applications in Agriculture. S. Prerequisite: A 140 or BD 150 or CS 110.

A) Optimization. B) Data base. (Ω-O) C) Communications. (Ω-O) D) Project management. (Ω-O) E) Spreadsheets. (Ω-O) F) Presentation technology. (Ω-O)

A 330/PL 330 03(3-0-0). Agricultural Ethics. S. Credit not allowed for both A 330 and PL 330.

Basic concepts in ethics and their application to agriculture.

+A 383/NR 383 02(0-2-1). U.S. Travel-Integrated Resource Management. S. Credit not allowed for both A 383 and NR 383.

Evaluation of integrated ranch management decision alternatives in conjunction with professional resource managers. (\$)

A 387A-B Var [1-12]. Internship.

A) Agricultural extension education. B) General.

A 424/NR 424 03(2-0-1). Integrated Resource Management II. S. Prerequisite: A 224/NR 224. Credit not allowed for both A 424 and NR 424.

Application of enterprise planning analysis for use in ranch resource management. Continued emphasis on interdisciplinary systems analysis.

A 465 03. Pesticide Management. F, S, SS. Offered as correspondence course only.

Reasons for and safe correct pesticide use. (Ω-C)

A 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. (Ω-C)

A 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. (Ω-C)

A 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. (Ω-C)

A 487 Var [1-12]. Internship. Prerequisite: A 546.

A 492A-B Var [1-3]. Seminar. Prerequisite: A) A 546; concurrent registration in A 487.

A) Agricultural extension education. B) General.

A 495 Var [1-12]. Independent Study.

A 496B-D Var [1-12]. Group Study.

B) Agricultural ambassadors. C) Agricultural education. D) Agricultural extension education.

***A 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.

A 546 03(3-0-0). Principles of Cooperative Extension. F.

Traditional and contemporary delivery systems of Cooperative Extension emphasizing structures of nonformal education. (Ω-C/O)

A 547 04(2-0-2). Delivery of Cooperative Extension Programs. F. Prerequisite: A 346 or A 546 or concurrent registration.

Methods, techniques, and procedures in planning, implementation, and delivery of Cooperative Extension programs. (Ω-C)

A 570/VS 570 02(2-0-0). Issues in Animal Agriculture. F.

Credit not allowed for both A 570 and VS 570.

Issues that have a major impact on the direction of changes in animal agriculture.

A 587 Var [1-12]. Internship.

A 630 03(3-0-0). Integrated Decision Making/Management Skills. F.

Motivation for management, decision making, introduction to systems, information management, introduction to statistics.

A 631 03(3-0-0). Building the Business. F. Prerequisite: A 630 or written consent of instructor.

Skills required to organize and implement a modern business enterprise with focus on land-based operations.

A 632 03(2-2-0). Understanding and Managing the Land. F. Prerequisite: A 631 or written consent of instructor.

Impacts of ecological processes, use of mechanism-based understanding, and tools used to manage the ecosystem for sustainability.

A 633 03(2-2-0). Understanding and Managing Animal Resource. F. Prerequisite: A 632 or written consent of instructor.

Evaluating nutritional requirements of a variety of animals, how and why requirements vary according to level of production.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

A 634 03(2-2-0). Animal Production Systems. F. Prerequisite: A 633 or written consent of instructor.

Developing animal management systems for a variety of animal species in a forage-based environment.

A 635 03(2-2-0). Integrated Grazing Management. S. Prerequisite: A 634 or written consent of instructor.

Understanding plant growth, animal foraging and the plant-animal interface; and using these factors to create management protocols.

A 636 03(3-0-0). Analyzing and Managing the Business. S. Prerequisite: A 635 or written consent of instructor.

Assimilating, preparing, and analyzing records; reading financial statements to manage a land-based business.

A 637 03(3-0-0). Understanding Policy and Emerging Issues. S. Prerequisite: A 636 or written consent of instructor.

Origination, purpose, and policy effects of policy on land-based enterprises; policy effects on management decisions.

A 638 03(2-2-0). Monitoring for Success. S. Prerequisite: A 637 or written consent of instructor.

Process of effectively gathering management information meeting operational goals and objectives.

A 639 03(3-0-0). Products to Profit. S. Prerequisite: A 638 or written consent of instructor.

Marketing all aspects of the enterprise, beginning with land and forage resource and tracking all revenue generation.

A 640 03(3-0-0). Integrated Resource Management Plan. S. Prerequisite: A 639 or written consent of instructor.

Formulation of an optimal land management plan for a specific site based on specific goals and objectives.

A 692 01(0-0-1). Seminar.

A 695 Var [1-12]. Independent Study.

A 698 Var [1-6]. Research. (Ω-O)

ASTRONOMY COURSES (AA)

Department of Physics

College of Natural Sciences

AACC 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.

AACC 101 01(0-2-0). Astronomy Laboratory. (AUCC 3A). F, S. Prerequisite: AACC 100 or concurrent registration.

Observations of the various objects found in the heavens with 5-inch reflecting telescopes.

AA 150 03(2-3-0). Observational Astronomy. SS.

Astronomical objects in the night and day sky; observation with 16-inch telescope.

°AA 301 05(4-2-0). Astrophysics I. F. Prerequisite: M CC 124, M CC 126; PHCC 110 or PHCC 121 or PHCC 141.

Celestial mechanics, earth-moon systems, planets and satellites, interplanetary medium, origin of solar system.

°AA 302 05(4-2-0). Astrophysics II. S. Prerequisite: M CC 124, M CC 126; PHCC 110 or PHCC 121 or PHCC 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: M CC 124, M CC 126; PHCC 110 or PHCC 121 or PHCC 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.

ADULT EDUCATION COURSES (AD)

School of Education

College of Applied Human Sciences

AD 495 Var. Independent Study-Adult Education.

AD 520 03(0-0-3). Adult Education. F.

Philosophical foundations, a description of program service areas, adult participation trends, and current issues.

AD 586 Var. Practicum.

Participation in field experiences relevant to study program and objectives.

AD 590 Var. Workshop.

Specially designed learning situations to provide opportunities for concentrated problem-solving experiences.

AD 620 03(0-0-3). Processes and Methods. F. Prerequisite: AD 520 or AD 624.

Processes and methods including helping theories used by adult learning facilitators.

AD 624 03(0-0-3). Adult Teaching and Learning I. S. Prerequisite: AD 520 or written consent of instructor.

Using theory and best practices to design and deliver instruction for adults.

AD 629 03(0-0-3). Program Development. S. Prerequisite: AD 520.

Models for planning, implementing, and evaluating programs for adult learners.

AD 687Var. Internship.

Career or job fieldwork experience with an adult education institution, agency, or program.

AD 692 Var. Seminar-Adult Education.

AD 695 Var. Independent Study.

AD 698 Var. Research.

AD 699 Var. Thesis.

AD 724 03(0-0-3). Adult Teaching and Learning II. F. Prerequisite: AD 624.

Adult teaching and learning, alternative delivery systems, performance technology, and faculty evaluation.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

APPAREL AND MERCHANDISING COURSES (AM)

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. (Ω-O)

AM 130 03(3-0-0). Design Appreciation-Apparel and Merchandising. F, S, SS.

Impact of elements and principles of design on apparel and merchandising. (Ω-O)

AM 143 04(0-8-0). Introduction to Apparel Design. F, S, SS.

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.

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.

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. (Ω-O)

AMCC 250 03(3-0-0). Clothing, Adornment and Human Behavior. (AUCC 3E). F, S.

Psychological, sociological and cultural factors influencing clothing and adornment.

AM 270 03(3-0-0). Merchandising Processes. S. Prerequisite: AUCC math requirement except M CC 130.

Forecasting, planning, evaluating, and presenting merchandise lines to meet target market demands. (Ω-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: DM 120 and ECCC 202.

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.

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. (Ω-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. (Ω-O)

AM 366 03(3-0-0). Merchandising Promotion. F. Prerequisite: AM 270 or BK 300 or BK 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: AM 270; BA 205 or BA 210.

Business mathematics and current practices related to acquisition, negotiation, distribution, and sale of merchandise.

AM 384 Var [1-3]. Supervised College Teaching. F, S, SS.

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 and DM 360/BK 360 or written consent of instructor.

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.** F. Prerequisite: AMCC 250, PYCC 100 or S CC 100 or written consent of instructor.

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(3-0-0). 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.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

AM 479 03(3-0-0). Merchandising Policies and Strategies. F, S. Prerequisite: AM 270, AM 330, AM 366, AM 371, DM 360/BK 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 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 550 03(0-0-3). Appearance, Self, and Society. F. 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 or written consent of instructor.

Theoretical perspective on the design and development of merchandising strategies for U.S. and global production, distribution, and consumption.

AM 590B Var. Workshop-Apparel.

AN 250 03(1-4-0). Live Animal and Carcass Evaluation. F, S.

Growth, development, and value-determining characteristics of market animals. (\$)

AN 300A-T. Topics in Animal Sciences. F, S. Prerequisite: AN 101 or AN 102. Credit not allowed for both AN 300B and BI 300.

A) Livestock handling 01(1-0-0). B) /BI 300. Livestock entomology 01(1-0-0). D) Environmental effects on livestock 01(1-0-0). E) Family ranching 01(1-0-0). G) Fitting/showing 01(0-2-0). H) Performance records 01(1-0-0). K) Replacement heifer development 02(2-0-0). L) Health programs/quality assurance 02(2-0-0). M) DNA technology for livestock 01(1-0-0). N) Seed-stock merchandising 01(1-0-0). P) Interpreting and using EPDs 01(1-0-0). Q) Applied equine genetics 01(1-0-0). R) Calving and calf care 02(1-2-0). T) Event, fair, and show management 01(1-0-0).

AN 310 03(3-0-0). Animal Reproduction. F, S. Prerequisite: BS 230 or BS 300.

Anatomy and physiology of the reproductive system; causes of reproductive failure in farm animals; methods of improving reproductive performance.

AN 311 01(0-2-0). Bovine Artificial Insemination. F.

Proper technique for artificially inseminating cattle as well as an overview of reproductive anatomy and physiology. (\$)

AN 320 03(3-0-0). Principles of Animal Nutrition. F, S. Prerequisite: One semester of chemistry.

Understanding of nutrients and nutrient function required to support animal life through all physiological states.

AN 322 02(2-0-0). Pet Nutrition. F, S, SS. Offered only as correspondence course or online course.

Nutrients, nutrient requirements, feeding practices, food sources and management for companion animals (dogs, cats, birds, fish, reptiles, etc.). (Ω-C/O)

AN 323 02(2-0-0). Zoo Nutrition. F, S, SS. Prerequisite: Previous nutrition course or written consent of instructor. Offered only as correspondence course or online course.

Unique nutritional requirements of mammalian, avian, and reptile captive wild animals; management protocols needed. (Ω-C/O)

AN 330 03(3-0-0). Principles of Animal Breeding. F, S. Prerequisite: Three credits in statistics.

Genetic principles underlying animal improvement; elementary population genetics; heritability; systems of mating; selection.

AN 340 03(0-6-0). Horse Training Laboratory I. F. Prerequisite: AN 343D or equivalent skills and written consent of instructor.

Practical training skills using a yearling or two year old: in-hand, restraint, ground driving, longeing, first rides, stable management. (\$)

AN 341 03(0-6-0). Horse Training Laboratory II. S. Prerequisite: AN 340.

Skills in training for specific riding maneuvers, conditioning, fitting for sale and stable management. (\$)

AN 343A-D 02(0-4-0). Advanced Equitation. F, S. Prerequisite: AN 243A-B or written consent of instructor.

Emphasis on individual work: A) Western. (\$) B) Dressage. (\$) C) Jumping. (\$) D) Training techniques. (\$)

AN 346 03(3-0-0). Equine Disease Management. F. Prerequisite: BS 230. Lameness and common diseases of horses.

ANIMAL SCIENCE COURSES (AN)

Department of Animal Sciences *College of Agricultural Sciences*

AN 101 04(3-2-0). 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. (\$)

AN 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. (\$)

AN 143A-B 02(0-4-0). Elementary Equitation. F, S, SS.

Basics of horsemanship; proper horse handling procedures. A) Western. (\$) B) English. (\$)

AN 145 01(0-2-0). Packing and Outfitting. F, S. Prerequisite: AN 143A or written consent of instructor.

Outfitting and packing the horse; hitches, knots, and horse care; planning pack trips, setting up camp. Overnight pack trip included. (\$)

AN 220 02(2-0-0). Feeds and Feeding. F, S. Prerequisite: AN 101 or AN 102.

Advantages and limitations of feedstuffs; nutrients and their functions; and feed practices for all physiological stages of livestock.

AN 243A-B 02(0-4-0). Intermediate Equitation. F, S. Prerequisite: AN 143A-B or equivalent skills.

Trail obstacles, caveletti control, basic dressage. A) Western. (\$) B) English. (\$)

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

AN 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 10 credits allowed for any combination of the following courses: AN 350A-E, AN 384, AN 487, AN 495.

A) Meat animal. B) Meats. C) Dairy. D) Horses. E) Wool.

AN 360 03(3-0-0). Principles of Meat Science. F, S. Prerequisite: C CC 107 or C CC 111.

Structure, composition, and biology of muscle and associated tissues; wholesomeness, nutritive value, and palatability of beef, pork, and lamb.

AN 372 03(2-2-0). Sheep Production. S. Prerequisite: AN 250, AN 310, AN 320, AN 330.

Sheep production under farm and ranch conditions; products, breeds, breeding, nutrition, reproduction, and management systems.

AN 375 03(3-0-0). Computerized Livestock Records Management. F, S. Prerequisite: CS 110.

Effective use of computers and data base managers for management of livestock records; emphasis on horses and beef cattle.

AN 376 03(2-3-0). Dairy Farm Operations. S. Prerequisite: AN 310, AN 320, AN 330.

Integration of nutrition, genetics, physiology, and economics for management decisions of dairy farm operations and production and marketing of milk.

AN 384 Var [1-5]. Supervised College Teaching. F, S, SS. Maximum of 6 credits allowed in course. Maximum of 10 credits allowed for any combination of the following courses: AN 350A-E, AN 384, AN 487, AN 495.

AN 386A-C. Equine Practicum.

A) Equine training and management 02(1-2-0). B) Equine reproductive management 02(1-2-0) (\$) C) Equine farrier management 01(0-2-0).

AN 420A 02(2-0-0). Applied Animal Nutrition. F, S. Prerequisite: AN 320.

Digestive physiology and nutritional requirements. A) Ruminants.

AN 422 03(3-0-0). Animal Metabolism. F. Prerequisite: C 245 and C 246 or C 346.

Nutrient digestion, absorption, transport and metabolism in monogastric and ruminant domestic species as affected by physiological changes.

AN 430 02(1-2-0). Applied Animal Breeding. S. Prerequisite: AN 330.

Planning and evaluating improvement program designed to direct genetic changes in livestock.

AN 440 03(3-0-0). Equine Production and Industry. F, S. Prerequisite: AN 346, AN 444, AN 446.

For students planning a career in the horse industry; management of facilities, production systems, personnel, marketing, and biological systems.

AN 442 02(0-4-0). Riding Instructor Training. F, S. Prerequisite: AN 343A or B or C or D.

Teaching techniques; theory; handling of large mounted groups, beginner through advanced levels.

AN 444 03(2-3-0). Equine Reproductive Management. S. Prerequisite: AN 310.

Anatomy and physiology of genital tract, estrus detection, control of cycle, artificial insemination, infertility, stallion management. (\$)

AN 446 02(2-0-0). Equine Nutrition. F, S. Prerequisite: AN 320.

Digestive physiology, nutrition and related diseases of the horse.

°AN 448/SC 448 03(2-2-0). Manure Management and the Environment. F. Prerequisite: AN 101 or AN 102, SC 240; or written consent of instructor. Credit not allowed for both AN 448 and SC 448.

Manure management; maximizing benefits to soils and crops; minimizing air and water quality hazards; complying with regulations.

°AN 460 03(2-2-0). Meat Processing. S. Prerequisite: AN 360

Formulation, processing, and analysis of meat products.

AN 474 03(2-2-0). Swine Production. S. Prerequisite: AN 250, AN 310, AN 320, AN 330.

Production of purebred and commercial swine; breeds, breeding, feeding, marketing, and management.

AN 475 02(2-0-0). Travel Abroad-Australian Animal Agriculture. F, S, SS.

Onsite evaluation of Australian animal agriculture systems with emphasis on production, marketing, and management.

AN 476 03(3-0-0). Beef Feedlot Management. F. Prerequisite: AN 320.

Feedlot facilities; nutrition; procurement, merchandising, handling, processing cattle; health care; custom feeding; managerial duties.

AN 478 03(2-2-0). Beef Production and Management. F. Prerequisite: AN 250, AN 310, AN 320, AN 330.

Beef production as related to consumer through seedstock segments. Major emphasis on cow-calf management.

AN 487 Var. Internship. Maximum of 6 credits allowed in course. Maximum of 10 credits allowed for any combination of the following courses: AN 350A-E, AN 384, AN 487, AN 495.

AN 495 Var. Independent Study. Maximum of 6 credits allowed in course. Maximum of 10 credits allowed for any combination of the following courses: AN 350A-E, AN 384, AN 487, AN 495.

AN 496 Var [1-5]. Group Study.

AN 500 Var [1-6]. Recent Developments. SS. Prerequisite: Fifteen credits in animal sciences.

Recent developments in animal science, avian science, and food technology.

AN 510 03(2-2-0). Bovine Reproduction Management. F. Prerequisite: AN 310.

Role of reproduction in economic efficiency of cattle production systems. Causes of delayed breeding and nonpregnancy, abortion and perinatal mortality.

***AN 520 03(3-0-0). Applied Comparative Nutrition.** F. Prerequisite: AN 320 or FN 550 and FN 551.

Comparative digestion strategies and mechanisms of nutrient utilization for terrestrial vertebrates: livestock, pets, wildlife, and zoo animal models.

AN 550 02(1-2-0). Basic Research Surgery. F, S.

Basic principles and techniques of animal surgery to meet ACUC requirements for experimental procedures.

AN 560 03(3-0-0). Issues in the Meat Industry. F. Prerequisite: AN 101.

Current issues in U.S. meat production, processing, marketing, and consumption.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

AN 565 03(3-0-0). Interpreting Animal Science Research. S. Prerequisite: AN 101 or AN 102; STCC 301 or STCC 307/EHCC 307.

Designing, conducting, analyzing, and reporting of animal science research.

***AN 567 03(2-0-1). Meat Safety, HACCP, and TQM.** S. Prerequisite: Written consent of instructor.

Control of health problems in meat products through hazard analysis critical control point (HACCP) and total quality management (TQM) practices.

***AN 570 03(3-0-0). World Animal Agriculture.** S. Prerequisite: AN 101.

Production methods for selected countries of first, second, and third world. Effect of feed supplies, climate, and market demand upon choice of management and breeds.

°AN 575 03(2-2-0). Computational Biology in Animal Breeding. F. Prerequisite: Graduate standing or written consent of instructor.

Numerical analysis and use of computers to solve problems in animal improvement.

AN 578 03(2-2-0). Beef Cattle Management Decisions. S. Prerequisite: AN 478.

Integration of principles of nutrition, meats, breeding, herd health, etc. into a total management program to meet needs of beef industry.

AN 587 Var [1-9]. Internship.

°AN 610 02(2-0-0). Hormonal Regulation of Growth. S. Prerequisite: BS 501 or written consent of instructor.

Cellular and molecular regulation of animal growth by hormones and growth factors.

***AN 621A-B 02(2-0-0). Animal Nutrition.** S. Prerequisite: AN 422 or BC 351.

Factors affecting feed and supplement sources, metabolism, deficiency and toxicity signs in domestic animals. *A) Vitamins. *B) Minerals.

°AN 631 03(2-0-1). Selection Index Theory. S. Prerequisite: ST 304 or written consent of instructor.

Quantitative methods for genetic evaluation: selection index theory and introduction to best linear unbiased prediction.

AN 660 03(1-0-2). Advanced Meat Science. S. Prerequisite: AN 360 or AN 422 or FN 350.

Anatomical, biochemical, histological, and physical factors associated with transformation of muscle into meat.

AN 699 Var. Thesis.

°AN 720 03(3-0-0). Nutritional Energetics. F. Prerequisite: One graduate-level nutrition course or written consent of instructor.

Dietary energy use to meet animal requirements for maintenance, growth, pregnancy, and lactation; environmental, nutritional, and physiological effects.

°AN 725 03(3-0-0). Rumen Metabolism. S. Prerequisite: One graduate-level nutrition course or written consent of instructor.

Microbial degradation, transformation, and synthesis of ingested nutrients, feed particle passage kinetics in the rumen.

***AN 730 03(3-0-0). Advances in Cattle Breeding.** S. Prerequisite: AN 330, ST 302.

Literature and research methods in beef cattle breeding.

°AN 731 03(2-0-1). Parameter Estimation for Genetic Prediction. F. Prerequisite: AN 631.

Models used in analysis of livestock data and restricted maximum likelihood procedures for mixed models.

AN 784 Var. Supervised College Teaching. F, S, SS.

AN 792A-F 01(0-0-1). Seminar.

A) General. B) Breeding/genetics. C) Physiology. D) Meat sciences. E) Nutrition. F) Management.

AN 795 Var. Independent Study.

AN 799 Var. Dissertation.

ANTHROPOLOGY COURSES (AP)

Department of Anthropology *College of Liberal Arts*

APCC 100 03(3-0-0). Introductory Cultural Anthropology. (AUCC 3C). F, S.

Human societies and their cultural settings; variation in beliefs, social customs, and technologies; human differences in anthropological terms. (GT-SS3)

APCC 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.

APCC 121 01(0-2-0). Human Origins and Variation Laboratory. (AUCC 3A). F, S. Prerequisite: APCC 120 or concurrent registration.

Labs demonstrating genetic and evolutionary processes, comparative skeletal anatomy, human evolution through fossil casts, and modern human variation. (\$)

APCC 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.

APCC 200 03(3-0-0). Cultures and the Global System. (AUCC 3E). F, S.

Analyze diversity, cultural responses, and adaptations of smaller-scale societies to emerging global trends. (GT-SS3)

AP 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.

AP 260 02(1-2-0). Introduction to Field Archaeology. F, S, SS.

Prerequisite: APCC 140.

Field methods including map preparation and interpretation, site location and recording, site excavation, and stratigraphy.

AP 295 Var [1-3]. Independent Study.

***AP 310 03(3-0-0). Peoples and Cultures of Africa.** S. Prerequisite: APCC 100.

Sub-Saharan life styles including marriage and family, traditional government, religion and magic, ecology and economy, art, music, and literature.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

°AP 312 03(3-0-0). Modern Indian Culture and Society. S. Prerequisite: APCC 100 or APCC 200.

Anthropological contributions to the understanding of contemporary India.

AP 315 03(3-0-0). Psychological Anthropology. F. Prerequisite: APCC 100, PYCC 100.

Cross-cultural studies of socialization, sex roles, perception, cognition, ethnopsychiatry, altered states of consciousness, cultural change.

***AP 318/ET 318 03(3-0-0). Peoples and Cultures of the Southwest.** F, S. Prerequisite: APCC 100. Credit not allowed for both AP 318 and ET 318.

Analyze development of cultures of the American Southwest; colonialism, migration, political incorporation, and socioeconomic processes. (Ω-O)

***AP 319 03(2-0-1). Latin American Peasantries.** S. Prerequisite: APCC 100.

Sociocultural, economic, and political responses of Latin American peasantries to poverty and global processes.

AP 322 03(3-0-0). Religion and Society. F. Prerequisite: APCC 100 or APCC 200.

Major anthropological theories and descriptions of religious beliefs and practices in traditional and modern societies.

AP 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.

°AP 329 03(3-0-0). Cultural Change. F. Prerequisite: APCC 100.

Cultural change and effects of directed global forces; colonial origins of underdevelopment on small-scale societies.

***AP 330 03(3-0-0). Human Ecology.** F. Prerequisite: APCC 100; APCC 120 or BY 220 or BZCC 101.

Roles of technology, economics, social organization, and ideology in human adaptations to and survival in natural and cultural environments.

***AP 332 03(3-0-0). Peoples of the Caribbean.** F. Prerequisite: APCC 100 or APCC 200.

Postcolonial ethnic, class, and gender identities, varying colonial legacies and contemporary economic pressures.

AP 334 03(3-0-0) Narrative Traditions and Social Experience. S. Prerequisite: APCC 100 or APCC 200 or E CC 140 or S CC 100 or written consent of instructor.

Relationship between narrative traditions and social contexts of their creation.

AP 335 03(3-0-0). Language and Culture. F, S.

Human language and primate communication, nonverbal channels, sociolinguistics, and language change.

AP 340 03(3-0-0). Medical Anthropology. S. Prerequisite: APCC 100.

Cultural adaptation to disease; non-Western theories of health and disease: categories, causes, cures; learned roles of patients and healers.

AP 350 03(3-0-0). Archaeology of North America. F. Prerequisite: APCC 140.

Indian life, tools, architecture, religion, food-getting from cultures of 12,000 years ago or earlier until European contact.

***AP 351 03(3-0-0). Archaeology of Europe and Africa.** S. Prerequisite: APCC 140.

Human culture, tools, art, religion, social life, subsistence, and palaeoecology from 4 million B.C. to 1200 B.C. in the Old World.

AP 356 03(2-0-1). Forensic Archaeology. F. Prerequisite: APCC 140 or written consent of instructor.

Application of modern archaeological method and theory to crime scene investigation and reconstruction.

AP 359 03(2-0-1). Colorado Prehistory. F.

Human behavioral responses to environmental diversity, cultural adaptation, Pleistocene and Recent climates, anthropogenic environmental change.

°AP 360 03(3-0-0). Gender and Anthropology. F, S. Prerequisite: APCC 100.

Theory, themes, and debates in anthropological gender studies, ethnographic survey of women and men cross-culturally.

AP 370 03(3-0-0). Primate Behavior and Ecology. S. Prerequisite: APCC 120 or BZCC 101.

Behavioral patterns, ecological relationships, and communication of nonhuman primates.

AP 372 03(2-2-0). Human Osteology. F. Prerequisite: APCC 120 or BZCC 101 or BZCC 110 or LSCC 102.

Human bones and teeth in a review of functional human evolution.

AP 373 03(3-0-0). Human Evolution. S. Prerequisite: APCC 120 or BZCC 110.

Current topics and debates in human evolution concentrating on biocultural changes in the human lineage.

***AP 374 03(2-0-1). Human Biological Variation.** S. Prerequisite: APCC 120 or BZCC 101 or BZCC 110 or LSCC 102.

Biological diversity of human populations; history of development of race concept.

***AP 375 03(3-0-0). Evolution of Primate Behavior.** F. Prerequisite: APCC 120 or BZCC 110 or LSCC 102.

Primate behavior from an evolutionary perspective, drawing on a variety of studies of humans, primates, and mammals.

AP 376 03(2-0-1). Evolution of Human Adaptation. F. Prerequisite: APCC 120 or BZCC 110 or LSCC 102.

Unique characteristics of humans: bipedalism, encephalization, dentition, birth process, an attenuated period of development.

AP 400 03(3-0-0). History of Anthropological Theory. S. Prerequisite: APCC 100 or APCC 200; APCC 140 or APCC 120 and APCC 121.

Anthropological theory from its beginnings in 19th century through recent developments in the latter half of the 20th century.

AP 412 03(3-0-0). Indians of North America. F, SS. Prerequisite: APCC 100 or APCC 200 or AP 413 or AP 414/ET 414, or written consent of instructor.

Native American peoples, their cultural variation across the continent, and cultural encounters with colonial expansion.

AP 413 03(3-0-0). Indigenous Peoples Today. F. Prerequisite: APCC 200 or AP 412 or AP 414/ET 414.

Contemporary cultural and social issues of indigenous peoples around the globe, including North and South American Indians and Australian Aboriginals.

°AP 414/°ET 414 03(3-0-0). Development in Indian Country. F. Credit not allowed for both AP 414 and ET 414.

Critical examination of history, public policy, and tribal strategies for economic development and natural resource management in Indian Country.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

***AP 422/*S 422 03(3-0-0). Comparative Legal Systems.** S. Prerequisite: APCC 100 or S CC 100. Credit not allowed for both AP 422 and S 422.
Traditional approaches to law, competing concepts of law in the global system, and experiences of minorities in state legal systems.

°AP 440 03(3-0-0). Theory in Cultural Anthropology. F, S. Prerequisite: APCC 100.

Theoretical paradigms used to explain culture including evolutionary, functional, ecological, political economy, postmodernism, and hegemony.

°AP 441 03(3-0-0). Method in Cultural Anthropology. F. Prerequisite: APCC 100.

Methodological orientations and research techniques. Ethnographic and cross-cultural approaches including quantitative and formal models.

AP 442/ET 442 08(8-0-0). Ethnographic Field School. SS. Prerequisite: APCC 100, ETCC 100 or written consent of instructor. Credit not allowed for both AP 442 and ET 442.

Directed fieldwork with American Indian communities; methodology, protocols, and social relations of ethnographic field research.

AP 450 03(0-0-3). Hunter-Gatherer Ecology. S. Prerequisite: APCC 100; APCC 120 and APCC 121; APCC 140.

Development of anthropological method and theory; study of contemporary and prehistoric foraging peoples.

°AP 451 03(3-0-0). Andean Archaeology and Ethnohistory. S. Prerequisite: APCC 100 or APCC 140.

Prehistory and colonial experiences of native Andean peoples.

°AP 454/°HY 454 03(3-0-0). Heritage Resource Management. S. Prerequisite: Junior standing. Credit not allowed for both AP 454 and HY 454.

Cultural resource laws and policy; practices commonly employed in management and preservation of these diverse resources.

***AP 455 03(1-0-2). Great Plains Archaeology.** F. Prerequisite: APCC 140.

Prehistoric people on Great Plains from earliest hunter-gatherers to historic contact; cultural responses to changing conditions.

+AP 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. (\$)

AP 461 03(0-0-3). Archaeological Report Preparation. F. Prerequisite AP 460; written consent of instructor.

Producing written and oral presentations for archaeological research, employment, or graduate work. Grant writing and manuscript preparation.

°AP 465 03(2-2-0). Zooarchaeology. S. Prerequisite: APCC 120, APCC 140.

Analysis of animal bones from archaeological sites to develop interpretations of past human behavior.

AP 472 03(3-0-0). Human Adaptability. S. Prerequisite: APCC 120 or BZCC 101 or BZCC 110 or LSCC 102.

Human biological responses to environmental conditions and constraints including diet, nutrition, disease, climate, culture change, and urbanization.

AP 475 03(3-0-0). Methods of Analysis in Paleoanthropology. F. Prerequisite: AP 373 or written consent of instructor.

Practical discussion of techniques used to reconstruct dietary and locomotor behavior and evolutionary relationships in human fossil remains.

AP 484 Var [1-5]. Supervised College Teaching. F, S. Prerequisite: Written consent of instructor.

AP 486 Var [1-6]. Practicum.

Application of anthropological methods under actual project conditions.

AP 492A-B 03(0-0-3). Seminar. Prerequisite: Six credits of anthropology. A) Archaeology. B) Biological anthropology.

AP 493 01(0-0-1). Capstone Seminar. F, S. Prerequisite: Concurrent registration in one of the following: AP 329, AP 330, AP 332, AP 334, AP 356, AP 374, AP 412, AP 450, AP 451, AP 455, AP 461.

Linkages between anthropological subfields and how professional anthropologists approach issues.

AP 495 Var [1-3]. Independent Study.

AP 496 Var [1-3]. Group Study.

AP 500 04(3-0-1). Development of Anthropological Theory. F. Prerequisite: Undergraduates must have written consent of instructor. Contemporary development of anthropological thought.

°AP 510 03(3-0-0). Contemporary Issues and Ethics in Anthropology. S. Prerequisite: AP 500 or written consent of instructor.

Contemporary anthropological theory and ethical issues in cultural anthropology, archaeology, and biological anthropology.

°AP 520 03(3-0-0). Women, Health, and Culture. F, S.

Women's experiences and interpretations of their health; cultural, political, and economic forces affecting women's health.

AP 528 03(0-0-3). Economic Anthropology. S. Prerequisite: Nine credits in anthropology or written consent of instructor.

Theoretical approaches to the cultural context of economic activity.

AP 529 03(0-0-3). Anthropology and Development. F. Prerequisite: Nine credits in anthropology or written consent of instructor.

Process of socioeconomic development intervention and the evolving role of anthropologists.

°AP 530 03(3-0-0). Humans in Ecosystems. F. Prerequisite: APCC 100.

Links between people and environments including human causes of land use change and adaptations people make to their environments.

***AP 535 03(0-0-3). Globalization and Culture Change.** F. Prerequisite: Nine credits in anthropology or written consent of instructor.

Evolving paradigms and patterns of globalization and international development; cultural responses--resistance, dependency, fragmented identities.

°AP 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 Atraditional@ peoples.

AP 540 03(0-0-3). Medical Anthropology. S. Prerequisite: Nine credits in anthropology or written consent of instructor.

Biocultural and cultural approaches to adaptation to health/ illness; application to ethnicity, gender, patient/healer roles, sociocultural change.

***AP 541 03(1-0-2). Seminar in Archaeological Method.** S. Prerequisite: Nine credits in anthropology or written consent of instructor.

Methods of archaeological recovery and interpretation, and process of archaeological analysis and reporting.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

°AP 542 03(1-0-2). **Seminar in Archaeological Theory.** S. Prerequisite: Nine credits in anthropology or written consent of instructor.

Theories of recovery, reconstruction, and interpretation of the archaeological record.

AP 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.

AP 550A-C 03(0-0-3). **Regional Prehistory.** Prerequisite: A-B) AP 350. C) Nine credits in anthropology or written consent of instructor.

A) Great Plains prehistory. F. B) Great Basin prehistory. °S. C) Southwestern. *S.

°AP 551 03(3-0-0). **Historical Archaeology.** S. Prerequisite: Graduate standing or written consent of instructor.

Theory, methods, and issues in historical archaeology.

*AP 555 03(0-0-3). **Paleoindian Archaeology.** F. Prerequisite: APCC 140.

Archaeology of the Americas during late Pleistocene/early Holocene; background and development of contemporary models.

AP 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.

*AP 571 03(3-0-0). **Anthropology and International Health.** F. Prerequisite: Graduate standing or written consent of instructor.

Global health concerns and problems including poverty, urbanization, malnutrition, diet, war and refugees, climate, and environment.

°AP 572 03(0-0-3). **Advanced Human Evolution.** S. Prerequisite: Graduate standing or written consent of instructor.

Major trends in human evolution through use of detailed case studies and regionally focused primary research.

+AP 660 Var [2-10]. **Field Archaeology.** F, SS. Prerequisite: AP 460 or two seasons field experience.

Field application of nondestructive survey methods, advanced cartographic and excavation methods, project supervision skills. (\$)

AP 684 Var. **Supervised College Teaching.** F, S, SS.

AP 686 Var. **Practicum-Field Archaeology.**

Direction of anthropological fieldwork under professional supervision.

AP 692 03(0-0-3). **Seminar.**

Current trends of research in archaeology; cultural and physical anthropology.

AP 695 Var. **Independent Study.**

AP 696 Var [1-3]. **Group Study-Anthropological Theory.**

Intensive analysis of selected topics and theories in anthropology, both historical and contemporary.

AP 699 Var. **Thesis.**

ART COURSES (AR)

Department of Art College of Liberal Arts

ARCC 100 03(3-0-0). **Introduction to the Visual Arts.** (AUCC 3B). F, S, SS.

Exploration of the development of visual arts. (GT-AH1)

AR 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.

AR 106D 03(0-6-0). **Art Studio-Fibers.** F, S, SS.

AR 110 03(3-0-0). **History of Western Art I.** F, S.

Western arts from prehistory through the medieval period.

AR 111 03(3-0-0). **History of Western Art II.** F, S. Prerequisite: AR 110.

Western arts from Renaissance through the 19th century.

*AR 112 03(3-0-0). **History of Asian Art.** F.

Arts of China, Japan, and India.

°AR 113 03(3-0-0). **Native Art Survey.** F.

Visual arts of native peoples of North America, Africa, and Oceania.

AR 135 03(0-6-0). **Introduction to Drawing.** F, S, SS.

Elements of artistic freehand drawing emphasizing experimentation with wide variety of media. (\$)

AR 136 03(0-6-0). **Introduction to Figure Drawing.** F, S, SS. Prerequisite: AR 135.

Human form as basis for self-expression through various drawing media. (\$)

AR 160 03(0-6-0). **Foundations Painting.** F, S.

Concepts of organization and color theory structured for understanding and manipulation of two-dimensional space. (\$)

AR 170 03(0-6-0). **Foundations Sculpture.** F, S.

Concepts of organization structured for understanding and manipulation of three-dimensional space; use of shop tools and materials.

+AR 208/ET 208 03(3-0-0). **Native American Art and Material Culture.** S. Credit not allowed for both AR 208 and ET 208.

Traditional arts and material culture of the indigenous peoples of North America. (\$)

AR 212 03(3-0-0). **History of Western Art III.** F, S. Prerequisite: AR 111.

20th-century visual arts.

AR 230 03(0-6-0). **Photo Image Making I.** F, S. Prerequisite: AR 111, AR 136, AR 160, and AR 170.

Photographic imagery as an art medium; exploration of silver-based (film) materials. (\$)

AR 235 03(0-6-0). **Drawing Workshop I.** F, S. Prerequisite: AR 136.

Drawing using models and various still life material. (\$)

AR 240 03(0-6-0). **Pottery I.** F, S. Prerequisite: AR 111, AR 136, AR 160, and AR 170; or written consent of instructor.

Basic techniques of studio ceramics; exploration of expressive potential in pottery. (\$)

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

AR 245 03(0-6-0). Metalsmithing and Jewelry I. F, S. Prerequisite: AR 111, AR 136, AR 160, AR 170.
Basic metal techniques; forming and construction; surface treatment and finishing processes; behavior and mechanical properties of metals. (\$)

AR 250 03(0-6-0). Fibers I. F, S. Prerequisite: AR 110 and AR 135; AR 160 or AR 170; or written consent of instructor.
Basic weaving and other fiber structure techniques. (\$)

AR 255 03(0-6-0). Introduction to Graphic Design. F, S. Prerequisite: AR 111, AR 136, AR 160, and AR 170.
Problems emphasizing typography, layout, symbols, illustration, and package design. (\$)

AR 260 03(0-6-0). Painting I. F, S. Prerequisite: AR 111, AR 136, AR 160, and AR 170.
Basic oil painting procedures, techniques, and concepts. (\$)

AR 265 03(0-6-0). Printmaking I-Intaglio and Relief. F, S. Prerequisite: AR 110, AR 135; AR 160 or AR 170.
Problems in composition utilizing basic techniques and principles of printmaking processes. (\$)

AR 270 03(0-6-0). Sculpture I. F, S. Prerequisite: AR 111, AR 136, AR 160, and AR 170.
Introduction to sculptural techniques and concepts. (\$)

AR 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.

AR 305 03(0-6-0). Paper Making I. F, S, SS. Prerequisite: AR 101 or AR 160.
Basic techniques and processes of handmade paper; emphasis on flat design.

AR 306 03(0-6-0). Paper Making II. F, S, SS. Prerequisite: AR 305.
Exploration of handmade paper as medium for personal expression; emphasis on sculptural form and pulp dyeing.

***AR 310 03(3-0-0). History of American Art.** F. Prerequisite: AR 212.
History of American art from Colonial Period to end of World War II.

AR 311 03(3-0-0). Art of Africa. F. Prerequisite: ARCC 100 or AR 111 or AR 113.
History of the art of Africa.

***AR 312 03(3-0-0). History of Pre-Columbian Art.** F. Prerequisite: AR 110, AR 111.
History of the art of Central and South America.

°AR 314 03(3-0-0). Women in Art History. S. Prerequisite: ARCC 100 or AR 110.
Women as artists in history of art and women's media in art.

°AR 315 03(3-0-0). United States Art Since 1945. F. Prerequisite: AR 212.
Visual art in the United States since 1945.

***AR 316 03(3-0-0). Art of the Pacific.** S. Prerequisite: ARCC 100 or AR 111 or AR 113.
Arts of Australia, Indonesia, Melanesia, Micronesia, and Polynesia.

AR 318 03(3-0-0). Native American Art. F. Prerequisite: AR 110; ARCC 100 or AR 111 or AR 113.
Arts and crafts of Northern American Indian groups.

°AR 319 03(3-0-0). History of Graphic Design. F. Prerequisite: AR 212.
History of graphic design emphasizing 19th- and 20th-century work.

AR 321A-C Var [3-5]. Travel Abroad-Studio Workshop in Italy. SS. Prerequisite: A) AR 135. B) AR 230 or portfolio review and written consent of instructor. C) AR 250 or portfolio review and written consent of instructor.
Exploration of studio techniques in Italy. A) Drawing. B) Photo image making. C). Fibers.

AR 325 03(3-0-0). Concepts in Art Education. S. Prerequisite: EDCC 275; admission to Teacher Licensure Program.
Artistic learning in children, adolescents, adults, and special populations.

AR 326 04(0-8-0). Art Education Studio. F, S. Prerequisite: EDCC 275, admission to Teacher Licensure Program.
Art areas required for teacher licensure as indicated by individual student needs. (\$)

AR 330 04(0-8-0). Photo Image Making II. F, S. Prerequisite: AR 230 or portfolio review.
Studio course designed to develop the growth of photographic expression. (\$)

AR 331 04(0-8-0). Photo Image Making III. F, S. Prerequisite: AR 330.
Studio course designed to further growth of concept, materials in photographic expression as an art medium. (\$)

AR 335 03(0-6-0). Drawing Workshop II. F, S. Prerequisite: AR 235.
Maximum of 9 credits allowed in course.
Independent as well as common drawing experiences. (\$)

AR 336 03(0-6-0). Drawing Workshop III. F, S. Prerequisite: AR 335 or AR 365.
Drawing with strong emphasis on reading assignments from fields of contemporary art history, aesthetics, and art criticism. (\$)

AR 340 04(0-8-0). Pottery II. F, S, SS. Prerequisite: AR 240.
Beginning wheel throwing; investigation of the expressive potential of throwing technique. (\$)

AR 341 04(0-8-0). Pottery III. S. Prerequisite: AR 340.
Exploration of form for expression of personal content; supportive technology; expression in historical pottery. (\$)

AR 345 04(0-8-0). Metalsmithing and Jewelry II. F, S. Prerequisite: AR 245.
Raising and casting techniques in combination with construction; metal spinning. (\$)

AR 346 04(0-8-0). Metalsmithing and Jewelry III. F, S. Prerequisite: AR 245.
Forging and enameling techniques on nonferrous and ferrous metals; stone setting. (\$)

AR 350 04(0-8-0). Fibers II. F. Prerequisite: AR 250.
Fabric decoration and surface design techniques; investigation of fabric as an expressive medium. (\$)

AR 351 04(0-8-0). Fibers III. S. Prerequisite: AR 250.
Studio work investigating expressive potential of fibers and fabric. (\$)

AR 355 04(0-8-0). Typography and Design Systems. F. Prerequisite: AR 255.
Emphasis on typographic solutions for advertising, corporate identity, packaging, and publication design. (\$)

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

AR 356 04(0-8-0). Illustration. S. Prerequisite: AR 255, 6 credits in drawing.

Problems emphasizing media, experimental techniques, and compositions. (\$)

AR 360 04(0-8-0). Painting II. F. Prerequisite: AR 260.

Techniques and concepts inherent in acrylic and other water-based media. (\$)

AR 361 04(0-8-0). Painting III. S. Prerequisite: AR 235, AR 260.

Compositions and techniques in oil and/or acrylic emphasizing the human figure. (\$)

AR 365 04(0-8-0). Printmaking II-Lithography. F, S. Prerequisite: AR 136.

Preparation, processing, and printing techniques in stone and metal plate lithography. (\$)

AR 366 04(0-8-0). Printmaking III-Studio Workshop. F, S. Prerequisite: AR 365.

Advanced intaglio, relief, planographic, and stencil processes in the workshop; continued emphasis on individual creative growth. (\$)

AR 370 04(0-8-0). Sculpture II. F. Prerequisite: AR 270.

Additive, subtractive, and related techniques. (\$)

AR 371 04(0-8-0). Sculpture III. S. Prerequisite: AR 270.

Casting in metal. (\$)

AR 375 03(0-6-0). Figure Modeling and Drawing. F. Prerequisite: AR 270.

Studio course based on observation of the human figure in sculpture and drawing. (\$)

AR 384 Var [1-4]. Supervised College Teaching. F, S. Maximum of 10 credits allowed in course.

Supervised assistance in instruction.

AR 405 03(0-6-0). Paper Making III. F, S, SS. Prerequisite: AR 305.

Further use of paper as a media for personal expression; emphasis on controlled serial editions.

AR 410 03(3-0-0). Greek Art. F. Prerequisite: AR 110.

Aegean and Greek architecture, painting, and sculpture.

***AR 411 03(3-0-0). History of Medieval Art.** S. Prerequisite: AR 110.

Early Christian, Byzantine, Islamic, Romanesque, and Gothic visual art forms.

AR 412 03(3-0-0). History of Renaissance Art. S. Prerequisite: AR 111.

Architecture, sculpture, painting, and minor arts, 1300 to 1600.

***AR 414 03(3-0-0). History of Baroque and Rococo Art.** S. Prerequisite: AR 111.

17th- and 18th-century European styles in architecture, painting, and sculpture and other art forms from Mannerism to neoclassicism.

***AR 415 03(3-0-0). History of 19th-Century European Art.** F. Prerequisite: AR 111.

Architecture, sculpture, painting, and other arts in Europe, 1780 to 1900.

AR 416 03(3-0-0). History of 20th-Century European Art. S. Prerequisite: AR 212.

Architecture, sculpture, painting, and other arts in Europe, 1900 to present.

***AR 417 03(3-0-0). Roman Art.** S. Prerequisite: AR 110.

Roman sculpture, painting, and architecture.

AR 419 03(3-0-0). Historiography and Methodology of Art History. S.

Prerequisite: Written consent of instructor.

Historiography/methodology/research methods in art history.

AR 420 Var [3-5]. Travel Abroad-Art History in Italy. SS. Prerequisite: AR 111.

Art historical study of painting, sculpture, and architecture in Italy.

AR 430 04(0-8-0). Advanced Photo Image Making I. F, S. Prerequisite: AR 331.

Advanced problems in use of photo image making as an art medium. (\$)

AR 431 04(0-8-0). Advanced Photo Image Making II. F, S. Prerequisite: AR 430.

Studio course to refine individual directions and professional goals in photography as an art medium. (\$)

AR 435 03(0-6-0). Drawing Workshop IV. F, S. Prerequisite: AR 336.

Further definition of philosophical and artistic direction. (\$)

AR 436 03(0-6-0). Drawing Workshop V. F, S. Prerequisite: AR 435.

Capstone course leading to a unified body of finished drawings. (\$)

AR 440 04(0-8-0). Pottery IV. F. Prerequisite: AR 341.

Advanced individual research in pottery form and expression; supportive technology; expression in contemporary American pottery. (\$)

AR 441 04(0-8-0). Pottery V. S. Prerequisite: AR 440.

Advanced individual research in pottery form and expression of personal subject matter; supportive technology. (\$)

AR 445 04(0-8-0). Metalsmithing and Jewelry IV. F, S. Prerequisite: AR 346.

Chasing and repousse techniques in two- and three-dimension; inlay, engraving, and etching techniques. (\$)

AR 446 04(0-8-0). Metalsmithing and Jewelry V. S. Prerequisite: AR 346.

Advanced techniques: granulation, electroforming, photoetching, makume, niello; ferrous metals techniques. (\$)

AR 450 04(0-8-0). Fibers IV. F. Prerequisite: AR 350, AR 351. Maximum of 8 credits allowed in course.

Advanced studio problems in expressive use of fibers and fabric. (\$)

AR 451 04(0-8-0). Fibers V. S. Prerequisite: AR 351 or AR 450. Maximum of 8 credits allowed in course.

Advanced individual research in the expressive use of fibers and fabric. (\$)

AR 455 04(0-8-0). Advanced Typography and Design Systems. F. Prerequisite: AR 160, AR 170, AR 255. Maximum of 8 credits allowed in course.

Two- and three-dimensional solutions for advertising, corporate identity, packaging, and publication design. (\$)

AR 456 04(0-8-0). Advanced Illustration. S. Prerequisite: AR 356. Maximum of 8 credits allowed in course.

Projects in editorial and reportorial illustration emphasizing techniques applied to solving problems in advanced composition. (\$)

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

AR 460 04(0-8-0). Advanced Painting I. F. Prerequisite: AR 360, AR 361. Maximum of 8 credits allowed in course.

Advanced composition and exploration of individual creative expression. (\$)

AR 461 04(0-8-0). Advanced Painting II. S. Prerequisite: AR 460. Maximum of 8 credits allowed in course.

Continuation in direction of individual creative expression. (\$)

AR 465 04(0-8-0). Printmaking IV-Studio Workshop. F, S. Prerequisite: AR 366.

Advanced printmaking workshop; intaglio, relief, planographic, and stencil; continued emphasis on individual creative growth. (\$)

AR 466 04(0-8-0). Printmaking V-Studio Workshop. F, S. Prerequisite: AR 465. Maximum of 8 credits allowed in course.

Advanced printmaking concepts in studio and research problems. (\$)

AR 470 04(0-8-0). Sculpture IV. F, S. Prerequisite: AR 370, AR 371. Maximum of 12 credits allowed in course.

Development of individual expression using sculptural techniques. (\$)

AR 471 04(0-8-0). Sculpture V. F, S. Prerequisite: AR 470. Maximum of 8 credits allowed in course.

Advanced expression using sculptural techniques. (\$)

AR 487 Var [1-4] Internship.

Supervised work experience in an approved location.

AR 492A-B 03(0-0-3). Seminar. B) Corequisite: AR 326.

A) Art history. B) Art education.

AR 495A-L Var [1-4]. Independent Study. Prerequisite: K) AR 330. 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.

AR 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.

AR 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. L) Native American art. M) Roman art. N) Graphic design. O) Women in art. P) Pacific art.

***AR 514 03(0-0-3). Contemporary American Art Critics and Artists.** S. Prerequisite: AR 510E or written consent of instructor.

Issues in contemporary American art are explored through the work of critics and artists who visit through the Critic and Artist Residency Series.

AR 515 03(0-0-3). Seminar-Contemporary Art Theory. F. Prerequisite: AR 510E or written consent of instructor.

Relationship between critical theory and the visual arts; how artists and critics apply theory in their work.

AR 575A-G Var [1-15]. Studio Problems. F, S, SS. Prerequisite: Acceptance into MFA program in art or written consent of instructor.

A) Painting. B) Printmaking. (\$) C) Sculpture. (\$) D) Fibers. (\$) E) Metalsmithing and jewelry. (\$) F) Drawing. G) Graphic design.

AR 592 03(0-0-3). Art History Seminar. Prerequisite: Twenty-one credits of art history.

AR 675A-G Var [1-15]. Studio Problems. F, S, SS. Prerequisite: Ten credits of AR 575 in one concentration.

A) Painting. B) Printmaking. (\$) C) Sculpture. (\$) D) Fibers. (\$) E) Metalsmithing and jewelry. (\$) F) Drawing. G) Graphic design.

AR 684 Var. Supervised College Teaching. F, S, SS.

AR 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.

AR 696AH Var. Group Study.

A) Painting. B) Printmaking. C) Sculpture. D) Fibers. E) Metalsmithing and jewelry. F) Drawing. G) Graphic design. H) Art history.

AR 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 (AS)

Department of Aerospace Studies

Office of Provost/Academic Vice President

AS 101 01(1-0-0). Foundations of the Air Force I. F.

Air Force opportunities, benefits; emphasis on officership, customs, and communicative skills, group problem solving.

AS 102 01(1-0-0). Foundations of the Air Force II. S.

Organizational structure and missions of Air Force organizations; emphasis on leadership, military history, and communicative skills.

AS 196 Var [1-3]. Aerospace Studies Group Study I. F, S.

AS 201 01(1-0-0). Evolution of Air and Space Power I. F.

History of the development of air power and air doctrine from Wright brothers to present emphasizing role of air power; communications skills emphasized.

AS 202 01(1-0-0). Evolution of Air and Space Power II. S.

History of air power from World War II to present examining role of air power in Berlin Airlift, Korean War, Mideast, and Vietnam War.

AS 250 03(3-0-0). Aerospace Studies-Ground School. F, S.

Ground school instruction in principles of flight, weather, navigation, radio communications, flight planning, emergency procedures, FAA regulations.

AS 296 Var [1-3]. Aerospace Studies Group Study II. F, S.

AS 301 03(3-2-0). Air Force Leadership Studies I. F.

Leadership and quality management fundamentals, officer professional knowledge, ethics, and values; communication skills heavily emphasized.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

AS 302 03(3-2-0). Air Force Leadership Studies II. S.

Officer professional development, emphasizing total quality management (TQM) in the Air Force environment; emphasis on communication skills.

AS 401 03(3-2-0). National Security Affairs/Active Duty I. F.

Evolution and formulation of U.S. defense policy and strategy, regional conflict studies, Air Force roles and missions.

AS 402 03(3-2-0). National Security Affairs/Active Duty II. S.

Professionalism, military justice system, military ethics, commissioning essentials, and emphasis on communication skills.

ATMOSPHERIC SCIENCE COURSES

(AT)

Department of Atmospheric Science

College of Engineering

AT 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.

AT 350 02(2-0-0). Introduction to Weather and Climate. F, S.

Behavior of atmosphere and its influence upon human's activities.

AT 351 01(0-3-0). Introduction to Weather and Climate Laboratory. F, S.

Prerequisite: AT 350 or concurrent registration.

Actual weather data, visualization of meteorological phenomena, in-depth discussion of current environmental issues.

AT 495 Var. Independent Study.

AT 540 02(0-6-0). Daily Weather Laboratory I. F.

Corequisite: AT 601. Synoptic analysis; cyclones, anticyclones, fronts, associated weather; long waves in the westerlies; upper troughs, ridges, basic currents; weather phenomena.

AT 541 02(1-3-0). Daily Weather Laboratory II. S.

Prerequisite: AT 540. Synoptic computation of cyclone and anticyclone movement, circulation, and intensity changes; mesoscale weather phenomena; precipitation processes.

°AT 555 03(3-0-0). Air Pollution. S.

Prerequisite: C 113, M 261 or M 340, PHCC 122 or PHCC 142. Nature, ambient concentrations, sources, sinks, and physiological activities of pollutants; meteorology; legislation; social and economic factors.

AT 560 02(1-3-0). Air Pollution Measurement. F.

Prerequisite: C 114. Examination and application of techniques for air pollution measurement. Includes sampling and analysis of gases, aerosols, and precipitation.

AT 601 03(3-0-0). Atmospheric Dynamics I. F.

Prerequisite: M 261, M 531. Momentum, continuity equations; circulation, vorticity, thermodynamics; boundary layer; synoptic scale motions in midlatitudes.

AT 602 02(2-0-0). Atmospheric Dynamics II. S.

Prerequisite: AT 601. Sound waves, gravity waves, Rossby waves; numerical weather prediction; baroclinic instability; general circulation; tropical dynamics.

°AT 604 02(2-0-0). **Atmospheric Modeling. F.** Prerequisite: AT 602 or written consent of instructor.

Design and applications of atmospheric, numerical models to current problems. Spectral models and physical parameterizations.

AT 605 03(3-0-0). Atmospheric Circulation. S.

Corequisite: AT 602. General circulation theory, transports, energetics, cyclones, jetstreams, monsoons, El Nino, and the Southern Oscillation.

AT 606 03(3-0-0). Climatology. F.

Prerequisite: M 261, M 531. Processes that govern climate, radiation, hydrologic cycle, oceans, and land surface. Climate variability and climate change.

AT 620 03(3-0-0). Thermodynamics and Cloud Physics. F.

Prerequisite: M 340, PH/PHCC 142. Equilibrium thermodynamics, cloud microphysics, cloud dynamics, precipitation formation, and cloud electrification.

AT 621 02(2-0-0). Atmospheric Chemistry. F.

Prerequisite: C 114, M 340, PH/PHCC 142. Overview of chemical kinetics and equilibria; sources and sinks of pollutants; photochemistry and smog formation; aqueous-phase chemistry; acid rain.

AT 622 03(3-0-0). Atmospheric Radiation. S.

Prerequisite: AT 620, concurrent registration in AT 602. Terrestrial, solar radiation propagation in the atmosphere; radiative components in energy budgets, weather systems, climate studies; remote sensing.

***AT 623 02(2-0-0). Atmospheric Boundary Layer. F.**

Prerequisite: AT 601 or concurrent registration. Equations for shallow atmospheric motions; thermal instability of a fluid layer; atmospheric turbulence; flow stability; 1-D mixed layer models.

AT 650 02(2-0-0). Measurement Systems and Theory. F.

Prerequisite: PHCC 142, STCC 301. Surface and upper air measurement systems; theory and system response, sensor design; automated data collection, analysis and display systems.

°AT 652 02(2-0-0). Atmospheric Remote Sensing. F.

Prerequisite: AT 622 or written consent of instructor. Concepts of electromagnetic and acoustic wave propagation; active and passive remote sensing techniques including radar, lidar, thermal emission systems.

AT 655 03(3-0-0). Objective Analysis in Atmospheric Sciences. S.

Prerequisite: M 531 or written consent of instructor. Objective analysis of geophysical data: general statistics; matrix methods; time series analysis. Emphasis on applications to real-world data.

AT 695 Var. Independent Study.

AT 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.

***AT 703 02(2-0-0). Numerical Weather Prediction. F.**

Prerequisite: AT 602. Quasi-geostrophic approximation; barotropic, baroclinic, primitive equation, and general circulation models; numerical methods.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

°AT 704 02(2-0-0). **Planetary Circulations.** S. Prerequisite: AT 602.

Quasi-static, quasi-geostrophic equations; planetary waves; geostrophic adjustment; barotropic, baroclinic instability; frontogenesis; tropical cyclones.

°AT 707 03(2-0-1). **Atmospheric Waves and Vortices.** F. Prerequisite: AT 605 or written consent of instructor.

Atmospheric wave motions and embedded vortices spanning mountain waves to large-scale Rossby waves and critical layers.

*AT 710 03(3-0-0). **Geophysical Vortices.** F. Prerequisite: AT 602 or written consent of instructor.

Observational, experimental, and theoretical aspects of geophysical vortices, such as hurricanes, polar lows, tornadoes, and dust devils.

*AT 711 02(2-0-0). **Microclimate.** F. Prerequisite: M 340, AT 623 or written consent of instructor.

Momentum, heat, water, and trace gas fluxes near the earth's surface, including fluxes between the atmosphere and the land/ocean/ice surfaces.

°AT 712 03(3-0-0). **Dynamics of Clouds.** S. Prerequisite: AT 623.

General theory of cloud dynamics; parameterization of microphysics and radiation; models of fog, stratocumuli, cumulonimbi, and orographic clouds.

°AT 715 02(2-0-0). **Atmospheric Oxidation Processes.** F. Prerequisite: AT 621.

Atmospheric hydrocarbon and nitrogen oxide reactions; aqueous phase scavenging and reactions; chemical pathways in the atmosphere.

AT 716 02(1-2-0). **Air Quality Characterization.** S. Prerequisite: AT 560; AT 555 or AT 621 or written consent of instructor.

Planning, executing, and reporting on a measurement campaign to characterize local air quality.

°AT 721 03(3-0-0). **Theoretical Topics in Radiative Transfer.** F. Prerequisite: AT 622.

Physics of atmospheric radiation; theoretical techniques used to show radiation transfer equation.

°AT 722 03(2-0-1). **Atmospheric Radiation and Energetics.** S. Prerequisite: AT 622.

Radiative transfer in the atmosphere; implications on remote sensing and energetics.

°AT 724 02(2-0-0). **Cloud Microphysics.** S. Prerequisite: AT 621.

Theories and observations of nucleation; cloud droplet spectra broadening; precipitation growth and breakup; ice multiplication; cloud electrification.

*AT 730 03(3-0-0). **Mesoscale Modeling.** F. Prerequisite: AT 602, AT 623.

Development of basic equations used in mesoscale models and methodology of solution.

°AT 735 03(3-0-0). **Mesoscale Dynamics.** F. Prerequisite: AT 602.

Analysis of physical and dynamical processes that initiate, maintain, and modulate atmospheric mesoscale phenomena.

*AT 737 03(3-0-0). **Satellite Observation of Atmosphere and Earth.** S. Prerequisite: AT 622, AT 650.

Satellite measurements; basic orbits and observing systems; applications of remote probing and imaging to investigations of atmospheric processes.

°AT 741 03(3-0-0). **Radar Meteorology.** S. Prerequisite: AT 652 or written consent of instructor.

Radar systems; radar equation and applications; multiple Doppler observation and processing; radar studies of mesoscale systems.

°AT 742 03(2-2-0). **Tropical Atmosphere.** F. Prerequisite: AT 605, AT 623, AT 655.

Climatology and general circulation of the tropics; air-sea, cumulus energy, and momentum exchanges; tropical storm dynamics.

*AT 745 03(3-0-0). **Advanced General Circulation.** S. Prerequisite: AT 602, AT 605.

Theories of the atmospheric general circulation. Numerical modeling findings. Index cycles, blocking action, transient vs. standing wave activity.

*AT 750 03(3-0-0). **Analysis and Diagnosis of Climate Variability.** F. Prerequisite: AT 605, AT 655 or written consent of instructor.

Identification and diagnosis of large-scale variability in the climate system (including climate change).

*AT 753 03(3-0-0). **Atmospheric Water Cycle.** F. Prerequisite: AT 601, AT 622, or AT 652.

Hydrologic cycle; moisture transport and air-ground exchange; water budgets of meteorological phenomena; climatology of atmospheric water.

*AT 755 03(3-0-0). **Theoretical and Applied Climatology.** F. Prerequisite: AT 606.

Forcing functions; atmospheric response, feedback loops; climatic models, change hypotheses; applications to agriculture, industry, business.

°AT 760 02(2-0-0). **Global Carbon Cycle.** S. Prerequisite: AT 606.

Exchanges of CO₂ between the atmosphere, the land surface, and oceans. Biogeochemical processes. Micrometeorological and inverse flux estimation.

*AT 765 03(3-0-0). **Climate Dynamics.** F. Prerequisite: AT 606.

Description and theory of the variability of the climate system on time scales of months to millions of years. Emphasis on dynamical understanding.

*AT 770 03(3-0-0). **Physical Oceanography.** F. Prerequisite: AT 602.

Properties of sea water and ice; oceanic structure; dynamics of current systems; air-sea interaction; tides.

°AT 772 02(2-0-0). **Aerosol Chemistry.** F. Prerequisite: C 114, MCC 161, PHCC 122 or PHCC 142.

Physics and chemistry of atmospheric aerosols including composition, surface properties, size, interaction with radiation sources, sinks.

AT 784 Var. **Supervised College Teaching.** F, S, SS.

AT 786 Var. **Practicum.**

AT 795 Var. **Independent Study.**

AT 796 Var. **Group Study.**

AT 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.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

AMERICAN STUDIES COURSES (AU)

College of Liberal Arts

AUCC 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.

AUCC 101 03(3-0-0). Self/Community in American Culture Since 1877. (AUCC 3D and 3F). S.

Meaning and development of American culture, 1877, through themes of self and community, in art, politics, society, and religion.

AU 300/E 300 03(3-0-0). American Lives-Methods in American Studies. F, S. Prerequisite: AUCC 100, AUCC 101. Credit not allowed for both AU 300 and E 300.

Methods and changing approaches of American Studies since 1950s using autobiography as organizing theme.

AU 492 03(3-0-0). Seminar in American Studies. Prerequisite: AU 300/E 300.

AU 495 Var [1-3]. Independent Study in American Studies. Prerequisite: Written consent of instructor.

Individually guided studies in interdisciplinary work in American culture.

AU 499 03. Thesis in American Studies. Prerequisite: AU 492.

BUSINESS ACCOUNTING COURSES (BA)

Department of Accounting *College of Business*

BA 205 03(3-0-0). Fundamentals of Accounting. F, S, SS. For nonbusiness majors. Credit not allowed for both BA 205 and BA 210.

Understanding of financial statements to support financial and managerial decision making.

BA 210 03(2-0-1). Introduction to Financial Accounting . F, S, SS. Credit not allowed for both BA 210 and BA 205.

Use of accounting information by decision makers; development of the basic accounting model, and issues concerning income and cash flows.

BA 220 03(2-0-1). Introduction to Managerial Accounting. F, S, SS. Prerequisite: BA 205 or BA 210.

Use of accounting information in internal decision making.

BA 310 03(3-0-0). Financial Statement Analysis. F, S. Prerequisite: BA 220. For business majors. Credit not allowed for both BA 310 and BA 311.

Analysis of balance sheet and income statement accounts.

BA 311 03(3-0-0). Intermediate Accounting I. F. Prerequisite: BA 205 with grade of B- or better or BA 210 with grade of B- or better; BA 220 with grade of B- or better. Credit not allowed for both BA 311 and BA 310.

Asset and liability accounting.

BA 312 03(3-0-0). Intermediate Accounting II. S. Prerequisite: BA 311 with grade of C- or better.

Equity structure of corporations; analysis and interpretation of accounting data.

BA 321 03(3-0-0). Cost Management. F. Prerequisite: BA 220.

Utilizing budgetary and cost accounting information for planning, controlling, and decision-making.

BA 330 03(3-0-0). Introduction to Taxation. F, S. Prerequisite: BA 205 or BA 210.

Introduction to U.S. taxation, with emphasis on federal income tax; impact of taxation on business decisions.

BA 350 03(3-0-0). Accounting Information Systems. F, S. Prerequisite: BA 220.

Design, administration and control of accounting information systems; use of accounting systems software.

BA 411 03(3-0-0). Advanced Accounting. F, S. Prerequisite: BA 312 with a grade of C- or better.

Accounting for branches and subsidiaries, partnerships, and business combinations. Accounting for multinational business transactions.

BA 421 03(3-0-0). Management Control Systems. S. Prerequisite: BA 220.

Business transaction cycles. Laws and regulations regarding responsibility for internal control. Performance measurement systems and controllership.

BA 430 03(3-0-0). Income Tax Accounting. F, S. Prerequisite: BA 330.

Basic structure of federal income tax law; impact of taxes on decision making; social security taxes.

BA 431 03(3-0-0). Corporate Taxation. F. Prerequisite: BA 220, BA 330.

Federal income tax principles pertaining to formation and operation of corporate entities.

BA 435 03(3-0-0). Multi-Jurisdictional Tax. F. Prerequisite: BA 330.

Tax planning and compliance issues for entities doing business in multi-state and multi-nation locales.

BA 441 03(3-0-0). Auditing Practices. F, S. Prerequisite: BA 312 with grade of C- or better; BA 350 with grade of C- or better.

Environment, professional standards, and practices involved in auditing financial statements and performance of other assurance services.

BA 442 03(3-0-0). International Accounting. SS. Prerequisite: BA 220. Credit not allowed for both BA 442 and BA 642.

International accounting issues facing multi-national enterprises.

BA 487 Var. Internship.

Supervised work experience in public, industry, or governmental accounting.

BA 495 Var. Independent Study.

BA 496 Var. Group Study.

BA 511 03(3-0-0). Advanced Accounting I. F. Prerequisite: BA 312.

Accounting for business combinations and consolidations in corporate restructuring and alternative organizational forms.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

BA 540 03(3-0-0). Professional Ethics and Responsibilities. S. Prerequisite: BA 311.
Ethical practice of professional accounting.

BA 550 03(3-0-0). Electronic Commerce Accounting Issues. S. Prerequisite: BA 350, BA 421.
Electronic commerce resources available and tools required of today's professional accountant.

BA 561 03(3-0-0). Legal and Regulatory Issues in Accounting. F, S. Prerequisite: BG/BGCC 260.
Contracts, ownership, bankruptcy (debtor/creditor relationship), formation of business entities, regulation of accounting profession. (Ω-V)

BA 570 03(3-0-0). Governmental Accounting and Assurance Services. S. Prerequisite: BA 441.
Accounting for, and financial reporting by, local governmental units and related assurance services. (Ω-V)

BA 601 03(3-0-0). Professional Practice. F. Prerequisite: BA 441.
Management of accounting practice; professional ethics and regulation; research techniques. (Ω-O)

BA 612 03(3-0-0). Contemporary Financial Accounting Issues. F. Prerequisite: BA 312.
Historical development of accounting; controversial issues involved in calculations and disclosure of enterprise periodic income. (Ω-O)

BA 622 03(3-0-0). Advanced Cost and Managerial Accounting. S. Prerequisite: BA 321.
Contributions of cost accounting to decision making and planning. (Ω-O)

BA 630 03(3-0-0). Tax and Accounting Research. F. Prerequisite: BA 220.
Research aspects of professional accounting and tax practices; development of oral and written communication skills.

BA 631 03(3-0-0). Corporate Taxation. F. Prerequisite: BA 220, BA 330.
Federal income tax principles pertaining to formation and operation of corporate entities. (Ω-V)

BA 633 03(3-0-0). Flow-Through Entities. S. Prerequisite: BA 220.
Federal income tax principles and problems pertaining to flow-through entities. (Ω-V)

BA 635 03(3-0-0). State and Local Taxation. F. Prerequisite: BA 220.
Tax planning and compliance issues for entities doing business in multijurisdictional locales. (Ω-O)

BA 636 03(3-0-0). Taxation of Corporations and Shareholders. SS. Prerequisite: BA 220.
Federal income tax principles and problems relating to reorganization, consolidation, and termination of corporations. (Ω-V)

BA 641 03(3-0-0). Contemporary Auditing. S. Prerequisite: BA 441.
Seminar exploring various facets of the assurance services environment. (Ω-V)

BA 642 03(3-0-0). International Accounting. SS. Prerequisite: BA 220. Credit not allowed for both BA 642 and BA 442.
Preparation for work with multinational companies in coordinating operations to adhere to global regulations and customs. (Ω-O)

BA 679 03(3-0-0). Capstone Seminar. F, S, SS. Prerequisite: Fifteen graduate credits.
Group service learning project which integrates material from prior courses. (Ω-O)

BA 695 Var. Independent Study.

BA 696 Var. Group Study.

BIOCHEMISTRY AND MOLECULAR BIOLOGY COURSES (BC)

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: LSCC 102 and C CC 112 or concurrent registration; written consent of instructor.
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: BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 346 or concurrent registration in C 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 BC 401 or concurrent registration, 2 credits of college chemistry laboratory.
Introduction to laboratory techniques in biochemistry.

BC 401 03(3-0-0). Comprehensive Biochemistry I. F. Prerequisite: C 245 or C 345 or concurrent registration in C 345; M CC 155 or M CC 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; C 246 or C 344; LS 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, C 471 or C 474.
Structural biological methods used to elucidate macromolecular structure and function.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

BC 441 01(0-1.5-5). 3D Molecular Models for Biochemistry. F. Prerequisite: BC 401 or concurrent registration.

Computer instruction to construct 3D models of proteins and nucleic acids using leading software.

BC 463 03(3-0-0). Molecular Genetics. F. Prerequisite: BC 401 or concurrent registration or BC 351; LSCC 201B. Credit not allowed for both BC 463 and BC 563.

Molecular basis of gene structure, replication, repair, recombination, and expression.

BC 465 03(3-0-0). Molecular Regulation of Cell Function. S.

Prerequisite: LS 210; BC 403 or concurrent registration or BC 351. 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 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. F, S, SS. Prerequisite: Written consent of supervising instructor and department chair.

Assist in teaching selected courses in biochemistry and molecular biology.

BC 487A-B Var. Internship. Prerequisite: A) BC 401, BC 403, BC 404 with minimum GPA of 2.0, written consent of instructor. B) BC 401, BC 463, BC 495 (one credit in lab of CSU mentor), selection by departmental committee.

A) Work experience with an approved preceptor outside of a university laboratory environment. B) International. 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 GPA of 3.0 and consent of laboratory mentor.

BC 496 Var. Group Study. Prerequisite: Written consent of supervising instructor and department chair.

Faculty-directed exploration of areas of special interest in biochemistry and molecular biology.

BC 498 Var [1-6]. Research. Prerequisite: Written consent of research mentor and department chair.

Supervised laboratory research in biochemistry and molecular biology.

BC 499 03(0-0-3). Thesis. Prerequisite: Written consent of department chair.

Preparation and defense of laboratory-based research thesis.

BC 511 02(2-0-0). Structural Biology I. F. Prerequisite: BC 401 or concurrent registration, C 471 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: LSCC 201B; BC 401. 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: LS 210; BC 403 or concurrent registration or BC 351. 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 03(3-0-0). Gene Expression. S. Prerequisite: BC 563.

Eukaryotic transcription mechanisms with emphasis on methods of study and regulatory mechanisms.

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 563 or concurrent registration; BC 511 or concurrent registration.

Didactic and hands-on experience with locating funding sources, writing effective grant proposals and the review process in the biomolecular sciences.

BC 711A-F 01(1-0-0). Advanced Topics in Structural Biology. F, S. Prerequisite: BC 511 and 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. F, S, SS.

BC 793 01(0-0-1). Seminar.

BC 795 Var. Independent Study.

BC 796 Var [1-5]. Group Study.

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BC 798 Var. Research.

BC 799 Var. Dissertation.

BUSINESS INFORMATION SYSTEMS COURSES (BD)

Department of Computer Information Systems College of Business

BD 120 03(3-0-0). Business Programming Fundamentals. F, S. File and operating systems for business application development.

Business program development using a high-level programming language.

BD 150 03(3-0-0). Business Computing Concepts and Applications. F, S, SS.

System hardware, operating environments, and software applications. (Ω-O)

BD 220 03(3-0-0). Object-Oriented Information Design. F, S, SS. Prerequisite: BD 120.

Object-oriented information design and programming; design and manipulation of data structures.

BD 240 03(3-0-0). Program Design and Construction. F, S, SS.

Software engineering methods including design, implementation, and testing using structured and event-driven techniques, logic, and data structures.

BD 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. (Ω-O)

BD 320 03(3-0-0). Project Management for Information Systems. F, S. Prerequisite: BD 120.

Project management concepts including work breakdown structure, estimating, scheduling, tools, and reports.

BD 350 03(3-0-0). Operating Systems and Networks. F, S. Prerequisite: BD 220 and BD 240.

Multiuser and network operating systems; basic networking concepts including security, transmission, performance, and topologies.

BD 355 03(3-0-0). Business Database Systems. F, S. Prerequisite: BD 220 and BD 240.

Physical and logical design, implementation, and administration of databases. (Ω-O)

BD 360 03(3-0-0). Systems Analysis and Design. F, S. Prerequisite: BD 220 or BD 240.

Traditional and cutting-edge systems analysis and design techniques, with emphasis on object-oriented approaches.

BD 400 03(3-0-0). Information Management in the Enterprise. F, S. Prerequisite: Any two of BF 300, BK 300, BN 320, BN 301.

Role of information in business functional areas, value of information in business; risks and rewards of enterprise information.

BD 410 03(3-0-0). Web Application Development. F. Prerequisite: BD 355.

Web development techniques and strategies including Active Server Pages using VBScript, JavaScript, ColdFusion; security, web design.

BD 411 03(3-0-0). Enterprise Resource Planning Systems. S. Prerequisite: BA 220; BF 300 or BF 305; BK 300 or BK 305; BN 305 or BN 320.

Introduction to enterprise resource planning (ERP) systems concepts, business processes impacted by ERP, systems and software integration.

BD 412 03(3-0-0). Issues and Cases in Electronic Commerce. S. Prerequisite: BD 355.

Business models for B2B or B2C e-commerce, technology infrastructure, electronic payment mechanisms, information privacy.

BD 413 03(3-0-0). Advanced Networking and Security. F. Prerequisite: BD 350.

Modern communication standards, protocol systems; network security, security policies, attack and protection mechanisms, legal and ethical issues.

BD 460 03(3-0-0). Object-Oriented Systems. F. Prerequisite: BD 355, BD 360.

Object-oriented concepts, development methodologies, techniques, and languages.

BD 462 03(3-0-0). Systems Development Project. F, S. Prerequisite: BD 320, BD 360.

Application of concepts, techniques, and tools used in analysis, design, and implementation of computer-based information systems in applied setting.

BD 487 03(0-9-0). Internship. Prerequisite: BD 355, BD 360.

Supervised and planned work experience paralleling concentration in industry.

BD 492 03(3-0-0). Seminar. Prerequisite: BD 460.

Current topics in computer-based information systems.

BD 495 Var. Independent Study.

BD 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.

BD 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.

BD 601/BN 601 03(3-0-0). Enterprise Computing and Systems Integration. F. Prerequisite: Admission to the M.S. program. Credit not allowed for both BD 601 and BN 601.

Integrated extended enterprise planning and execution systems concepts including ERP, CRM, SCM, MRPII, business processes, front/back office systems.

BD 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.

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Courses of Instruction

BD 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.

BD 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.

BD 611 03(3-0-0). Object-Oriented Systems. S. Prerequisite: BD 610.

Object-oriented and web-based software; object model describing classes; relationships to other objects, attributes, and operations.

BD 620 03(3-0-0). IT Communications Infrastructure.. S. Prerequisite: BD 606.

Technical aspects of information communications, business considerations; wireless technology, architecture, and applications.

BD 655 03(3-0-0). Business Database Systems. S. Prerequisite: BD 605.

Database analysis, design, administration; data modeling; data sublanguages, query facilities; distributed database systems.

BD 665 03(3-0-0). E-Business Application Technologies. S. Prerequisite: BD 605, BD 606, and BD 610.

Developing E-business (B2B and B2C) through construction and deployment.

BD 695 Var. Independent Study.

BD 696 Var. Group Study.

BD 699 Var. Thesis.

BIOMEDICAL ENGINEERING COURSES (BE)

College of Engineering

BE 306/BH 306 04(3-2-0). Bioprocess Engineering. S. Prerequisite: C CC 107 or C CC 111; PHCC 121 or PHCC 141. Credit not allowed for both BE 306 and BH 306.

Material, energy balances; fluid flow, heat exchange, mass transfer; application to operations in food, fermentation, other bioprocess industries.

BE 470 03(3-0-0). Biomedical Engineering.F. Prerequisite: PHCC 141; M CC 155 or M CC 160..

Engineering application in human/animal physiology, diagnosis of disease, treatment, rehabilitation, human genome manipulation.

BE 486A-B. Biomedical Clinical Practicum. F, S, SS. Prerequisite: BS 300 and BE 470 or written consent of instructor. A) 02(1-3-0). B) 04(1-6-0).

Biomedical lab work or exposure to the hospital/clinical environment.

BE 504/CH 504 03(3-0-0). Fundamentals of Biochemical Engineering. F. Prerequisite: MB 300; M CC 255 or M 340; BH 306 or CH 420 or concurrent registration. Credit not allowed for both BE 504 and CH 504.

Application of chemical engineering principles to enzyme kinetics, fermentation and cell culture, product purification, and bioprocess design.

BE 522/CH 522 03(2-2-0). Bioseparation Processes. F. Prerequisite: CH 331. Credit not allowed for both BE 522 and CH 522.

Analysis of processes to recover and purify fermentation products.

BE 525/CH 525 03(3-0-0). Cell and Tissue Engineering. S. Prerequisite: BS 300 or BS 500/NB 501 or BY 310 or BC 351. Credit not allowed for both BE 525 and CH 525.

Cell and tissue engineering concepts and techniques with emphasis on cellular response, cell adhesion kinetics, and tissue engineering design.

BE 532/ME 532 03(3-0-0). Material Issues in Mechanical Design. F. Prerequisite: ME 331. Credit not allowed for both BE 532 and ME 532.

Failure mechanisms from materials viewpoint with emphasis on use in design. Fracture, creep, fatigue and corrosion.

***BE 570/*ME 570 03(3-0-0). Bioengineering.** F. Prerequisite: ME 307, ME 324. Credit not allowed for both BE 570 and ME 570.

Physiological and medical systems analysis using engineering methods including mechanics, fluid dynamics, control, electronics, and signal processing.

BE 571/ME 571 03(3-0-0). Biomechanics. S. Prerequisite: BE 470 or BE 570/ME 570. Credit not allowed for both BE 571 and ME 571.

Mathematical approach to analysis of living systems, their function, diseases, and replaceable parts. (Ω -T)

BE 573/ME 573 03(3-0-0). Structure and Function of Biomaterials. S. Prerequisite: ME 331. Credit not allowed for both BE 573 and ME 573.

Structure-function relationships of natural biomaterials; application to analysis of biomimetic materials and biomaterials used in medical devices.

BE 586A-B. Biomedical Clinical Practicum. F, S, SS. Prerequisite: BE 570/ME 570; BS 300 or BS 500 or written consent of instructor. 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.

BUSINESS FINANCE AND REAL ESTATE COURSES (BF)

Department of Finance and Real Estate College of Business

BF 250 03(3-0-0). Personal Investments. SS.

Investment in securities, insurance, real estate; use of credit in personal investment programs.

BF 300 03(3-0-0). Principles of Finance. F, S, SS. Prerequisite: BA 205 or BA 210; ECCC 204. Credit not allowed for both BF 300 and BF 305.

Overview of financial markets and institutions, analysis of securities and investigation of financial management techniques.

BF 305 03(3-0-0). Fundamentals of Finance. F, S. Prerequisite: BA 205, ECCC 204. Credit not allowed for both BF 305 and BF 300.

Role of finance in management of the firm; role, structure of financial markets and institutions, valuation of basic securities.

BF 311 03(3-0-0). Investments-Fixed Income Securities. F, S, SS. Prerequisite: BF 300 or BF 305.

Analysis of money market and long-term debt instruments. Coverage includes corporate, government, and mortgage-based obligations.

BF 342 03(3-0-0). Risk Management and Insurance. S. Prerequisite: BF 300 or BF 305.

Management of insurable risks for the individual and business firm.

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BF 355 03(3-0-0). Investments-Equity Securities. F, S, SS. Prerequisite: BF 300 or BF 305.

Analysis of common stock and other equity securities; extensive portfolio management techniques.

BF 360 03(3-0-0). Real Estate Principles. F, S, SS. Prerequisite: ECCC 204.

Broad survey of real estate emphasizing land use, urban structure and growth, market analysis, real estate finance and valuation, and property rights.

BF 367 03(3-0-0). Real Estate Law. F. Prerequisite: BGCC 205 or BGCC 260 or HD 403.

Legal regulations applicable to real property ownership and transfer, to real estate agents, and to use of real property.

BF 370 03(3-0-0). Financial Management-Theory and Application. F, S, SS. Prerequisite: BF 300 or BF 305.

Theory and application of financial management to business firms; case problems used for illustration.

BF 460 03(3-0-0). Real Estate Finance and Investment. F. Prerequisite: BF 300 or BF 305, BF 360 or written consent of instructor.

Financing of real estate resources: real estate financial markets, policies; use of leverage and real estate investment analysis in real estate investment programs.

BF 465 03(3-0-0). Real Estate Appraisal. S. Prerequisite: BF 360 or written consent of instructor.

Various approaches to value as applied to real property; problems in appraising urban and rural property. Preparation of detailed appraisal reports.

BF 470 03(3-0-0). Financial Risk Management. S. Prerequisite: BF 311.

Futures, options, asset-backed securities and other derivatives as they are used in financial risk management.

BF 475 03(3-0-0). International Business Finance. F, S, SS. Prerequisite: BF 300 or BF 305.

International financial management emphasizing markets, instruments, hedging techniques, and operating strategies.

BF 478 03(0-0-3). Contemporary Issues in Finance. F, S, SS. Prerequisite: BF 370; BF 311 or BF 355.

Application of financial analysis and decision-making tools to current issues in financial markets, investments, and business finance.

BF 487 Var. Internship.

BF 495 Var. Independent Study.

BF 496 Var. Group Study.

BF 600 03(3-0-0). Financial Management-Theory and Case Studies. F, SS.

Financial problems for various types of business organizations.

BF 610 03(3-0-0). Financial Markets. F.

Overview of financial instruments, markets, and institutions emphasizing fixed income securities.

BF 655 03(3-0-0). Investments. S.

Investment analysis and decision making emphasizing equity securities and portfolio management.

BF 665 03(3-0-0). Financial Engineering. S. Prerequisite: BF 610 or BF 655 or BF 675.

Using futures, options, swaps, and securitized transactions in financial management.

BF 675 03(3-0-0). International Finance. S.

Analysis of the foreign exchange market and international financial markets. (Ω-T)

BF 678 03(3-0-0). Financial Decisions-Theory and Practice. S. Prerequisite: BF 600.

Analysis of theory of corporate finance with emphasis on underlying assumptions and implications for financial decisions.

BF 695 Var. Independent Study.

BF 696 Var. Group Study.

BF 699 Var. Thesis.

BUSINESS GENERAL COURSES (BG)

College of Business

BG 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.

BG 200 03(3-0-0). Business Communications and Report Writing. F, S, SS. Prerequisite: COCC 150.

Theory and principles of business communication with emphasis on written communication and presentation of reports.

BGCC 205 03(3-0-0). Fundamentals of Business Law. (AUCC 3F). F, S, SS. Credit not allowed for both BGCC 205 and BGCC 260.

Legal environment of business including norms, rules, laws, ethical principles, and values central to public life in the conduct of business.

BGCC 260 03(3-0-0). Social-Ethical-Regulatory Issues in Business. (AUCC 3F). F, S, SS. Credit not allowed for both BGCC 260 and BGCC 205.

Legal issues, business ethics, corporate responsibility, and the business interface within the U.S. regulatory and business environment.

BG 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.

BG 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.

BG 430 03(3-0-0). Business and Its Environment. F, S.

Social responsiveness of managers as they face expectations in the firm's internal and external environment.

BG 479 03(3-0-0). Business Policy and Administration. F, S, SS. Prerequisite: BN 301; BF 300 or BF 305; BK 300 or BK 305; BN 320 or BN 305.

An integration of various business subject areas in terms of top-level policy and decision making.

BG 495 Var. Independent Study.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

BG 496 Var. Group Study.

BG 604/ST 604 02(2-0-0). Managerial Statistics. F. Prerequisite: Admission to the MBA Program. Credit not allowed for both BG 604 and ST 604.

Introduction to statistical thinking and methods used to support managerial-decision making. (Ω-V)

BG 615 04(4-0-0). Accounting Systems. F. Prerequisite: Admission to M.B.A. program.

Financial, managerial accounting information systems. Use of accounting information for purposes of management decision making, planning, and control.

BG 616 02(2-0-0). Financial Reporting and Analysis. SS. Prerequisite: BG 615.

Tools and techniques for analysis of financial reports of public companies. (Ω-V)

BG 620 02(2-0-0). Leadership and Motivation. S. Prerequisite: Admission to M.B.A. program.

Ethical leadership and team dynamics; basic models of motivation utilized by leaders.

BG 621 02(2-0-0). Tools for Decision Making. F. Prerequisite: Admission to M.B.A. program.

Key decision areas and tools that help managers make better decisions based on data and structured analysis.

BG 625 02(2-0-0). Organizational Communication and Negotiations. S. Prerequisite: Enrollment in M.B.A. program.

Improving understanding and application of managerial communication skills and negotiation tools and their implications for effective management.

BG 630 02(2-0-0). Information Management. S. Prerequisite: Admission to M.B.A. program.

Role and value of information in business functions; risks and rewards of enterprise information; fundamentals of information storage and retrieval.

BG 631 02(2-0-0). Strategic Uses of Information Technology. F, S. Prerequisite: BG 630 or concurrent registration.

Strategic and tactical uses of information technology in the global business environment.

BG 635 02(2-0-0). Business Economics for the World Market. F, S. Prerequisite: Admission to M.B.A. program.

Application of economic principles to current business problems within context of global marketplace.

BG 640 02(2-0-0). Financial Principles and Practice. F, S. Prerequisite: BG 615, BG 635.

Financial environment; tools and techniques of corporate financial decision making.

BG 641 02(2-0-0). Financial Markets and Investments. F, S. Prerequisite: BG 640 or concurrent registration.

Operating of financial markets, techniques for security valuation, and portfolio management.

BG 645 02(2-0-0). Enterprise Electronic Business Strategies. S. Prerequisite: BG 630.

Technology for electronic commerce; regulation and strategies for competitive usage.

BG 650 02(2-0-0). Supply Chain Management. S. Prerequisite: Admission to M.B.A. program.

Value-driven supply chain principles, design and management of supply chains, and supply chain management software and applications.

BG 655 0 2(2-0-0). Marketing Management. F. Prerequisite: BG 616, BG 635.

Examines processes of customer value creation (e.g., product development, communications, distribution) and value capture (e.g. pricing).

BG 656 02(2-0-0). Marketing Strategy and Planning. F. Prerequisite: BG 655.

Basic marketing strategy analysis, formulation, evaluation and implementation concepts and tools. (Ω-V)

BG 660 02(2-0-0). Ethical, Legal, and Regulatory Issues S. Prerequisite: Admission to M.B.A. program.

Legal, regulatory, societal and ethical issues encountered by business professionals; analytical skills for making judgments.

BG 662 02(2-0-0). International Business. SS. Prerequisite: Admission to M.B.A. program.

Role of government regulations and how international firms affected; cultural aspects of business, global marketing, finance, management.

BG 665 04(4-0-0). Strategic Management. S. Prerequisite: BG 641, BG 656.

Integrates skills and concepts through analysis and discussion of cases and articles based on actual business problems.

BG 678 03(3-0-0). Business Research. F. Prerequisite: BQ 270.

Techniques for designing, conducting, and evaluating business research.

BG 695 Var. Independent Study.

BG 699 Var. Thesis.

BIOTECHNOLOGY COURSES (BH)

College of Veterinary Medicine and Biomedical Sciences

BH 306/BE 306 04(3-2-0). Bioprocess Engineering. S. Prerequisite: C CC 107 or C CC 111; PHCC 121 or PHCC 141. Credit not allowed for both BH 306 and BE 306.

Material, energy balances; fluid flow, heat exchange, mass transfer; application to operations in food, fermentation, other bioprocess industries.

BH 450 02(2-0-0). Topics in Biotechnology. S. Prerequisite: BC 351 or BC 401, MB 300.

Developments, trends in biotechnology; products from genetically engineered microorganisms, plant or animal cell cultures; advances in bioengineering.

BH 499 Var [1-3]. Biotechnology Thesis. Prerequisite: Twelve credits from biotechnology core; approval of program coordinator.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

BIOAGRICULTURAL SCIENCES AND PEST MANAGEMENT COURSES (BI)

***Department of Bioagricultural Sciences and Pest Management
College of Agricultural Sciences***

BICC 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.

BI 300/AN 300B 01(1-0-0). Topics in Livestock Entomology. S.
Prerequisite: AN 101 or AN 102. Credit not allowed for both BI 300 and AN 300B.
Identification, biology, and management of insect, tick, and mite pests.

BI 302 02(2-0-0). Applied and General Entomology. F.
Biology and management of insects.

BI 303A-C. Entomology Laboratory. F. Prerequisite: BI 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).

+BI 308 04(2-2-1). Biology and Control of Weeds. F. Prerequisite: BZCC 120 or LS 103; C CC 107 or C CC 111.
Classification, characteristics, reproduction, identification, ecology of weeds; weed control by cultural, biological, and chemical means; herbicides. (S)

BI 310 02(2-0-0). Fundamentals of Pesticides. F. Prerequisite: Introductory biological science or introductory chemistry.
Identification, properties, use, labeling, environmental interactions, and application of major classes of pesticides.

BI 361 03(2-2-0). Elements of Plant Pathology. S. Prerequisite: BZCC 104 or BZCC 120 or H CC 100 or LSCC 102.
Diseases of economic plants. (S)

+BI 365 04(3-3-0). Integrated Tree Health Management. F. Prerequisite: BZCC 120 or LSCC 102.
Insects and diseases in forest and urban ecosystems. Effects, diagnosis, prevention, and interactions. (S)

BI 384 Var [1-3]. Supervised College Teaching. F, S, SS.

BI 402A-G 01(.5-1-0). Plant Health Practica. A-B, E, F) F, S, C) *F. G) °F. Prerequisite: A-B, E-G) One course in plant pathology, weed science, or entomology. C) BI 402G or concurrent registration and one course in plant pathology, weed science, or entomology.
Application of plant health principles to: A) Vegetable and field plants. (S) B) Greenhouse and foliar plants (S) C) Turf and woody ornamental plants. (S) E) Household and structural. F) Pest management techniques and safety issues. G) Plant health diagnostics.

°BI 423 04(2-4-0). Evolution and Classification of Insects. F.
Prerequisite: BI 303A or B or C.
Major groups of insects, living and fossil; major evolutionary trends in structure and behavior.

***BI 424/*BZ 424 03(3-0-0). Principles of Systematic Zoology.** S.
Prerequisite: BZCC 111 or LS 103. Credit not allowed for both BI 424 and BZ 424.
Principles and methods of classification, zoological nomenclature, taxonomic decisions regarding species and higher categories.

BI 445 04(2-4-0). Aquatic Insects. F. Prerequisite: BZCC 111 or LS 103.
Biology and recognition of major orders and families of aquatic insects; a collection is required.

***BI 450 03(3-0-0). Molecular Plant-Microbe Interactions.** S.
Prerequisite: One course in biology and one course in genetics. Credit not allowed for both BI 450 and BI 550.
Principles of plant-microbe/insect interactions, physiological and molecular aspects of plant defense, genomics approaches to study plant defense.

BI 451 03(3-0-0). Integrated Pest Management. S. Prerequisite: BI 302 or BI 361 or BI 308 or 10 credits of biology.
Concepts of integrated pest management and the strategies and tactics employed in the application of these concepts.

BI 462/MB 462/BZ 462 05(3-4-0). Parasitology and Vector Biology. F.
Prerequisite: BZCC 110 or LS 103; MB 301 or MB 302 or LS 206 or BZ 212. Credit allowed for only one of the following: BI 462, MB 462, BZ 462.
Protozoa, helminths, and insects and related arthropods of medical importance; systematics, epidemiology, host damage and control.

BI 487 Var. Internship.

BI 492 Var [1-3]. Seminar.

BI 495 Var [1-3]. Independent Study.

BI 496 Var [1-3]. Group Study.

BI 502A-G 01. Topics in Plant Pathology. Prerequisite: One course in biology and plant pathology or written consent of instructor.
°A) Plant viruses 01(.5-1-0). F. °B) Plant bacteriology 01(.5-1-0). F. *C) Fungal plant pathogens 01(1-0-0). F. °E) Molecular plant-microbe interactions 01(1-0-0).F. *F) Plant disease epidemiology. 01(1-0-0). F. *G) Plant disease management 01(1-0-0).F.

°BI 507 03(3-0-0). Insect Behavior. S. Prerequisite: One course in biology.
Behavior of insects and related arthropods with special attention to social behavior.

°BI 508 03(3-0-0). Environmental Fate of Pesticides. S. Prerequisite: One course in soils, organic chemistry, or plant physiology, or written consent of instructor.
Processes that affect fate of pesticides and their metabolites in the environment with emphasis on soil and water.

***BI 509 03(3-0-0). Herbicide Selectivity and Action.** F. Prerequisite: BZ 440, BI 308.
Selectivity of major photosynthetic and growth inhibitor herbicides based on herbicide transport, metabolism, and mode of action.

°BI 510 03(3-0-0). Insect-Plant Disease Relationships. F. Prerequisite: One entomology or plant disease course.
Relationships between insects and various plant pathogens as they affect survival and transmissions of pathogens.

°BI 520/°BZ 520 03 (3-0-0). Advanced Systematics. S. Prerequisite: BZ 325 or BZ 424/BI 424. Credit not allowed for both BI 520 and BZ 520.
Theory and practice of modern systematics.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

***BI 521 02(0-0-2). Forest Health Issues.** F. Prerequisite: Introductory biological science.

Current topics related to forest and shade tree health from ecosystems to tree defense physiology.

***BI 525 03(3-0-0). Insect Physiology.** S. Prerequisite: BI 302.

Principles of insect function.

***BI 528 03(3-0-0). Ecophysiology of Weeds.** F. Prerequisite: BI 308, BZ 440.

Comparative ecophysiology of weeds with crops and factors involved in weed competition and population dynamics.

***BI 550 03(3-0-0). Molecular Plant-Microbe Interactions.** S. Prerequisite: One course in biology and one course in genetics. Credit not allowed for both BI 550 and BI 450.

Principles of plant-microbe interactions, physiological and molecular aspects of plant defense, genomic approaches to study plant defense.

BI 551 04(3-0-1). Advanced Integrated Pest Management. S. Prerequisite: 10 credits of biology.

Concepts of integrated pest management and the strategies and tactics employed in the practical application of these concepts.

°BI 555 03(1-4-0). Immature Insects. S. Prerequisite: BI 303A or B or C.

Characteristics of immature forms of orders and families of insects emphasizing those important to humans.

°BI 556 03(3-0-0). Biological Control of Plant Pests. F. Prerequisite: Ten credits of biology.

Management of insect pests of plants, plant pathogens, and weeds using biological control agents such as insects, bacteria, viruses, and fungi.

°BI 562/°MB 562 05(1-8-0). Field Ecology of Disease Vectors. Prerequisite: BI 462/BZ 462/MB 462 or MB 300; BI 302. Credit allowed for only one of the following: BI 562, BZ 562, MB 562.

Evolution, morphology, life cycles, and field biology of disease vectors; field techniques and experience in surveillance of arthropods and pathogens.

***BI 570 03(3-0-0). Chemical Ecology.** S. Prerequisite: C 245 or C 345.

Chemical interactions among animals, plants, fungi, and microorganisms.

***BI 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.

BI 576/MB 576 03(3-0-0). Bioinformatics. F, S. Prerequisite: BC 463 or BY 310 or CM 501 or MB 450. Access to campus network. Credit not allowed for both BI 576 and MB 576.

Technical computing across platforms using bioinformatics tools in molecular analyses.

BI 584 Var [1-3]. Supervised College Teaching. F, S, SS.

BI 587 Var. Internship.

BI 594 Var [1-3]. Independent Study.

BI 596 Var [1-3]. Group Study.

BI 698 Var. Research.

BI 699 Var. Thesis.

BI 710/CM 710 03(0-4-1). Techniques in Molecular Biology and Genetics. S. Prerequisite: BC 463 or BZ 346 or BZ 350 or MB 450 or SC 330. Credit not allowed for both BI 710 and CM 710.

Genetic manipulation of bacteria, bacteriophage, and yeast including experiments in molecular cloning and gene expression.

°BI 740/°SC 740 03(3-0-0). Plant Molecular Genetics. F. Prerequisite: BC 351, SC 330. Credit not allowed for both BI 740 and SC 740.

Advances in study of organization and function of nuclear and organellar genomes, gene expression in higher plants, and plant-microbe interactions.

BI 784 Var [1-3]. Supervised College Teaching. F, S, SS.

BI 787 Var. Internship.

BI 792 Var [1-2]. Seminar.

BI 794 Var [1-3]. Independent Study.

BI 798 Var. Research.

BI 799 Var. Dissertation.

BUSINESS MARKETING COURSES (BK)

Department of Marketing ***College of Business***

BK 300 03(3-0-0). Marketing. F, S, SS. Prerequisite: EACC 202 or ECCC 202. Credit not allowed for both BK 300 and BK 305.

Market and buyer analysis, product and service development, pricing, promotion, advertising, selling, and distribution.

BK 305 03(3-0-0). Fundamentals of Marketing. F, S. Prerequisite: ECCC 101 or ECCC 202 or EACC 202. Credit not allowed for both BK 305 and BK 300.

Overview of marketing activities involved in provision of products and services to consumers, including target markets and managerial aspects.

BK 320 03(3-0-0). Integrated Marketing Communications. F, S. Prerequisite: BK 300 or BK 305.

Principles and practices of managing promotional activities including advertising, sales promotion, and other major media.

BK 330 03(3-0-0). Business Customer Relationships. F, S. Prerequisite: BK 300 or BK 305.

Managing relationships with distribution channel intermediaries and business customers.

BK 360/DM 360 03(3-0-0). Retailing. F, S, SS. Prerequisite: BK 300 or BK 305. Credit not allowed for both BK 360 and DM 360.

Retail markets, institutions, operations, and problems. (Ω-O)

BK 361 03(3-0-0). Buyer Behavior. F, S. Prerequisite: BK 300 or BK 305.

Marketing analysis of buying behavior of individuals, households, businesses, and not-for-profit organizations.

BK 362 03(3-0-0). Professional Selling. F, S. Prerequisite: BK 300 or BK 305.

Persuasive personal communications in selling consumer and industrial products and services.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

BK 363 03(3-0-0). Sales Management. S. Prerequisite: BK 300 or BK 305.

Recruiting, selecting, training, compensating, motivating, supervising, and evaluating a sales force.

BK 364 03(3-0-0). Product Development and Management. F. Prerequisite: BK 300 or BK 305.

Consumer and industrial product development and management issues as an integral part of the marketing mix.

BK 365 03(3-0-0). International Marketing. F, S. Prerequisite: BK 300 or BK 305.

Analysis of international markets and development of strategic and tactical options for marketing across national boundaries.

BK 366 03(3-0-0). Services Marketing. S, SS. Prerequisite: BK 300 or BK 305.

Customer service issues and unique challenges involved in marketing and management of services operations.

BK 410 03(3-0-0). Marketing Research. F, S. Prerequisite: BK 300 or BK 305, STCC 204.

Role and methodology of research in business emphasizing selection of study's direction, collecting data, and choosing techniques for analyzing these data.

BK 440 03(3-0-0). Pricing and Financial Analysis in Marketing. F, S. Prerequisite: BK 300 or BK 305.

Financial analysis involved in addressing marketing problems; advanced study of pricing strategy and tactics.

BK 479 03(3-0-0). Marketing Strategy and Management. F, S. Prerequisite: BK 410.

Marketing decisions involving integration of elements of the marketing mix.

BK 487 03(0-9-0). Internship. Prerequisite: Marketing majors with written consent of instructor. Maximum of 3 credits allowed in course.

BK 492 03(0-0-3). Seminar. Prerequisite: BK 300 or BK 305; written consent of instructor.

BK 495 Var [1-5]. Independent Study. Prerequisite: 2.75 GPA or better.

BK 496 Var [1-3]. Group Study.

BK 692 03(0-0-3). Seminar.

Critical review and discussion of relevant marketing topics.

BK 695 Var [1-3]. Independent Study. Prerequisite: 3.25 GPA or better.

BN 305 03(3-0-0). Fundamentals of Management. F, S, SS. Credit not allowed for both BN 305 and BN 320.

Managerial process of planning, directing, and controlling inputs of an organization. Analysis, decision making, and survey of research literature.

BN 310 03(3-0-0). Human Resource Management. F, S.

Principles and practices of employee management including hiring, development, compensation, and employee relations.

BN 320 03(3-0-0). Organization Management. F, S, SS. Prerequisite: BG 200. Credit not allowed for both BN 320 and BN 305.

Fundamentals of management and organizational behavior in the work environment. (Ω-O)

BN 330 03(3-0-0). Organizational Theory. F, S. Prerequisite: BN 305 or BN 320.

Design, structure, and change of organizations.

BN 340 03(3-0-0). Entrepreneurship in the Contemporary World. S.

Concepts of entrepreneurship and role of entrepreneurs in the economy.

BN 350 03(3-0-0). Employment Law and Policy. F.

Legal principle and policy issues arising from the employment relationship.

BN 375 03(3-0-0). Introduction to Supply Chain Management. F, S. Prerequisite: BN 301.

Supply chain management processes and functions.

BN 410 03(3-0-0). Organizational Behavior. F, S. Prerequisite: BN 305 or BN 320.

Behavior of people and groups as members of organizations.

BN 420 03(3-0-0). New Venture Creation. F. Prerequisite: BN 340.

Entrepreneurs and the entrepreneurial process. Growth of an independent business.

BN 425 03(3-0-0). Strategic Communications in Organizations. F. Prerequisite: BF 300 or BF 305; BK 300 or BK 305; BN 305 or BN 320.

Strategic communications in organizations; contribution that organizational members make whether acting as individual or group communicators.

BN 440 03(3-0-0). New Venture Management. S. Prerequisite: BN 420.

Theories and skills necessary for managing startup and existing small firms.

BN 450 02(2-0-0). Biomedical Entrepreneurship I. S. Prerequisite: BE 470 or BN 340 or written consent of instructor.

Commercialization process for biomedical inventions; market and competitor analysis, regulations, patents; preliminary feasibility study.

BN 451 01(1-0-0). Biomedical Entrepreneurship II. F. Prerequisite: BN 450.

Financing (especially regulatory financing) and operational issues.

BN 470 03(3-0-0). Managerial Decisions-Issues and Analysis. F, S. Prerequisite: BN 301, BN 305 or BN 320.

Investigation and application of managerial decision-making processes and methods to solve problems in business functions.

BN 471 03(3-0-0). Micro Issues in Supply Chain Management. F. Prerequisite: BN 375.

Managing the supply function (locally or globally) and the productive flow of materials in goods and services-producing supply chains.

BUSINESS MANAGEMENT COURSES (BN)

Department of Management College of Business

BN 301 03(3-0-0). Production Fundamentals. F, S, SS. Prerequisite: STCC 204 or STCC 301.

Fundamental concepts in design, planning, operation, and control of producing systems, and decision making in the production function.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

BN 472 03(3-0-0). Macro Issues in Supply Chain Management. S. Prerequisite: BN 375.

Application of analytical and computer-based tools in the analysis and improvement of supply chains with variable demand and supply.

BN 473 03(3-0-0). Labor Relations and Collective Bargaining. F, S.

Managerial decision making and action in labor-management relations as affected by labor legislation and administrative practices.

BN 474 03(3-0-0). Human Resource Planning and Development. S. Prerequisite: BN 310.

Human resource planning, recruitment, selection, training, and development.

BN 475 03(3-0-0). International Business Management. F, S. Prerequisite: BF 300 or BF 305; BK 300 or BK 305; BN 305 or BN 320.

Multinational corporations: their scope, activities, managerial problems and decisions.

BN 487 Var. Internship.

BN 495 Var. Independent Study.

BN 496 Var. Group Study.

BN 600 03(3-0-0). Manufacturing Process and Systems Design. S. Prerequisite: BG 620, BG 625.

Strategic understanding of alternate manufacturing processes and systems design support needed to manage those processes.

BN 601/BD 601 03(3-0-0). Enterprise Computing and Systems Integration. F. Prerequisite: Admission to the M.S. program. Credit not allowed for both BN 601 and BD 601.

Integrated extended enterprise planning and execution systems concepts including ERP, CRM, SCM, MRPII, business processes, front/back office systems.

BN 608 03(3-0-0). Project Management. F. Prerequisite: Admission to graduate degree program.

Project management using quantitative and computer-based tools.

BN 610 03(3-0-0). Strategic Human Resource Management. S. Prerequisite: BN 310.

Strategic systems for employee management including planning, staffing, evaluation, development, reward, and maintenance.

BN 611 03(3-0-0). Management of Organization Development. S. Prerequisite: BN 305 or BN 320.

Methods for managing organizational change.

BN 620 03(3-0-0). Management. F, S.

Practices, policies, philosophies, and behavior.

BN 630 03(3-0-0). Management of Technology. F. Prerequisite: Admission to graduate degree program.

Introduction to managing technological change in industries with short product life-cycle strategies.

BN 640 02(2-0-0). Supply Chain Management Strategies. F. Prerequisite: BN 600.

How to create an effective supply chain management system to establish an efficient network for supplying final consumption.

BN 671 03(3-0-0). Labor Management Relations. S.

Collective bargaining process, administration of contract, and impact of public policy on industrial relations.

BN 679 02(2-0-0). Strategic Management. S. Prerequisite: Thirty-one credits in M.S. Management Program.

Integration of strategic management to create competitive advantages.

BN 695 Var. Independent Study.

BN 696 Var. Group Study.

BN 699 Var. Thesis.

BUSINESS MANAGEMENT SCIENCE COURSES (BQ)

Department of Computer Information Systems College of Business

BQ 270 03(2-2-0). Basic Business Statistics. F, S, SS. Prerequisite: STCC 204.

Statistical tools applied to business conditions and functions.

BQ 375 03(2-2-0). Models and Applications in Management Science. F, S. Prerequisite: STCC 204.

Introduction and application of operations research techniques to business decision problems.

BQ 570 03(3-0-0). Statistical Decision Making. F, SS. Prerequisite: BQ 270.

Classical statistical techniques including hypothesis testing and multiple regression; model building, control charts, time series and forecasting.

BIOMEDICAL SCIENCES (BS)

Department of Biomedical Sciences College of Veterinary Medicine and Biomedical Sciences

BSCC 110/EHCC 110 03(3-0-0). Human Health and Environmental Perspectives. (AUCC 3G). F, S. Prerequisite: High school level biology. Credit not allowed for both BSCC 110 and EHCC 110.

Survey of health and wellness, physical activity and nutrition, the environment, drugs and health, diseases and injuries, sexuality and pregnancy.

BSCC 120 02(2-0-0). Human Health and Disease. (AUCC 3G). F, S, SS.

Function of the human body in health and disease; exercises for decision making related to health.

BSCC 122 02(2-0-0). Drugs and the Human Body. (AUCC 3G). F, S.

Drugs effect on body functions. Implications of drug use in society.

BSCC 124 03(3-0-0). Sexuality and Health. (AUCC 3G). F, S.

Basic concepts of human reproduction, contraception, pregnancy, abortion, and venereal disease; their relationship to health.

BS 192 0 1(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.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

BS 200 01(0-0-1). Concepts in Human Anatomy and Physiology. F, S. Prerequisite: BS 300 or concurrent registration.
Basic concepts in the anatomy and physiology of the human body.

BS 230 03(3-0-0). Animal Anatomy and Physiology. S. Prerequisite: C CC107, LSCC 102. Credit not allowed for BS 230 and BS 231, BS 305, or VS 333.
Comparative systemic anatomy and physiology of farm animals.

BS 300 04(4-0-0). Principles of Human Anatomy and Physiology. F, S, SS. Prerequisite: BZCC 101 or BZCC 110 or LSCC 102; C CC 103 or C CC 107 or C CC 111.
Anatomy and physiology of humans.

BS 301 05(3-2-1). Human Gross Anatomy. F. Prerequisite: BZCC 110 or LSCC 102.

Structure and function of the human body. Study of prosected human cadavers; clinical applications; living anatomy. (\$)

BS 302 02(0-3-1). Laboratory in Principles of Physiology. F, S. Prerequisite: BS 300 or BS 310/BZ 310 or concurrent registration..
Basic physiology lab exercises.

BS 305 04(3-3-0). Domestic Animal Gross Anatomy. S. Prerequisite: LSCC 102 or BZCC 110. Credit allowed for only one of the following: BS 305 or VS 333.

Comparative gross anatomy of domestic carnivores, ruminants, and horses.

BS 310/BZ 310 03(3-0-0). Fundamentals of Physiology. S. Prerequisite: BZCC 101 or BZCC 110 or LSCC 102; C 245 or concurrent registration. Credit not allowed for both BS 310 and BZ 310.

Basic mechanisms of physiology: comparative and quantitative.

BS 325 03(3-0-0). Cellular Neurobiology. F. Prerequisite: BS 300 or BY 310.

Cellular and molecular bases of nervous system function and behavior.

BS 330 04(3-3-0). Microscopic Anatomy. S. Prerequisite: BS 300 or BS 360. Credit not allowed for both BS 330 and VS 331.

Microscopic anatomy of mammalian tissue.

BS 345 04(3-2-0). Functional Neuroanatomy. S. Prerequisite: BS 300.

Functional systems and circuits of the human brain and spinal cord. (\$)

BS 360 04(4-0-0). Fundamentals of Physiology. S. Prerequisite: LS 210. Credit allowed for only one of the following: BS 310, BS 360, BZ 310.

Cell, tissue, and organ function related to integrated whole body function.

BS 365 03(3-0-0). Nerve and Muscle-Toxins, Trauma, and Disease. S. Prerequisite: BS 300 or BY 310.

Understanding cellular and molecular basis of nerve and muscle activities in health and disease.

BS 384 Var [1-5]. Supervised College Teaching. F, S, SS. Prerequisite: BS 300.

Supervision by and work with graduate teaching assistants in small group learning sessions involving students enrolled in BS 300.

BS 410 03(3-0-0). Physiological Responses to the Environment. S. Prerequisite: BS 300.

Acute and chronic physiological responses to various environmental factors.

BS 420 03(3-0-0). Cardiopulmonary Physiology. F. Prerequisite: BS 300.
Normal and pathophysiology of cardiovascular and pulmonary systems.

BS 430 03(3-0-0). Endocrinology. F. Prerequisite: BS 300.
Physiology of the glands of internal secretion.

BS 450 03(3-0-0). Pharmacology. S. Prerequisite: BS 300 or BS 310/BZ 310 or written consent of instructor.

Pharmacologic principles, absorption, distribution, metabolism, excretion, side effects, and actions of drugs.

BS 460 03(3-0-0). Essentials of Pathophysiology. S. Prerequisite: BS 360; concurrent registration in BS 492.

Integration of different facets of mechanisms underlying health and disease.

BS 492 02(2-0-0). Seminar-Pathophysiology of Disease. S. Corequisite: Concurrent enrollment in BS 460.

Capstone seminar in biomedical sciences.

BS 495 Var. Independent Study.

BS 500 04(4-0-0). Mammalian Physiology I. F. Prerequisite: Six credits of biological sciences. Credit not allowed for both BS 500 and NB 501.

Membrane function and electrical activity of cells, neurophysiology, blood and immune, muscle physiology, and cellular endocrinology.

BS 501 05(5-0-0). Mammalian Physiology II. S. Prerequisite: Six credits of biological science,.

Cardiovascular, respiratory, renal, digestive, endocrine, metabolic, and reproductive function.

BS 531 03(0--9-0). Domestic Animal Dissection. S

Dissection of domestic animals.

BS 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. (\$)

BS 550 03(2-0-1). Electron Microscopy-TEM, SEM, and X-ray. S. Prerequisite: PHCC 110. For biologists and materials scientists.

Theory and demonstration of transmission and scanning electron microscopy and X-ray microanalysis.

***BS 560 03(2-0-1). Theory and Practice of Animal Biotechnology.** S. Prerequisite: One semester of biochemistry or written consent of instructor.

Principles of molecular technology and applications to animal and human populations, including transgenic technology and gene therapy.

BS 575 04(0-8-0). Human Anatomy Dissection. F. Prerequisite: BS 301 and written consent of instructor.

Regional approach to human gross anatomy through laboratory dissection of human cadaver. (\$)

BS 610A-B 01(1-0-0). Managing a Career in Science. F.

A) Survival skills for coursework (M.S.). B) Survival skills for research (M.S. and Ph.D.).

BS 619 02(0-0-2). Advanced Human Gross Anatomy. F. Prerequisite: Written consent of instructor.

Clinical application of human anatomy through case-based study.

°BS 620 03(3-0-0). Cardiovascular Physiology. S. Prerequisite: BS 500.
Physiology and biophysics of the circulatory system.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

***BS 625 03(3-0-0). Pulmonary Physiology.** S. Prerequisite: BS 420 or BS 500.

Structure, function, and pathophysiology of respiratory system.

°BS 631 02(2-0-0). Mechanisms of Hormone Action. S. Prerequisite: BS 430 or BS 501.

Synthesis, secretion, and mechanisms of action of hormones.

°BS 632 02(2-0-0). Metabolic Endocrinology. S. Prerequisite: BS 631.

Endocrine regulation of metabolic homeostasis; effects of exercise or pregnancy.

BS 633 02(0-0-2). Domestic Animal Anatomy-Case Discussions. S. Prerequisite: Concurrent registration in BS 531.

Clinical case discussions utilized in advanced understanding of domestic animal anatomy and physiology.

***BS 640 05(5-0-0). Reproductive Physiology and Endocrinology.** F. Prerequisite: BS 501.

Reproductive physiology and endocrinology of vertebrate animals.

***BS 642 01(0-3-0). Research Techniques for Gametes and Embryos.** S. Prerequisite: Course in reproductive physiology.

Collection, storage, evaluation, in vitro manipulation, and replacement of sperm, oocytes, embryos, and other reproductive tissues.

BS 650 01(0-3-0). Transmission EM Laboratory. S. Prerequisite: BS 550.

Operation of transmission electron microscope; preparation of samples; interpretation of images.

BS 652 01(0-3-0). Scanning EM Laboratory. S, SS. Prerequisite: BS 550.

Operation of scanning electron microscope; preparation of samples; interpretation of images.

BS 672A-B. Advanced Topics in Electron Microanalysis.

A) Freeze fracture 02(1-3-0). SS. Prerequisite: BS 650. B) X-ray microanalysis 01(0-3-0). SS. Prerequisite: BS 652.

BS 684 Var. Supervised College Teaching. F, S, SS.

BS 692 01(0-0-1). Seminar-Classics in Neurosciences. Prerequisite: Admission to graduate program or written consent of instructor.

Review of classic papers in the neurosciences.

BS 695A-F Var. Independent Study.

A) Developmental anatomy. B) Microscopic anatomy. C) Neuroanatomy. D) Radiographic anatomy. E) Surgical anatomy. F) Gross anatomy.

BS 699 Var. Thesis.

***BS 740 03(3-0-0). Metabolism.** F. Prerequisite: BS 501.

Applied pathophysiology of disorders of carbohydrate, lipid, protein, fluid, and electrolyte metabolism.

BS 784 Var. Supervised College Teaching. F, S, SS.

BS 792 Var [1-5]. Seminar.

BS 795A-E Var. Independent Study.

A) Endocrinology. B) Neurophysiology. C) Cell physiology. D) Cardiopulmonary physiology. E) Reproductive physiology.

BS 796A-C Var. Group Study.

A) Neurophysiology. B) Cardiopulmonary physiology. C) Reproductive physiology.

BS 799 Var. Dissertation.

BIOLOGICAL SCIENCE COURSES (BY)

Office of Provost/Academic Vice President

BY 220 03(3-0-0). Fundamentals of Ecology. F, S. Prerequisite: One course in biology; M CC 124 or M CC 141 or M CC 155 or M CC 160. Credit not allowed for both BY 220 and BY 320.

Interrelationships among organisms and their environments. (Ω-O)

+BY 221 01(0-3-0). Introductory Ecology Field Laboratory. F, S. Prerequisite: BY 220 or concurrent registration.

Field and laboratory exercises where students learn and apply methods in ecology. (\$)

BY 310 04(3-3-0). Cell Biology. F, S. Prerequisite: One semester of organic chemistry or concurrent registration; two semesters of introductory biology.

Structure and function of cells emphasizing molecular mechanisms. Communication, metabolism, motility, genetics, growth, reproduction. (\$)

BY 311 04(3-2-0). Developmental Biology. S, SS. Prerequisite: BY 310 or written consent of instructor.

Developmental aspects of growth and differentiation stressed in higher plants and animals.

BY 320 03(3-0-0). Ecology. F, S. Prerequisite: One course in biology; M CC 141, M CC 155, or M CC 160. Credit not allowed for both BY 320 and BY 220.

Interrelationships among organisms and their environments using conceptual models and quantitative approaches.

BY 384 Var [1-3]. Supervised College Teaching. F, S, SS. Prerequisite: 3.0 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 BY courses.

BOTANY/ZOOLOGY COURSES (BZ)

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. (Ω-T)

BZCC 101 03(3-0-0). Humans and Other Animals. (AUCC 3A). F, S, SS. Credit not allowed for students who have already taken BZCC 110 or LSCC 102 or LS 103.

Characteristics of animals, their evolution and diversity; humans considered as an animal.

BZCC 104 03(3-0-0). Basic Concepts of Plant Life. (AUCC 3A). F, S, SS. For nonscience and physical science majors. Credit not allowed for students who have already taken BZCC 120 or LSCC 102 or LS 103.

Broad concepts of biology with major emphasis on plant life.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

BZCC 105 01(0-2-0). Basic Concepts of Plant Life Laboratory. (AUCC 3A). F, S, SS. Prerequisite: BZCC 104 or concurrent registration.
Modern biology exercises including viruses, Monera, Protista, fungi, plants, genetics, physiology, and ecology. (\$)

BZCC 110 03(3-0-0). Principles of Animal Biology. (AUCC 3A). F, S, SS.

General features (body form, physiology, life history, ecology) and evolutionary relationships of major phyla of animals.

BZCC 111 01(0-3-0). Animal Biology Laboratory. (AUCC 3A). F, S, SS. Prerequisite: BZCC 110 or concurrent registration.

Laboratory exercises demonstrating major features of animal biology and major phyla of animals. (\$)

BZCC 120 04(3-3-0). Principles of Plant Biology. (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: BZCC 110 and BZCC 111 or LS 103.

General biology of invertebrates; their characteristics, classification, and adaptations. (\$)

+BZ 214 04(3-3-0). Animal Biology-Vertebrates. F. Prerequisite: BZCC 111 or LS 103.

General biology of vertebrates; their characteristics, classification, and adaptations. (\$)

BZ 220 03(3-0-0). Introduction to Evolution. F, S. Prerequisite: BZCC 110 and BZCC 111 or BZCC 120 or LS 103.

Fundamental concepts in evolutionary biology.

BZ 223 03(2-2-0). Plant Identification. F, S. Prerequisite: BZCC 120 or LS 103.

Relationships and identification of flowering plants.

BZ 300 03(3-0-0). Animal Behavior. S. Prerequisite: BZCC 111 or LS 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.

Laboratory experiments in animal behavior; demonstrations and independent investigations.

°BZ 302 03(2-2-0). Poisonous Plants. F. Prerequisite: BZCC 120 or LS 103.

Identification and toxic properties of certain plants; animal reactions to more important ones.

BZ 310/BS 310 (03(3-0-0)). Fundamentals of Physiology. S. Prerequisite: BZCC 101 or BZCC 110 or LSCC 102; C 245 or concurrent registration. Credit not allowed for both BZ 310 and BS 310.

Basic mechanisms of physiology: comparative and quantitative.

°BZ 315 03(2-0-1). Marine Ecology. F. Prerequisite: BZCC 111 and BZCC 120 or LS 103, C 245.

Marine organisms, habitats, and communities.

***BZ 321 03(1-4-0). Aquatic Vascular Plants.** F. Prerequisite: BZ 223 or BZ 325 or written consent of instructor.

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: BZCC 111 or LS 103.

Evolution, classification, and biology of mammals; practice in identifying and preparing specimens.

***BZ 331 04(2-4-0). Developmental Plant Anatomy.** F. Prerequisite: BZCC 120 or LS 103; C 245 or C 346; BZ 350 or concurrent registration.

Structure of plant cells, tissues, and organs as they develop.

°BZ 332 04(3-2-0). Introductory Phycology. F. Prerequisite: BZCC 120 or LSCC 102 or LS 103.

Morphology, ultrastructure, physiology, ecology, and phylogeny of freshwater and marine algae.

BZ 333 04(2-4-0). Introductory Mycology. F. Prerequisite: BZCC 120 or LS 103 or written consent of instructor.

Groups of fungi including classification, structure, morphogenesis, phylogeny, and genetics and reproduction.

+BZ 335 03(1-4-0). Ornithology. S. Prerequisite: BZCC 111 or LS 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: BZCC 120 or LS 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, M CC 155, STCC 301 or STCC 307/EHCC 307.

Evolutionary theories and history; heredity mechanisms that are basis for variation, evolution, and biological communication between generations.

BZ 350 04(3-0-1). Molecular and General Genetics. F. Prerequisite: LSCC 102, one course in statistics. 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. Maximum of 10 credits allowed in course.

***BZ 401 03(3-0-0). Comparative Animal Physiology.** F. Prerequisite: BZCC 111 or LS 103.

Physiological mechanisms of digestion, metabolism, osmoregulation, excretion, circulation, and respiration in vertebrate and invertebrate animals.

BZ 402 04(3-3-0). Chromosomes of Eukaryotes. S. Prerequisite: BY 310.

Structure, function, and behavior of eukaryotic chromosomes during interphase, mitosis, and meiosis.

°BZ 403 03(3-0-0). Comparative Endocrinology. F. Prerequisite: BY 310.

Comparison of endocrine molecules, responses, and control mechanisms in vertebrates and invertebrates emphasizing molecular aspects.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

***BZ 424/BI 424 03(3-0-0). Principles of Systematic Zoology.** S. Prerequisite: BZCC 111 or LS 103. Credit not allowed for both BZ 424 and BI 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: One course in genetics.

Genetics of behavioral characteristics in human and infrahuman species.

BZ 440 03(3-0-0). Plant Physiology. S. Prerequisite: BZCC 120 or LS 103; C 245 or concurrent registration.

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: BZCC 111 or LS 103.

Human heredity and its individual and social implications; causes of congenital defects.

BZ 462/MB 462/BI 462 05(3-4-0). Parasitology and Vector Biology. F. Prerequisite: BZCC 110 or LS 103; MB 301 or MB 302 or LS 206 or BZ 212. Credit allowed for only one of the following: BZ 462, BI 462, MB 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: BY 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: BY 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 SC 330.

Advanced topics in model genetic systems including molecular and developmental genetics.

BZ 487 Var [1-12]. Internship. F, S, SS.

Supervised work-related research experience in laboratory or field setting with consultation and approval of a regular faculty member.

BZ 492A-G Var [1-3]. Seminar.

A) Behavior. B) Ecology. C) Genetics. D) Ornithology. E) Herpetology. F) Evolution. G) Departmental.

BZ 495 Var [1-3]. Independent Study. Maximum of 7 credits allowed in course.

BZ 498 Var [1-6]. Laboratory or Field Research. F, S, SS. 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: One course in physiology, one course in ecology.

Concepts, principles, and examples of adaptive physiological strategies used by animals.

°BZ 520/°BI 520 03 (3-0-0). Advanced Systematics. S. Prerequisite: BZ 325 or BZ 424/BI 424. Credit not allowed for both BI 520 and BZ 520.

Theory and practice of modern systematics.

***BZ 530 02(2-0-0). Ecological Plant Morphology.** S. Prerequisite: One course in ecology, written consent of instructor.

Adaptive significance and evolution of plant form and structure.

BZ 535 03(3-0-0). Behavioral Ecology. S. Prerequisite: BZCC 111 or LS 103; BZ 300, M CC 155, one course in ecology.

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.

***BZ 555 03(3-0-0). Reproductive Biology of Higher Plants.** F. Prerequisite: BZ 223 or BZ 325 or written consent of instructor.

Reproductive processes influencing evolution in higher plant groups.

BZ 561 03(3-0-0). Landscape Ecology. F. Prerequisite: One course in ecology, one course in statistics, and 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: BZ 350 or SC 330 or BC 463 or MB 450.

Various aspects of plant development at the molecular level.

BZ 571 03(3-0-0). Molecular and Developmental Evolution. S. Prerequisite: BZ 220, M CC 155, STCC 301 or STCC 307/EHCC 307. Credit not allowed for both BZ 571 and BZ 478.

Biological mechanisms of evolutionary change in populations and results of their operation.

°BZ 572 03(3-0-0). Phytoremediation. S. Prerequisite: BZCC 120 or LS 103.

Environmental cleanup using plants.

°BZ 578/°MB 578 04(3-0-1). Genetics of Natural Populations. F. Prerequisite: One course in genetics, one course in statistics. Credit not allowed for both BZ 578 and MB 578.

Theoretical and empirical aspects of the genetics of natural populations; current molecular techniques and statistical analysis.

***BZ 579/MB 579 04(0-8-0). Laboratory in Population Genetics.** F. Prerequisite: BZ 578/MB 578 or written consent of instructor. Credit not allowed for both BZ 579 and MB 579.

Molecular and statistical techniques in discrete and quantitative genetics. Students design and complete practical exercises. (\$)

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

BZ 584 Var [1-3]. Supervised College Teaching. F, S, SS. 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. F, S, SS. 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.

CHEMISTRY COURSES (C)

Department of Chemistry *College of Natural Sciences*

C CC 103 03(3-0-0). Chemistry in Context. (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.

C CC 104 01(0-3-0). Chemistry in Context Laboratory. (AUCC 3A). F, S, SS. Prerequisite: C CC 103 or concurrent registration.

Laboratory applications of principles covered in C CC 103.

C CC 107 04(4-0-0). Fundamentals of Chemistry. (AUCC 3A). F, S, SS. Prerequisite: M CC 117 or M CC 120A-B or placement in M CC 121 or higher. For students in science-related programs requiring one semester of general chemistry. Quantitative reasoning but with less focus on mathematical calculations than C CC 111/C 113. Credit not allowed for both C CC 107 and C CC 111.

Atomic/molecular theory, gases, liquids, solids, solutions, acid/base and oxidation/reduction reactions, kinetics, selected topics.

C CC 108 01(0-3-0). Fundamentals of Chemistry Laboratory. (AUCC 3A). F, S, SS. Prerequisite: C CC 107 or concurrent registration. Credit not allowed for both C CC 108 and C CC 112.

Laboratory applications of principles presented in C CC 107.

C CC 111 04(3-0-1). General Chemistry I. (AUCC 3A). F, S, SS. Prerequisite: M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher. Intended for science majors. Students should complete the sequence: C CC 111, C CC 112, C 113 and C 114. Credit not allowed for both C CC 111 and C CC 107.

Fundamental aspects of chemistry and chemical principles; emphasis on structure, bonding, and stoichiometry. (GT-SC1)

C CC 112 01(0-3-0). General Chemistry Laboratory I. (AUCC 3A). F, S, SS. Prerequisite: C CC 111 or concurrent registration. Credit not allowed for both C CC 112 and C CC 108.

Laboratory applications of principles covered in C CC 111.

C 113 03(3-0-0). General Chemistry II. F, S, SS. Prerequisite: C CC 107 or C CC 111; M CC 124 or M CC 141 or M CC 155 or M CC 160 or concurrent registration in M CC 155 or M CC 160.

Acid/base equilibria, kinetics, thermodynamics, solubility, oxidation-reduction reactions, electrochemistry, selected topics.

C 114 01(0-3-0). General Chemistry Laboratory II. F, S, SS. Prerequisite: C CC 112; C 113 or concurrent registration.

Laboratory applications of principles covered in C 113.

C 117 03(3-0-0). General Chemistry I for Chemistry Majors. F. Prerequisite: M CC 118 or M CC 121 or placement in M CC 124 or M CC 125 or M CC 126 or M CC 141 or higher; concurrent registration in C 192. Credit not allowed for both C 117 and C CC 111.

Fundamental aspects of chemistry and chemical principles with an emphasis placed on atomic and molecular structure, bonding, and stoichiometry.

C 192 01(0-0-1). Introductory Seminar in Chemistry. F. Prerequisite: Concurrent registration in C 117.

Small group discussions of aspects of chemistry.

C 245 04(4-0-0). Fundamentals of Organic Chemistry. F, S, SS. Prerequisite: C CC 107 or C 113. Credit allowed for only one of the following: C 245 or C 345. Intended for students in science-related programs requiring one semester of organic chemistry. For students who need only one semester of organic chemistry.

Nomenclature, structure, bonding, reactions, mechanisms, synthesis, stereochemistry of organic compounds.

C 246 01(0-3-0). Fundamentals of Organic Chemistry Laboratory. F, S. Prerequisite: C CC 108 or C CC 112 or C 114; C 245 or concurrent registration. Credit not allowed for both C 246 and C 344.

Laboratory applications of principles presented in C 245. (\$)

C 261 03(3-0-0). Fundamentals of Inorganic Chemistry. S. Prerequisite: C 113.

Preparation, structures, properties, and reactions of chemical elements and inorganic compounds; periodic trends, organizing principles; applications.

C 331 03(3-0-0). Quantitative Analysis. F. Prerequisite: C 113.

Volumetric, spectrophotometric, electrochemical methods of analysis; analytical applications of acid-base, solubility, redox, and complex ion equilibria.

C 332 02(0-6-0). Quantitative Analysis Laboratory. F. Prerequisite: C 114 and C 335 or concurrent registration.

Laboratory applications of principles presented in C 335. (\$)

C 334 01(0-3-0). Quantitative Analysis Laboratory. S. Prerequisite: C 114; C 331 or concurrent registration.

Laboratory applications of principles presented in C 331. (\$)

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

C 335 03(3-0-0). Introduction to Analytical Chemistry. F. Prerequisite: C 113 with grade of C or better; C 332 or concurrent registration.

Modern and classical applications and methods in analytical chemistry including statistical, kinetic, spectroscopic, and chromatographic analysis.

C 345 04(3-3-0). Organic Chemistry I. F, S. Prerequisite: C 113, C 114. Intended for science majors. Students should plan to complete the sequence, C 345, C 346. Credit allowed for only one of the following: C 245 or C 345.

Structure, nomenclature, dynamics, spectroscopy, reactions of organic molecules. Laboratory applications of principles presented in lecture.

C 346 04(3-3-0). Organic Chemistry II. F, S. Prerequisite: C 345. Intended for science majors. Students should plan to complete the sequence C 345, C 346.

Continue studies of reactions and mechanisms of organic molecules. Laboratory applications of principles presented in lecture.

C 384 Var [1-3]. Supervised College Teaching. F, S, SS. 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 C 384, C 487, C 495, C 498.

C 431 04(3-3-0). Instrumental Analysis. F. Prerequisite: C 332 or C 334; C 471 or C 474 or concurrent registration.

Instrumental methods of chemical analysis.

C 433 03(2-3-0). Clinical Chemistry. S. Prerequisite: C 245 or C 332 or C 334; one semester of biochemistry.

Principles and methodology of clinical chemistry. Laboratory experience in methodology and method development.

C 440 02(0-6-0). Advanced Organic Chemistry Laboratory. F. Prerequisite: C 346.

Advanced techniques in organic synthesis, mechanisms of reactions, structure determination. (\$)

C 461 03(3-0-0). Inorganic Chemistry. S. Prerequisite: C 261; C 476 or concurrent registration.

Concepts, models to explain structural, spectroscopic, magnetic, thermodynamic, and kinetic properties of inorganic compounds; symmetry, group theory.

C 462 02(0-6-0). Inorganic Chemistry Laboratory. S. Prerequisite: C 461 or concurrent registration.

Synthetic techniques and instrumental methods in inorganic chemistry.

C 471 04(4-0-0). Physical Chemistry for Biological Sciences. F. Prerequisite: C 113; M CC 161 or M CC 255; PHCC 122 or PHCC 142. Credit allowed for only one of the following: C 471, C 472, or C 474.

Thermodynamics; transport phenomena; kinetics, quantum theory, molecular spectroscopy, statistical dynamics with applications to biological sciences.

C 472 04(4-0-0). Physical Chemistry for Engineers. F. Prerequisite: C 113, M 261, PHCC 142.

Methods and applications of physical chemistry including quantum chemistry, statistical mechanics, thermodynamics, and kinetics.

C 474 03(3-0-0). Physical Chemistry I. F. Prerequisite: C 113, M 261, PHCC 142. Credit not allowed for both C 474 and C 471.

Quantum chemistry; applications to bonding, molecular structure, and spectroscopy.

C 476 03(3-0-0). Physical Chemistry II. S. Prerequisite: C 474.

Statistical thermodynamics; applications to phase and chemical equilibria; kinetics.

C 478 02(0-6-0). Physical Chemistry Laboratory. S. Prerequisite: C 471 or C 474; and C 332 or C 334 or CH 333.

Planning and execution of physicochemical experiments; interpretation and presentation of experimental data; formal laboratory reports.

C 487 Var. Internship. Prerequisite: C 476. Maximum of 12 credits allowed for any combination of C 384, C 487, C 495, C 498.

Supervised work experience in approved off-campus chemical laboratory setting. Consultation with faculty adviser/instructor.

C 493 02(0-0-2). Seminar. Prerequisite: C 474.

Critical analyses of selected literature; develop presentation of technical topic; required oral presentation.

C 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 C 384, C 487, C 495, C 498.

Satisfactory completion of course requires a written report, an oral presentation at a research group meeting, or a poster presentation.

C 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 C 384, C 487, C 495, C 498.

Supervised laboratory research in chemistry; written report consistent with ACS guidelines required.

C 511 03(3-0-0). Solid State Chemistry. F. Prerequisite: C 461, C 476.

Physical and descriptive chemistry of solids including characterization and synthetic methods.

C 515 03(3-0-0). Polymer Chemistry. F. Prerequisite: C 346, C 476.

Fundamentals of polymer chemistry: synthesis, characterization, physical properties.

***C 517 03(3-0-0). Chemistry of Electronic Materials.** F. Prerequisite: C 571 or concurrent registration.

Chemical aspects of preparation and processing of materials in electronic devices, "molecular electronics," and nanostructured materials.

C 531 03(3-0-0). Advanced Chemical Analysis I. F. Prerequisite: C 431 or concurrent registration.

Chemical equilibria, electrochemistry, analytical separations, introduction to molecular spectroscopy.

C 532 03(3-0-0). Advanced Chemical Analysis II. S. Prerequisite: C 431.

Advanced optics; instrumentation and methodology for analytical spectroscopy; computer applications.

C 537 03(3-0-0). Electrochemical Methods. S. Prerequisite: C 531.

Theory and methods of electrochemistry; applications of modern electrochemical techniques.

C 539A-C 01(1-0-0). Principles of NMR and MRI. S. Prerequisite: C 474.

A) Basic NMR principles. B) NMR diffusion measurements-2D NMR and MRI. C) Advanced NMR and MRI techniques.

C 541 03(3-0-0). Organic Spectroscopy. SS. Prerequisite: C 440.

Organic structure determination by spectroscopic methods.

C 543 03(3-0-0). Structure/Mechanisms in Organic Chemistry. F. Prerequisite: C 346.

Structure including stereochemistry and conformational isomerism; reactivity and mechanisms in organic chemistry.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

C 545 03(3-0-0). Synthetic Organic Chemistry I. S. Prerequisite: C 543.
Reactions and synthesis in organic chemistry.

C 547 03(3-0-0). Physical Organic Chemistry. S. Prerequisite: C 543.
Mechanisms, theory, kinetics, and thermodynamics.

C 549 03(3-0-0). Synthetic Organic Chemistry II. F. Prerequisite: C 545.
Modern synthetic methods. Strategies for total synthesis of natural products.

C 551 03(3-0-0). Organometallic Chemistry. F, S. Prerequisite: C 346.
Descriptive and mechanistic organometallic chemistry applied to homogeneous catalysis and organic synthesis.

C 561 03(3-0-0). Inorganic Synthesis. F, S. Prerequisite: Written consent of instructor.

Chemistry of compounds of representative elements and transition metals.

C 563A-F 01(1-0-0) Physical Methods in Inorganic Chemistry. F, S. Prerequisite: C 561.

A) Group theory. B) Vibrational spectroscopy. C) Electronic structure and magnetism. D) Magnetic spectroscopies. E) Advanced nuclear magnetic resonance spectroscopy. F) Other structural methods.

***C 565 03(3-0-0). Inorganic Mechanisms.** F. Prerequisite: C 476 or written consent of instructor.

Fundamental tools, key principles, selected classic case histories of inorganic and organometallic mechanistic chemistry, emphasizing kinetic methods.

C 567 01(1-0-0). Crystallographic Computation. F, S, SS. Prerequisite: C 476.

Theory and practice of structural computations using single crystal X-ray diffraction data.

***C 569 03(3-0-0). Chemical Crystallography.** S. Prerequisite: C 476.

Theory and practice of determination of crystal and molecular structure by single crystal X-ray and neutron diffraction.

***C 570 03(3-0-0). Chemical Bonding.** F. Prerequisite: C 476.

Electronic structure methods; chemical bonding models; intermolecular interactions.

°**C 571 03(3-0-0). Quantum Chemistry.** F. Prerequisite: C 476.

Simple systems; symmetry; approximate methods; time dependent methods; molecular structures.

***C 575 03(3-0-0). Chemical Thermodynamics.** F. Prerequisite: C 476.

Thermodynamic concepts and their applications to chemical problems.

°**C 576 03(3-0-0). Statistical Mechanics.** S. Prerequisite: C 476 or written consent of instructor.

Principles of statistical mechanics with application in the chemical sciences.

°**C 577 03(3-0-0). Surface Chemistry.** S. Prerequisite: C 472 or C 476.

Capillarity; interfacial thermodynamics, electrical aspects of surface chemistry, adsorbed layers.

°**C 579 03(3-0-0). Chemical Kinetics.** F. Prerequisite: C 476.

Elementary reactions, unimolecular reactions, reactions in solution, gas phase ion chemistry, photochemistry, and kinetic modeling.

C 641 02(2-0-0). Organic Reaction Mechanisms. S. Prerequisite: C 545.

Organic reaction mechanisms, including using arrows to show electron movement; heterolytic, radical, and pericyclic reactions.

C 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.

C 695 Var [1-3]. Independent Study.

C 699 Var [1-15]. Thesis.

C 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.

C 751 01(1-0-0). Methods of Chemistry Laboratory Instruction. F.

Basic materials, methods, and skill development related to teaching undergraduate chemistry laboratory courses.

C 752 01(0-0-1). Advanced Methods of Chemistry Instruction. S. Prerequisite: C 751 or written consent of instructor.

Advanced materials, methods, and presentation skills development related to teaching undergraduate chemistry courses.

***C 773 03(3-0-0). Atomic and Molecular-Spectroscopy.** S. Prerequisite: C 571.

Time-dependent methods; multiphoton and nonlinear spectroscopy; fundamentals of rotational, vibrational, electronic and magnetic resonance spectroscopy.

C 784 Var [1-2]. Supervised College Teaching. F, S, SS.

C 793 01(0-0-1). Seminar.

C 795A-D Var [1-5]. Independent Study.

A) Inorganic chemistry. B) Analytical chemistry. C) Biological chemistry. D) Physical chemistry.

C 799 Var [1-15]. Dissertation.

CIVIL ENGINEERING COURSES (CE)

Department of Civil Engineering College of Engineering

CE 104 01(0-3-0). Surveying. F. Prerequisite: M CC 125.

Surveying fundamentals for civil engineering applications; leveling, horizontal and vertical control, horizontal curves, instrument operation, errors.

CE 105 01(1-0-0). Civil Engineering Computing. F, S.

Equation solver software with emphasis on TK Solver and applications in civil engineering.

CE 106 02(2-0-0). Introduction to Engineering Computer Graphics. F, S. Prerequisite: M CC 125.

Creation and production of engineering drawings using AutoCad, including layering, annotated, and three-dimensional drawings.

CE 108 03(2-3-0). Civil Engineering Principles I. F.

Civil engineering profession, computer applications and programming related to civil engineering; introduction to surveying.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

CE 109 03(2-2-0). Civil Engineering Principles II. S. Prerequisite: CE 108.

Introduction to the profession and academia; principles of civil engineering design; graphical, oral, and written communication; team projects.

CE 204/EV 204 03(2-2-0). Agricultural and Environmental Measurements. S. Prerequisite: PHCC 110 or PHCC 141. Credit not allowed for both CE 204 and EV 204.

Measurement techniques for analysis and design of agricultural and environmental systems based on engineering principles.

CECC 208 03(2-2-0). Civil Engineering Analysis I. (AUCC 2B). F. Prerequisite: CE 109.

Theory and use of measurements and mapping; infrastructure basics and design tools; risks and statistical variabilities in civil engineering.

CE 209 03(2-2-0). Civil Engineering Analysis II. S. Prerequisite: C CC 111, CE 208, CE 260.

Behavior and properties of construction materials, instrumentation, use of statistical tools, material standards, material selection, quality control.

CE 260 03(3-0-0). Engineering Mechanics-Statics. F, S. Prerequisite: M CC 160, PHCC 141.

Forces using vector notation; static equilibrium of rigid bodies; friction, virtual work, centroids, and moments of inertia.

CE 261 03(3-0-0). Engineering Mechanics-Dynamics. F, S. Prerequisite: CE 260.

Kinematics and kinetics of particles and rigid bodies; concepts of work-energy and impulse-momentum; computer applications; vector notation.

CE 262 04(3-2-0). Engineering Mechanics. F. Prerequisite: M CC 161, PHCC 141.

Forces, static equilibrium, mass center, moments of inertia, kinematics and kinetics of particles and rigid bodies.

CE 300 04(3-3-0). Fluid Mechanics. F, S. Prerequisite: CE 261 or CE 262, ME 237.

Fluid properties; statics, kinematics, and dynamics of fluid motion including viscous and gravitational effects.

CE 308 03(2-2-0). Civil Engineering Synthesis I. F. Prerequisite: CE 204/EV 204 or CE 209.

Civil engineering systems, simulation and optimization techniques, statistical tools and their use in civil engineering, risk analysis.

CE 309 03(2-2-0). Civil Engineering Synthesis II. S. Prerequisite: CE 308.

Civil engineering infrastructure systems, numerical and decision analysis techniques, statistical and risk analysis, project management.

CE 322/EV 322 03(3-0-0). Basic Hydrology. F, S. Prerequisite: CE 300 or CH 331 or WR 416, STCC 301 or STCC 309 or CE 308; or written consent of instructor. Credit not allowed for both CE 322 and EV 322.

Hydrologic cycle, soil moisture, groundwater, runoff processes, water contamination, applications in water resources and environmental engineering.

CE 350 03(2-3-0). Soil Engineering for Nonengineers. F, S. Prerequisite: CE 359.

Concepts of soil mechanics and soil behavior, elementary application to compaction, seepage, earth pressure, foundations, and slopes.

CE 359 03(3-0-0). Basics of Statics and Strength of Materials. F, S. Prerequisite: M CC 125, M CC 141, PHCC 110 or PHCC 121 or PHCC 141.

Forces and their components; static equilibrium; friction; section properties; stresses and deformations of elastic solids, combined stresses.

CE 360 03(3-0-0). Mechanics of Solids. F, S. Prerequisite: CE 260 or CE 262.

Stresses and deformations in structural members and machine elements, combined stresses, stress transformation.

CE 362 02(1-2-0). Properties of Materials. F, S. Prerequisite: CE 360. Credit not allowed for both CE 362 and CE 363.

Behavior of materials including metals, woods, plastics, and bituminous and Portland cement concretes; testing techniques and material standards.

CE 363 01(0-3-0). Material Properties. F, S. Prerequisite: CE 360. Credit not allowed for both CE 363 and CE 362.

Mechanical properties of metals, woods, and plastics; testing techniques and standards.

CE 367 03(3-0-0). Structural Analysis. F, S. Prerequisite: CE 360.

Determination of actions in and deformations of determinate and indeterminate structures.

CE 370 03(2-2-0). Introductory Structural Engineering. F, S. Prerequisite: CE 359, F 432.

Behavior, design basics and construction concerns for structural members and systems of steel, reinforced or prestressed concrete, or masonry.

+CE 377/SC 377 03(2-2-0). Geographic Information Systems in Agriculture. F. Prerequisite: CS 110. Credit allowed for only one of the following: CE 377, SC 377, and SC 577.

Introduction to geographic information systems and global positioning systems with applications to agriculture. (\$)

CE 401 03(3-0-0). Hydraulic Engineering. S. Prerequisite: CE 300.

Basic principles of fluid mechanics applied to practical problems in hydraulic engineering.

CE 408 03(2-2-0). Civil Engineering Design I. F. Prerequisite: CE 309 (CE majors only) or CE 322/EV 322 (EV majors only).

Design of civil engineering systems, nontechnical and economic design considerations, project organization, design project development and presentation. (\$)

+CE 409 03(2-2-0). Civil Engineering Design II. S. Prerequisite: CE 408.

Design of civil engineering systems, nontechnical and economic design considerations; project organization, design project development and presentation. (\$)

CE 413 03(3-0-0). Environmental River Mechanics. S. Prerequisite: CE 300 or WR 416.

Fluvial geomorphology, river hydraulics, sediment transport, and river response with special emphasis on environmental aspects. (Ω-O)

CE 423 03(3-0-0). Groundwater Engineering. S. Prerequisite: CE 300 or CH 331 or WR 416.

Development of groundwater resources; origin, movement, distribution of water below ground surface.

CE 425 04(3-3-0). Soil and Water Engineering. S. Prerequisite: CH 331 or CE 300 or SC 240.

Control of the soil-water-plant medium for optimum plant growth and environmental protection.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

CE 438/EV 438 04(4-0-0). Pollution Control Engineering. F, S. Prerequisite: C 113, CE 300 or CH 331 or ME 342. Credit not allowed for both CE 438 and EV 438.

Environmental engineering approaches to designing water supply, wastewater removal, and pollution control systems.

CE 439/CH 439 03(2-3-0). Environmental Engineering Chemical Concepts. F. Prerequisite: C 113, M 340. Credit not allowed for both CE 439 and CH 439.

Application of chemical principles to environmental engineering problems.

CE 440 03(3-0-0). Nonpoint Source Pollution. F. Prerequisite: One course in soil science, hydrology, or fluid mechanics.

Principles, processes, impacts, and control of nonpoint source pollution of surface and groundwater.

CE 450 04(3-3-0). Introduction to Geotechnical Engineering. S. Prerequisite: CE 360.

Soil behavior, stress-strain and strength properties, application to earth pressure, slope and foundation problems.

CE 466 03(2-3-0). Design and Behavior of Steel Structures. S. Prerequisite: CE 367.

Loads acting on a structure; behavior and design of steel members, connections, and systems.

CE 467 03(2-3-0). Design of Reinforced Concrete Structures. F. Prerequisite: CE 367.

Design and behavior of reinforced concrete structural members.

CE 471 01(0-0-1). Engineering Design I. S. Prerequisite: CH 201 or CE 204/EV 204.

Selection of engineering design project; development of project proposal.

CE 472 03(2-2-0). Engineering Design II. F. Prerequisite: CE 471.

Engineering project requiring each student to work on an individual basis with adviser; technical progress reports, final project report.

CE 474 03(3-0-0). Engineering Planning and Management. S. Prerequisite: CE 360.

Planning, organizing, and managing engineering projects, including engineering estimating, engineering economy, and CPM scheduling.

CE 478 03(3-0-0). Transportation Engineering. F. Prerequisite: CE 300, STCC 309.

Transportation planning, design, and operation emphasizing systems approach to urban transportation problems.

CE 495 Var [1-3]. Independent Study.

CE 496 Var. Group Study.

CE 502 03(3-0-0). Fluid Mechanics. F. Prerequisite: CE 300.

Fundamental physical concepts of fluid mechanics; ideal and viscous fluid flows; boundary-layer concepts.

CE 504 03(2-3-0). Wind Engineering. F. Prerequisite: CE 300.

Influence of wind on humanity. Applications to structures, air pollution, wind energy, agricultural aerodynamics, snow movement, human comfort.

CE 505 03(2-3-0). Experimental Methods and Measurements. S. Prerequisite: CE 300 or CE 360.

Design experiments; instrumentation and experimental techniques; data acquisition and processing; error analysis.

+*CE 510 03(3-0-0). Operation of Hydraulic Systems. F. Prerequisite: CE 401.

Operational management systems, data collection, real-time control, management modeling, rehabilitation and retrofit, maintenance. (\$)

CE 512 03(3-0-0). Irrigation Design and Management. F. Prerequisite: CE 322/EV 322 or CE 425.

Irrigation performance criteria. Design, management and evaluation of surface, sprinkler and trickle irrigation. Selection of irrigation systems.

CE 514 03(3-0-0). Hydraulic Structures/Systems. F. Prerequisite: CE 401.

Analysis and design of hydraulic structures which make up components of water resource systems.

°CE 515 03(3-0-0). Hydropower. F. Prerequisite: CE 322/EV 322, CE 401.

Operation of hydrogenerating and pump storage stations, characteristics of systems loads, hydrology, storage of water, optimum power production.

CE 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.

CE 517 03(3-0-0). Surface Irrigation Systems. F. Prerequisite: CE 425.

Design and evaluation of surface irrigation systems. Water measurements, conveyance and control structures, land forming.

CE 518 03(3-0-0). Sprinkler and Trickle Irrigation Systems. S. Prerequisite: CE 425, CE 300.

Basic principles, design, and evaluation of pressurized irrigation systems.

CE 520 03(3-0-0). Physical Hydrology. F. Prerequisite: CE 322/EV 322.

Hydrologic, atmospheric processes in the water cycle; linear systems, hydrologic response; geomorphologic description of hydrologic processes, response.

CE 522 03(3-0-0). Engineering Hydrology. S. Prerequisite: CE 520.

Hydrologic design under uncertainty; conventional and remote sensing; design flows and storms; river routing; reservoir design; watershed models.

°CE 524/WR 524 04(3-0-1). Modeling Watershed Hydrology. S. Prerequisite: CE 322/EV 322 or WR 416, ST 304 or STCC 309. Credit not allowed for both CE 524 and WR 524.

Development and application of watershed models: structure, calibration, evaluation, sensitivity analysis, simulation.

CE 531 03(3-0-0). Groundwater Hydrology. F. Prerequisite: CE 300 or CH 331 or ME 342.

Groundwater occurrence, distribution, movement, exploration and recharge, well hydraulics and design, interaction of ground and surface water.

CE 536 01(1-0-0). Wastewater Treatment. F. Prerequisite: CE 540/CH 540.

Application of environmental biotechnology to wastewater treatment engineering and design.

CE 537 03(3-0-0). Residuals Management. S. Prerequisite: CE 300.

Planning and design for processing and disposal of residuals including solid wastes, sludges, hazardous wastes.

CE 538 03(3-0-0). Aqueous Chemistry. S. Prerequisite: C 113, M 340.

Principles of solution chemistry applied to aquatic systems.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

°CE 539 03(2-3-0). Water and Wastewater Analysis. F. Prerequisite: C 113, M 340.

Chemical and biological methods of assessing water quality; significance of chemicals in aquatic systems.

CE 540/CH 540 02(2-0-0). Fundamentals of Environmental Biotechnology. S. Credit not allowed for both CE 540 and CH 540.

Fundamentals of environmental biotechnology: environmental microbiology, microbial kinetics, basic reactor design.

CE 541 04(3-3-0). Treatment of Water Contaminants II. S. Prerequisite: CE 540, C 471 or C 474.

Reactor theory, filtration, adsorption, ion exchange, gas transfer, oxidation, membranes, biological reactors, disinfection.

°CE 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.

CE 544 03(3-0-0). Water Resources Planning and Management. F. Prerequisite: CE 322/EV 322.

Management and planning of natural and constructed water systems. Integrated management and case studies of water use and environmental resources.

CE 545 03(3-0-0). Management and Monitoring of Water Quality. F. Prerequisite: CE 322/EV 322 or WR 418.

Management activities, information needs, data analysis protocols, network design, case studies.

CE 546 03(2-2-0). Water Resource Systems Analysis. S. Prerequisite: CE 322/EV 322, EG 510/M 510, or concurrent registration in each.

Applications of systems analysis and optimization techniques in water resources planning and management. (Ω-O)

CE 547/ST 547 03(3-0-0). Statistics for Environmental Monitoring. S. Prerequisite: STCC 301. Credit not allowed for both CE 547 and ST 547.

Applications of statistics in environmental pollution studies involving air, water, or soil monitoring; sampling designs; trend analysis; censored data. (Ω-O)

CE 548 03(3-0-0). Irrigation Management for Water Quality. F. Prerequisite: CE 425.

Environmental impacts of irrigation; reduced environmental impact by improved design and management of irrigation; sustainability.

CE 549 03(3-0-0). Drainage and Wetlands Engineering. S. Prerequisite: CE 425.

Drainage and wetlands design for agricultural and natural resource applications. Water table modification for nonpoint sources pollution control.

CE 550 03(3-0-0). Foundation Engineering. F. Prerequisite: CE 450.

Mechanics and methodology of foundation engineering; selection and design of foundation systems on soft, firm, and expansive soils; special problems.

°CE 553 03(3-0-0). Earth and Earth-Retaining Structures. S. Prerequisite: CE 450.

Load on conduits; retaining walls; braced cuts; sheet pilewalls; slope stability; embankments.

CE 558 03(3-0-0). Containment Systems for Waste Disposal. F. Prerequisite: CE 450.

Basic principles governing the design of containment systems used in waste disposal applications.

CE 560 03(3-0-0). Advanced Mechanics of Materials. F. Prerequisite: CE 360.

Analysis of stress and strain failure theory; selected topics in solid mechanics, plate analysis; introduction to elastic stability.

CE 562 03(3-0-0). Fundamentals of Vibrations. S. Prerequisite: CE 261, CE 360.

Free and forced vibrations of single, two, and multiple degree of freedom systems. Closed-form and numerical solutions.

CE 566 03(3-0-0). Intermediate Structural Analysis. F. Prerequisite: CE 367.

Work and energy concepts, curved members and arches, matrix analysis of linear systems, numerical techniques.

CE 567 03(3-0-0). Advanced Concrete Design. S. Prerequisite: CE 467.

Behavior of reinforced and prestressed concrete members. Development of design methods. Behavior and design of slabs, shearwalls, and buildings.

CE 569 03(3-0-0). Intermediate Design of Wood Structures. F. Prerequisite: CE 367, F 432.

Characteristics of structural products and their consideration in design; behavior of glulam members, wood trusses, and other wood structural systems.

***CE 572 03(2-2-0). Analysis of Urban Water Systems.** F. Prerequisite: CE 300 and CE 401 or written consent of instructor.

Behavior and interaction of urban water distribution and collection systems; how system state and driving variables affect system performance.

°CE 573 03(2-2-0). Urban Stormwater Management. F. Prerequisite: CE 322/EV 322 and CE 401 or written consent of instructor.

Effects of urbanization on watershed hydrology and receiving waters; control practices to mitigate effects using mathematical models.

CE 575 03(2-2-0). Expert System Applications in Engineering. F. Prerequisite: M 340.

Construction of expert systems and decision aids for practical applications in typical engineering domains.

CE 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.

CE 577 03(2-2-0). GIS in Civil and Environmental Engineering. S. Prerequisite: CE 300, CE 322/EV 322.

GIS technology for spatial design/analysis; applications in facilities management, urban infrastructure, water resources, environmental engineering.

CE 578 03(3-0-0). Infrastructure Engineering and Management. S. Prerequisite: Ten credits of engineering, economics, public administration, or planning courses.

Infrastructure program planning, management, and engineering. Problems, tools of analysis, solution strategies. Use of decision support systems.

CE 584 Var. Supervised College Teaching. F, S, SS.

CE 592A-L 01(0-0-1). Seminar.

A) Fluid mechanics and wind engineering. E) Geotechnical engineering. G) Environmental engineering. L) Space engineering.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

°CE 603 03(3-0-0). Wind Effects on Structures. S. Prerequisite: CE 504.

Analysis of wind effects on buildings and structures; deterministic and probabilistic methods; aerodynamic loading and response; codes and standards.

°CE 604 03(3-0-0). Turbulent Transport and Diffusion. S. Prerequisite: CE 502 or CE 504.

Engineering concepts for transport of pollutants, toxic and flammable species, sand, and snow. Fluid modeling, numerical and analytical approaches.

°CE 607 03(3-0-0). Computational Fluid Dynamics. S. Prerequisite: CE 502 or AT 601, M 350.

Unique fluid mechanics aspects of advection, boundary conditions, and turbulence models. Solution of elliptic, parabolic, and hyperbolic problems.

CE 610 03(3-0-0). Special Topics in Hydraulics. S. Prerequisite: CE 502.

Advanced topics in hydraulics, hydromechanics, environmental hydraulics, and computational hydraulics.

CE 612 04(4-0-0). Open Channel Flow. S. Prerequisite: CE 502.

Steady, uniform, and non-uniform flow; backwater curves; flow through bridge piers, transitions, and culverts; spatially varied and unsteady flow.

CE 614 03(3-0-0). Hydraulics of Closed Conduits. S. Prerequisite: CE 502.

Pipe transmission and distribution systems design including flow control, flow measurement, energy dissipation, pump selection, transients, cavitation.

CE 617 02(0-0-2). Irrigation Field Trip. SS. Prerequisite: CE 300 or SC 370.

Site visitations to observe various irrigation methods, practices, and water diversions in Colorado.

CE 622 03(3-0-0). Risk Analysis of Water/Environmental Systems. F. Prerequisite: CE 322/EV 322, STCC 309.

Risk and uncertainty analysis applied to hydrology, hydraulics, groundwater, water resources, and environmental engineering systems.

CE 623 03(3-0-0). Water Quality Hydrology. S. Prerequisite: CE 322/EV 322.

Effects and dispersion of natural, municipal, industrial, toxic, and other water pollutants on natural and impounded waters.

***CE 624 03(3-0-0). Control of Floods and Droughts.** S. Prerequisite: CE 522.

Flood and drought characteristics, impacts; structural, nonstructural flood control measures; drought prediction, drought control, drought response.

CE 631 03(3-0-0). Solutions to Groundwater Problems. S. Prerequisite: CE 531, M 340.

Numerical flow models; finite difference and finite element methods; parameter identification, stochastic modeling and advanced analytical solutions.

CE 633 03(3-0-0). Groundwater Contaminant Transport Modeling. F. Prerequisite: CE 300, M 340; concurrent registration in CE 423 or CE 531.

Numerical modeling, transport, control and cleanup, applied to complex groundwater contamination problems found in the field.

CE 635 03(3-0-0). Quantitative Hydrogeology. F. Prerequisite: CE 300, M 340, concurrent registration in CE 423 or CE 531.

Geostatistics; modeling fracture flow; saltwater intrusion, heat transfer; conjunctive use, optimal groundwater management; solution nonlinear problems.

CE 638 03(3-0-0). Groundwater Quality and Contaminant Transport. S. Prerequisite: CE 531.

Analysis of hydrochemical data. Advection with and without mixing. Retardation of reactive solutes. Design of groundwater quality investigations.

***CE 639/S 639 03(3-0-0). Technology Assessment and Social Forecasting.** F. Prerequisite: CE 544 or S 500. Credit not allowed for both CE 639 and S 639.

Interrelationship between technology and society emphasizing procedures for evaluating impacts and forecasting alternatives.

CE 645 03(2-2-0). Computer-Aided Water Management and Control. F. Prerequisite: CE 546 or CE 577.

Real-time management and control of water resource systems; applications of computer control concepts to improve system performance.

CE 655 04(3-3-0). Advanced Soil Mechanics. F. Prerequisite: CE 450.

Soil behavior; principles of mechanics of soils; effective stress principle; shear strength and consolidation of soils.

°CE 656 03(3-0-0). Design of Dams. S. Prerequisite: CE 450.

Design of earth and concrete gravity dams; hydrologic, structural, soil mechanics, seepage, earthquake, wind waves, and site selection considerations.

CE 658 03(3-0-0). Remediation Systems-Subsurface Contamination. S.

Applications in geoenvironmental engineering practice involving design of in situ containment and remediation systems.

CE 662 03(3-0-0). Foundations of Solid Mechanics. F. Prerequisite: CE 560, M 531.

Analysis of stress and strain in solids emphasizing linear elasticity and plasticity; introductions to creep, viscoelasticity, and finite deformations.

CE 665 03(3-0-0). Finite Element Method. S. Prerequisite: M 340.

Theory and application in elasticity, porous flow, heat conduction, and other engineering problems.

CE 667 03(3-0-0). Advanced Structural Analysis. S. Prerequisite: CE 566.

Analysis program development, application of finite element analysis, computer-assisted analysis, introduction to nonlinear analysis.

°CE 669 03(3-0-0). Advanced Design of Metal Structures. S. Prerequisite: CE 466.

Behavior of steel, aluminum, and cold formed members. Development of elastic and inelastic code provisions. LRFD design methods, building systems.

CE 684 Var. Supervised College Teaching. F, S, SS.

CE 693 Var. Seminar I.

CE 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.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

CE 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.

CE 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.

CE 703 03(3-0-0). Special Topics in Fluid Mechanics. F. Prerequisite: CE 502 or written consent of instructor.

Advanced topics in fluid mechanics; associated experimental and numerical techniques.

CE 716 03(3-0-0). Erosion and Sedimentation. F. Prerequisite: CE 502.

Sediment properties; resistance to flow; incipient motion and bedforms; sediment transport, reservoir sedimentation.

°CE 717 03(3-0-0). River Mechanics. S. Prerequisite: CE 716.

Characteristics of rivers, mechanics of sediment and water discharge emphasizing alluvial systems, channel stabilization, control, response.

°CE 721 03(3-0-0). Stochastic Water and Environmental Systems. S. Prerequisite: CE 622.

Stochastic analysis of water and environmental systems. Simulation, forecasting, spatial analysis, modeling changes, stochastic differential equations.

°CE 722 03(3-0-0). Large Scale Hydrology. F. Prerequisite: CE 520.

Global and regional scale hydrologic processes; land/atmosphere interaction; scaling in hydrology, geomorphoclimatic structure of hydrologic response.

CE 733 03(3-0-0). Flow in Porous Media. S. Prerequisite: CE 300; CE 531 or SC 470.

Mechanics of single and two-phase fluids in soils and porous rocks with application to infiltration, drainage, and petroleum production.

***CE 742 03(2-3-0). Advanced Topics in Environmental Engineering.** S. Prerequisite: CE 540 or written consent of instructor.

Selected topics from current environmental engineering research including molecular methods, water/wastewater treatment, hazardous waste remediation.

***CE 751 03(3-0-0). Soil Dynamics.** S. Prerequisite: CE 450.

Soil behavior under dynamic loading; stress wave propagation; foundation response to vibratory and transient loading; elements of earthquake effects.

°CE 754 03(3-0-0). Special Topics in Geotechnical Engineering. S. Prerequisite: CE 655, written consent of instructor.

Advanced topics in geotechnical engineering including cold regions problems, expansive/collapsing soils, computer applications.

***CE 766 03(3-0-0). Plate, Shell, and Bridge Structures.** F. Prerequisite: CE 560, CE 665.

Classical plate, shell, and membrane theory. Finite difference, element, and strip methods. Application to layered systems, domes, and bridges.

°CE 767 03(3-0-0). Structural Dynamics and Earthquake Engineering. F. Prerequisite: CE 562, CE 667.

Analysis, behavior, and design of structural systems subjected to dynamic loads, including earthquakes, wind, and ocean waves.

CE 793 Var. Seminar II.

CE 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.

CONSUMER AND FAMILY STUDIES COURSES (CF)

College of Applied Human Sciences

CF 179 02(2-0-0). Introduction to Consumer and Family Studies. S.

Career options in consumer and family studies and professional leadership responsibilities.

CF 479 02(0-0-2). Colloquium-Consumer and Family Studies. F. Prerequisite: CF 179 or written consent of instructor.

Current topics and issues related to professional roles, responsibilities, and opportunities.

CF 487A-C Var. Internship.

A) Extension. B) Community service. C) Business.

CF 494 Var. Independent Study.

CF 590 Var [1-3]. Workshop.

CF 698 Var. Research.

CHEMICAL ENGINEERING COURSES (CH)

Department of Chemical Engineering College of Engineering

CHCC 104 03(2-2-0). Strategies of Engineering Problem Solving. (AUCC 2B). S. Prerequisite: CH 192.

Engineering approach to problem solving, computer programming, term project.

CH 192 03(2-2-0). Strategies of Engineering Design. F.

Engineering design and problem solving, measurements, calculations, and statistics; team projects; technical presentation skills. (\$)

CH 201 03(3-0-0). Material and Energy Balances. F. Prerequisite: C CC 111, M CC 160, PHCC 141, one course in computer programming.

Principles of chemistry, physics, and mathematics applied to development of material and energy balances; illustration of concepts.

CH 202 03(3-0-0). Thermodynamic Process Analysis. S. Prerequisite: CH 201.

Thermodynamic fundamentals and applications to ideal and non-ideal mixtures, power cycles, and chemical equilibria.

CH 330 03(3-0-0). Process Simulation. F. Prerequisite: CH 202, concurrent registration in M 340.

Analysis of chemical engineering problems by numerical simulation.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

CH 331 03(3-0-0). Momentum Transfer and Mechanical Separations.

F. Prerequisite: CH 201, M 340; CH 202 or ME 237.

Fluid properties; conservation equations; compressible and incompressible flow; pumping and metering; mixing; separation of fluid-solid mixtures.

CH 332 03(3-0-0). Heat Transfer and Thermal Separations. F.

Prerequisite: M 340; CH 331 or CE 300 or concurrent registration.

Conservation of energy; thermal processes; steady and unsteady conduction; convective heat transfer; radiation; heat exchange equipment design.

CH 333 02(0-6-0). Momentum and Heat Transfer Laboratory. S.

Prerequisite: CH 332.

Momentum and heat transfer experimentation; rheology, heat exchangers, steam condensation, drying.

CH 341 04(4-0-0). Equilibrium-Staged Separations. S. Prerequisite: CH

202 or ME 237; one course in physical chemistry.

Thermodynamics of phase equilibrium; distillation; absorption and stripping; washing and extraction; energy conservation; process economics.

CH 406 03(3-0-0). Introduction to Transport Phenomena. F.

Prerequisite: C 474, CH 332.

Fundamental treatment of momentum and mass transport processes; dimensional analysis for parameter identification and order of magnitude estimation.

CH 420 03(3-0-0). Chemical Reactor Design. S. Prerequisite: M 340, one course in physical chemistry.

Mechanisms and rates of chemical reactions; design of homogeneous and heterogeneous reactors; enzyme reactions.

CH 430 04(3-2-0). Process Control and Instrumentation. S. Prerequisite:

CH 332, CH 341, CH 420.

Measurement and control of process variables; transient behavior of chemical processes; feedback, feedforward, and computer control concepts.

CH 439/CE 439 03(2-3-0). Environmental Engineering Chemical Concepts. F. Prerequisite: C 113, M 340. Credit not allowed for both CH

439 and CE 439.

Application of chemical principles to environmental engineering problems.

CH 442/EV 442 03(3-0-0). Rate-Controlled Separations. F. Prerequisite:

CE 300 or CH 331; M 340; one course in physical chemistry. Credit not allowed for both CH 442 and EV 442.

Diffusion; convective mass transfer; packed tower operations; electrophoretic and membrane separations; selection and sequencing of separations.

CH 443 02(0-6-0). Mass Transfer and Separation Laboratory. F.

Prerequisite: CH 341 or CH 442/EV 442 or concurrent registration.

Mass transfer experimentation: evaporation, distillation, solvent extraction, ion exchange, gas absorption, humidification.

CH 451 03(3-0-0). Chemical Engineering Design I. F. CH 341, CH 420,

CH 442/EV 442 or concurrent registration.

Process synthesis and simulation; engineering economics principles.

CH 452 03(2-2-0). Chemical Engineering Design II. S. Prerequisite: CH

451.

Design projects requiring students to complete a process design with cost estimation; technical progress and final reports.

CH 493 01(0-0-1). Seminar.

CH 495 Var. Independent Study.

CH 496 Var. Group Study.

CH 501 03(3-0-0). Chemical Engineering Thermodynamics. F.

Definition, correlation, and estimation of thermodynamic properties; nonideal chemical and physical equilibria.

CH 502 03(3-0-0). Advanced Reactor Design. S. Prerequisite: CH 503 or written consent of instructor.

Nonideal flow and tracers, reactions and diffusion, evaluation of complex kinetics, stability of reactors. Biochemical reactor examples.

CH 503 03(3-0-0). Transport Phenomena Fundamentals. S. Prerequisite:

CH 406.

General topics in transport phenomena; analytical and numerical solutions of laminar flows; perturbation techniques; coupled transport.

CH 504/BE 504 03(3-0-0). Fundamentals of Biochemical Engineering.

F. Prerequisite: MB 300; M CC 255 or M 340; BE 306/BH 306 or CH 420 or concurrent registration. Credit not allowed for both CH 504 and BE 504.

Application of chemical engineering principles to enzyme kinetics, fermentation and cell culture, product purification, and bioprocess design.

°CH 505 01(0-3-0). Biochemical Engineering Laboratory. F.

Prerequisite: CH 504 or concurrent registration or written consent of instructor.

Fermentation technology, bioprocess control, and protein purification.

CH 514 03(3-0-0). Polymer Science and Engineering. F. Prerequisite: C

346, C 474.

Fundamentals of polymer science: synthesis, characterization, processing of polymers. Physical properties of polymers; rheology of melts and solutions.

CH 521 03(3-0-0). Mathematical Modeling for Chemical Engineers. F.

Prerequisite: CH 420, CH 442/EV 442, one course in computer programming.

Application of mathematical models to analysis and design of chemical reactors and separation processes.

CH 522/BE 522 03(2-2-0). Bioseparation Processes. F. Prerequisite: CH

331. Credit not allowed for both CH 522 and BE 522.

Analysis of processes used to recover and purify fermentation products.

°CH 524 0 1(1-0-0). Bioremediation. F. Prerequisite: CE 540/CH 540.

Use of biotechnology for site remediation. Biodegradation, bioreactor design, and in situ bioremediation.

CH 525/BE 525 03(3-0-0). Cell and Tissue Engineering. S.

Prerequisite: BS 300 or NB 501 or BY 310 or BC 351. Credit not allowed for both CH 525 and BE 525.

Cell and tissue engineering concepts and techniques with emphasis on cellular response, cell adhesion kinetics, and tissue engineering design.

CH 540/CE 540 02(2-0-0). Fundamental of Environmental Biotechnology. S. Credit not allowed for both CH 540 and CE 540.

Fundamentals of environmental biotechnology, environmental microbiology, microbial kinetics, basic reactor design.

CH 621 03(3-0-0). Advanced Process Control. F. Prerequisite: CH 430.

Application of modern control theory to chemical processes. Computer control aspects emphasized.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

***CH 660 03(3-0-0). System and Parameter Identification.** S. Prerequisite: Graduate standing or written consent of instructor.

Principles and methods for selecting the most appropriate equations, and properties within those equations, to mathematically simulate physical phenomena.

CH 693 Var. Seminar I.

CH 695 Var. Independent Study.

CH 699 Var. Thesis.

CH 707 01(1-0-0). Advanced Topics in Biochemical Engineering.

F. Prerequisite: Graduate student status.

Advanced biochemical engineering topics.

CH 793 Var. Seminar II.

CH 795 Var. Independent Study.

CH 799 Var. Dissertation.

CELL AND MOLECULAR BIOLOGY COURSES (CM)

Office of Provost/Academic Vice President

CM 501 04(4-0-0). Advanced Cell Biology. F. Prerequisite: BY 310 or written consent of instructor.

Cell structure and organelle function.

***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/°PL 666 03(3-0-0). Science and Ethics. S. Credit not allowed for both CM 666 and PL 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: D, I) BC 403, CM 501, M CC 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. Prerequisite: B, D, E) BC 403, CM 501. C) BC 403, CM 501, M CC 255.

B) Mammalian cell culture techniques 01(0-3-0). C) Immunological techniques 01(0-3-0). D) Radiation cytogenetics 01(0-3-0). E) Flow cytometry and cell sorting 02(0-4-0).

CM 710/BI 710 03(0-4-1). Techniques in Molecular Biology and Genetics. S. Prerequisite: BC 463 or BZ 346 or BZ 350 or MB 450 or SC 330. Credit not allowed for both CM 710 and BI 710.

Genetic manipulation of bacteria, bacteriophage, and yeast including experiments in molecular cloning and gene expression.

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 784 Var. Supervised College Teaching. F, S, SS.

CM 793 01(0-0-1). Seminar.

CM 795 Var. Independent Study.

CM 799 Var. Dissertation.

COMPOSITION COURSES (CO)

Department of English College of Liberal Arts

CO 130 03(3-0-0). Academic Writing. F, S. Prerequisite: Composition Placement Exam.

Academic writing, critical thinking, and critical reading through study of a key academic issue.

COCC 150 03(3-0-0). College Composition. (AUCC 1A). F, S, SS. Prerequisite: Composition Placement Examination score of 3 to 6 or CO 130.

Expository and argumentative writing emphasizing purpose and audience; writing and reading processes; development of ideas; coherence; effective style. (Ω-O, GT-CO2)

COCC 300 03(3-0-0). Writing Arguments. (AUCC 2A2 or 2B). F, S, SS. Prerequisite: COCC 150.

Reading, analyzing, researching, and writing arguments.

COCC 301A-D 03(3-0-0). Writing in the Disciplines. (AUCC 2A2). F, S, SS. Prerequisite: COCC 150.

Learning writing strategies for addressing general audiences in: A) Arts and humanities. B) Sciences. C) Social sciences. (Ω-O) D) Education.

COCC 302 03(3-0-0). Writing Online. (AUCC 2A2). F, S. Prerequisite: COCC 150.

Writing and analysis of electronic texts.

CO 401 03(3-0-0). Advanced Composition. F, S. Prerequisite: COCC 300 or COCC 301A or B or C or D or COCC 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: COCC 302 or JT 372 or SP 346.

Advanced study of rhetorical contexts shaping online texts. Builds on fluency in coding and familiarity with online document design.

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COMPUTER SCIENCE COURSES (CS)

Department of Computer Science
College of Natural Sciences

CS 110 04(3-3-0). Personal Computing. F, S, SS.

Personal computing: hardware/software concepts, operating system commands, word processing, spreadsheets, programming.

CS 115 03(2-0-1). Computer Science Concepts and Practices. F, S, SS. Prerequisite: High school algebra, experience with PC's.

Development of computer science, central concepts: algorithm, recursion, autonomous computation, computability limits. Examples using programming. (Ω-O)

CSCC 150 04(3-0-1). Interactive Programming with Java. (AUCC 2D). F, S. Prerequisite: Some familiarity with personal computers. Credit not allowed for students who have already taken CSCC 153.

Introduction to object-oriented programming with Java; problem solving, creating applets for Web pages, and graphical user interfaces. (Ω-O)

CSCC 153 04(3-0-1). Java Programming. (AUCC 2B). F, S, SS. Prerequisite: M CC 118 with a C [2.0] or better. Credit not allowed for both CSCC 153 and CS 154.

Object-oriented programming using Java language syntax. Classes, standard class package; problem solving, basic data structures.

CS 166/M 166 04(4-0-0). Discrete Structures. F, S. Prerequisite: CSCC 153 with a C [2.0] or better; M CC 124. Credit not allowed for both CS 166 and M 166.

Algorithms, mathematical induction, graphs and trees, counting methods, difference equations, recursion, probability, introduction to mathematical logic.

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: CSCC 153 with a C [2.0] or better, CS 166/M 166 with a C [2.0] or better, M CC 160 with a C [2.0] or better.

Data structures; abstract data types, complexity analysis; sorting, searching, hashing; examples from operating systems and graphics.

CS 253 04(3-0-1). Problem Solving with C++. F, S. Prerequisite: CS 166/M 166 with a C [2.0] or better, CS 200 with a C [2.0] or better, CS 270 with a C [2.0] or better, or EE 251 with a C [2.0] or better.

C++ programming techniques for experienced programmers. UNIX tools for editing, compiling, debugging, and testing C++ programs.

CS 270 04(3-0-1). Computer Organization. F, S. Prerequisite: CS 166/M 166 with a C [2.0] or better, M CC 124 with a C [2.0] or better; concurrent registration in CS 200.

Representation of data, arithmetic, assembly language, digital logic, digital systems, memory organization and architecture.

CS 301 04(4-0-0). Foundations of Computer Science. F, S. Prerequisite: CS 166/M 166 with a C [2.0] or better, CS 200 with a C [2.0] or better, M CC 161 with a C [2.0] or better, M 229 with a C [2.0] or better and concurrent registration in CS 253.

Finite state machines, regular expressions, push down automata, context free grammars, Turing machines, the halting problem.

CS 314 04(3-3-0). Software Development Methods. F, S. Prerequisite: CS 253 with a C [2.0] or better.

Methods used to develop large-scale software projects in industry emphasizing design, implementation, and testing.

CS 370 04(3-3-0). System Architecture and Software. F, S. Prerequisite: CS 200 with a C [2.0] or better, CS 270 with a C [2.0] or better, STCC 301 with a C [2.0] or better or STCC 309 with a C [2.0] or better.

Introduction to operating systems including memory organization, I/O control, multitasking, process control, coordination, and resource management.

CS 410 04(3-2-0). Introduction to Computer Graphics. F, S. Prerequisite: CS 314 with a C [2.0] or better, M 229 with a C [2.0] 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. S. Prerequisite: CS 314 with a C [2.0] 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. (Ω-O)

CS 415 02(0-6-0). Software Development Project I. F. Prerequisite: CS 314.

Group software development project in a realistic setting. Requirements specification, prototyping, and design of software products.

CS 416 02(0-6-0). Software Development Project II. S. Prerequisite: CS 415.

Implementation, testing, and delivery of software products.

CS 420 04(3-3-0). Introduction to Analysis of Algorithms. S. Prerequisite: CS 301 with a C [2.0] 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, SS. Prerequisite: CS 314 with a C [2.0] or better.

Database analysis, design, administration, implementation, hierarchical, network relational models; data sublanguages; query facilities. (Ω-O)

CS 440 04(3-2-0). Introduction to Artificial Intelligence. F. Prerequisite: CS 253 with a C [2.0] or better, CS 301 with a C [2.0] 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. F. Prerequisite: CS 370 with a C [2.0] or better.

Operating system design and implementation, file systems, distributed operating systems, case studies.

CS 453 04(3-0-1). Introduction to Compiler Construction. F. Prerequisite: CS 253 with a C [2.0] or better, CS 301 with a C [2.0] or better.

Functional components of a compiler: modules, interfaces, lexical and syntax analysis, error recovery, resource allocation, code generation.

CS 457 04(3-3-0). Computer Networks and the Internet. S. Prerequisite: CS 370 with a C [2.0] or better.

Principles of communications, local area networks, communication protocols, TCP/IP, and the Internet. (Ω-O)

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Courses of Instruction

CS 460/EE 460 04(3-3-0). Embedded Systems. F. Prerequisite: CS 370.

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.(Ω-O)

CS 475 04(3-3-0). Parallel Programming. F, S. Prerequisite: CS 370 with a C [2.0] or better.

Parallel programming techniques for shared-memory and message-passing systems; process synchronization, communication; example languages. (Ω-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: Computer science majors only. Written consent of instructor.

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 or written consent of instructor.

Software development process modeling and evaluation; software metrics, testing verification, validation; experimental methods in software engineering. (Ω-O)

CS 515 02(0-6-0). Software Engineering Project I. F. Prerequisite: CS 514 or concurrent registration.

Practical application of advanced technical and management issues in software development through group software development project.

CS 516 02(0-6-0). Software Engineering Project II. S. Prerequisite: CS 515.

Coding, testing, and maintenance phases of development.

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. (Ω-O)

CS 518 04(3-2-0). Distributed Software System Development. S. Prerequisite: CS 414 and CS 451 or written consent of instructor.

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. F. 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 or written consent of instructor.

Achieving high reliability and fault tolerance. Fault modeling, testing, reliability evaluation, redundancy, fault tolerance.

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.

CS 545 04(3-3-0). Machine Learning. S. Prerequisite: CS 440.

Computational methods that allow computers to learn; neural networks, decision trees, genetic algorithms, bagging and boosting.

CS 551 04(3-3-0). Distributed Operating Systems. F, SS. Prerequisite: CS 370 (with a C [2.0] or better) or CS 451 (with a C [2.0] or better).

Distributed operating systems, memory management, computer security, client-server computing, distributed resource management failure recovery. (Ω-O)

CS 553 04(3-3-0). Algorithmic Language Compilers. S. Prerequisite: CS 420, CS 453.

Compiler construction; lexical scanner generators, parser generators, dataflow analysis, optimization.

CS 556 04(3-2-0). Computer Security. S. Prerequisite: CS 451 or written consent of instructor.

Topics in computer security: Concepts, threats, risks, access control models, trusted systems, cryptography, authentication. (Ω-O)

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. (Ω-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 or written consent of instructor.

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 or written consent of instructor.

Designing and analyzing algorithms and data structures; illustrations from variety of problem domains.

CS 635 04(3-3-0). Advanced Fault-Tolerant Computing. F. Prerequisite: CS 530.

Advanced topics and recent developments in high reliability and fault-tolerant systems.

CS 640 02(2-0-0). Advanced Artificial Intelligence I. F. Prerequisite: CS 540.

Research topics in artificial intelligence: genetic algorithms, neural networks, connectionist models; machine learning; planning, automated reasoning.

CS 641 02(2-0-0). Advanced Artificial Intelligence II. S. Prerequisite: CS 640.

Advanced research topics in artificial intelligence.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

CS 653A-B Var [1-4]. Advanced Topics in Programming Languages. F, S. Prerequisite: Written consent of instructor.

A) Language design and definition. Semantics, type theory. B) Language implementation. Data dependence analysis; parallel code generation.

CS 658/EE 658 04(3-3-0). Internet Engineering. F. Prerequisite: EE 456 or CS 457. Credit not allowed for both CS 658 and EE 658.

Link technologies, multiple access, hardware and software for internetworks routing, switching flow control, multicast, performance, and applications. (Ω-O)

CS 670 B-D/EE 670B-D Var [1-4]. Topics in Architecture/ Systems. F, S. Prerequisite: CS 570 or EE 554 or written consent of instructor. Credit not allowed for both CS 670B-D and EE 670B-D.

B) Performance evaluation and modeling. C) Distributed systems. D) Architecture of advanced systems.

***CS 674/*EE 674 03(3-0-0). Heterogeneous Computing.** S. Prerequisite: CS 551 or CS 570 or CS 575 or EE 550 or EE 554. Credit not allowed for both CS 674 and EE 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.

DANCE COURSES

Department of Music, Theatre, and Dance College of Liberal Arts

D CC 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. Prerequisite: A) D 120A; B) D 120B and written consent of instructor; C) D 120C.
A) Modern 02(0-4-0). B) Ballet 03(0-6-0). C) Jazz 02(0-4-0).

***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. Prerequisite: A) D 121A; B) D 121B and written consent of instructor; C) D 121C.

A) Modern 02(0-4-0). B) Ballet 03(0-6-0). C) Jazz 02(0-4-0).

D 221A-C. Dance Techniques IV. S. Prerequisite: A) D 220A; B) D 220B and written consent of instructor; C) D 220C.

A) Modern 02(0-4-0). B) Ballet 03(0-6-0). Jazz 02(0-4-0)

D 226 02(1-2-0). Dance Choreography I. F. Prerequisite: D 121A or B or C.

Elements of dance composition including space, levels, rhythm, dynamics, qualities of movement, form, style.

D 320A-C Dance Techniques V. F. Prerequisite: A) D 221A and written consent of instructor; B) D 221B and written consent of instructor; C) D 221C.

A) Modern 03(0-6-0). B) Ballet 03(0-6-0). C) Jazz 02(0-4-0).

D 321A-C. Dance Techniques VI. S. Prerequisite: A) D 320A and written consent of instructor; B) D 320B and written consent of instructor; C) D 320C.

A) Modern 03(0-6-0). B) Ballet 03(0-6-0). C) Jazz. 02(0-4-0).

D 324 02(1-2-0). Teaching Creative Movement for Children. S.
Theoretical and practical experience in teaching creative movement.

D 325 03(2-2-0). Dance Production. S. Prerequisite: TH 161.
Advanced stage management, lighting, and sound design.

D 326 02(1-2-0). Dance Choreography II. S. Prerequisite: D 221A or B or C.

Compositional studies of period styles, primitive Greek, Roman, medieval, Renaissance, 16th, 17th, 18th, 19th centuries.

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. Prerequisite: D 321A-C.
A) Modern. B) Ballet. C) Jazz.

D 421A-C 02(0-4-0). Dance Techniques VIII. S. Prerequisite: D 420AC.
A) Modern. B) Ballet. C) Jazz.

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 B or C.
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.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

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 V.

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 (DM)

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. (Ω-C)

DM 272 03(3-0-0). Consumers in the Marketplace. F, S, SS.

Analysis and evaluation of consumers in the marketplace as applied to merchandising. (Ω-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. (Ω-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. (Ω-O)

DM 360/BK 360 03(3-0-0). Retailing. F, S, SS. Prerequisite: BK 300 or BK 305. Credit not allowed for both DM 360 and BK 360.

Retail markets, institutions, operations, and problems. (Ω-O)

DM 400 02(0-2-1). U.S. Travel-New York City. S. Prerequisite: Six semester credits in design, merchandising, and consumer science courses or written consent of instructor.

Interview/analyze designers, manufacturers, buying offices, retail stores, magazine firms, consumer agencies, etc.

DM 487A-F Internship. Prerequisite: A) GPA 2.5; AM 371, DM 360/BK 360, DM 492. B) GPA 2.5; AM 343, AM 446, DM 492. F) Written consent of instructor.

A) Merchandising. Var [12-16]. (\$) B) Apparel design and production. Var [12-16]. (\$) F) General. Var [3-16]. (\$)

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. Prerequisite: Written consent of instructor.

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-Based Design Solutions. F. Prerequisite: Written consent of instructor.

Integrated model for research-based design solutions. Critical evaluation and synthesis of scholarly literature.

DM 518 03(3-0-0). Consumer Issues-Global Perspectives. F.

Understanding and analysis of consumer well-being and issues from global perspective.

DM 542 03(1-4-0). Advanced Computer-Aided Textile Design. F. Prerequisite: AM 342 or written consent of instructor.

Use of computer-aided design system to produce fabric designs for apparel or interior professional end use. (\$)

***DM 543 02(2-0-0). Interior Design Programming and Documentation.** F. Prerequisite: Written consent of instructor.

Applying theoretical components of programming and defining methodology for documenting interior installations.

DM 551 03(3-0-0). Research Methods. S. Prerequisite: Written consent of instructor.

Design and methods of research applicable to design and merchandising.

°DM 563 03(3-0-0). Advanced Historic Costume. S. Prerequisite: Twelve credits of art history, history, and/or textiles and clothing.

Theory and research in Western costume history.

DM 578 03(2-0-1). Trends-Consumer Issues. F, S, SS.

Developments and projections of consumer issues.

DM 590 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 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.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ENGLISH COURSES (E)

Department of English *College of Liberal Arts*

- E CC 140 03(3-0-0). The Study of Literature.** (AUCC 3B). F, S, SS.
Basic principles of reading literary texts. (GT-AH2)
- 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 CC 232 03(3-0-0). Introduction to Humanities.** (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/ET 234 03(3-0-0). Native American Literature.** S. Credit not allowed for both E 234 and ET 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 CC 238 03(3-0-0). 20th-Century Fiction.** (AUCC 3B or 3E). F, S.
20th-century fiction chosen for its relevance to global and cultural awareness. (GT-AH2)
- E 239/ET 239 03(3-0-0). Introduction to Chicano Literature.** F, S. Credit not allowed for both E 239 and ET 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 CC 242 03(3-0-0). Reading Shakespeare.** (AUCC 3B). F, S.
Reading of Shakespeare texts, using various approaches of interpretation for understanding and relation to our contemporary cultural situation.
- E CC 245 03(3-0-0). World Drama.** (AUCC 3B or 3E). F, S.
World drama in cultural contexts. (GT-AH2)
- 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 CC 270 03(3-0-0). Introduction to American Literature.** (AUCC 3B or 3D). F, S, SS.
History and development of American writings from 16th-century travel narratives through early 20th-century modernism. (GT-AH2)

- E CC 276 03(3-0-0). Survey of British Literature I.** (AUCC 3B). F.
British literature from Beowulf through the 18th century in relation to its historical contexts.
- E CC 277 03(3-0-0). Survey of British Literature II.** (AUCC 3B). S.
British literature from the Romantics to the present in relation to its historical contexts.
- E 300/AU 300 03(3-0-0). American Lives-Methods in American Studies.** F, S. Prerequisite: AUCC 100, AUCC 101. Credit not allowed for both E 300 and AU 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: COCC 150.
Critical examination of reading processes, as well as the rhetorical and cultural contexts of readers on the web.
- E 311A-C 03(3-0-0). Intermediate Creative Writing.** F. Prerequisite: A-B) E 210 with grade of B or better. C) COCC 150; E 210 with grade of B or better or JT 210.
Group discussion of student writing, literary models, and theory; emphasis on developing individual style. A) Fiction. B) Poetry. C) Nonfiction.
- 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 333 03(3-0-0). Literature and Social Sensitivity.** F, S, SS.
Contemporary American literature of special relevance to social issues.
- 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.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

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 341 03(3-0-0). Principles of Literary Criticism. F, S, SS. 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 HYCC 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 371 03(3-0-0). American Authors to 1870. F. Prerequisite: One course in literature.

In-depth study of selected American authors before 1870.

E 372 03(3-0-0). American Authors Since 1870. F, S. Prerequisite: One course in literature.

In-depth study of selected American authors since 1870.

E 384A-B Var [1-3]. Supervised College Teaching. F, S. Prerequisite: Written consent of department chair. A) May be taken for maximum of 6 credits.

Supervised assistance in instruction. A) Classroom. B) Writing Center.

E 401 03(3-0-0). Teaching Reading. F, S. Prerequisite: COCC 301D.

Theory and pedagogy for understanding, interpreting, and evaluating print and visual texts.

E 402 03(3-0-0). Teaching Composition. F, S. Prerequisite: COCC 301A or B or C or D.

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 COCC 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 Var [1-3]. Creative Writing Workshop. S. Prerequisite: A) Grade of B or better in E 311A. B) Grade of B or better in E 311B. C) Grade of B or better in E 311A or E 311C. Maximum of 8 credits allowed per subtopic.

Individual projects with group discussion and analysis. A) Fiction. B) Poetry. C) Nonfiction.

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 CC 276 or E 342 or E 343.

English Renaissance literature (1500-1670), covering a range of poetry, drama, and prose.

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 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 434 03(3-0-0). American Fiction, 1865-1914. F. Prerequisite: One course in literature.

Form, content, and context of American fiction, 1865-1914: James, Twain, Crane, Wharton, Norris, and others.

E 435 03(3-0-0). American Fiction, 1914-1945. F. Prerequisite: One course in literature.

Form, content, and context of American fiction, 1914-1945: Hemingway, Faulkner, Fitzgerald, Cather, Dos Passos, and others.

E 436 03(3-0-0). American Fiction, 1945-Present. S. Prerequisite: One course in literature.

Form, content, and context of American fiction from 1945 to present: Kesey, Updike, Heller, Pynchon, Barthelme, Vonnegut, and others. (Ω-O)

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

E 437 03(3-0-0). Heritage of the West. S. Prerequisite: One course in American history.

Western American literature, primarily fiction, focusing on the basic foundations of Western American society and attitudes.

E 438/ET 438 03(3-0-0). Contemporary Native American Literature. F. Credit not allowed for both E 438 and ET 438.

Contemporary fiction, poetry of Native Americans emphasized as distinctive tradition in American literature and cultural expression of indigenous peoples.

E 439 03(3-0-0). Novel in the American West. F. Prerequisite: E 179 or E CC 270.

History and development of American Western novels, including thematic and stylistic considerations. Writers will include Wister, Cather, and Stegner.

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. F. 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 and one other upper-division E prefix course.

Chaucer's works in medieval context.

E 463 03(3-0-0). Milton. F. Prerequisite: E 341 and 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 and 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 and 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. F. Prerequisite: E 240.

Major American poets through the 19th century including Whitman, Dickinson, and Frost.

E 476 03(3-0-0). English Poetry I. S. Prerequisite: E 240.

Major English poets of Renaissance and neoclassical periods including Spenser, Donne, Jonson, Milton, Dryden, and Pope.

E 477 03(3-0-0). English Poetry II. S. Prerequisite: E 240.

Major English poets of the 19th century including Blake, Wordsworth, Byron, Keats, and Browning.

E 478 03(3-0-0). Modern Poetry. F. Prerequisite: E 240.

Major British and American poets from late 19th century to Second World War.

E 487A-B. Internship. Prerequisite: 2.5 GPA; written consent of department head; Maximum of 4 credits allowed in E 487 A and B.

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 inquiry 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.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

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 615 03(3-0-0). Reading Literature-Recent Theories. F, S.

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 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 or written consent of instructor.

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.

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.

AGRICULTURAL AND RESOURCE ECONOMICS COURSES (EA)

Department of Agricultural and Resource Economics

College of Agricultural Sciences

EACC 202 03(3-0-0). Agricultural and Resource Economics. (AUCC 3C). F, S. Credit not allowed for both EACC 202 and ECCC 202.

Introduction to decision-making by consumers, firms, and government, and resulting allocation of resources through markets.

EA 205 03(2-2-0). Farm and Ranch Management. F. Prerequisite: EACC 202 or ECCC 202.

Application of economic concepts and management functions to production, financial, and marketing decisions involved in farm or ranch business.

EACC 240/ECCC 240 03(3-0-0). Issues in Environmental Economics. (AUCC 3F). F, S. Credit not allowed for both EACC 240 and ECCC 240.

Discussion and economic analysis of current environmental issues with special emphasis on the impact of economic growth. (Ω-C)

EA 305 03(2-2-0). Agricultural and Resource Enterprise Analysis. F, S. Prerequisite: EACC 202 or ECCC 202.

Use of records in agricultural and resource enterprise management; analytical methods, budgets, and planning techniques for improved decision making.

+EA 308 03(3-0-0). Agricultural Finance. F. Prerequisite: EACC 202 or ECCC 202.

Monetary affairs of farming and ranching emphasizing agricultural credit, facilities, procurement, extension, and management. (\$, Ω-O)

EA 310 03(3-0-0). Agricultural Marketing. F, S, SS. Prerequisite: EACC 202 or ECCC 202.

Market structure, behavior, and performance including futures market and market games theory. (Ω-O)

EA 328 03(3-0-0). Small Agribusiness Management. F, S. Prerequisite: EACC 202 or ECCC 202.

Apply business principles to small agribusinesses and cooperatives.

EA 335/EC 335 03(3-0-0). Introduction to Econometrics. F, S. Prerequisite: ECCC 204 and STCC 201 or STCC 204 or STCC 301. Credit not allowed for both EA 335 and EC 335.

Estimating statistical regression models of economic relationships; treatment of special problems that may arise in analysis of economic data.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

EA 340/EC 340 03(3-0-0). Introduction to Economics of Natural Resources. F. Prerequisite: EACC 202 or ECCC 202. Credit not allowed for both EA 340 and EC 340.

Concepts, theories, institutions; analytical methods for economic evaluation of alternative resource use patterns and land use plans.

EA 342 03(3-0-0). Economic Analysis-Water Resource Development. S. Prerequisite: EACC 202 or ECCC 202.

Water resource evaluation; concepts, issues, and problems; techniques employed in analyzing and evaluating water use in alternative situations.

EA 346/EC 346 03(3-0-0). Economics of Outdoor Recreation. F. Prerequisite: EACC 202 or ECCC 202. Credit not allowed for both EA 346 and EC 346.

Benefit cost framework in public planning for outdoor recreation, pricing problems, projecting demand, and regional economic development.

EA 375 03(3-0-0). Agricultural Law. F, S.

Laws, regulations, case decisions affecting ranching and farming in the Rocky Mountain area.

EA 405 03(2-2-0). Agricultural Production Management. F. Prerequisite: EACC 202 or ECCC 202.

Economic principles of agricultural production decisions with linear programming analysis of production choices and farm planning.

EA 412 03(3-0-0). Agricultural Commodities Marketing. S. Prerequisite: EA 310.

Agricultural marketing and agribusiness principles applied to current marketing problems relating to livestock and field and horticultural crops. (\$)

EA 415 03(3-0-0). International Agricultural Trade. F. Prerequisite: ECCC 204.

Agricultural trade patterns and institutions; trade theory with applications to agriculture. Current issues in agricultural trade.

EA 428 03(3-0-0). Agricultural Business Management. S. Prerequisite: EA 305, EA 310, and senior standing.

Economic analysis, organization, and management practices of agriculture and food industries studied through simulation, case study, computer labs.

EA 460 03(3-0-0). Economics of World Agriculture. F. Prerequisite: EACC 202 or ECCC 202.

Relationships between nations affecting agricultural growth and productivity, food security, and human welfare.

EA 475 03(3-0-0). Water Law. F, S. Prerequisite: EA 375 or written consent of instructor.

Law as it governs acquisition of water rights under riparian and appropriations systems; interstate waters and agencies of distribution.

EA 478 03(3-0-0). Agricultural Policy. S. Prerequisite: EACC 202 or ECCC 202 or EACC 240/ECCC 240.

Formulation and administration of public policies affecting agricultural industries and rural areas in the United States.

EA 484 Var [1-5]. Supervised College Teaching. F, S. Maximum of 10 credits allowed in course.

EA 487 Var. Internship.

EA 495 Var. Independent Study.

EA 496 Var. Group Study.

EA 505 03(3-0-0). Agricultural Production Economics. F. Prerequisite: M CC 141; EA 405 or EC 306.

Empirical applications of production economic theory for use of inputs and allocation of resources in agricultural, natural resource sectors.

EA 508 03(3-0-0). Financial Management in Agriculture. S. Prerequisite: EA 308.

Systematic approach to understanding and applying financial management in farm businesses.

EA 510 03(3-0-0). Agricultural Product Marketing. F. Prerequisite: EA 310.

Marketing techniques, industrial organization/competition for agricultural products in U.S. domestic, international trade, and developing country markets.

EA 530 03(3-0-0). Agricultural Price Analysis. S.

Agricultural commodity prices related to neoclassical economics; current literature emphasizing management problems.

EA 535/EC 535 03(3-0-0). Applied Econometrics. F, S. Prerequisite: EA 335/EC 335, EC 304, EC 306, M CC 315. Credit not allowed for both EA 535 and EC 535.

Econometric techniques applied to testing and quantification of theoretical economic relationships drawn from both microeconomics, macroeconomics.

EA 540/EC 540 03(3-0-0). Economics of Natural Resources. F. Prerequisite: EA 340/EC 340, M CC 141. Credit not allowed for both EA 540 and EC 540.

Public natural resources policy, effect on resource use in private sector, optimal pricing of minerals, timber and fisheries, public project analysis.

EA 541/EC 541 03(3-0-0). Environmental Economics. S. Prerequisite: EC 306. Credit not allowed for both EA 541 and EC 541.

Economics of environmental policy; partial equilibrium and general equilibrium model; pollution; natural environments; population and economic growth.

EA 542 03(3-0-0). Economics of Water Resource Planning. S. Prerequisite: EC 306, M CC 141.

Benefit-cost analysis of public water development programs; economic analysis of selected water allocation issues; groundwater, pollution, pricing.

EA 547 03(3-0-0). Public Lands Planning and Management. S. Prerequisite: EACC 202 or ECCC 202.

Principles and techniques used by federal land management agencies including Forest Service, Park Service, Fish and Wildlife Service, and BLM.

EA 563/EC 563 03(3-0-0). Regional Economics-Theory, Methods, and Issues. F. Prerequisite: EC 306, concurrent registration in M CC 315. Credit not allowed for both EA 563 and EC 563.

Tools and methods of regional economics, including supply, demand, and externality analyses. Applications to current urban and regional policy issues.

EA 566/S 566 03(3-0-0). Contemporary Issues of Developing Countries. S. Prerequisite: Two or more courses in economics and/or sociology. Credit not allowed for both EA 566 and S 566.

Social, economic, and technological factors in developing countries.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

***EA 570/*EC 530 03(3-0-0). Methodology of Economic Research.** F. Prerequisite: EC 304, EC 306. Credit not allowed for both EA 570 and EC 530.

Philosophical foundations of science and research. Concepts and skills for planning, performing, reporting, and evaluating economic research.

EA 572 03(3-0-0). Social Benefit Cost Analysis. F. Prerequisite: EC 306.

Theory, application of concepts relating to social benefit cost analysis of public projects, policies intended to promote social welfare, economic growth.

EA 635/EC 635 03(3-0-0). Econometric Theory I. S. Prerequisite: EA 535/EC 535. Credit not allowed for both EA 635 and EC 635.

Theory of mathematical statistics and classical linear regression model in context of economic application.

EA 660 03(3-0-0). Economics of Agricultural Development. S. Prerequisite: EA 460.

Developments in agriculture related to food supply and economic growth in developing countries.

EA 678 03(3-0-0). Agricultural and Resource Policy. F. Prerequisite: EC 306, M CC 315.

Evaluate and analyze economic theory, applications and public incentives related to government policies for agriculture and natural resources.

EA 695 Var. Independent Study.

EA 699 Var. Thesis.

EA 735/EC 735 03(3-0-0). Econometric Theory II. F. Prerequisite: EA 635/EC 635. Credit not allowed for both EA 735 and EC 735.

Model building, estimation and testing, using both microanalytic models and aggregate models of the economy.

EA 784 Var [1-3]. Supervised College Teaching. F, S, SS.

EA 792A-C Var. Seminar.

A) Agricultural. B) International. C) Resources.

EA 795 Var. Independent Study.

EA 799 Var. Dissertation.

ECONOMICS COURSES (EC)

Department of Economics College of Liberal Arts

ECCC 101 03(3-0-0). Economics of Social Issues. (AUCC 3C). F, S.

Economic analysis of poverty, crime, education, and other social issues. Basics of macro, micro, and political economy.

ECCC 202 03(2-0-1). Principles of Microeconomics. (AUCC 3C). F, S, SS. Prerequisite: M CC 117 or M CC 118 or M CC 120A-B or M CC 121 or M CC 141 or M CC 160. Credit not allowed for both EC/ECCC 202 and EA/EACC 202.

Introduction to decision-making by households, firms, and government, and resulting allocation of resources through markets.

ECCC 204 03(2-0-1). Principles of Macroeconomics. (AUCC 3F). F, S, SS. Prerequisite: ECCC 202 or EACC 202.

Determinants of national output, employment, and price level; inflation and unemployment; fiscal and monetary policy.

ECCC 211 03(3-0-0). Gender in the Economy. (AUCC 3E). S.

Role gender plays in economies; the way gender affects economic outcomes for individuals and societies.

ECCC 212 03(3-0-0). Racial Inequality and Discrimination. (AUCC 3F). F.

Economic inequality between Afro-Americans and Euro-Americans. Debates about causes, consequences, and remedies.

ECCC 240/EACC 240 03(3-0-0). Issues in Environmental Economics. (AUCC 3F). F, S. Credit not allowed for both ECCC 240 and EACC 240.

Discussion and economic analysis of current environmental issues with special emphasis on the impact of economic growth. (Ω-C)

EC 304 03(3-0-0). Intermediate Macroeconomics. F, S, SS. Prerequisite: ECCC 204, M CC 141.

Theory of national income, its measurement and determinants; analysis of inflation, growth, debt, and public policy. (Ω-C)

EC 306 03(3-0-0). Intermediate Microeconomics. F, S, SS. Prerequisite: ECCC 204, M CC 141.

Analysis of competitive and noncompetitive markets in terms of efficiency of resource utilization.

°EC 310 03(3-0-0). Poverty and the Welfare State. S, SS. Prerequisite: ECCC 101 or ECCC 202 or EACC 202.

Description and analysis of U.S. poverty; the "underclass"; feminization of poverty; working poor; the welfare state.

EC 315 03(3-0-0). Money and Banking. F, S, SS. Prerequisite: ECCC 204. Monetary theory and policy; description of financial institutions and markets. (Ω-O)

EC 320 03(3-0-0). Economics of Public Finance. F, S, SS. Prerequisite: ECCC 204.

Impact of taxes, government expenditures on allocation of resources, distribution of income; evaluation of government expenditure program; tax policies. (Ω-O)

EC 332/PO 332 03(3-0-0). International Political Economy. F, S. Prerequisite: EACC 202 or ECCC 202 and POCC 232. Credit not allowed for both EC 332 and PO 332.

Theories on relations between international politics and economics. Policy implications of different theories and case studies.

EC 335/EA 335 03(3-0-0). Introduction to Econometrics. F, S. Prerequisite: ECCC 204 and STCC 201 or STCC 204 or STCC 301. Credit not allowed for both EC 335 and EA 335.

Estimating statistical regression models of economic relationships; treatment of special problems that may arise in analysis of economic data.

EC 340/EA 340 03(3-0-0). Introduction to Economics of Natural Resources. F. Prerequisite: EACC 202 or ECCC 202. Credit not allowed for both EC 340 and EA 340.

Concepts, theories, institutions; analytical methods for economic evaluation of alternative resource use patterns and land use plans.

°EC 344 03(3-0-0). Economics of Energy Resources. S. Prerequisite: EACC 202 or ECCC 202.

Supply, consumption trends and projected demand for alternative energy resources in domestic and world perspective; economics of public energy policies.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

EC 346/EA 346 03(3-0-0). Economics of Outdoor Recreation. F. Prerequisite: EACC 202 or ECCC 202. Credit not allowed for both EC 346 and EA 346.

Benefit cost framework in public planning for outdoor recreation, pricing problems, projecting demand, and regional economic development.

EC 370 03(3-0-0). Comparative Economic Systems. F. Prerequisite: ECCC 101 or ECCC 202 or EACC 202.

Place of the economy in different societies; nature and evolution of capitalism; crisis of command economies and capitalist restoration.

EC 372 03(3-0-0). History of Economic Institutions and Thought. F, S. Prerequisite: ECCC 101 or ECCC 202 or EACC 202.

Origins and development of capitalist institutions including contemporary issues of alienation, loss of community, and changing values. (Ω-O)

EC 376 03(3-0-0). Marxist Economic Thought. S. Prerequisite: ECCC 101 or ECCC 202 or EACC 202.

Marxist critique of capitalism and orthodox economics in both its original 19th-century and contemporary settings.

EC 379/HY 379 03(3-0-0). Economic History of the United States. F. Prerequisite: ECCC 101 or ECCC 202 or EACC 202; or any two courses in American history. Credit not allowed for both EC 379 and HY 379.

Economic analysis of growth and welfare from beginning of industrialization to present.

EC 404 03(3-0-0). Macroeconomic Policy. S. Prerequisite: EC 304.

Alternative macroeconomic policies, policy coordination; application to current macroeconomic problems, policies, proposals.

***EC 410 03(3-0-0). Labor Economics.** S. Prerequisite: EC 306.

Capital/labor relationship; supply, demand of labor; wage determination; role of unions; unemployment and instability; structure of modern working class.

°EC 435 03(3-0-0). Economic Forecasting. S. Prerequisite: ECCC 204, EC 335/EA 335 or ST 304.

Theory and techniques used in economic forecasting as practiced by economists in industry, government, and academic life.

EC 440 03(3-0-0). International Economics I. F. Prerequisite: EC 306.

Theory of international trade; payments, commercial policies, and economic integration.

EC 442 03(3-0-0). International Economics II. S. Prerequisite: EC 304.

Balance of payments, adjustment mechanisms, and international monetary systems.

EC 451 03(3-0-0). Economics of Regulation. S. Prerequisite: EC 306.

U.S. regulatory history, institutions, and environment; economic justifications for and effects of regulation; evaluation of deregulation movement.

EC 460 03(3-0-0). Economic Development. F. Prerequisite: EC 304.

Economic problems of underdeveloped nations.

EC 463 03(3-0-0). Regional Economics-Tools/Analysis/Policy. S. Prerequisite: EC 306.

Introduction to economic importance of location for firms, consumers, and policy makers. Basic tools, applications, and student research.

EC 474 03(3-0-0). Recent Economic Thought. S. Prerequisite: EC 304, EC 306.

Nontraditional schools of economic thought, such as institutionalism and neo-Marxism, that critique neoclassical economic theory.

EC 484 Var [1-3]. Supervised College Teaching. F, S, SS. Prerequisite: EC 304, EC 306, written consent of instructor.

Assistance in teaching introductory economics courses.

EC 487 Var [1-3]. Internship.

EC 492 03(0-0-3). Seminar.

Summarizes, debates, and applies issues and policies chosen by the instructor. Emphasis on student participation, debate, and research.

EC 495 Var. Independent Study.

EC 504 03(3-0-0). Macroeconomic Analysis I. F, S. Prerequisite: EC 304, EC 306.

Analysis of national income, employment, price levels, growth, and policies to achieve national economic goals.

EC 505 03(3-0-0). Political Economy I. F, S. Prerequisite: EC 372 or EC 376 or EC 474.

Classical, liberal, conservative, modern liberal, and radical paradigms on relationship of the state to the market system.

EC 506 03(3-0-0). Microeconomic Analysis I. F, S. Prerequisite: EC 306, M CC 315.

Price theory: analyses of demand, production, and costs; analysis of various market structures; factor markets; general equilibrium, welfare economics.

***EC 510 03(3-0-0). Labor Market Analysis.** F. Prerequisite: EC 304, EC 306.

Determination of wages and employment. Focus on theoretical and applied controversies.

°EC 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.

EC 520 03(3-0-0). Economics of Taxation. S. Prerequisite: EC 320.

Analysis and evaluation of tax policy in terms of efficiency and equity.

***EC 530/EA 570 03(3-0-0). Methodology of Economic Research.** F. Prerequisite: EC 304, EC 306. Credit not allowed for both EC 530 and EA 570.

Philosophical foundations of science and research. Concepts and skills for planning, performing, reporting, and evaluating economic research.

EC 535/EA 535 03(3-0-0). Applied Econometrics. F, S. Prerequisite: EC 335/EA 335, EC 304, EC 306, M CC 315. Credit not allowed for both EC 535 and EA 535.

Econometric techniques applied to testing and quantification of theoretical economic relationships drawn from both microeconomics, macroeconomics.

EC 540/EA 540 03(3-0-0). Economics of Natural Resources. F. Prerequisite: EC 340/EA 340, M CC 141. Credit not allowed for both EC 540 and EA 540.

Public natural resources policy, effect on resource use in private sector, optimal pricing of minerals, timber and fisheries, public project analysis.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

EC 541/EA 541 03(3-0-0). Environmental Economics. S. Prerequisite: EC 306. Credit not allowed for both EC 541 and EA 541.

Economics of environmental policy; partial equilibrium and general equilibrium model; pollution; natural environments; population and economic growth.

***EC 550 03(3-0-0). Market Structure Analysis.** S. Prerequisite: EC 306. Neoclassical and institutional evaluation of structure-conduct-performance in markets and industries. Use of economic theory in antitrust.

EC 563/EA 563 03(3-0-0). Regional Economics-Theory, Methods, and Issues. F. Prerequisite: EC 306, concurrent registration in M CC 315. Credit not allowed for both EC 563 and EA 563.

Tools and methods of regional economics, including supply, demand, and externality analyses. Applications to current urban and regional policy issues.

***EC 570 03(3-0-0). Evolution of Economic Thought.** F. Prerequisite: EC 304, EC 306.

From Plato and Aristotle to the modern period.

°EC 579 03(3-0-0). U.S. Economic History. F. Prerequisite: EC 379/HY 379; or EC 304, EC 306.

History and economic analysis of growth, transformation, and institutional change.

EC 635/EA 635 03(3-0-0). Econometric Theory I. S. Prerequisite: EC 535/EA 535. Credit not allowed for both EC 635 and EA 635.

Theory of mathematical statistics and classical linear regression model in context of economic application.

EC 640 03(3-0-0). International Trade Theory. F. Prerequisite: EC 306 or EC 506.

Theory of international trade including comparative advantage, factor growth, market distortions, and commercial policy.

EC 695 Var. Independent Study.

EC 699 Var. Thesis.

EC 704 03(3-0-0). Macroeconomic Analysis II. S. Prerequisite: EC 504, M CC 315.

Theoretical framework for analyzing flows of aggregate income and expenditure; relationship between these flows and other dimensions of economic activity.

EC 705 03(3-0-0). Political Economy II. S. Prerequisite: EC 505.

Methodology of institutional economics, theory of institutional change, and policy evaluation from institutionalist viewpoint.

EC 706 03(3-0-0). Microeconomic Analysis II. F. Prerequisite: EC 506, M CC 315.

Partial and general equilibrium analysis of demand, production, pricing, and welfare under competitive and imperfectly competitive conditions.

EC 715 03(3-0-0). Monetary Economics. F. Prerequisite: EC 504.

Principle issues of monetary theory: money supply and demand, interest rates, and current problems of monetary policy.

EC 720 03(3-0-0). Economics of Public Expenditure. F. Prerequisite: EC 320, EC 506.

Analysis of welfare foundations of public expenditure, including cost-benefit analysis.

***EC 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.

EC 735/EA 735 03(3-0-0). Econometric Theory II. F. Prerequisite: EC 635/EA 635. Credit not allowed for both EC 735 and EA 735.

Model building, estimation and testing, using both microanalytic models and aggregate models of the economy.

EC 742 03(3-0-0). International Production and Monetary Theory. S. Prerequisite: EC 304 or EC 504.

Factor movements, theory of international production (multinationalism), balance of payments, and international monetary system.

°EC 760 03(3-0-0). Theories of Economic Development. S. Prerequisite: EC 460 or written consent of instructor.

Analysis of fundamentals of economic development (processes, problems, and strategies) with special reference to developing nations.

***EC 770 03(3-0-0). Economic Thought and Systems.** S. Prerequisite: EC 570.

Aspects of modern economic thought and comparative economics selected according to backgrounds and interests of the class.

EC 784 Var. Supervised College Teaching. F, S, SS.

EC 792A-E Var. Seminar.

A) Theory. C) Social and political. D) Quantitative analysis. E) Development.

EC 795 Var. Independent Study.

EC 799 Var. Dissertation.

EDUCATION COURSES (ED)

School of Education

College of Applied Human Sciences

ED 255 02(2-0-0). Introduction to Education. F, S, SS.

Overview of teaching profession emphasizing teaching opportunities, licensure, and University professional program.

EDCC 275 03(3-0-0). Schooling in the United States. (AUCC 3F). F, S, SS. Prerequisite: Consent of Teacher Licensure Office.

Social, political, historical, and economic forces that shape U.S. system of public schooling (K-12).

ED 296 Var. Group Study.

ED 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 through the Division of Continuing Education.

Psychological conditions of classroom learning and teaching including understanding needs of exceptional children in the classroom. (Ω)

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ED 331 02(1-2-0). Educational Technology and Assessment. F, S, SS. Prerequisite: Completion of Phase I courses; BD 150 or CS 110 within three years or computer proficiency test; consent of Teacher Licensure Office.

Skills and strategies for the use of appropriate technology and assessment in teacher education.

ED 340 03(2-2-0). 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 development. Field experiences, service learning experiences.

ED 350 03(2-2-0). Instruction I-Individualization/Management. F, S, SS. Prerequisite: EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program.

Theory, research, and practice of teaching at the junior high/middle school level; adapting instruction for individuals including learners with special needs.

ED 386 Var [1-3]. Practicum-Instruction I. Prerequisite: EDCC 275, ED 340, concurrent registration in ED 350; admission to Teacher Licensure Program.

ED 400 03(2-2-0). Diagnostic Teaching of Reading. F, S. Prerequisite: EDCC 275, ED 340, HD 217, HD 310, HD 400.

Development of the knowledge base, skills, and strategies for teaching reading from birth to age 8. Service learning experiences.

ED 425 04(2-6-0). Early Childhood Education I. F, S. Prerequisite: EDCC 275, ED 340; admission to Teacher Licensure Program.

Integrated methods; theoretical bases; teacher's role; appropriate curriculum; measurement; environments; pedagogy; instructional design and decisions.

ED 426 04(2-4-0). Early Childhood Education II. F, S. Prerequisite: ED 425.

Integrated methods; organizing/presenting materials/activities; applying decisions; managing groups; individual instruction; assessment/evaluation.

ED 450 04(2-4-0) Instruction II-Standards and Assessment. F, S. Prerequisite: ED 350, ED 386; concurrent reg. in ED 486J.

Theory, research, and practice of standards-based instruction: assessment, literacy and technology.

ED 460 04(3-2-0). Methods and Materials in Teaching Science. F. Prerequisite: Admission to Teacher Licensure Program.

Current trends in science education, K-12; techniques of experimentation demonstrations; study of equipment, facilities, and resource materials.

ED 462 04(4-0-0). Methods and Assessment in Teaching Languages. F. Prerequisite: Admission to Teacher Licensure Program; oral and written competency in the language endorsement area.

Objectives, methods, and resource materials for teaching languages in secondary schools.

ED 463 04(4-0-0). Methods in Teaching Language Arts. F, S. Prerequisite: Admission to Teacher Licensure Program.

Objectives, content, and methods of teaching English, speech, and journalism in secondary schools.

ED 464 04(4-0-0). Methods and Materials in Teaching Mathematics. S. Prerequisite: 18 credits in mathematics, admission to Teacher Licensure Program.

Problems and techniques of teaching secondary mathematics; evaluation of student achievement and teacher effectiveness.

ED 465 04(4-0-0). Methods and Materials in Social Studies. F. Prerequisite: Admission to Teacher Licensure Program.

Methods of teaching social studies; sources of information and teaching materials and literature for social studies teachers.

ED 466 04(4-0-0). Methods and Assessment in K-12 Art Education. F. Prerequisite: EDCC 275; admission to Teacher Licensure Program.

Objectives, methods, and resource materials for teaching art in elementary and secondary schools.

ED 475 04(2-6-0). Elementary School Music Methods. F. Prerequisite: MU 217, admission to Teacher Licensure Program.

Materials and teaching techniques for grades K-6; musical concepts and skills, individual and group activities, evaluation of pupil progress. (\$)

ED 476 02(1-3-0). Choral Methods for Secondary Schools. F. Prerequisite: MU 217, admission to Teacher Licensure Program.

General music classes, choral techniques and literature; current practices and trends. (\$)

ED 477 02(1-3-0). Instrumental Methods for Secondary Schools. F. Prerequisite: MU 217, admission to Teacher Licensure Program.

Organization and administration of instrumental music, grades 5-12. (\$)

ED 485A-C. Var [6-14]. Student Teaching. F, S. Prerequisite: A-B) ED 450 and appropriate special methods courses; C) ED 426.

Teacher education candidates participate in an intensive and extensive on-site capstone experience within a public school setting. A) Elementary. B) Secondary. (\$) C) Early childhood. (\$)

ED 486A-J Var. Practicum. Prerequisite: A-D, J) Admission to Teacher Licensure Program. I) ED 400 or concurrent registration.

A) K-12 classroom. B) Reading. D) Mathematics. I) Literacy. J) Instruction II.

ED 493A-B Var [1-3]. Seminar. Prerequisite: A) ED 426 or ED 450 and appropriate content methods course, concurrent registration in ED 485A or B or C. B) ED 426 or ED 450 and appropriate special methods courses, concurrent registration in ED 485A or B or C or VE 485.

A) Professional relations. Collegial and professional discussions, support, and assistance. B) Assessment of learning. Information and techniques that enable educators to use assessment results to inform planning and instructional practices.

ED 494 Var. Independent Field Studies.

Specialized field study in the public schools under direction and supervision of faculty.

ED 495 Var. Independent Study.

ED 496 Var. Group Study.

ED 501 03(3-0-0). Reading in the Content Areas. SS. Prerequisite: ED 320.

Specific methods, materials, and techniques for helping students become more efficient in reading content area material.

ED 502 03(3-0-0). Human Relations in Education. S. Prerequisite: Bachelor's degree or VE 300.

Human relations in an individual's educational, organizational, and social activities as applied to various educational settings.

ED 525B-E 02(0-0-2). Expert Teaching. B) S. C) F. D) S. E) F. Prerequisite: Bachelor's degree, admission to Teacher Licensure Program.

Theories related to effective classroom instruction. B) Inclusion, special needs. C) Thinking and learning. D) Reading, literacy. E) Standards, assessment.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

ED 530 02(1-2-0). Computer Applications in Effective Instruction. F, SS. Prerequisite: Bachelor's degree, admission to Teacher Licensure Program.

Increasing instructional effectiveness through the use of computer technology.

ED 550 03(3-0-0). Guidance-Organization and Supervision. F. Prerequisite: ED 485A or B.

Administrative, supervisory process in relationship to guidance program; law, ethics; program development; other aspects of pupil-personnel services.

ED 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.

ED 552 03(0-0-3). School Counseling Program Delivery/ Evaluation. F.

Effective school counseling program development, delivery, and evaluation.

ED 590 Var. Workshop.

ED 591B-H Var. Workshop.

B) Instruction. D) Community partnerships. E) Annenberg/CPB science instruction. Var [1-3]. (Ω-T) F) Annenberg/CPB mathematics instruction. Var [1-3]. (Ω-T) G) Annenberg/CPB educational theory and issues. Var [1-3]. (Ω-T) H) Annenberg/CPB humanities instruction. Var[1-3]. (Ω-T)

ED 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.

ED 602 03(3-0-0). Action Research. SS. Prerequisite: ED 600.

Provide educators with knowledge and skills to plan and implement school-based research to improve teaching and learning.

ED 606 03(3-0-0). Measurement Concepts. F, SS. Prerequisite: ED 600.

Concepts of measurement and descriptive data analysis.

ED 619 03(3-0-0). Curriculum Development. S, SS. Prerequisite: ED 485A or B.

Principles and procedures for school personnel in planning the public school curriculum.

ED 620 02(2-0-0). Philosophy of Education. S.

Contemporary philosophies as related to principles and practices in education.

ED 622 03(3-0-0). Innovative Social Studies Teaching. SS. Prerequisite: ED 485A or B.

Current trends in secondary school social studies teaching and curriculum techniques and materials for value formulation, decision-making skills, concepts, generalizations, and attitudes.

ED 623 03(0-2-2). Innovative Science Teaching. SS. Prerequisite: ED 485A or B. For K-12 science teachers.

Innovative trends in curriculum and methodology of science teaching.

ED 625 03(2-0-1). Foundations of Counseling. F. Prerequisite: Bachelor's degree. Credit not allowed for both VE 692EV and ED 625.

Foundations and techniques of individual guidance and counseling.

ED 628 03(3-0-0). Models of Teaching. F.

Exploration of pedagogical topics and skill development related to instructional approaches. (Ω-T)

ED 629 03(3-0-0). Communication and Classrooms. F, S, SS. Prerequisite: Written consent of instructor.

Exploration of pedagogical topics and growth experiences related to classroom management and presentation skills. (Ω-T)

***ED 635 03(3-0-0). Educators, Systems and Change.** F, S, SS. Prerequisite: ED 485A or B. Offered only through the Division of Continuing Education

Process of change in education, focusing on teacher's role as leader and facilitator. (Ω)

ED 645 03(3-0-0). Leadership and Ethics in Public Education. SS. Prerequisite: Admission to Administrator Licensure Program.

Focus on leadership functions for public schools and ethical dimensions of leadership.

ED 646 03(3-0-0). School Resource Management. SS. Prerequisite: Admission to Administrator Licensure Program.

School resource management including fiscal, personnel, and organization.

ED 647 02(2-0-0). School Culture, Climate, and Communications. SS. Prerequisite: Admission to Administrator Licensure Program; concurrent registration in ED 645, ED 646.

Assist public school leaders in their facilitation role in enhancing human relations and communication within schools and communities.

ED 648A-C. Role of the Principal. A) F. B) S. C) SS. Prerequisite: A-B) Concurrent registration in ED 687DV. C) ED 687DV.

Role of the principal as a result of changes in society and in the schools. A) Professional learning community 01(1-0-0). B) Managing and leading change 01(1-0-0). C) Capstone 02(2-0-0).

ED 650 03(2-0-1). Individual Guidance and Counseling. F. Prerequisite: ED 625.

Theories of individual counseling and development.

ED 651 03(2-0-1). Group Guidance and Counseling. S. Prerequisite: ED 650.

Theory and techniques of group guidance and counseling.

ED 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.

ED 660 03(3-0-0). Career Development Counseling. S, SS. Prerequisite: VE 500.

Career development programs and processes over the life span with particular attention to career choice.

ED 684 Var. Supervised College Teaching. F, S, SS.

ED 686A-F Var. Practicum.

A) Administration. D) Guidance and counseling. F) Urban teaching.

ED 687A-D Var. Internship.

A) Administration. C) Guidance and counseling. D) Principal.

ED 693A-E Var. Seminar.

A) Administrator. D) Guidance and counseling. E) Instruction.

ED 694 Var. Independent Field Studies.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ED 695 Var. Independent Study.

ED 696 Var. Group Study.

ED 698 Var. Research.

ED 699 Var. Thesis.

ED 704 03(3-0-0). Qualitative Research. F. Prerequisite: ED 600.
Examination of qualitative research theory, methods, and applications to education and the social sciences. (Ω -O)

ED 705 03(3-0-0). Qualitative Data Analysis. S. Prerequisite: ED 704 or written consent of instructor.
Examination of qualitative methods of data analysis, data presentation, and use of computer. (Ω -O)

ED 708 03(3-0-0). Narrative Inquiry. F. Prerequisite: ED 704.
Theory, methods and design of narrative approaches to research including data collection and analysis applications.

ED 709 03(0-0-3). Leadership Development. S, SS.
Principles, theories, attributes, and skills related to individual leadership development.

ED 713 03(3-0-0). Teaching, Learning, and Professional Growth. S, SS. Prerequisite: Admission to Ph.D. program or written consent of instructor.
Teaching, learning, and professional development perspectives related to educational change and reform.

ED 714 03(0-0-3). Education Policy Analysis. F. Prerequisite: Admission to Ph.D. Program, Administrator Licensing Program or, written consent of instructor.
Frameworks for analyzing, designing policy proposals, and implementing plans.

ED 715 03(3-0-0). Critical Issues for Special Populations. F. Prerequisite: Admission to Ph.D. program or written consent of instructor.
Social and cultural issues related to special populations are researched and analyzed to understand policy that guides educational decisions.

ED 786 Var. Practicum.

ED 787 Var. Internship. Prerequisite: Admission to Ph.D. program or written consent of instructor.

ED 792 Var. Seminar. Prerequisite: Admission to Ph.D. program or written consent of instructor.

ED 795 Var. Independent Study.

**ELECTRICAL AND COMPUTER
ENGINEERING COURSES (EE)**
*Department of Electrical and Computer
Engineering
College of Engineering*

EE 102 04(3-2-0). Digital Circuit Logic. S.
Boolean algebra; Karnaugh maps; multiplexers, decoders, ROMs, PLAs, flip-flops, counters; sequential networks; state tables.

EE 103 01(1-0-0). DC Circuit Analysis. S. Prerequisite: EE 192.
Methods of analysis and basic theorems of DC analysis.

EE 192 03(2-2-0). Electrical Engineering Fundamentals. F. Prerequisite: High school algebra and geometry.
Introduction to the profession and academia; problem solving and design skills including visualization tools; communication skills; team projects.

EE 201 03(2-2-0). Circuit Theory. F. Prerequisite: EE 192 with grade of C- or better; concurrent registration in M CC 161 and PHCC 142.
Basic circuit analysis techniques and applications to engineering design problems.

EE 202 04(3-3-0). Circuit Theory Applications. S, SS. Prerequisite: EE103.
Basic circuit analysis techniques and applications to engineering design problems.

EE 204 03(3-0-0). Introduction to Electrical Engineering. S. Prerequisite: M CC 161, PHCC 142.
Basic analog and digital circuits and systems; introduction to electromechanical devices.

EE 251 04(3-3-0). Introduction to Microprocessors. S. Prerequisite: EE 102 with grade of C- or better.
Microprocessor organization, assembly language, I/O techniques, real-time interfaces, applications, hardware/software.

EE 303/ST 303 03(3-0-0). Introduction to Communications Principles. F. Prerequisite: M 261. Credit not allowed for both EE 303 and ST 303.
Basic concepts in design and analysis of communication systems.

EE 311 03(3-0-0). Linear System Analysis I. F. Prerequisite: EE 202 with grade of C- or better and M 340 or M 345.
Continuous and discrete time signals and systems representations in time and frequency domain; time convolution.

EE 312 03(3-0-0). Linear System Analysis II. S. Prerequisite: EE 311 with grade of C- or better.
Laplace and Z transforms, applications to modulation, filtering and sampling, state space representation.

EE 325 03(3-0-0). Telecommunication Networks. S. Prerequisite: M CC 141, M CC 155, or M CC 160.
Principle technologies that support data and voice communications. (Ω -O)

EE 331 04(3-3-0). Electronics Principles I. F. Prerequisite: EE 202 with grade of C- or better and M 340 or M 345.
Discrete component semiconductor devices, characteristics and applications. Rectifier circuits, single-stage and multi-stage amplifiers.

EE 332 04(3-3-0). Electronics Principles II. S. Prerequisite: EE 331 with grade of C- or better.
Discrete and integrated-circuit amplifiers-frequency response, negative feedback; digital logic circuits.

EE 341 03(3-0-0). Electromagnetic Fields and Devices I. F. Prerequisite: M 340 or M 345.
Basic concepts of electrostatic and magnetostatic fields.

EE 342 03(3-0-0). Electromagnetic Fields and Devices II. S. Prerequisite: EE 341 with grade of C- or better.
Basic concepts of time varying electromagnetic fields and transmission lines.

\circ Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

EE 343 04(4-0-0). Electrodynamics for Computer Engineers. F. Prerequisite: EE 202 with grade of C- or better and M 340 or M 345. Fundamentals of electrodynamics with emphasis on time-varying fields and transmission lines.

EE 362 03(3-0-0). Electromechanical Devices. S. Prerequisite: EE 311 with grade of C- or better, EE 331 with grade of C- or better, EE 341 with grade of C- or better.

Operating principles and analysis of electromechanical devices including transformers, motors, and generators.

EE 372 03(3-0-0). Physical Electronics. S. Prerequisite: EE 341 with grade of C- or better, PHCC 142.

Electrical, optical, magnetic, and thermal properties of materials used in electrical engineering devices.

EE 395 Var. Independent Study.

EE 401 03(1-4-0). Senior Design Project I. F, S, SS. Prerequisite: EE 312 with grade of C- or better, EE 332 with grade of C- or better, and EE 342 with grade of C- or better or EE 343 with grade of C- or better.

Advanced project, seminar series, formal written report, and oral presentation.

EE 402 03(1-4-0). Senior Design Project II. F, S, SS. Prerequisite: EE 401.

Advanced project, formal report, and oral presentation.

EE 404 02(1-3-0). Experiments in Optical Electronics. F. Corequisite: EE 441.

Experiments in optical electronics and lasers.

EE 411 04(3-3-0). Control Systems. F. Prerequisite: EE 312 with grade of C- or better.

Control system analysis and design for linear systems: stability and performance; time and frequency domain techniques.

EE 412 03(3-0-0). Digital Control and Digital Filters. S. Prerequisite: EE 411.

FIR and IIR digital filter design, analog and digital invariance and direct digital control algorithms, hybrid systems analysis.

EE 421 03(3-0-0). Telecommunications I. F. Prerequisite: EE 303/ST 303 with grade of C- or better, EE 312 with grade of C- or better.

Digital communication (source coding; modulation and detection; channel coding), analog communication (modulation). (Ω -O)

EE 422 03(3-0-0). Telecommunications II. S. Prerequisite: EE 421.

Issues of source coding, detection and estimation, and equalization; introduction of information theory.

EE 441 03(3-0-0). Optical Electronics. F. Prerequisite: EE 342 with grade of C- or better.

Concepts of modern physics, optical properties of atoms, light sources, lasers, optical detectors, optical cavities, and optical fiber transmission.

EE 444 03(3-0-0). Antennas and Radiation. F. Prerequisite: EE 342 with grade of C- or better.

Retarded potential theory, antenna arrays, long wire antennas, dipoles, aperture antennas, receiving antennas.

EE 450 01(0-3-0). Digital System Design Laboratory. F. Corequisite: EE 451.

Small digital circuits are designed and simulated using very high speed hardware description language and synthesis tools.

EE 451 03(3-0-0). Digital System Design. F. Prerequisite: EE 251 with grade of C- or better; concurrent registration in EE 450.

State machines with PLAs as controllers and small computers; timing and race elimination considerations; state and microprogramming implementation.

EE 452 03(3-0-0). Principles of Digital Computing and Networking. S. Prerequisite: EE 251 with grade of C- or better.

Introduction to digital computing and networking: basic organizations of computers, networks, and computer arithmetics.

EE 453 03(3-0-0). Digital Systems Testing I. F. Prerequisite: EE 251 with grade of C- or better.

Fault modeling, test generation algorithms, fault simulation, functional testing, design for testability, built-in self-testing.

EE 454 03(3-0-0). Database Computers. F. Prerequisite: EE 251 with grade of C- or better or CS 370.

Computer architectures for database processing. Data filters, associative processors, parallel and distributed computers, text search processors.

EE 456 04(3-3-0). Computer Networks. F. Prerequisite: CSCC 153, EE 451.

Circuit/packet switching, protocols, LAN/MAN, TCP/IP, error correction, ATM, wireless LANS, mobile networks.

EE 457 03(3-0-0). Optical Information Processing. F. Prerequisite: EE 312 with grade of C- or better; EE 342 with grade of C- or better or EE 343 with grade of C- or better.

Introduction to optical systems for signal and information processing with emphasis on Fourier optics.

EE 460/CS 460 04(3-3-0). Embedded Systems. F. Prerequisite: CS 370.

Industry standard tools for embedded system hardware software co-design. VHDL, ModelSim, Xilinx ISE and EDK.

EE 461 03(3-0-0). Power Systems. F. Prerequisite: EE 341 with grade of C- or better, EE 362 with grade of C- or better.

Multi-phase power systems; power generation, transformer design, power distribution, power costs.

EE 471 03(3-0-0). Semiconductor Devices. F. Prerequisite: EE 332 with grade of C- or better, EE 372 with grade of C- or better; EE 342 with grade of C- or better or EE 343 with grade of C- or better.

Semiconductor physics, device fabrication technology, analysis of PN junctions, and bipolar and field-effect transistors.

EE 472 03(3-0-0). MOS Integrated Circuits. S. Prerequisite: EE 332 with grade of C- or better.

MOS transistor theory, design rules, layout design, gate, cell and circuit design, memories, clocking strategies, MOS technologies.

EE 495 Var. Independent Study.

EE 512 03(3-0-0). Digital Signal Processing. F. Prerequisite: EE 312 with grade of C- or better or written consent of instructor.

Discrete time signals and systems, digital filter design and implementation, fast algorithms, quantization effects. (Ω -O)

EE 513 03(3-0-0). Digital Image Processing. S, SS. Prerequisite: EE 303/ST 303 with grade of C- or better and EE 312.

Image acquisition and display systems, image enhancement, restoration and encoding, image analysis; real-life applications. (Ω -O)

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

EE 514 03(3-0-0). Applications of Random Processes. F. Prerequisite: EE 303/ST 303 with grade of C- or better, EE 312 with grade of C- or better.
Bit-error rates, signal-to-noise power ration, signal detection, signal estimation, Wiener filter, application.

EE 520 03(3-0-0). Optimization Methods-Control and Communication. S. Prerequisite: M 229 and M 317 or written consent of instructor.

Linear and nonlinear optimization theory and methods; applications in systems, control, and communication.

EE 521 03(3-0-0). Satellite Communication. S. Prerequisite: EE 421.
Principles of satellite communication systems engineering.

EE 524 03(3-0-0). Wireless Telecommunications. S. Prerequisite: EE 421.

Physical layer design, including channel modeling, receiver design and performance, and multiple access techniques.

EE 525 3(3-0-0). Fiber Optic Communications. S, SS. Prerequisite: EE 471.

Optoelectronic and optical components for fiber optics; communications system physical layer issues and examples. (Ω -O)

EE 534 03(3-0-0). Analog Integrated Circuit Design. F. Prerequisite: EE 332 with grade of C- or better.

Design methods for state-of-the-art analog integrated circuits, including CMOS op-amps, comparators, and phase-locked loops.

EE 535 01(0-2-0). Analog Integrated Circuit Laboratory. F. Corequisite: EE 534.

Analog integrated circuits are designed and simulated using modern software tools.

EE 546 03(3-0-0). Laser Fundamentals and Devices. S. Prerequisite: EE 441.

Amplification of light, laser excitation mechanisms, laser devices, characteristics and design.

EE 548 03(3-0-0). Microwave Theory and Component Design. F. Prerequisite: EE 342 with grade of C- or better.

Fundamentals of microwave engineering, components, devices, and measurements.

EE 549 03(3-0-0). Radar Systems and Design. F. Prerequisite: EE 444 or written consent of instructor.

Fundamental ideas of radar operation and basic design of various radar types including current topics. (Ω -O)

EE 550A-B. Microprocessors Based Systems. F. Prerequisite: EE 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.

EE 553 03(3-0-0). Digital Systems Testing II. S. Prerequisite: EE 453.

Fault modeling for CMOS, test generation for static and dynamic CMOS, design for robust testability, self-checking circuits.

EE 554 03(3-0-0). Computer Architecture. F. Prerequisite: EE 452 or CS 470 or written consent of instructor.

Fundamentals of computer design, multiprocessors and thread-level parallelism, storage systems, and interconnection networks and clusters.

EE 555 03(3-0-0). Robot Motion Planning. F. Prerequisite: EE 312 with grade of C- or better or written consent of instructor.

Concepts in geometry and spatial reasoning for the design of autonomous robots.

EE 557 03(3-0-0). Digital Optical Computing. S. Prerequisite: EE 441 or EE 451 or EE 554 or written consent of instructor.

Optical devices; optical disks, holographic memories; interconnection networks. Optical systems for numerical and nonnumerical data processing.

EE 562 03(3-0-0). Power Electronics I. F. Prerequisite: EE 332 with grade of C- or better.

Switch mode and resonant converters, control using switch averaged dynamic models, modeling of all circuit components including sources, loads, and switches.

EE 563 03(3-0-0). Power Electronics II. S. Prerequisite: EE 562.

Electrical energy, processing circuits, lightweight power management, and power conversion circuits, emphasizing small signal transfer functions.

***EE 564 03(3-0-0). Resonant Converters.** S. Prerequisite: EE 562 or written consent of instructor.

Analysis and design of resonant converters.

***EE 569/*ME 569 03(3-0-0). Micro-Electro-Mechanical Devices.** S. Prerequisite: EE 331 with grade of C- or better or ME 344. Credit not allowed for both EE 569 and ME 569.

Micro-electro-mechanical processes and applications in sensors, optics, and structures.

EE 570 03(3-0-0). Compound Materials and Devices. S. Prerequisite: EE 471.

III-V and II-VI alloy semiconductors; bandgap engineering; quantum well heterostructures; HEMT, HBT, and high-performance devices; GaAsICs.

EE 571 03(3-0-0). VLSI System Design. F. Prerequisite: EE 451.

Design of integrated circuits at the system level including cell design, digital systems, parallel architecture, systolic arrays.

***EE 574 03(3-0-0). Optical Materials and Devices.** S. Prerequisite: EE 441 or EE 471.

Semiconductor light emitters and detectors, dielectrics, and light reflection from, and propagation through, anisotropic dielectrics.

EE 575 01(0-3-0). Experiments in VLSI System Design I. F. Prerequisite: EE 451; concurrent registration in EE 571.

Set of labs designed to enhance students' understanding of the materials in EE 571.

EE 576 03(3-0-0). VLSI Processing-Science and Technology I. S. Prerequisite: EE 472.

Physics, chemistry of VLSI processing including plasma, thermal techniques of oxidation, deposition; photolithography; etching; cleaning, process modeling.

EE 611 03(3-0-0). Nonlinear Control Systems. F. Prerequisite: EE 412.

Controller analysis and design for nonlinear systems.

EE 612 03(3-0-0). Robust Control Systems. S. Prerequisite: EE 411.

Introduction to modern robust control theory techniques for analysis and design of large-scale uncertain multivariable systems.

***EE 614 03(3-0-0). Principles of Digital Communications.** S. Prerequisite: EE 514.

Information theory, optimal receiver design, waveform coding, error correcting coding.

\circ Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

***EE 641 03(3-0-0). Electromagnetics.** F. Prerequisite: EE 342 with grade of C- or better, M 532.

Electrostatics, magnetostatics, boundary value problems, EM induction, quasi-statics, Maxwell's equations.

°EE 642 03(3-0-0). Time Harmonic Electromagnetics. S. Prerequisite: EE 641.

Maxwell's equations, radiation, boundary value problem, dyadic Green's functions, scattering theory.

°EE 650 03(3-0-0). Extreme Ultraviolet and Soft X-Ray Radiation. S. Prerequisite: EE 342.

Fundamental principles of short wavelength electromagnetic radiation.

EE 652 03(3-0-0). Estimation and Filtering Theory. S. Prerequisite: EE 411 or EE 421; ST 525.

Optimal Kalman filter estimators; smoothing and prediction; applications to communications and controls.

EE 655 03(3-0-0). Multidimensional Digital Signal Processing. S. Prerequisite: EE 512 or written consent of instructor.

Multidimensional signals and systems, 2-D transforms, stability methods, design and implementations, spectral factorization, and image modeling.

EE 656 03(3-0-0). Neural Networks and Adaptive Systems. F. Prerequisite: EE 512.

Various adaptation rules, neural network paradigms, learning, stability and convergence, applications in signal/image processing and control.

EE 658/CS 658 04(3-3-0). Internet Engineering. F. Prerequisite: EE 456 or CS 457. Credit not allowed for both EE 658 and CS 658.

Link technologies, multiple access, hardware and software for interworks routing, switching flow control, multicast, performance, and application. (Ω-O)

EE 660 03(3-0-0). Advanced Topics in VLSI Design. S. Prerequisite: EE 571.

VLSI synthesis, optimization, and other issues.

EE 666 03(3-0-0). Topics in Robotics. S. Prerequisite: EE 555 or ME 514 or ME 564 or written consent of instructor.

Recent advances in robotics, automation, and intelligent systems.

EE 670 B-D/CS 670B-D Var [1-4]. Topics in Architecture/ Systems. F, S. Prerequisite: EE 554 or CS 570 or written consent of instructor. Credit not allowed for both EE 670B-D and CS 670B-D.

B) Performance evaluation and modeling. C) Distributed systems. D) Architecture of advanced systems.

EE 672/PH 672 03(3-0-0). Principles of Semiconductors. S. Prerequisite: EE 471 or PH 531. Credit not allowed for both EE 672 and PH 672.

Electronic properties of semiconductors: band structure, statistics, transport properties, photoelectronic properties, potential barriers, interfaces.

°EE 673 03(3-0-0). Thin Film Growth. F. Prerequisite: One course in thermodynamics or written consent of instructor.

Microstructures of physically vapor-deposited films; thin-film morphological development; atomistic processes of condensation, nucleation, and growth.

***EE 674/*CS 674 03(3-0-0). Heterogeneous Computing.** S. Prerequisite: EE 550 or EE 554 or CS 551 or CS 570 or CS 575. Credit not allowed for both EE 674 and CS 674.

Allocation of resources to tasks in parallel and distributed heterogeneous computing systems. A variety of computational environments are considered.

EE 695 Var. Independent Study.

EE 699 Var. Thesis.

***EE 721 03(3-0-0). Topics in Communication Theory.** S. Prerequisite: EE 521.

Detection and estimation theory; radar-sonar problems; nonlinear modulation; information theory; communication systems.

°EE 742 03(3-0-0). Topics in Electromagnetics. S. Prerequisite: EE 641.

Applications of wave propagation and scattering to microwave radar, Doppler radar, meteorological radar applications.

***EE 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.

***EE 752 03(3-0-0). Topics in Signal Processing.** F. Prerequisite: EE 512; EE 514 or ST 525.

Adaptive filtering, spectral estimation, sonar/radar signal processing, and detection/classification schemes.

EE 773 03(3-0-0). Topics in Solid State Electronics. F. Prerequisite: EE 672/PH 672 or EE 471.

Advanced principles of microwave devices, solar cells, theory of solids, or transport in materials.

***EE 777 03(3-0-0). X-ray Lasers.** S. Prerequisite: EE 546.

Fundamentals, design, and implementation of soft X-ray lasers and X-ray optics.

EE 795 Var. Independent Study.

EE 799 Var. Dissertation.

ENGINEERING COURSES (EG)

College of Engineering

EG 192 01(0-0-1). Seminar.

Engineering/society/humanities relationships. Combined program requirements and opportunities.

EG 510/M 510 03(3-0-0). Linear Programming and Network Flows. F, S, SS. Prerequisite: M 261 or M CC 315. Credit not allowed for both EG 510 and M 510.

Optimization methods; linear programming, simplex algorithm, duality, sensitivity analysis, minimal cost network flows, transportation problem.

EG 610 03(3-0-0). Engineering Decision Support/Expert Systems. S. Prerequisite: EG 510 or M 510.

Decision support systems for complex engineering problems; multicriteria decision making and optimization; hybrid knowledge-based/algorithmic methods.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ENVIRONMENTAL HEALTH COURSES (EH)

Department of Environmental and Radiological Health Sciences College of Veterinary Medicine and Biomedical Sciences

EHCC 110/BSCC 110 03(3-0-0). Human Health and Environmental Perspectives. (AUCC 3G). F, S. Prerequisite: High school level biology. Credit not allowed for both EHCC 110 and BSCC 110.

Survey of health and wellness, physical activity and nutrition, the environment, drugs and health, diseases and injuries, sexuality and pregnancy.

EH 220 03(3-0-0). Environmental Health. F, S. Prerequisite: BZCC 101 or BZCC 104 or BZCC 110 or BZCC 120 or LSCC 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.

EH 230 03(0-6-0). Environmental Health Field Methods. S. Prerequisite: EH 220, high school chemistry.

Field and laboratory techniques necessary for practice of environmental health. (\$)

EHCC 307/STCC 307 03(3-0-0). Introduction to Biostatistics. (AUCC 2B). F, S, SS. Prerequisite: M CC 118 or M CC 121. Credit allowed for only one of the following: EHCC 307/STCC 307, STCC 301, STCC 309, STCC 311.

Biostatistical methods: confidence intervals, hypothesis tests, simple correlation and regression, one-way analysis of variance.

EH 320 03(3-0-0). Environmental Health Water Quality. F. Prerequisite: EH 230, MB 300 or concurrent registration.

Water quality and treatment technologies for practice of environmental health.

EH 332 03(3-0-0). Principles of Epidemiology. S. Prerequisite: EHCC 307/STCC 307; MBCC 149 or MB 300.

Use of epidemiological methods in studying distribution of diseases in human populations.

EH 350 03(3-0-0). Industrial Hygiene and Air. F. Prerequisite: BS 300, EH 230.

Industrial and airborne hazards, disease prevention, hazard control and evaluation.

EH 410 03(3-0-0). Environmental Health Waste Management. S. Prerequisite: C 346, EH 230.

Recognition and management of impacts, occupational and environmental, in handling hazardous and solid waste.

EH 430 03(3-0-0). Human Disease and the Environment. S. Prerequisite: EH 320, EH 446.

Overview of the human diseases which are associated with the environment.

EH 446 03(3-0-0). Environmental Toxicology. F. Prerequisite: C 245 or C 346.

Essentials of environmental toxicology based on problem-oriented discussions addressing environmental impacts of organic/inorganic chemicals.

EH 460 02(2-0-0). Environmental Health Program Management. F. Prerequisite: EH 320.

Development of skills in communication, program management, crisis management, and conflict resolution in environmental health entities.

EH 487 07(0-21-0). Internship-Environmental Health. F, S.

Professional field practice in environmental health with a public or private sector agency.

EH 492 01(0-0-1). Environmental Health Seminar. S.

Networking, preparation of resume, and statement of qualifications for professional internship or employment.

EH 494 Var. Independent Study in Environmental Health. Prerequisite: EH 220.

Directed independent study or project under faculty guidance.

EH 498 Var [1-4]. Research. F, S, SS. Prerequisite: Written consent of instructor.

Research in environmental and radiological health sciences.

EH 502 03(3-0-0). Fundamentals of Toxicology. F. Prerequisite: BS 300, C 245 or C 346.

Fundamental principles of toxicology; dose-response, organ targets, toxic agents.

EH 520 03(1-0-2). Advanced Environmental Health. F. Prerequisite: MB 300, C 346.

Issues relating to environmental health problem definition, evaluation, and control using interdisciplinary focus.

EH 526 03(3-0-0). Industrial Hygiene. F. Prerequisite: C 245 or C 345; PHCC 110 or PHCC 121; EH 520 or concurrent registration.

Theory and application of industrial hygiene principles to management of the occupational environment.

EH 527 01(0-3-0). Industrial Hygiene Laboratory. S. Prerequisite: EH 526.

Theory, rationale, and practice of measurement in industrial hygiene. Emphasizes use of quantitative information in occupational health.

EH 532 03(2-0-1). Epidemiologic Methods. F. Prerequisite: EHCC 307/STCC 307.

Method of epidemiologic investigation and study design. Applications to disease control with literature examples.

***EH 533/*MB 533 03(2-0-1). Epidemiology of Infectious Diseases/Zoonoses.** S. Prerequisite: MB 300. Credit not allowed for both EH 533 and MB 533.

Epidemiologic features of infectious and parasitic diseases that have a major impact on community medicine.

EH 536 03(3-0-0). Advanced Occupational Health. S. Prerequisite: EH 446 or EH 526.

Advanced topics in occupational health emphasizing contemporary issues, topics, trends, and problems in the field of industrial hygiene.

EH 542 03(3-0-0). Biostatistical Methods for Qualitative Data. F. Prerequisite: EHCC 307/STCC 301 or STCC 307.

Statistical analysis of categorical data as obtained in epidemiology, toxicology, occupational health, and clinical sciences.

EH 544/ST 544 03(3-0-0). Biostatistical Methods for Quantitative Data. S. Prerequisite: EHCC 307/STCC 307 or STCC 301. Credit not allowed for both EH 544 and ST 544.

Regression and analysis of variance methods applied to both observational studies and designed experiments in the biological sciences.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

°EH 547 03(0-6-0). Equipment and Instrumentation. S. Prerequisite: EH 446.

Sample collection, quality control, theory and application of equipment and instrumentation for analysis and confirmation of organic-inorganic chemicals. (\$)

EH 550 03(3-0-0). Principles of Ergonomics. F.

Theory and practice of ergonomics.

EH 551 03(3-0-0). Ergonomics in Product and Process Design. S. Prerequisite: EH 550 or written consent of instructor.

Application of ergonomics to design of products and processes with respect to health, safety, function, and quality.

EH 601 04(2-0-2). Advanced Toxicology I. S. Prerequisite: EH 502.

Biochemical and metabolic processes involved in mechanisms of toxicity. Research methods and understanding of current literature.

EH 636 03(3-0-0). Industrial Hygiene Control Methods. S. Prerequisite: EH 526; EH 536 or concurrent registration.

Controlling occupational exposures to chemical agents, emphasizing local exhaust ventilation; personal protective devices.

***EH 648 03(3-0-0). Environmental Health Risk Assessment.** S. Prerequisite: EH 446, EH 520.

Environmental contamination and health effects of chemicals using risk assessment, management, and communication approaches.

EH 656 03(3-0-0). Occupational Noise Control. F. Prerequisite: EH 527.

Measurement and control of industrial or environmental noise emphasizing practical solutions. (Ω-O)

°EH 658 03(2-0-1). Environmental/Occupational Epidemiology. S. Prerequisite: EH 532.

Epidemiologic analyses of effects of exposure to environmental and occupational health hazards.

***EH 662/*VS 662 03(2-0-1). Applied Research-Planning/Design/Analysis.** S. Prerequisite: EHCC 307/STCC 307. Credit not allowed for both EH 662 and VS 662.

Training to conceptualize and execute an independent research project.

EH 670 Var [1-3]. Directed Readings. F, S, SS. Prerequisite: EH 520.

Advanced study through supervised readings on specialized topics.

EH 684 Var [1-3]. Supervised College Teaching. F, S, SS.

Participation in environmental health course teachings under guidance of faculty in classroom, laboratory, or field.

EH 687 Var [1-6]. Internship.

Advanced study or research in environmental health with a governmental agency, private sector entity, or research facility.

EH 692 01(1-0-0). Seminar.

Professional seminar series with student interaction on weekly basis; topics presented by outside experts, faculty, or doctoral candidates.

EH 693A-C 01(0-0-1). Research Seminar.

Presentation of student research and discussion of publications from scientific literature. A) Epidemiology. B) Industrial hygiene. C) Toxicology.

EH 695 Var. Independent Study.

Specialized study in a defined area under supervision of environmental health faculty.

EH 696A-C Var [1-3]. Group Study. Prerequisite: EH 520.

A) Epidemiology. B) Industrial hygiene. C) Toxicology.

EH 698 Var [1-6]. Research. Prerequisite: Written consent of research mentor.

EH 699 Var. Thesis.

Master's-level research and preparation of thesis.

°EH 701 03(3-0-0). Environmental Carcinogenesis. F. Prerequisite: BC 403.

Molecular and cellular mechanisms by which environmental carcinogens exert effects.

EH 702 04(2-0-2). Advanced Toxicology II. F. Prerequisite: EH 601.

Role of cellular information systems in toxic mechanisms: DNA expression, signal transduction and control of cellular processes.

EH 726 03(3-0-0). Aerosols and Occupational Health. F. Prerequisite: EH 636 or written consent of instructor.

Properties and behavior of industrial aerosols, emphasizing measurement and control of dust related to disease.

EH 784 Var [1-3]. Supervised College Teaching. F, S, SS.

Participation in environmental health course teachings under guidance of faculty in classroom, laboratory, or field.

EH 787 Var [1-6]. Internship.

Advanced study or research in environmental health with a governmental agency, private sector entity, or research facility.

EH 792 01(0-0-1). Seminar.

Professional seminar series with student interaction on weekly basis; topics presented by outside experts, faculty, or doctoral candidates.

EH 795 Var. Independent Study.

Specialized study in a defined area under supervision of environmental health faculty.

EH 799 Var. Dissertation.

Doctoral-level research and preparation of dissertation.

ENGINEERING SCIENCE COURSES (ES)

College of Engineering

ES 492 01(0-0-1). Seminar.

ES 495 Var. Independent Study.

ETHNIC STUDIES COURSES (ET)

Center for Applied Studies in American Ethnicity

College of Liberal Arts

ETCC 100 03(3-0-0). Ethnicity in America. (AUCC 3F). F, S, SS.

Key concepts, theories, and historical experiences that form the basis of scholarly work in the interdisciplinary area of comparative American ethnicity.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ETCC 204 03(3-0-0). Ethnicity in Colorado. (AUCC 3F). S, SS.

Cultures, histories, and contributions of major ethnic groups in Colorado, with emphasis on interethnic relations and incorporation into the US society.

ETCC 205 03(3-0-0). Ethnicity and the Media. (AUCC 3B or 3E). F.

Ethnic representation across time as represented in auto/biography, fiction, poetry, and popular media.

+ET 208/AR 208 03(3-0-0). Native American Art and Material Culture. S. Credit not allowed for both ET 208 and AR 208.

Traditional arts and material culture of the indigenous peoples of North America. (S)

ET 220 03(3-0-0). A Century of Black Cinema. F.

History of Black cinema in 20th century.

ET 234/E 234 03(3-0-0). Native American Literature. F. Credit not allowed for both ET 234 and E 234.

Native American writings and their significance in American culture.

ET 239/E 239 03(3-0-0). Introduction to Chicano Literature. F, S. Credit not allowed for both ET 239 and E 239.

Contemporary Chicano fiction and poetry with consideration of historical roots and influences.

ETCC 240 03(3-0-0). Native American Cultural Expressions. (AUCC 3B). F.

Exploration of Native lives and expressions through examination of Native architecture, art, music, film, activism, and literature.

ETCC 250/HYCC 250 03(3-0-0). African American History, 1619-1865. (AUCC 3D). F. Credit not allowed for both ETCC 250 and HYCC 250.

African background and slavery in the United States from colonial times to the end of the Civil War.

ETCC 251/HYCC 251 03(3-0-0). African American History Since 1865. (AUCC 3D). S. Credit not allowed for both ETCC 251 and HYCC 251.

Political, socioeconomic, and cultural history of African Americans since abolition.

ETCC 252/HYCC 252 03(3-0-0). Asian-American History. (AUCC 3D). F. Credit not allowed for both ETCC 252 and HYCC 252.

Asian-American historical experience in the United States from 1850s to the present time.

ETCC 253 03(3-0-0). Chicana/o History and Culture. (AUCC 3D or 3E). F.

Historical study of Chicana/o/Mexicana/o people and culture from Spanish colonization to beginning of 20th century.

ET 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.

ETCC 255/HYCC 255 03(3-0-0). Native American History. (AUCC 3D). S. Credit not allowed for both ETCC 255 and HYCC 255.

History of Native American peoples in the United States to the present, including origin stories.

ETCC 256 03(3-0-0). Americans in a Changing World. (AUCC 3B or 3E). S.

Colonial and post-colonial discourse, politics of representation and epistemology of "location" it has produced: first and third world.

ET 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.

ET 304 03(3-0-0). Race Formation in the United States. S.

Concept of race as a social construct in the shaping of U.S. character, values, and institutions.

ET 305 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.

ET 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.

ET 312 03(3-0-0). African-American Situation. F.

Examination of historical, political, social, and economic experiences of the African-American people.

ET 316/JT 316 03(3-0-0). Multiculturalism and the Media. S.

Credit not allowed for both ET 316 and JT 316.

Media and multiculturalism with emphasis on race, ethnicity, and other protected groups.

***ET 318/AP 318 03(3-0-0). Peoples and Cultures of the Southwest.** F, S. Prerequisite: APCC 100. Credit not allowed for both ET 318 and AP 318.

Analyze development of cultures of the American Southwest; colonialism, migration, political incorporation, and socioeconomic processes. (Ω-O)

ET 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.

ET 324 03(3-0-0). Asian-Pacific Americans and the Law. S.

Legal history of Asian-Pacific Americans examined through case studies.

ET 332 03(3-0-0). Contemporary Chicana/o/Latina/o Issues. S.

Current Latina/o issues including conquest, immigration, urbanization, health in context of societal trends.

ET 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.

ET 344 03(3-0-0). Native-American Ceremony and the Sacred. F.

Native ritual, ceremony, and sacred existence; clearer understanding of Native life and religious ways.

ET 352/SW 352 03(3-0-0). Indigenous Women, Children, and Tribes. F. Credit not allowed for both ET 352 and SW 352.

Historical and contemporary lives of women, children, and tribal communities.

***ET 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.

°ET 412 03(3-0-0). Africa and African Diaspora. S.

Interdisciplinary investigation of retention, transformation, and creation of culture in plantation economies of Americas.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

°ET 414/°AP 414 03(3-0-0). **Development in Indian Country.** F. Credit not allowed for both ET 414 and AP 414.

Critical examination of history, public policy, and tribal strategies for economic development and natural resource management in Indian Country.

°ET 420 03(3-0-0). **Asian/Pacific-American Families/ Communities.** S. Formation and transformation of families, institutions, and communities.

°ET 424 03(3-0-0). **Asian/Pacific-American Literature and Culture.** S. Asian/Pacific-American culture viewed through literature, art, and popular culture.

ET 430 03(3-0-0). **Chicana/o/Latina/o Creative Expression.** S. Creative expression in literature, art, theatre, music: approach to understanding experiences of various Chicana/o/Latina/o groups in the U.S.

ET 432 03(3-0-0). **Chicana/o/Latina/o Routes to Empowerment.** S. Critical examination of political and economic strategies used to incorporate Chicana/o/Latina/o groups into U.S. society.

ET 438/E 438 03(3-0-0). **Contemporary Native American Literature.** F. Credit not allowed for both ET 438 and E 438. Contemporary fiction, poetry of Native Americans emphasized as distinctive tradition in American literature and cultural expression of indigenous peoples.

ET 442/AP 442 08(8-0-0). **Ethnographic Field School.** SS. Prerequisite: APCC 100, ETCC 100 or written consent of instructor. Credit not allowed for both ET 442 and AP 442. Directed fieldwork with American Indian communities; methodology, protocols, and social relations of ethnographic field research.

ET 444/S 444 03(3-0-0). **Federal Indian Law and Policy.** S. Credit not allowed for both ET 444 and S 444. Indian policy processes and their impact on Native lives and culture, particularly Native sovereignty.

ET 454/SP 454 03(3-0-0). **Chicano/a Film and Video.** F. Credit not allowed for both ET 454 and SP 454. Emergence of Chicano/a cinema from a place of displacement, resistance, and affirmation found in contemporary Chicano/a film, video.

ET 484 Var [1-3]. **Supervised College Teaching.** Prerequisite: Written consent of instructor. May be taken only once.

ET 487 Var [1-3]. **Internship.** Prerequisite: ET/ETCC 100.

ET 492 03(0-0-3). **Seminar.**

ET 493 03(3-0-0). **Ethnic Studies Research Methods and Writing.** F. Research ethics, methodology, theory, and writing in ethnic studies.

ET 495 Var. **Independent Study.**

ET 500 03(3-0-0). **Race, Ethnicity, and Nationality.** S. Intersections of race, ethnicity, and nationality within a broader framework of political economy.

ET 540/SP 540 03(3-0-0). **Rhetoric, Race and Identity.** F. Prerequisite: Graduate status or SP 412 and 12 additional 300-300 SP credits. Credit not allowed for both ET 540 and SP 540. Critical race theory and its relevance to rhetorical studies.

ET 695 Var. **Independent Study.**

ET 698 Var. **Research in Ethnicity.**

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ENVIRONMENTAL ENGINEERING COURSES (EV)

College of Engineering

EV 204/CE 204 03(2-2-0). **Agricultural and Environmental Measurements.** S. Prerequisite: PHCC 110 or PHCC 141. Credit not allowed for both EV 204 and CE 204.

Measurement techniques for analysis and design of agricultural and environmental systems based on engineering principles.

EV 322/CE 322 03(3-0-0). **Basic Hydrology.** F, S. Prerequisite: CE 300 or WR 416 or CH 331, STCC 301 or STCC 309 or CE 308; or written consent of instructor. Credit not allowed for both EV 322 and CE 322.

Hydrologic cycle, soil moisture, groundwater, runoff processes, water contamination, applications in water resources and environmental engineering.

EV 438/CE 438 04(4-0-0). **Pollution Control Engineering.** F, S. Prerequisite: C 113, CE 300 or CH 331 or ME 342. Credit not allowed for both EV 438 and CE 438.

Environmental engineering approaches to designing water supply, wastewater removal, and pollution control systems.

EV 441 01(0-3-0). **Water and Wastewater Characterization.** S. Prerequisite: CE 440 or concurrent registration or CE 438/EV 438 or concurrent registration.

Physical, chemical and biological methods for the characterization of waters and wastewaters.

EV 442/CH 442 03(3-0-0). **Rate-Controlled Separations.** F. Prerequisite: CE 300 or CH 331; M 340; one course in physical chemistry. Credit not allowed for both EV 442 and CH 442.

Diffusion; convective mass transfer; packed tower operations; electrophoretic and membrane separations; selection and sequencing of separations.

EV 448/ME 448 03(3-0-0). **Pollution Prevention.** F. Prerequisite: CH 331 or CE 300 or ME 342. Credit not allowed for both EV 448 and ME 448.

Prevention of environmental problems by modification of industrial processes.

HEALTH AND EXERCISE SCIENCE COURSES (EX)

Department of Health and Exercise Science College of Applied Human Sciences

EX 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. (\$))

EX 101B-J 01(0-3-0). **Intermediate Physical Education.** F, S, SS. Prerequisite: EX 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. (\$))

EX 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.

EX 106 01(0-3-0). Scuba Diving. F, S. Prerequisite: Intermediate ability. (\$)

EX 119 02(1-2-0). Games and Rhythmic Activities. F, S.

Methods and materials of movement education; rhythmic activities for all age groups.

EXCC 123 02(1-2-0). Fitness and Wellness. (AUCC 3G). F, S, SS.

Health, fitness, and wellness; design, implement, and evaluate a complete personal fitness and wellness program. (\$)

EXCC 143 02(1-0-1). Survey of Health and Wellness. (AUCC 3G). F, S, SS. Credit not allowed for both EXCC 143 and EXCC 145.

Socioeconomic, environmental, physiological, and behavioral factors that affect the health and well being of humans.

EXCC 145 03(3-0-0). Health and Wellness. (AUCC 3G). F, S, SS. Credit not allowed for both EXCC 143 and EXCC 145.

Personal health behaviors and personal choice in response to wellness.

EX 203 03(3-0-0). Motor Learning. F, S, SS. Prerequisite: PYCC 100.

Motor skill acquisition as function of maturation and experience. Emphasis on strategies for facilitating skill learning in normal school-age population.

EX 207 03(2-2-0). Anatomical Kinesiology. F, S, SS. Prerequisite: LSCC 102.

Anatomical, physiological, and mechanical fundamentals of human movement.

EX 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. (\$)

EX 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. (\$)

EX 260 02(2-0-0). History and Principles of Physical Education. F, S.

Emerging philosophies and principles.

EX 307 03(3-0-0). Biomechanical Principles of Human Movement. F, S, SS. Prerequisite: EX 207 or BS 301; PHCC 121 or PHCC 141.

Identify with and utilize biomechanical principles pertinent to human movement.

EX 309 02(2-0-0). Methods of Coaching. F, S.

Preparation to coach in an interscholastic athletic situation.

EX 319 03(3-0-0). Neuromuscular Aspects of Human Movement. F, S. Prerequisite: BS 300, BS 301.

Neuromuscular anatomy and physiology of human movement. Applied/integrated topics: aging, muscle fatigue, training, and neuromuscular disease.

EX 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.

EX 332A-H. 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 01(0-2-0). B) Golf 01(0-2-0). C) Tennis 01(0-2-0). D) Track and field 01(0-2-0). F) Weight training 01(0-2-0). H) Aerobics 01(0-2-0).

EX 340 01(1-0-0). Exercise Prescription. F, S, SS. Corequisite: EX 386A.

Theory and practice of exercise prescription for healthy individuals, cardiac patients, and other special populations.

EX 344 03(3-0-0). Methods of Health Education. F, S. Prerequisite: EXCC 145.

Prepare teaching units and methods for health education in the public schools, K-12.

EX 345 03(3-0-0). Population Health and Disease Prevention. F, S, SS. Prerequisite: EXCC 145.

Causes of disease throughout the lifespan and interventions designed to prevent disease.

EX 346 03(2-2-0). Training Room Methods. F, S. Prerequisite: EX207.

Preventive measures, taping, bandaging, massage and manipulation, diet and conditioning of athletes.

EX 356 03(3-0-0). Wellness Programming. F, S, SS. Prerequisite: EXCC 145, EX 386A.

Assessment of wellness concerns and organizational problems; selection and implementation of program design.

EX 365 02(2-0-0). Program Administration. F, S.

Problems and nature of organization and administration in health and physical education.

EX 386A-B. Practicum. Prerequisite: A) EXCC 145, EX 240, EX 332F, EX 332H, FNCC 150; concurrent registration in EX 340. B) EX 386A.

A) Adult fitness. 02(1-3-0). B) Wellness program management. 03(1-6-0).

EX 403 04(3-2-0). Physiology of Exercise. F, S, SS. Prerequisite: BS 300.

Effects of exercise on tissues, organs, and systems of the body. (\$)

EX 405 02(1-2-0). Exercise Testing Instrumentation. F, S. Prerequisite: EX 403.

Theory and operation of devices commonly employed in quantifying factors related to exercise. (\$)

EX 420 03(2-2-0). Electrocardiography and Exercise Management. F, S. Prerequisite: BS 300.

Interpretation of 12-lead ECG tracings, administering exercise tests, and prescribing exercise program for healthy individuals and special populations. (\$)

EX 430 03(3-0-0). Advanced Athletic Training. F, S. Prerequisite: EX 240, EX 346.

Theory and techniques of habilitative and rehabilitative sports medicine. Emphasis on contemporary evaluative procedures and rehabilitative modalities.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

EX 444 02(2-0-0). Successful Aging: Role of Physical Activity. F, S, SS. Prerequisite: LSCC 102 or BZCC 110.

Biology and physiology of healthy aging and impact of disease and physical activity on aging processes.(Ω-O)

EX 453 03(3-0-0). Applied Statistics for the Health Sciences. F, S, SS. Prerequisite: M CC 120A-B.

Applied quantitative techniques of analysis in health and exercise science.

EX 456 03(3-0-0). Advanced Wellness Programming. F, S. Prerequisite: EX 356; EX 386B or concurrent registration.

Investigation of established wellness programs with special emphasis on design, implementation, and evaluation of programming models.

EX 476 03(2-2-0). Rehabilitation Exercise. F, S. Prerequisite: EX 207; EX 240.

Evaluation, design, and selection of exercises for individuals with permanent or temporary disabilities.

EX 479 03(3-0-0). Psychology and Sport. F, S. Prerequisite: PYCC 100.

Psychological and social implications involved in teaching of physical education and coaching of athletics.

EX 484 Var [1-5]. Supervised College Teaching. F, S, SS. Maximum of 10 credits allowed in course.

EX 486A-C Var [1-3]. Practicum.

A) Adaptive correctives. B) Wellness program management. Prerequisite: EX 386B. C) Coaching.

EX 487 Var. Internship. Prerequisite: EX 486B and all course work.

Practical application of knowledge and skills in a professional situation.

EX 492 02(0-0-2). Health and Exercise Science Seminar. F, S.

Integration and reflection on health and exercise science disciplinary knowledge.

EX 495A-D Var. Independent Study.

A) Physical education. B) Health. C) Athletics. D) Biomechanics.

EX 496A-D Var. Group Study.

A) Physical education. B) Health. C) Athletics. D) Biomechanics.

EX 520 03(2-2-0). Advanced Exercise Testing and Prescription. S. Prerequisite: EX 403.

Theory and practice of exercise testing and prescription in apparently healthy and diseased populations.

EX 540 03(3-0-0). Human Performance in Environmental Extremes. F. Prerequisite: One course in exercise physiology or written consent of instructor.

Ability of humans to exercise or work in extremes of temperature, barometric pressure, air pollution, and sleep deprivation.

EX 545 03(3-0-0). Evolutionary Basis for Health and Fitness. S. Prerequisite: EX 403, FN 350.

Evolutionary basis for human health and fitness based upon dietary and exercise patterns of pre-agricultural humans.

EX 556 03(3-0-0). Wellness and Health Promotion Concepts. F.

Discussion of theory and application of health promotion in various settings.

EX 560/FN 560 03(3-0-0). Exercise and Nutrition. S. Prerequisite: EX 403, FN 350, undergraduate biochemistry course. Credit not allowed for both EX 560 and FN 560.

Interaction of nutrition and physical fitness in exercise performance and promotion of health.

EX 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.

EX 603 03(3-0-0). Advanced Topics in Exercise Physiology. F. Prerequisite: EX 403.

Advanced principles of theoretical and applied exercise physiology at molecular, cellular, and systemic levels.

EX 604 03(3-0-0). Oxygen Transport in Exercise and Health.

S. Prerequisite: EX 403.

Role of oxygen transport mechanisms in exercise performance and in health at the cellular and systemic levels.

EX 610 03(3-0-0). Exercise Bioenergetics. F. Prerequisite: Undergraduate course in biochemistry and undergraduate course in exercise physiology.

Biology of energy transfer reactions related to human locomotion and exercise performance in both healthy individuals and disease states.

EX 645 03(3-0-0). Epidemiology of Health and Physical Activity. S. Prerequisite: EX 600.

Foundation in chronic disease epidemiology that will enable students to evaluate the current epidemiologic literature.

EX 656 03(3-0-0). Comprehensive Stress Management. F, S, SS.

Relationship between stress and illness emphasizing methods to impact its detrimental effects.

EX 684 Var. Supervised College Teaching. F, S, SS.

EX 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.

EX 687 Var [3-9]. Internship. Prerequisite: EX 686A or B or C or D or E.

Practical application of knowledge and skills in a professional situation.

EX 692 01(0-0-1). Seminar.

Consideration of graduate education in health and exercise science.

EX 693 01(0-0-1). Seminar.

Maximum of 2 credits allowed in course.

Current topics and issues in health and exercise science.

EX 695B-E Var. Independent Study.

B) Health. C) Athletics. D) Exercise science. E) Biomechanics.

EX 696A-F Var. Group Study.

A) Physical education. B) Health. C) Exercise and nutrition. D) Athletics. E) Exercise science. F) Biomechanics.

EX 698 Var. Research.

Non-thesis research in health and exercise science.

EX 699 Var. Thesis.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ECOLOGY COURSES (EY)

Colleges of Natural Resources and Natural Sciences

EY 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.

EY 571 Var [1-3]. Advanced Topics in Ecology. S. Prerequisite: One course in ecological principles.

Current research topics presented and analyzed by visiting scientists.

EY 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.

EY 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.

***EY 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.

EY 693 01(0-0-1). Research Seminar. Prerequisite: Written consent of instructor.

Critique of research programs, plans, and ecological theory.

EY 695 Var. Independent Study.

EY 698 Var. Research.

Non-thesis research in ecology.

EY 699 Var. Thesis.

EY 799 Var. Dissertation.

FOREST SCIENCES COURSES (F)

Department of Forest, Rangeland, and Watershed Stewardship College of Natural Resources

F 210 03(2-2-0). Forest Ecogeography. F, S. Prerequisite: BZCC 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: BY 220 or BY 320.

Relationships of ecological concepts to the dynamics of forest ecosystems.

+F 321 03(2-2-0). Forest Biometry. F. Prerequisite: STCC 201 or STCC 301; NR 220.

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: ECCC 202 or EACC 202 or ECCC 240/EACC 240.

Economic principles and techniques applied to forested environments.

F 324 03(3-0-0). Fire Effects and Adaptations. F. Prerequisite: BY 220 or BY 320.

Introduction to fire ecology including fire history, ecosystem effects, and organism responses.

F 325 03(3-0-0). Silviculture. S. Prerequisite: F 230, F 311, NR 220. Credit not allowed for both F 325 and NR 326.

Principles of silviculture and their application to major forest types of United States.

+F 330 03(2-2-0). Timber Harvesting and the Environment. S. Prerequisite: F 230 or F 321.

Principles of timber harvesting and effects of logging on the environment. (\$)

+F 331 03(2-2-0). Wood Products in Society. F.

Role of wood products in society; spectrum of wood products, some field trips. (\$)

F 421 04(3-2-0). 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). Forest Fire Management. F. Prerequisite: F 224 or written consent of instructor.

Policies and systems for fire prevention, fuel treatment, prescribed fire, and wildfire operations in forestry.

***F 425 02(2-0-0). Forest Fire Behavior.** S. Prerequisite: Fire experience.

Programmed instruction in fuel, weather, and topography effects on wildland fire behavior.

F 432 03(2-2-0). Design of Wood Structures. F, S. Prerequisite: CE 360.

Anatomy and fundamental properties of wood; design of connections and structural elements of wood composites.

F 487 Var [3-12]. Professional Forestry Internship. Prerequisite: Written consent of department head.

Professional-level field experience with forestry organization.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

F 489A-F 03(3-0-0). Technical Fire Management. F, S, SS. Prerequisite: A) STCC 201. A-F) Five years professional, full-time forestry management. Offered only through Division of Continuing Education.

A) Numerical analysis for fire managers. (Ω) B) Economics and management for fire specialists. (Ω) C) Fuels and fuel management. (Ω) D) Fire effects. (Ω) E) Fire and land management. (Ω) F) Technical fire management project. (Ω)

F 493 01(0-0-1). Seminar in Forestry. S. Prerequisite: Senior standing. Current issues in forestry and natural resources; discussion of professional leadership roles and ethics; inquiry and debate of contemporary issues.

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, M CC 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: EC 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: AT 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 or written consent of instructor. 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, completion of 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: One 300-level course in ecology. Development, structure, and production in forest communities; manipulation of forest production.

F 693 01(0-0-1). Seminar.

F 695 Var. Independent Study.

F 698 Var. Research.

F 699 Var. Thesis.

***F 721 03(3-0-0). Forest Policy.** S. Prerequisite: NRCC 320. Policies and institutions affecting management of forest lands in U.S.

F 798 Var. Research.

F 799 Var. Dissertation.

FOOD SCIENCE AND HUMAN NUTRITION COURSES (FN)

Department of Food Science and Human Nutrition
College of Applied Human Sciences

FNCC 125 02(2-0-0). Food and Nutrition in Health. (AUCC 3G). F, S. Nutritional quality and safety of food related to human health.

FNCC 150 03(3-0-0). Survey of Human Nutrition. (AUCC 3G). F, S, SS. Basic nutrition principles and concepts; their application to personal health and interactions with societal and environmental issues.

FN 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. (Ω-C)

FN 300 03(3-0-0). Food Principles and Applications. F, S. Prerequisite: C CC 107, FNCC 150. Application of food preparation theories to modification and evaluation of food products.

FN 301 02(0-6-0). Food Principles and Applications Laboratory. F, S. Prerequisite: FN 300 or concurrent registration. Techniques and manipulative skills for preparation and evaluation of standard and modified food products. (S)

FN 310 03(3-0-0). Food Service Systems-Operations. F, S. Technical operations: menu planning, evaluation; recipe standardization; forecasting, food cost, sanitation, hospital food distribution systems.

FN 311 03(3-0-0). Food Service Systems-Production and Purchasing. F, SS. Prerequisite: FN 310. Quantity food production principles, purchasing specifications, market channels.

FN 350 03(3-0-0). Human Nutrition. F, S, SS. Prerequisite: BS 300 or BS 310/BZ 310; C 245 or C 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.

FN 360 02(2-0-0). Nutrition Assessment. S. Prerequisite: C 246, FN 350. Principles of anthropometric, dietary, and biochemical assessment of nutritional status.

FN 386 02(0-4-0). Practicum in Food Service Management.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

FN 414 03(3-0-0). Food Service Systems-Operations Analysis. F, S. Prerequisite: FN 311; BD 150 or CS 110.

Manual and computer-assisted food management production and cost problem.

FN 428 03(3-0-0). Nutrition Teaching and Counseling Techniques. S. Prerequisite: FN 350, nine credits in food science and nutrition.

Objectives, principles, and organization of subject matter for nutrition education and counseling.

FN 444 01(1-0-0). Nutrition and Aging. F. Prerequisite: FNCC 150 or admission to Gerontology Interdisciplinary Studies Program or written consent of instructor.

Effect of aging on nutrient needs and impact of nutrition on successful aging and health in the elderly.

FN 450 05(4-2-0). Medical Nutrition Therapy. F. Prerequisite: FN 350, BS 300.

Use of nutrition therapy in the treatment of acute conditions and chronic disease states. (\$)

FN 451 03(3-0-0). Community Nutrition. F. Prerequisite: FN 350.

Influences on nutritional status, assessment of nutrition problems and needs, planning and evaluation of nutrition intervention programs.

FN 459 03(3-0-0). Nutrition in the Life Cycle. F. Prerequisite: FN 350.

Nutritional aspects associated with each phase of human life cycle including pregnancy, infancy, childhood, adolescence, and early and late adulthood.

FN 470 03(3-0-0). Integrative Nutrition and Metabolism. S. Prerequisite: FN 350; BC 351.

Influence of nutrition on roles and action of hormones and gene expression on metabolism.

FN 484 Var [1-3]. Supervised College Teaching. F, S.

FN 486B-C Var [1-3]. Practicum. Prerequisite: B) FN 350. C) FN 310.

Supervised off-campus experience in B) Nutrition. C) Food service management.

FN 492 03(0-0-3). Seminar in Dietetics and Nutrition. S. Prerequisite: Minimum of 12 credits in FN courses and senior standing.

Capstone seminar in nutrition and dietetics.

FN 495A-B Var. Independent Study.

A) Nutrition. B) Food service management.

FN 496A-I 01(1-0-0). Group Study in Dietetics and Nutrition.

Prerequisite: FN 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.

FN 520 03(3-0-0). Advanced Medical Nutrition Therapy. SS. Prerequisite: FN 550 or FN 551.

Role of nutrition in etiology and treatment of selected disorders.

FN 525 02(2-0-0). Nutrition Education Theories and Practice. F. Prerequisite: FN 350.

Examination of current theories, skills, and models used in nutrition education programs as preparation for research and practice.

FN 550 03(3-0-0). Advanced Nutritional Science I. S. Prerequisite: BC 351 or BC 403, FN 350.

Protein, vitamin, mineral metabolism; human studies, animal models.

FN 551 03(3-0-0). Advanced Nutritional Science II. F. Prerequisite: BC 351 or BC 403, FN 350.

Carbohydrate, lipid, energy metabolism; human studies, animal models.

FN 560/EX 560 03(3-0-0). Exercise and Nutrition. S. Prerequisite: EX 403, FN 350, undergraduate biochemistry class. Credit not allowed for both FN 560 and EX 560.

Interaction of nutrition and physical fitness in exercise performance and promotion of health.

FN 575 01(1-0-0). Nutrition Education for a Healthy Heart. F, S, SS. Offered only through the Division of Continuing Education.

Nutrition-related issues of atherosclerotic cardiovascular disease risk reduction and background in the art/science of facilitating behavior change. (Ω-C)

FN 586A-B Var. Practicum. A) F, S, SS. B) SS.

A) Nutrition for a healthy heart 01(0-2-0). (Ω) B) Advanced clinical nutrition Var [1-3]. (Ω-C)

FN 587A-C 06(0-18-0). Internship.

A) Clinical dietetics. B) Community dietetics. C) Food service management.

FN 590 Var. Workshop.

FN 620 02(2-0-0). Advanced Community Nutrition. S. Prerequisite: FN 350; concurrent registration in FN 686.

Community nutrition assessment; nutrition program planning and evaluation, nutrition policy analysis.

FN 640 02(2-0-0). Selected Topics in Nutritional Epidemiology.

F. Prerequisite: FN 350; STCC 301 or STCC 307/EHCC 307.

Overview of topics in nutritional epidemiology; study design, interpretation of findings, linkage of data to action.

FN 650A-B 02(2-0-0). Recent Developments in Human Nutrition. *A)

F. 1B) F. Prerequisite: A) FN 550. B) FN 551.

Appraisal of literature on human nutritional status. A) Protein, vitamins, and minerals. S. B) Carbohydrates, lipids, and energy. SS.

FN 660 02(2-0-0). Women's Issues in Lifecycle Nutrition. F.

Prerequisite: FN 459 or written consent of instructor.

Current nutritional issues related to selected stages of lifecycle compared to normal adult nutritional needs.

***FN 661 02(2-0-0). International Nutrition.** F. Prerequisite: FN 350.

Roles of technological programs and international agencies in meeting nutritional needs.

FN 670 02(0-4-0). Laboratory Methods. F. Prerequisite: C 245, C 246.

Laboratory techniques and instrumentation in nutrition and food science.

FN 684 Var. Supervised College Teaching. F, S.

FN 686 Var. Practicum.

FN 692 01(0-0-1). Seminar.

FN 695A-C Var. Independent Study.

A) Food science. B) Nutrition. C) Food service management.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

FN 696A-D Var. Group Study.

A) Food science. B) Nutrition. D) Exercise and nutrition.

FN 698B-C Var. Research.

B) Nutrition. C) Food service management.

FN 699B-C Var. Thesis.

B) Nutrition. C) Food service management.

°FN 700 02(2-0-0). Cellular Nutrition. F. Prerequisite: FN 550, FN 551; or BC 403; BS 501.

Essential nutrient requirements of cells and organs.

FN 795 Var. Independent Study.

FN 796 01(0-0-1). Group Study.

FN 799 Var. Dissertation-Nutrition.

FOOD TECHNOLOGY COURSES (FT)

Department of Food Science and Human Nutrition

College of Applied Human Sciences

FT 110 03(3-0-0). Food-From Farm to Table. S. Prerequisite: High school chemistry.

Commercial food processing related to preservation and enhancing of food quality, safety, and value.

***FT 369 03(2-2-0). Food Processing.** F. Prerequisite: C 245, MB 300, PHCC 121.

Food processing principles used to preserve and enhance nutritive value and quality of food. Food processing and preservation principles.

FT 400 03(3-0-0). Food Safety. F. Prerequisite: Six credits in biology and/or chemistry.

Safety of human food emphasizing safe production, processing, marketing, preparation, consumption, and regulations.

°FT 420 03(2-2-0). Quality Assessment of Food Products. S. Prerequisite: FT 110, MB 300.

Quality control of raw ingredients to manufactured products; assessment and sensory evaluation of foods.

FT 447 02(2-0-0). Food Chemistry. F. Prerequisite: C 245; BC 351 or concurrent registration.

Chemistry of food constituents as related to food quality and stability.

FT 448 01(0-2-0). Food Chemistry Laboratory. F. Prerequisite: FT 447 or concurrent registration.

Analysis of food constituents as related to food quality and stability.

°FT 449 03(2-2-0). Food Analysis. S. Prerequisite: FT 447.

Sampling, separations, physical and chemical measurements, and biochemical techniques.

FT 487 Var [1-15]. Internship.

FT 495 Var. Independent Study.

***FT 570 02(2-0-0). Food Product Development.** F. Prerequisite: FT 447.

Food product concepts, feasibility, and evaluation.

°FT 572 02(2-0-0). Food Biotechnology. S. Prerequisite: MB 334.

Interrelationships among microorganisms, food processing methods, advances in biotechnology and food quality, spoilage, shelf-life and safety.

°FT 576 02(2-0-0). Cereal Science. F. Prerequisite: FT 447.

Chemistry and functionality of cereal grain components and their importance in human nutrition.

***FT 578 03(2-2-0). Nutraceuticals.** S. Prerequisite: FT 447 or C 245 or C 345.

Bioactive food components and other phytochemicals as related to health promotion and disease prevention.

FT 698 Var. Research.

FT 699 Var. Thesis.

FT 799 Var. Dissertation.

FISHERY AND WILDLIFE BIOLOGY COURSES (FW)

Department of Fishery and Wildlife Biology

College of Natural Resources

FW 100 02(2-0-0). Wildlife Fundamentals. F, S. Corequisite: 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 192 0 1(1-0-1). Wildlife Inquiries. F.

Discussions in fishery and wildlife ecology and conservation. (\$)

FW 200 03(3-0-0). Wildlife Conservation. S. Prerequisite: M CC 118 or M CC 121. 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. Prerequisite: FW 100.

Exposure to sampling techniques, agencies, and topics in fishery biology careers. (\$)

FW 300 02(2-0-0). Ichthyology. S. Prerequisite: BZCC 111 or LS 103.

Biology of fishes: anatomy, taxonomy, physiology, behavior, ecology, evolution, and zoogeography.

+FW 301 01(0-3-0). Ichthyology Laboratory. 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 as correspondence course only.

Principles of learning and teaching for instructors of state hunter education courses. (Ω-C)

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

FW 356 03. Leopold's Ethic for Wildlife and Land. F, S, SS. Offered as correspondence course only.

Philosophy, art, history, and science of wildlife and land management from writings of Aldo Leopold. (Ω-C)

FW 357 03. Wildlife Habitat on the Great Plains. F, S, SS. Offered as correspondence course only.

Management of cover, food, and water for wildlife and fish in the Great Plains. Emphasis on practices compatible with other uses of private land. (Ω--C)

FW 360 03(3-0-0). Principles of Vertebrate Management. F, S. Prerequisite: BY 220 or BY 320; M CC 141 or M CC 155 or M CC 160.

Principles of ecology applied to management of fish and wildlife resources. Quantitative methods, socioeconomic factors, population dynamics.

FW 370 03(2-2-0). Design of Fish and Wildlife Projects. F, S. Prerequisite: FW 360; NR 220; STCC 301 or STCC 307/EHCC 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: BY 220 or BY 320.

Field trip to see wildlife management and habitats and to discuss problems and practices with professional ecologists and resources managers. (\$)

FW 384 Var [1-5]. Supervised College Teaching. F, S, SS. Prerequisite: Written consent of instructor.

Instruction and practice in laboratory instruction in lower-division departmental courses.

FW 400 03(3-0-0). Fish Ecology. F. Prerequisite: BY 220 or BY 320, 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; STCC 301 or STCC 307/EHCC 307; M CC 141 or M CC 155 or M CC 160.

Theory, philosophy, and applications for study and management of fishery resources. (\$)

FW 402 04(3-2-0). Fish Culture. S. Prerequisite: FW 204, FW 300; FW 301.

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.

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: BY 220; C CC 108 or C CC 112.

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. F. Prerequisite: FW 360, STCC 301 or STCC 307/EHCC 307, BZ 330.

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: BY 220, STCC 301 or STCC 307/EHCC 307.

Analysis of wildlife communities; distribution, abundance, adaptations; wildlife ethology; human impacts on wildlife.

+FW 477 03(1-3-1). Habitat for Wildlife. F. Prerequisite: FW 360. 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 501 03(2-0-1). Advanced Ichthyology.** S. Prerequisite: BZ 214 or FW 300.

Advanced phylogeny, classification, anatomy, physiology, distribution, and ecology of fishes.

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: BY 220 or BY 320; EH 446; EHCC 307/STCC 307 or STCC 301; or written consent of instructor.

Ecological effects of contaminants on populations, communities, and ecosystems.

FW 551 Var [2-3]. Design of Fish and Wildlife Studies. F. Prerequisite: STCC 301; or ST 512 for three-credit option.

Statistical designs applicable to wildlife investigations, their planning and analysis.

FW 555 03(2-0-1). Conservation Biology. S. Prerequisite: BY 220 or BY 320; STCC 307/EHCC 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.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

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. F. Prerequisite: FW 360.

Strategies for biologic, chemical, integrated control of wildlife pests; life histories, management; economic, cultural restraints on control methods. (\$)

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 as correspondence course only.

Teachers or leaders implement wildlife habitat evaluation procedures in classroom or community programs and evaluate performance of students. (Ω-C)

FW 576 03. Wildlife Policy, Administration, and Law. F, S, SS. Prerequisite: Political science, introductory course to natural resources management fields. Offered as correspondence course only.

Evolution of policy affecting wildlife and humans using historical, current, philosophical, legal, and administrative constructs. (Ω-C)

°FW 662 03(1-2-1). Wildlife Population Dynamics. S. Prerequisite: FW 360, M CC 155 or M CC 160, STCC 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 360, STCC 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 360. 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. F, S, SS. Prerequisite: Written consent of instructor.

FW 692A-B Var. Seminar.

A) Fishery biology. B) Wildlife biology.

FW 695A-B Var. Independent Study.

A) Fishery biology. B) Wildlife biology.

FW 696A-B Var. Group Study.

A) Fishery biology. B) Wildlife biology.

FW 698A-B Var. Research.

A) Fishery biology. B) Wildlife biology.

FW 699A-B Var. Thesis.

A) Fishery biology. B) Wildlife biology.

FW 798A-B Var. Research.

A) Fishery biology. B) Wildlife biology.

FW 799A-B Var. Dissertation.

A) Fishery biology. B) Wildlife biology.

GEOSCIENCE COURSES (G)

Department of Geosciences

College of Natural Resources

+G CC 120 03(3-0-0). Exploring Earth: Physical Geology. (AUCC 3A). F, S, SS. Credit allowed for only one of the following: G CC 130, G CC 140, G 150, G CC 120, G CC 122, G CC 124.

Develops scientific understanding through introduction to earth processes, materials, resources, and hazards. (\$)

G CC 121 01(0-2-0). Introductory Geology Laboratory. (AUCC 3A). F, S, SS. Prerequisite: G CC 120 or G CC 122 or G CC 124 or concurrent registration in G CC 120 or G CC 122 or G CC 124. Credit allowed for only one of the following: G CC 140, G 150, G CC 121.

Laboratory applications of introductory geology.

+G CC 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: G CC 130, G CC 140, G 150, G CC 120, G CC 122, G CC 124.

Develops scientific understanding through introduction to geological processes, natural hazards, earth resources, and their impacts on society. (\$)

G CC 124 03(3-0-0). Geology of Natural Resources. (AUCC 3A). S. Credit allowed for only one of the following: G CC 130, G CC 140, G 150, G CC 120, G CC 122, G CC 124.

Develops scientific understanding through introduction to the origin, use, and environmental impact of geological resources extracted from the Earth.

G 150 04(3-3-0). Physical Geology for Scientists and Engineers.

F. Credit allowed for only one of the following: G CC 130, G CC 140, G 150.

Earth materials, structures, and surface processes. Geologic analysis using field data, topographic and geologic maps, and aerial photos. (\$)

+G 154 04(3-3-0). Historical and Analytical Geology. S. Prerequisite: G CC 120 or G CC 122 or G 150.

Physical and biological history of Earth with introduction to laboratory, computer, and field techniques. (\$)

+G 232 03(2-3-0). Mineralogy. F. Prerequisite: G CC 1420 or G 150; C CC 111, M CC 124 or concurrent registration; concurrent registration in G 332; or written consent of instructor.

Crystal structures, crystal chemistry, rock-forming and economically important minerals, crystal growth and defects, physical properties of minerals. (\$)

G 332 02(1-2-0). Optical Mineralogy. F. Prerequisite: G 232 or concurrent registration, or written consent of instructor.

Fundamental light optics in crystalline substances; optical indicatrix; isotropic, uniaxial, and biaxial substances; common minerals in thin section.

G 342 03(2-3-0). Paleontology. F. Prerequisite: G 154.

Description of invertebrates, vertebrates, and plants and their distribution in earth history.

+G 344 04(3-3-0). Stratigraphy and Sedimentology. F. Prerequisite: G 154.

Description, genesis, correlation and age of sediments, sedimentary rocks and layered rock sequences. (\$)

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

+G 364 04(3-3-0). Igneous and Metamorphic Petrology. S. Prerequisite: G 232.

Identification, classification, geochemistry, petrogenesis of igneous and metamorphic rocks; textural interpretation of hand samples and thin sections. (\$)

+G 366 04(3-3-0). Sedimentary Petrology and Geochemistry. F. Prerequisite: C 113, G 154, G 364.

Composition, identification, and classification of sedimentary rocks; geochemical processes affecting sedimentary rocks and surficial deposits. (\$)

+G 372 04(3-3-0). Structural Geology. S. Prerequisite: G 154, M CC 125, concurrent registration in PHCC 141.

Stress and strain in rocks, geometry of deformed rocks, and tectonic principles. (\$)

+G 376 03(1-4-0). Geologic Field Methods. S. Prerequisite: G 344; G 372 or concurrent registration.

Scientific, surveying, and mapping methods used in geologic field studies; proposal, map, and report preparation. (\$)

G 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.

+G 436 06(0-18-0). Geology Summer Field Course. SS. Prerequisite: G 364, G 376.

Geologic mapping, measuring sections, interpreting geologic history in Colorado. Required comprehensive reports, geologic maps, and cross sections. (\$)

G 442 04(3-2-0). Applied Geophysics. F. Prerequisite: M CC 161, PHCC 142, and G 372 or written consent of instructor.

Geophysical exploration methods emphasizing hydrocarbon and mineral exploration, hydrogeology, and engineering applications.

+G 446 03(3-0-0). Environmental Geology. S. Prerequisite: G 454 or concurrent registration.

Geology applied to environmental problems. (\$)

°G 447 03(2-3-0). Mineral Deposits. F. Prerequisite: G 366, G 372 or written consent of instructor.

Occurrence, origin, and exploration of economic metallic mineral deposits.

+G 452 04(3-3-0). Hydrogeology. F. Prerequisite: G CC 1420 or G 150 or GR 210; PHCC 141; M CC 161 or M CC 255 or written consent of instructor.

Interaction of water and geologic materials; surface and groundwater; quantitative analysis and geologic effects on quality and flow of groundwater. (\$)

G 454 04(2-4-0). Geomorphology. S. Prerequisite: G CC 1420 or G 150 or GR 210; M CC 155 or M CC 160.

Origin of landforms; morphology and processes. (\$)

+G 492 Var. Seminar. (\$)

G 494A-H Var. Independent Study.

A) Environmental-engineering geology. B) Geomorphology. C) Mineralogy-petrology. E) Paleontology-stratigraphy. F) Sedimentology. G) Structural geology. H) Oceanography.

***G 530 03(2-2-0). Advanced Petrology.** S. Prerequisite: ER/G 364.

Igneous and metamorphic processes and products explored through thermodynamics, phase equilibria, and textural analysis.

+G 546 04(3-3-0). Sedimentary Basin Analysis. S. Prerequisite: G 344 or written consent of instructor.

Sedimentologic data base, correlation, mapping, facies models, classification, and evolution of sedimentary basins. Applications to petroleum exploration. (\$)

°G 547 03(3-0-0). Mineral Deposits. S. Prerequisite: G 447.

Tectonic setting and parameters in minerals exploration.

G 552 Var [2-3]. Advanced Topics in Hydrogeology. S. Prerequisite: G 452 or written consent of instructor.

Current literature, new techniques, legislative and political developments in hydrogeology, and appropriate case histories.

°G 560 03(2-3-0). Clay Mineralogy. F. Prerequisite: G 364 or written consent of instructor.

Crystallography and chemistry of clay minerals. Applications to geology, engineering, and soil sciences, X-ray analysis of clays.

°G 562 03(3-0-0). Statistical Data Analysis in Earth Resources. F. Prerequisite: ST 302, ST 304.

Statistical parameters, sequential data, map analysis, and multivariate data.

°G 565 03(3-0-0). Petroleum Geochemistry and Geology. S. Prerequisite: G 366 and G 372 or written consent of instructor.

Geochemistry and geology of hydrocarbon generation, migration, and accumulation. Applications to hydrocarbon exploration.

***G 567 03(3-0-0). Sedimentary Geochemistry.** S. Prerequisite: G 366.

Geochemical processes affecting sedimentary rocks and other surficial materials.

G 570 03(1-0-2). Tectonics. S. Prerequisite: G 372, G 364.

Evidence, environments, and consequences of tectonic theories.

***G 575 04(3-2-0). Subsurface Geophysical Mapping.** S. Prerequisite: M CC 161, PHCC 142, G 344, and G 372 or written consent of instructor.

Advanced techniques for creating subsurface geological maps based on seismic reflection and well log data.

°G 576 03(3-0-0). Exploration Seismology. S. Prerequisite: M CC 161, PHCC 142, G 344, and G 372 or written consent of instructor.

Seismic exploration methods, including theory, data acquisition, and data processing.

+G 601 02(1-0-1). Earth Resources Analysis. F. Prerequisite: G 372 or WR 416.

Analytical techniques and their applications in the geology and watershed programs. (\$)

+G 652 03(3-0-0). Fluvial Geomorphology. F. Prerequisite: G CC 1420.

Geomorphology of channels, slopes, and drainage systems. (\$)

G 672 03(2-3-0). Advanced Structural Geology. F. Prerequisite: G 436.

Rheology, deformation mechanisms, structural associations, and advanced methods of structural analysis.

G 684 Var [1-5]. Supervised College Teaching. F, S, SS. Prerequisite: Written consent of instructor.

G 692 Var. Seminar.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

G 695 Var. Independent Study.

+G 696 Var. Group Study. (\$)

G 698 Var. Research.

G 699 Var. Thesis.

***G 747 04(3-3-0). Advanced Sedimentary Petrology.** S. Prerequisite: G 344.

Classification, origin, depositional history, and diagenesis of detrital sedimentary rocks as determined from thin sections.

G 798 Var. Research.

G 799 Var. Dissertation.

GEOGRAPHY COURSES (GR)

Department of Forest, Rangeland, and

Watershed Stewardship

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. (Ω-O)

+GR 342 03(3-0-0). Geography of Water Resources. F. ~~Special fee, \$10.~~

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.

GRADUATE SCHOOL COURSES (GS)

Graduate School

GS 510 03(2-2-0). Fundamentals of High Performance Computing. F.

UNIX; networks; scalar, vector, and parallel architectures; performance programming.

GS 511 03(2-2-0). High Performance Computing and Visualization. S.

Prerequisite: GS 510 or written consent of instructor.

Iterative methods for linear systems; Monte Carlo methods; visualization and image processing.

GS 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.

GS 596 Var [1-3]. Group Study-Graduate Education. SS. Prerequisite: Graduate School approval.

Preparation for graduate education.

GS 670 03(2-2-0). Interdisciplinary Agricultural Development. S. Prerequisite: Written consent of instructor.

Theory and process for technology transfer to improve on-farm water management. Interdisciplinary teamwork using a systems approach will be emphasized.

GS 770 01(0-2-0). Teaching Analysis Using Videotape. F, S. Prerequisite: GS 792 and/or currently assigned teaching duties as a teaching assistant in lecture or laboratory.

Video recordings of actual teaching are critiqued and analyzed by instructor and peers.

GS 792 02(0-0-2). Seminar on College Teaching.

Role of college teacher emphasizing applied principles and practices derived from empirical research and collective experience of teaching professors.

GS 793 01(0-0-1). Genetics Seminar.

Joint seminar in the Genetics Institute offered on a rotational basis in the Departments of Animal Sciences; Biochemistry and Molecular Biology; Bioagricultural Sciences and Pest Management; Biomedical Sciences; Biology; Environmental and Radiological Health Sciences; Forest, Rangeland, and Watershed Stewardship; Horticulture and Landscape Architecture; Soil and Crop Sciences; and Statistics.

HORTICULTURE COURSES (H)

Department of Horticulture and Landscape

Architecture

College of Agricultural Sciences

H CC 100 04(3-2-0). Horticultural Science. (AUCC 3A). F, S. Prerequisite: High school biology.

Principles of plant science and related disciplines as the base and context for the introduction of horticulture practices. (\$)

H 130 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.

+H 140 04(2-4-0). Principles of Landscape Design. S. Prerequisite: H 130.

Basic concepts in the art and process of landscape design. (\$)

H 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. (Ω)

+H 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. (\$)

H 235 04(2-4-0). Landscape Grading and Drainage Studio. F. Prerequisite: H 140; M CC 118 or M CC 121.

Basic design principles for grading, drainage, and earth forms for small-scale projects. (\$)

H 260 04(3-2-0). Plant Propagation. S. Prerequisite: H CC 100.

Theories, principles, and techniques of sexual and asexual propagation. (\$)

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

H 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. (\$, Ω-O)

+*H 321 04(3-2-0). Nursery Production and Management. S. Prerequisite: H CC 100.

Nursery industry organization, management, equipment, field and container production, storage, shipping, marketing, and business management practices. (\$)

+H 322 03(2-2-0). Herbaceous Plants. F. Prerequisite: One course in botany or biological science or horticulture.

Identification, landscape features, cultural requirements, and uses of ornamental annual, perennial, and bulb plants. (\$)

H 330 02(1-2-0). Computers for Landscape Design. S. Prerequisite: One course or knowledge of AutoCad.

Applications and techniques of computer software utilized in small-scale landscape design-build.

H 331 02(2-0-0). Landscape Design. S, SS.

Fundamentals of landscape design theory and plant composition as presented in simple problems. For non-design majors only.

+H 332 04(2-4-0). Planting Design Studio. F. Prerequisite: H 140, H 221, H 322.

Functional and aesthetic values of plant materials; their creative use in landscape design. (\$)

+H 335 04(2-4-0). Landscape Structures. S. Prerequisite: H 140, one CAD class.

Design and construction methods for structures commonly used in residential landscaping. Preparation of construction documents. (\$)

+H 341 03(2-2-0). Turfgrass Management. F. Prerequisite: H CC 100.

Principles and practices of turfgrass propagation and maintenance. (\$)

H 367 03(2-2-0). Landscape Irrigation. S.

Practical design of sprinkler and trickle irrigation systems for commercial and residential landscapes.

H 368/LA 368 03(2-2-0). Landscape Irrigation and Water Conservation. F, S. Prerequisite: H CC 100 or LA 110 or written consent of instructor. Credit not allowed for both H 368 and LA 368.

Practical approaches and methods of irrigation, water conservation, and water management in the designed landscape.

H 371 02(2-0-0). Horticultural Therapy Techniques. S. Prerequisite: H 170. Offered only off campus.

Clinical skills in horticultural therapy; communication, safety, and adaptation of tools, activities, and gardens. (Ω)

H 373 02(2-0-0). Horticultural Therapy Programming. SS. Prerequisite: H 170. Offered only off campus.

Methods for individual treatment planning, intervention, documentation, and reporting within therapy, social, and vocational HT programs. (Ω)

H 377 02(2-0-0). Horticultural Methods for Therapy Programs. F. Prerequisite: H 170 and H 371 or H 373. Offered only off campus.

Horticultural therapy methods including indoor and outdoor garden design, management of site, tools and other modifications. (Ω)

H 384 Var [1-5]. Supervised College Teaching. F, S. Maximum of 10 credits allowed in course.

°H 401 03(3-0-0). Medicinal and Value-Added Uses of Plants. S.

Prerequisite: BZCC 120 or H CC 100; C CC 107 and C CC 108.

Chemical, biochemical and ethnobotanical perspective on the medicinal and value-added uses of plants.

+°H 412 04(3-0-1). Floriculture Crops. F, S, SS. Prerequisite: H 310.

Commercial production and marketing of bedding plants, potted container crops, and cut flowers. (\$, Ω-O)

+H 432 05(2-6-0). Intensive Landscape Design Studio. S. Prerequisite: H 332.

Site planning and design for landscape projects of a limited scale. Problems of increasing complexity. Emphasis on real sites and clients. (\$)

+°H 441 03(3-0-0). Turfgrass Science. F. Prerequisite: BZCC 120, H 341, SC 240.

Examination of turfgrass management practices from a scientific perspective; discussion of advanced turfgrass management technologies. (\$)

+°H 450A-E 01(1-0-0). Horticulture Food Crops. F. Prerequisite: One plant science course.

*A) Cool season vegetable production. (\$) *B) Warm season vegetable production. (\$) *C) Small fruit production. (\$) *D) Tree fruit production. (\$) *E) Grape production in temperate zone climates.

+H 454 02(2-0-0). Horticulture Crop Production and Management. S. Prerequisite: H 310 or H 450A-B.

Production and management of horticulture crops. (\$)

H 460/SC 460 03(3-0-0). Plant Breeding. S. Prerequisite: SC 330. Credit not allowed for both H 460 and SC 460.

Theory and practice of plant breeding using principles of genetics and related sciences.

H 461/SC 461 01(0-2-0). Plant Breeding Laboratory. S. Prerequisite: H 460/SC 460 or concurrent registration. Credit not allowed for both H 461 and SC 461.

Techniques and procedures used in public and commercial plant breeding programs.

+H 464 03(2-2-0). Arboriculture and Urban Plant Management. F. Prerequisite: H CC 100, SC 240.

Cultural management of plants in the urban landscape, including plant diagnostic techniques and developing landscape management plans. (\$)

H 465 03(2-2-0). Landscape Estimating. F. Prerequisite: Three credits of mathematics.

Landscape construction estimating and bidding, contract documentation, and other business practices relevant to landscape design-build and contracting.

***H 466 03(2-2-0). Community Forestry.** S. Prerequisite: F 210 or H 221, H 464.

Policies and management of public and privately owned community forests in urbanized areas.

H 471 02(2-0-0). Horticultural Therapy Management. S. Prerequisite: H 170, H 371, H 373, H 377. Offered only off campus.

Horticultural therapy program development, site planning and management, program proposals. (Ω)

°H 475 03(3-0-0). Environmental Requirements of Horticultural Plants. S. Prerequisite: BZ 440.

Impact of environmental factors and global climatic change on production of horticultural crops, plant distribution, and species biodiversity.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

H 486 Var [1-6]. Practicum.

Directed experiences in applications of horticulture techniques and procedures.

H 487 Var. Internship.

H 495 Var. Independent Study.

H 496 Var. Group Study.

°H 571 03(3-0-0). Soil-Plant-Water Relations/Water Stress. S. Prerequisite: One course in plant physiology.

Movement of water in the soil-plant-atmosphere continuum. Instrumentation for measuring plant-water relations. Plant responses to drought and salinity.

***H 575 02(2-0-0). Plant Germplasm Conservation. S.** Prerequisite: H 460/SC 460 or written consent of instructor.

Principles, concepts, and methodology for collection, conservation, and utilization of plant genetic resources.

H 588 Var. Supervised Extension Practices. F, S, SS.

Field experiences in extension practices in horticulture.

H 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.

H 698 Var. Research.

H 699 Var. Thesis.

H 784 Var. Supervised College Teaching. F, S, SS.

H 792 01(0-0-1). Seminar.

H 795 Var. Independent Study.

H 799 Var. Dissertation.

HUMAN DEVELOPMENT AND FAMILY STUDIES COURSES (HD)

Department of Human Development and Family Studies

College of Applied Human Sciences

HDCC 101 03(3-0-0). Individual and Family Development. (AUCC 3C). F, S, SS. Also offered as correspondence course.

Principles of life-span human development in the context of the family. Theory and research on the influence of family systems on individuals. (Ω-C)

HD 175/PY 175 03. Developmental Psychology Across the Life Span. F, S, SS. Credit not allowed for both HD 175 and PY 175. Offered as telecourse only.

Theory and research on physical, cognitive, and psychosocial human development across the life span. (Ω-T)

HD 217 03(3-0-0). Creative Experiences for Children. F, S, SS. Prerequisite: HDCC 101 or concurrent registration in HD 286. Credit not allowed for both HD 217 and HD 218.

Theories of play; art, music, literature as related to child development.

HD 218 03. Creative Experiences for Preschool Children. F, S, SS. Credit not allowed for both HD 218 and HD 217. Offered as correspondence course only.

Role of art, music, and literature in development; emphasis on planning and conducting creative experiences for preschool children. (Ω-C)

HD 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. (Ω-C)

HD 286 03(2-3-0). Practicum-Professional Skills. F, S. Prerequisite: COCC 150 and HDCC 101.

Observational and applied experience with children, adolescents, adults, or families. Exploration of professional skills and opportunities. (\$)

HD 302 03(3-0-0). Marriage and Family Relationships. F, S, SS. Prerequisite: PYCC 100, S CC 100.

Preparation for and adjustment to marital and family relationships throughout the life cycle. (Ω-T/O)

HD 310 03(3-0-0). Infant and Child Development in Context. F, S. Prerequisite: HDCC 101 and PYCC 100.

Physical, cognitive, and socioemotional development from conception through middle childhood in context of family, relationships, and culture. (Ω--T)

HD 311 03(3-0-0). Adolescent/Early Adult Development in Context. F, S, SS. Prerequisite: HDCC 101.

Physical, cognitive, and socioemotional development of adolescents and young adults in context of family, relationships, and culture.

HD 312 03(3-0-0). Adult Development-Middle Age and Aging. F, S, SS. Prerequisite: HDCC 101 or PYCC 100 or S CC 100.

Developmental issues and processes pertaining to middle and later adulthood. Contexts in which adult development and aging occur are emphasized. (Ω-C/O)

HD 317 03. Children with Special Needs in Child Care. F, S, SS. Prerequisite: HD 276 or written consent of instructor. Offered as correspondence course only.

Exploration of characteristics, services, and issues affecting exceptional individuals. (Ω-C)

HD 332 03(2-0-1). Death, Dying, and Grief. F, S, SS. Prerequisite: HDCC 101.

Developmental processes of death and dying related to the dying individual and family; applied to dealing with grief, death in human service agencies.

HD 334 03(3-0-0). Parenting Across the Lifespan. F, S, SS. Prerequisite: HDCC 101 or HD 310.

Parenthood as a developmental process; child rearing as a function of variations in risk status, family systems, and ecological contexts. (Ω-O)

HD 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. (Ω-C)

HD 375 03(3-0-0). Programming for Children and Families. F, S. Prerequisite: HD 310, HD 286.

Prevention and intervention programs for children and families.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HD 400 03(3-0-0). Speech, Language, and Communication Development. F, S, SS. Prerequisite: HD 310 or PY 260.

Speech, language, and communication development from birth to adulthood; review of physical, cognitive, social, cultural influences.

HD 401 03(3-0-0). Childhood Socialization. F, S, SS. Prerequisite: HD 310, HD 334.

Socialization processes that influence human development within diverse family styles and cultures.

HD 402 03(3-0-0). Family Studies. F, S, SS. Prerequisite: HDCC 101.

Theory and research concerning relationships within families; interaction between family and other social institutions.

HD 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.

HD 430 03. Play Behavior. F, S, SS. Prerequisite: HDCC 101 or HD 310 or written consent of instructor. Offered as correspondence course only.

Theories and research of play behavior and play environments. (Ω-C)

HD 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. (Ω-C)

HD 477 01(1-0-0). Professional Skills Development. F, S, SS. Prerequisite: HD 286; HD 488V or concurrent registration.

Applications and integration of human development and family background within professional settings.

HD 484 Var [1-3]. Supervised College Teaching. F, S, SS.

HD 488A-D Var [1-14]. Field Placement. Prerequisite: HD 286; HD 477V 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.

HD 490A Var [1-3]. Workshop.

A) Human development.

HD 492 03(0-0-3). Seminar–Program Proposal Development. F, S, SS. Prerequisite: HD 477 and HD 488A or B or C or D or concurrent registration or written consent of instructor.

Research, development, and oral presentations of program proposals from a family systems and development perspective.

HD 493 03(0-0-3). Specialized Seminar. Prerequisite: Written consent of instructor.

Advanced study of theory, research, and application in a specialized area.

HD 495A-C Var. Independent Study.

A) Human development. B) Family studies. C) Early childhood education.

HD 497 Var. Group Study.

HD 498A-B Var [1-3]. Research.

A) Human development. B) Family studies.

HD 499 Var [1-6]. Thesis. Prerequisite: Written consent of department head.

Independent research project presented to a faculty committee.

HD 500 03(2-3-0). Issues in Human Development and Family Studies. F. Prerequisite: Six credits in human development or family studies.

A selected, broad issue in human development and family studies emphasizing principles of research.

HD 510 03(3-0-0). Theories of Human Development. S. Prerequisite: One child development course, three additional credits in human development.

Comparative analysis of major theories in human development.

HD 524 03(3-0-0). Family Theory. F. Prerequisite: One family studies course.

Major theories and conceptual frameworks for family analysis.

HD 528 04(3-2-0). 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.

HD 534 03(3-0-0). Marriage and Family Therapy. F. Prerequisite: HD 524.

Theories and techniques.

HD 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.

HD 590A-B Var [1-3]. Workshop.

A) Human development. B) Family studies.

HD 592 03(1-0-2). Grant Writing–Human Services and Research. F, S. Prerequisite: STCC 201.

Writing grant proposals that support client services or for research.

HD 600B-E 03(3-0-0). Advanced Studies. F, S, SS. Prerequisite: B-C, E) Six credits in behavioral sciences. D) HD 550 or concurrent registration.

B) Grief and loss. C) Intimacy and human sexuality. D) Program planning and evaluation. E) Parenting.

HD 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.

***HD 613/*HS 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. Offered as an online course as part of the Great Plains Interactive Distance Education Alliance. Credit not allowed for both HD 613 and HS 613.

Advanced study of developmental change and adaptation during adult years. (Ω-O)

HD 624 03(3-0-0). Skills and Techniques in Family Therapy. F. Prerequisite: HD 534.

Elaboration of techniques and therapy skills based on theory and research.

HD 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.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

***HD 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.

°HD 636/°HS 636 03(3-0-0). Aging and the Family. S. Prerequisite: One course in adult development or six credits of upper-division behavioral science. Offered as an online course only as part of the Great Plains Interactive Distance Education Alliance. Credit not allowed for both HD 636 and HS 636.

Theory and research relating to topics on aging during middle and late years of family life cycle. (Ω-O)

HD 644 03(3-0-0). Foundations in Family Therapy. F, SS. Prerequisite: HD 524.

Contemporary research and treatment strategies for parenting problems, family violence, and substance abuse.

HD 650 03(2-0-1). Research Methods II. F. Prerequisite: HD 550.

Statistical concepts and analysis.

HD 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.

°HD 677 03(3-0-0). Ethical and Legal Issues. S.

Ethical and legal issues in the field of human development and family studies.

HD 678 Var [1-3]. Applications of Marriage and Family Therapy. F, S, SS. Prerequisite: HD 677 or concurrent registration; admission to MFT Program.

Applications of family therapy theory to clinical cases.

HD 684 Var. Supervised College Teaching. F, S.

HD 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.

HD 687A-C Var. Internship. Prerequisite: A-B) Nine graduate credits in human development. C) HD 677, HD 678, HD 688 or concurrent registration.

Application of advanced human development skills in professional settings. A) Human development. B) Family studies. C) Marriage and family therapy.

HD 688 Var [1-5]. Field Placement. Prerequisite: Admission to MFT Program; concurrent registration in HD 678.

Application of knowledge, skills, and methods to therapy and intervention.

HD 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.

HD 695A-C Var. Independent Study.

A) Human development. B) Family studies. C) Early childhood education.

HD 697 Var [1-6]. Group Study.

HD 698A-B Var [1-3]. Research.

A) Human development. B) Family studies.

HD 699 Var. Thesis. Prerequisite: HD 550.

HD 799 Var. Dissertation.

HIGHER EDUCATION COURSES (HE)

School of Education

College of Applied Human Sciences

HE 590A-H Var [1-3]. Workshop-Student Personnel.

A) Admissions. B) College union administration. C) Housing/auxiliary services. E) Career services. H) Designing and facilitating workshops.

HE 618 03(3-0-0). Analyzing Education Literature. F. Prerequisite: Admission to Ph.D. program or written consent of instructor.

Analyze, critique, and interpret scholarly literature in the discipline.

HE 670 03(0-0-3). College Student Personnel Administration. F. Prerequisite: Written consent of instructor.

Historical, philosophical, and professional development in student affairs functions; analysis of role of student affairs in higher education.

HE 671 02(2-0-0). Higher Education Administration. F. Prerequisite: HE 670.

Purpose, structure, and role of administration of higher education. Emphasis on financial management for student affairs administrators.

HE 673 03(0-0-3). Student Development Theory. F. Prerequisite: HE 670.

Strategies for application of student development theories in practice of student affairs.

HE 675 03(3-0-0). The Community College. F. Prerequisite: VE 601 or appropriate experience.

Role and scope of community college: history, philosophy, organization, administration.

HE 676 03(3-0-0). Organizational Behavior in Student Affairs. S. Prerequisite: HE 670.

Understanding and application of basic organizational behavior principles within administration of student affairs in higher education.

HE 677 03(3-0-0). Law in Student Affairs. F. Prerequisite: HE 670.

Legal issues focusing on sources and application of educational law and responsibilities of higher education administrators.

HE 687 Var. Internship.

HE 692C-I Var. Seminar.

C) Research methods/proposal design. D) Inclusive university. E) Financial management in student affairs. F) Current trends and issues. G) Working with student groups. H) Service learning. I) International programs.

HE 694 Var. Independent Field Studies.

HE 695 Var. Independent Study.

HE 701 03(0-0-3). Higher Education Law. S. Prerequisite: Written consent of instructor.

Legal theory, analysis, and review of cases relevant to higher education.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HE 702 03(2-0-1). Community College Curriculum. F. Prerequisite: HE 675 or concurrent registration.

Investigation and research of critical curricular issues affecting the community college now and in the future.

HE 703 03(2-0-1). Community College Leadership. S. Prerequisite: HE 675 or written consent of program chair.

Investigation and research of critical leadership issues affecting the community college now and in the future.

HE 710 03(0-0-3). Community College Finance. S. Prerequisite: HE 675.

Federal, state, and local revenue distribution, budget preparation and controls, accounting options, audit preparation.

HE 750 03(0-0-3). Simulated Presidential Cabinet I. SS. Prerequisite: Completion of community college leadership course work or consent of program chair.

Issues and challenges relating to students, faculty, instructional programs, noninstructional programs, and instructional delivery.

HE 751 03(0-0-3). Simulated Presidential Cabinet II. SS. Prerequisite: Completion of community college leadership course work or consent of program chair.

Issues and challenges relating to internal/external governances, legal authority, institutional revenues, expenditures and insurances, human resources.

HE 792 Var [1-6]. Seminar. F. Prerequisite: HE 710 or consent of program chair.

HE 799 Var. Dissertation.

HPCC 193 03(0-0-3). Seminar. (AUCC1A). F, S. Prerequisite: HP 192, participation in University Honors Program.

Humanistic and scientific studies with emphasis on rigorous literate activities, especially written communication.

HP 195 Var [1-3]. Honors Independent Study. F, S, SS. Prerequisite: Participation in University Honors Program.

HP 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.

HP 384 Var. Supervised College Teaching. F, S.

HPCC 392 03(0-0-3). Seminar. (AUCC 3B and 3F). F, S. Prerequisite: HPCC 193, participation in University Honors Program.

Various topics in humanistic and scientific studies.

HP 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.

HP 399 01(0-0-1). Pre-thesis. F, S. Prerequisite: HPCC 193, participation in University Honors Program.

Preparation for Honors senior thesis.

HPCC 492 03(0-0-3). Senior Seminar. (AUCC 3C). Prerequisite: HPCC 392, participation in University Honors Program.

Variable topics on humanistic and scientific studies.

HP 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.

HP 499 03. Senior Honors Thesis. Prerequisite: HP 399. Maximum of 6 credits allowed in course.

HONORS COURSES (HP)

University Honors Program

Office of Provost/Academic Vice President

HP 100 01(0-0-1). Honors Western Civilization I. F. Corequisite: HYCC 100; participation in University Honors Program.

Selected readings complementing "Western Civilizations" material.

HP 101 01(0-0-1). Honors Western Civilization II. S. Corequisite: HYCC 101; participation in University Honors Program.

Selected readings complementing "Western Civilizations" material.

HP 103 02(1-0-1). Honors Biology of Organisms. S. Corequisite: LS 103; participation in University Honors Program.

Selected readings complementing "Biology of Organisms" material.

HP 170 01(0-0-1). Honors World Civilizations, Ancient-1500. F. Corequisite: HYCC 170; participation in University Honors Program.

Selected readings complementing "World Civilizations, Ancient-1500" material.

HP 171 01(0-0-1). Honors World Civilizations, 1500-Present. S. Corequisite: HYCC 171; participation in University Honors Program.

Selected readings complementing "World Civilizations, 1500-Present" material.

HP 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.

HUMAN SCIENCES COURSES (HS)

College of Applied Human Sciences

HS 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.

HS 201 03(3-0-0). Perspectives in Gerontology. F. Prerequisite: HDCC 101 or PYCC 100 or S CC 100 or written consent of instructor.

Using multidisciplinary perspectives to explore a variety of issues in human aging; emphasis on applied gerontology. (Ω-T)

HSCC 300 03(3-0-0). Research in Applied Professions. (AUCC 2B). F, S, SS.

Application of social science research methodology to applied professions including problem formulation, research design, and data collection.

HS 484 02(0-0-2). Supervised College Teaching. F, S, SS.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

HS 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.

HS 490 Var [1-5]. Workshop.

HS 492 Var [1-5]. Seminar.

HS 495 Var [1-5]. Independent Study.

HS 559 01(1-0-0). Foundations of Youth Development. F, S, SS.

Fundamentals of youth development and the youth development professions. (Ω-O)

HS 590 Var [1-5]. Workshop.

HS 612 03(3-0-0). Contemporary Perspectives in Gerontology. F. Prerequisite: Six credits of social/behavioral sciences. Offered as an online course only as part of the Great Plains Interactive Distance Education Alliance.

Basic concepts, themes, and issues in gerontology. (Ω-O)

***HS 613/*HD 613 03(3-0-0). Adult Development and Aging.** F, S.

Prerequisite: One course in adult development or three credits of upper-division behavioral science. Offered as online course only as part of the Great Plains Interactive Distance Education Alliance. Credit not allowed for both HS 613 and HD 613.

Advanced study of developmental change and adaptation during adult years. (Ω-O)

HS 615 03(3-0-0). Environments and Aging. S. Prerequisite: One course in adult development or three credits or upper-division behavioral science. Offered as an online course only as part of the Great Plains Interactive Distance Education Alliance.

Physical environments and needs of older people, emphasizing design-related aspects of home, other care settings, and neighborhood. (Ω-O)

HS 616 03(3-0-0). Research Methods in Gerontology. SS. Prerequisite:

One course in adult development or three credits of upper-division behavioral science. Offered as an online course only as part of the Great Plains Interactive Distance Education Alliance.

Evaluation, research methods, and grant writing in gerontology.

HS 617 03(3-0-0). Physical Health and Nutrition in Aging. S.

Prerequisite: One course in adult development or three credits of upper-division behavioral science. Offered as an online course only as part of the Great Plains Interactive Distance Education Alliance.

Nutrition and physical activity during aging, emphasizing physiological and metabolic changes, and health and disease. (Ω-O)

HS 618 03(3-0-0). Aging and Public Policy. F. Prerequisite: One course in adult development or three credits of upper-division behavioral science. Offered as an online course only as part of the Great Plains Interactive Distance Education Alliance.

Public policy programs and policy development related to economic security and sufficiency for aging populations. (Ω-O)

HS 619 03(3-0-0). Professional Seminar in Gerontology. SS.

Prerequisite: HS 612, HS 613/HD 613, HS 616, HS 617. Offered as an online course only as part of the Great Plains Interactive Distance Education Alliance.

Integrative capstone seminar in gerontology. (Ω-O)

°HS 636/°HD 636 03(3-0-0). Aging and the Family. S. Prerequisite: One course in adult development or six credits of upper-division behavioral science. Offered as an online course only as part of the Great Plains Interactive Distance Education Alliance. Credit not allowed for both HS 636 and HD 636.

Theory and research relating to topics on aging during middle and late years of family life cycle. (Ω-O)

HS 660 03(3-0-0). Community Youth Development. F, S.

Study of youth development within communities with emphasis on a strength-based or assets approach to community youth development. (Ω-O)

HS 661 03(3-0-0). Adolescents and Families: Implications. F, S.

Adolescent development in the context of the family; implications for professionals working with youth and families. (Ω-O)

HS 662 03(3-0-0). Contemporary Youth Issues and Life Skills. F, S.

Issues faced by youth today and associated risks and resiliency factors; life skills for youth; helping skills for youth professionals. (Ω-O)

HS 663 03(3-0-0). Youth Policy. F, S.

Youth policies and programs that impact youth services. (Ω-O)

HS 664 03(3-0-0). Youth Program Administration and Management. F, S.

Youth program administration and management concepts, models and challenges in program implementation. (Ω-O)

HS 665 03(3-0-0). Youth Development. F, S.

Developmental periods of adolescence; how tasks of this life stage influence family/home life, school, peers, and other factors. (Ω-O)

HS 666 03(3-0-0). Youth in Cultural Contexts. F, S.

Examination of diverse youth and families for youth work professionals. (Ω-O)

HS 667 03(3-0-0). Youth Professionals as Consumers of Research. F, S.

Understanding and evaluating research for practice with youth. (Ω-O)

HS 668 03(3-0-0). Program Design, Implementation and Evaluation. F, S.

Principles and methods of program design, implementation, and outcome. (Ω-O)

HS 692 Var [1-5]. Seminar.

HS 695 Var [1-5]. Independent Study.

HISTORY COURSES (HY)

Department of History *College of Liberal Arts*

HYCC 100 03(3-0-0). Western Civilization, Pre-Modern. (AUCC 3D). F, S, SS.

Historical development of Western civilization from antiquity to the early modern era (c. 1600 C.E.).

HYCC 101 03(3-0-0). Western Civilization, Modern. (AUCC 3D). F, S, SS.

Historical development of Western civilization from c. 1600 C.E. to the contemporary era.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

HYCC 115 03(3-0-0). Islamic World to 1500. (AUCC 3D or 3E). F.

Religion, society, and culture in the Islamic world from the time of Muhammad to 1500.

HYCC 120 03(3-0-0). Asian Civilizations I. (AUCC 3D or 3E). F.

Major traditional intellectual and cultural patterns of Asia during the formative years.

HYCC 150 03(3-0-0). U.S. History to 1876. (AUCC 3D and 3F). F, S, SS.

Major issues and themes in the development of the United States from the colonial period through reconstruction.

HYCC 151 03(3-0-0). U.S. History Since 1876. (AUCC 3D and 3F). F, S, SS.

Major issues and themes in the historical development of the United States since reconstruction.

HYCC 170 03(3-0-0). World History, Ancient-1500. (AUCC 3D). F, S, SS.

Historical developments and interactions of world societies from the ancient to modern periods.

HYCC 171 03(3-0-0). World History, 1500-Present. (AUCC 3D). F, S, SS.

Historical developments and interactions of world societies from 1500 to the present.

HYCC 215 03(3-0-0). Islamic World Since 1500. (AUCC 3D or 3E). S.

Religion, society, and culture in the Islamic world since 1500.

HYCC 219 03(3-0-0). Africa-Precolonial States and Empires. (AUCC 3E). F.

Origins of societal and political development in Africa before 1800; technology, the environment, human migrations, and trade.

HYCC 220 03(3-0-0). Asian Civilizations II. (AUCC 3D or 3E). S.

Transformation of major intellectual and cultural patterns and the process of globalization in Asia.

HYCC 230 03(3-0-0). Medieval Europe. (AUCC 3D or 3E). S.

Political, legal, socioeconomic development of Europe from 300-1500 emphasizing emergence of major states.

HYCC 235 03(3-0-0). Slavic and East Central European Civilizations. (AUCC 3D or 3E). F.

Political, cultural, socioeconomic development of Slavic and East Central Europe emphasizing similarity and diversity of the peoples of the region.

HYCC 238 03(3-0-0). Latin America Since 1500. (AUCC 3D or 3E). F, S.

Major trends in the social, cultural, political and economic evolution of Spanish America and Brazil from the European conquest to the present.

HY 240 03(3-0-0). History of England. F, SS.

From Roman period to present emphasizing constitutional, legal, political developments.

HY 242 03(3-0-0). History of Ireland. S.

History of Ireland from earliest times to the present day.

HY 245 03(3-0-0). World War II. F, S, SS.

History of World War II, a global conflict; its origins, major events, personalities, and nature.

HYCC 250/ETCC 250 03(3-0-0). African American History, 1619-1865. (AUCC 3D). F. Credit not allowed for both HYCC 250 and ETCC 250.

African background and slavery in the United States from colonial times to the end of the Civil War.

HYCC 251/ETCC 251 03(3-0-0). African American History Since 1865. (AUCC 3D). S. Credit not allowed for both HYCC 251 and ETCC 251.

Political, socioeconomic, and cultural history of African Americans since abolition.

HYCC 252/ETCC 252 03(3-0-0). Asian-American History. (AUCC 3D). F. Credit not allowed for both HYCC 252 and ETCC 252.

Asian-American historical experience in the United States from 1850s to the present time.

HYCC 255/ETCC 255 03(3-0-0). Native American History. (AUCC 3D). S. Credit not allowed for both HYCC 255 and ETCC 255.

History of Native American peoples in the United States to the present, including origin stories.

HY 260 03(3-0-0). Colorado. F, S, SS.

Survey of Colorado history from ancient Indians to present.

HY 263 02(2-0-0). War for Independence. S.

Surveys the War for Independence, 1775-1781.

HY 297 Var [1-3]. Group Study.

***HY 302 03(3-0-0). Ancient Near East.** S.

Neolithic period to 500 B.C.E. emphasizing political, social, intellectual, and cultural developments.

°HY 304 03(3-0-0). Ancient Rome. S.

From monarchy to republic emphasizing political, social, intellectual, and cultural developments.

HY 305 03(3-0-0). Ancient Greece to 323 B.C.E. F.

From the Bronze Age to the death of Alexander the Great, emphasizing political, social, intellectual, and cultural developments.

HY 306 03(3-0-0). Hellenistic World: Alexander to Cleopatra. S.

From Alexander the Great to Cleopatra VII, emphasizing intellectual, social, military, political, and cultural developments.

HY 309 03(3-0-0). Women in the Ancient World. S. Prerequisite: HYCC 100 or HYCC 120 or HYCC 170.

Comparative study of roles of women and gender in the ancient world.

HY 310 03(3-0-0). Renaissance and Reformation Europe. F.

Development of European society during Renaissance and Reformation eras; religion, society, and the rise of nation-states.

HY 312 03(3-0-0). The Age of the Enlightenment. S.

Development of European society from settlement of religious wars to French Revolution emphasizing political, economic, and intellectual trends.

HY 316 03(3-0-0). Modern Europe, 1815-1914. F, SS.

Europe in 19th century emphasizing growth of liberalism, nationalism, and industrialism.

HY 318 03(3-0-0). Europe in Crisis, 1914-1941. F.

Political, social, economic developments since 1914; consequences of world wars, Great Depression, spread of totalitarianism, decline of imperialism.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

HY 319 03(3-0-0). Contemporary Europe. F, SS.

Political, economic, social, and cultural history of major European nations since World War II.

HY 326 03(3-0-0). European Biography. F, S.

Historical inquiry into European social, intellectual, political, and economic development through study of leading personalities.

°HY 330 03(3-0-0). Africa: Colonialism to Independence. S.

Africa from abolition of the slave trade to independence, focusing on economic, social, and political change under colonialism.

HY 331 03(3-0-0). Modern South Asia. F, S.

Major political, social, economic and cultural developments in South Asia from the seventeenth century to the present.

HY 332 03(3-0-0). South Asia Since Independence. S.

Major political, social, economic, and cultural developments in South Asia since independence.

HY 335 03(3-0-0). Tokugawa and Modern Japan, 1600-Present. F, S. Prerequisite: HYCC 101 or HYCC 151 or HYCC 171 or HYCC 215 or HYCC 220 or written consent of instructor.

Historical developments in Japan since 1600.

HY 337 03(3-0-0). Ancient China. F. Prerequisite: HYCC 100 or HYCC 120 or HYCC 170.

Development of civilization in China from Neolithic times to 200 B.C.E.

HY 339 03(3-0-0). Medieval China and Central Asia. S. Prerequisite: HYCC 100 or HYCC 115 or HYCC 120 or HYCC 170.

Historical developments in China and Central Asia from 200 B.C.E. to 1300 A.D.

HY 341 03(3-0-0). China in the Modern World, 1600-Present. S, SS. Prerequisite: HYCC 101 or HYCC 151 or HYCC 171 or HYCC 215 or HYCC 220 or written consent of instructor.

Historical developments in China since 1600.

HY 342 03(3-0-0). Sacred History in the Bible and the Qur'an. F, S, SS. Prerequisite: E 160 or HYCC 100 or HYCC 115 or HYCC 170 or PL 171.

Conceptions of sacred history in the Biblical and Qur'anic traditions, emphasizing pre-modern historiography and exegesis.

***HY 344 03(3-0-0). Muhammad and the Origins of Islam.** F. Prerequisite: HYCC 100 or HYCC 115 or HYCC 120 or HYCC 170 or HYCC 230.

Emergence of Islam and growth of the Islamic community from time of Muhammad to decline of the Arab Caliphate.

HY 346 03(3-0-0). Crusades in the Near East. S. Prerequisite: HYCC 100 or HYCC 115 or HYCC 120 or HYCC 170 or HYCC 230.

The Crusades, emphasizing religion, politics, and warfare in Western Europe, Byzantium, the Near East, and the Mongol world empire, c. 1050-1300.

HY 348 03(3-0-0). The Modern Middle East. S. Prerequisite: HYCC 101 or HYCC 151 or HYCC 171 or HYCC 215 or HYCC 235.

Historical developments in the Middle East in 19th and 20th centuries.

HY 350 03(3-0-0). Mexico. S.

Social, economic, and political development of Mexican people from pre-Columbian times to present.

HY 352 03(3-0-0). Caribbean Civilization. F. Prerequisite: HYCC 101 or HYCC 171 or HYCC 354.

Socioeconomic, political, and cultural development of the nations of the Caribbean.

HY 354 03(3-0-0). Colonial Latin America. F, S. Prerequisite: HYCC 101 or HYCC 171 or HYCC 238.

Spanish and Portuguese America from pre-Columbian times through independence (c. 1825).

HY 360 03(3-0-0). Colonial and Provincial America to 1740. F, SS.

English colonies and their maturation to the Great Awakening.

HY 362 03(3-0-0). Era of the American Revolution. S, SS.

Imperial relations and American society during revolutionary period.

°HY 364 03(3-0-0). Early U.S. Republic. F, SS. Prerequisite: HYCC 150.

Major themes of U.S. cultural, economic, social, and political history, 1787 to 1815.

HY 368 03(3-0-0). Age of Jackson. S, SS. Prerequisite: HYCC 150.

National growth, 1815 to 1850, emphasizing political, social, and economic developments.

HY 370 03(3-0-0). Civil War Era. S. Prerequisite: HYCC 150.

U.S. history between 1848 and 1865 emphasizing causes and results of the Civil War.

HY 372 03(3-0-0). Reconstruction and the New South. F. Prerequisite: HYCC 150.

Reconstruction Era, 1865-1877, and the South to present with emphasis on purposes and results of Reconstruction.

***HY 375 03(3-0-0). United States, 1876-1917.** S.

Victorian way of life; rise of industry; reform movements; imperialism; World War I.

HY 376 03(3-0-0). United States, 1917-1945. F, SS.

World War I, the 1920s, the Great Depression, and World War II.

HY 377 03(3-0-0). United States Since 1945. S, SS.

The Cold War, foreign and domestic affairs from Truman to present.

HY 379/EC 379 03(3-0-0). Economic History of the United States. F. Prerequisite: ECCC 101 or ECCC 202 or EACC 202; or any two courses in American history. Credit not allowed for both HY 379 and EC 379.

Economic analysis of growth and welfare from beginning of industrialization to present.

HY 401/MS 401 03(3-0-0). The American Military Experience. F, SS. Credit not allowed for both HY 401 and MS 401.

Role of the armed forces in American society; development of military traditions, institutions, and practices.

HY 402 03(3-0-0). Pacific Wars: Philippines-WWII. F.

Diplomatic, ideological, political, cultural, and military aspects of war in the Pacific from the Philippines war through WWII.

HY 403 03(3-0-0). Pacific Wars: Korea and Vietnam. S.

Diplomatic, ideological, political, cultural, and military aspects of war in the Pacific from the war in Korea through the war in Vietnam.

HY 404 03(3-0-0). Ancient Israel. S.

Ancient Israel to 70 A.D. emphasizing the Near Eastern background, using archaeological data and the Old Testament.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

***HY 410 03(3-0-0). Medieval England.** S.

Political, social, and intellectual development of England from Romans to end of Middle Ages.

HY 414 03(3-0-0). Tudor Stuart England, 1485-1689. F, SS.

Political, economic, and social history of England from 1485-1689 emphasizing religious movements, revolution, and constitutional development.

HY 415 03(3-0-0). Early Modern France, 1500-1789. S.

Political, social, economic, religious, and cultural developments in France (16th-18th centuries) emphasizing formation of the absolutist state.

°HY 416 03(3-0-0). Great Britain and the Empire, 1714-1901. S.

Transition of aristocratic Britain to world's first middle-class, urban, industrial society, and development of world's largest empire.

HY 417 03(3-0-0). Women and Gender in Europe, 1450-1789. F.

Women and gender in western Europe (15th-18th centuries); political, social, economic, religious, and cultural developments.

***HY 418 03(3-0-0). Britain in the 20th Century.** F.

Political, economic, and social developments emphasizing role of Britain in world affairs and internal changes that led to welfare state.

°HY 422 03(3-0-0). Habsburg Empire. F.

From Charles V through World War I emphasizing significance, uniqueness, and crucial role of Danubian Europe in modern history.

***HY 423 03(3-0-0). Eastern Europe Since 1918.** S.

Breakup of Austrian, German, Russian, Turkish Empires; successor states between wars; communist revolutions and character of East European socialist regimes.

°HY 425 03(3-0-0). South African History. F.

South African history from human origins to the end of Apartheid.

***HY 429 03(3-0-0) Modern Africa.** S.

Colonial roots of modern Africa focusing on the period since 1935. Case studies of social and political change in Africa since World War II.

HY 435 03(3-0-0). Germany Since World War I. F.

German history, culture, and everyday life from 1914 to present.

HY 438 03(3-0-0). Russia Before 1700. F.

Russia's political predecessors; contacts with Byzantium, Western Europe, and the Mongol Empire, and resulting cultural, religious, and social change.

HY 440 03(3-0-0). Imperial Russia. F, S, SS.

Tsarist Russia from its beginnings to November 1917 Revolution with emphasis on modern period. (Ω)

HY 442 03(3-0-0). The Soviet Union. F, S, SS.

Formation of Soviet system in 1918 to its demise in 1991 emphasizing emergence of an advanced socialist state.

HY 443 03(3-0-0). American Architectural History. S.

Broad historical interpretation of the North American built environment from 1500 to present.

HY 444 03(3-0-0). Revolutions in Latin America. F, S.

Historical and theoretical issues arising from revolutionary episodes in Latin America, with emphasis on 20th century case studies.

HY 445 03(3-0-0). Themes in World History. F, S.

Major themes in world history including urbanization, technology, religion, politics, and economics.

HY 446 03(3-0-0). World Since 1914. F, S.

Major world events since World War I with an emphasis on political, economic, social, and technological themes.

HY 447 03(3-0-0). Science and Technology in Modern History. S.

Impact of science and technology on industry, agriculture, medicine, education, etc. Issues in science and technology policy.

HY 450 03(3-0-0). History of Sport. F, S.

Evolution of athletics from ancient times to present with emphasis upon the United States.

***HY 451 03(3-0-0). Ancient Christianity to 500 A.D.** F.

Growth of Christian Church from 1st to 5th century; emphasis on its role in Roman Empire; development of ecclesiastical institutions and literature.

°HY 452 03(3-0-0). Medieval Christianity, 500-1500. S.

Christian Church in Eastern and Western Christendom emphasizing its role in medieval society, relationship with the state, and its institutions.

°HY 454/°AP 454 03(3-0-0). Heritage Resource Management. S.

Prerequisite: Junior standing. Credit not allowed for both HY 454 and AP 454.

Cultural resource laws and policy; practices commonly employed in the management and preservation of these diverse resources.

HY 457 03(3-0-0). United States Foreign Relations Since 1914. S.

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.

HY 459 03(3-0-0). European Diplomatic History Since 1914. S.

Diplomacy of Europe from origins of World War I to present.

HY 460 03(3-0-0). U.S. China Relations Since 1800. F, S.

United States-China relations as represented in travel narratives, memoirs, journalistic and diplomatic writing, biography, and autobiography.

HY 463 03(3-0-0). European Culture in the 20th Century. S.

Cultural developments since World War I emphasizing science, art, clash of ideologies, existentialism, youth culture, and environmental issues.

HY 464 03(3-0-0). American Environmental History. S.

Interaction of humans and nature in American history with emphasis on relationships between environmental, social, and cultural change.

HY 466 03(3-0-0). American Intellectual History. S, SS.

Ideas and institutions that have molded American character from earliest times to present.

HY 468 03(3-0-0). Women in America. F.

Roles and contributions of women from colonial times to present.

HY 469 03(3-0-0). United States Immigration History. S.

Examines central themes of U.S. immigration from perspective of major immigrant groups and within context of U.S. immigration policy.

HY 470 03(3-0-0). American West to 1900. F.

Social, political, economic, environmental developments and intercultural relations in trans-Mississippi West to 1900.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

HY 471 03(3-0-0). American West Since 1900. S.

Social, political, economic, environmental developments and intercultural relationships in trans-Mississippi West since 1900.

HY 472 03(3-0-0). American Southwest. F, S, SS.

Borderlands, northern Mexico, southwestern U.S. from 16th century to 1912; intercultural relationships among Indian, Spanish, Mexican, Anglo cultures.

°HY 474 03(3-0-0). Industrial Revolution in Europe. F. Prerequisite: HYCC 101 or HYCC 151 or HYCC 171.

Causes and consequences of European industrialization and economic growth 1700-1950; emphasis on northwest Europe.

HY 475 03(3-0-0). Themes in Modern European Social History. S.

Modern European social history; emphasis on France, Germany, and Great Britain in the 19th and 20th centuries.

***HY 479 03(3-0-0). Practice of Public History.** F.

Public history methodology.

HY 484 Var. Supervised College Teaching. F, S, SS.

Assisting the instructor in teaching introductory history courses; relevant readings and discussions.

HY 487 Var [1-3]. Internship.

Application of historical methods in museums, libraries, and at historic sites.

HY 492 03(0-0-3). Capstone Seminar. F, S. Prerequisite: Senior status or written consent of instructor. History majors only. To count toward the major, the course must be completed with a grade C or better.

Seminar involving critical reading, writing, research, and discussion. Topics vary by instructor.

HY 495 Var [1-3]. Independent Study.

HY 497 Var [1-3]. Group Study.

HY 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.

HY 502 03(0-0-3). Historical Method: Archives. F, S, SS.

Historiographical skills and methods; emphasis on fundamentals of archival science.

HY 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.

HY 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.

HY 511 03(0-0-3). Reading Seminar-U.S. to 1877. F, S, SS. Prerequisite: HY 501.

Readings on United States history to 1877.

HY 512 03(0-0-3). Reading Seminar-U.S. Since 1877. F, S, SS. Prerequisite: HY 501 or written consent of instructor.

Readings on United States history since 1877.

°HY 515 03(3-0-0). Archival Records Management. S. Prerequisite: HY 501.

Historical context of records management and instruction in techniques for controlling, creation, use, and disposition of records.

HY 520 03(0-0-3). Reading Seminar-Europe to 1815. F, S, SS. Prerequisite: HY 501.

Readings on European history to 1815.

HY 521 03(0-0-3). Reading Seminar-Europe Since 1815. F, S, SS. Prerequisite: HY 501.

Readings on European history since 1815.

HY 530 03(0-0-3). Reading Seminar-Africa. F, S, SS. Prerequisite: HY 501 or written consent of instructor.

Readings on major historiographical issues in African history.

HY 531 03(0-0-3). Reading Seminar-Latin America. F, S, SS. Prerequisite: HY 501 or written consent of instructor.

Readings on major historiographical issues in Latin American history.

HY 532 03(0-0-3). Reading Seminar-Middle East. F, S, SS. Prerequisite: HY 501 or written consent of instructor.

Readings on major historiographical issues in Middle East history.

HY 533 03(0-0-3). Reading Seminar-East Asia. F, S, SS. Prerequisite: HY 501 or written consent of instructor.

Readings on major historiographical issues in East Asian history.

HY 534 03(0-0-3). Reading Seminar-South Asia. S. Prerequisite: HY 501 or written consent of instructor.

Major historiographical issues in South Asian history.

HY 540 03(0-0-3). Material Culture. F, S, SS. Prerequisite: HY 501.

Social, cultural, economic, and political developments in history as interpreted through artifacts.

HY 586 Var. Practicum. Prerequisite: HY 501.

HY 587 Var [1-6]. Internship. Prerequisite: HY 501 or written consent of adviser.

Work-oriented instruction involving implementation of classroom or laboratory experiences coordinated by faculty member.

HY 611 03(0-0-3). Research Seminar: United States. F, S, SS. Prerequisite: HY 501.

Research on United States history.

HY 621 03(0-0-3). Research Seminar: Europe. F, S, SS. Prerequisite: HY 501.

Research on European history.

HY 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.

HY 684 Var. Supervised College Teaching. F, S, SS.

Discussions and readings to enhance teaching proficiency.

HY 695 Var. Independent Study. Prerequisite: HY 501.

HY 697 Var [1-3]. Group Study.

HY 699 Var. Thesis. Prerequisite: HY 501.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

INTERIOR DESIGN COURSES (ID)

Department of Design and Merchandising College of Applied Human Sciences

ID 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. (Ω-O)

ID 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.

IDCC 200 03(3-0-0). Housing Values in America. (AUCC 3F), 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.

ID 210 03(3-0-0). Interior Design Anatomy. F. Prerequisite: ID 129, ID 166; design scenario review.

Concept theory and space planning as they influence human behavior in interior space.

ID 236 02(0-4-0). Three Dimensional Thinking. S. Prerequisite: ID 256; concurrent registration in ID 276; advancement to interior design second year or written consent of instructor.

Demonstration and application in visualizing interior space in three dimensions.

ID 250 03(3-0-0). Interior Facility Design. S.

Designing facilities to coordinate physical workplace with people and work of an organization.

ID 256 03(1-4-0). Computer-Aided Design for Interior Designers. F. Prerequisite: ID 129, ID 166; design scenario review.

Use of computer-aided design (CAD), specifically two-dimensional and three-dimensional drafting using PC software.

ID 266 03(0-6-0). Visual Communication-Multi-Media. F., Prerequisite: ID 129, ID 166; advancement to interior design second year or written consent of instructor.

Visual communication using advanced sketching rendering, manually and with technology, and alternative presentation methods.

ID 276 03(0-6-0). Interior Design I. S. Prerequisite: ID 210, ID 256, ID 266.

Application of design process to small interior design projects. Design solutions communicated using manual and technology tools.

ID 296A-B Var [1-3]. Group Study. F, S, SS. Prerequisite: Acceptance into the professional ID program following portfolio review process.

A) Space planning and application. B) Design application.

ID 330 03(2-2-0). Lighting Design. F. Prerequisite: ID 256, ID 276.

Application of lighting design in interior environments. (\$)

ID 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. (Ω-O)

ID 340 03(3-0-0). Interior Materials and Finishes. F. Prerequisite: DM 120, ID 276.

Analysis of materials and resources for interiors .

ID 350 03(3-0-0). Codes-Health and Safety. S. Prerequisite: ID 210; concurrent registration with ID 276.

Health and safety issues in interior design, including codes, regulations, and universal design.

ID 356 03(3-0-0). Professional Communications-Interior Design.

F. Prerequisite: COCC 150 and advancement to Interior Design second year.

Mastery of written communication skills required in the field of interior design.

ID 357 03(3-0-0). History of International Interiors. F. Prerequisite: ID 276.

Major international interior periods/styles from Middle Ages through 19th century.

ID 358 03(3-0-0). History of American and 20th Century Interiors.S. Prerequisite: ID 357.

Historical interiors in the United States through the 20th century.

ID 360 03(3-0-0). Interior Project Management. S. Prerequisite: ID 276, ID 356.

Objectives, processes, and practices in managing interior projects. (Ω - O)

ID 376 03(0-6-0). Interior Design II. S. Prerequisite: ID 276, ID 330, ID 340.

Application of design components to medium-scale residential and non-residential interior design projects.

ID 384 Var. Supervised College Teaching. Maximum of 10 credits allowed in course.

ID 40004(1-4-1). Interior Design Research Proposal. F. Prerequisite: ID 376, HSCC 300 or concurrent registration.

Research, development, and presentation of a programming proposal for a large scale interior design project with service learning component.

ID 450/MC 450 03(3-0-0). Travel Abroad-Sustainable Building. SS. Credit not allowed for both ID 450 and MC 450.

Major components of sustainable design and construction, energy, healthy buildings, natural resources, and other environmental issues.

ID 476 04(0-8-0). Interior Design Project . S. Prerequisite: ID 400.

Large scale projects representing research-based design solutions, illustrating synthesis and analysis of entry-level concepts, portfolio development.

ID 487 Var Internship. Prerequisite: ID 356, ID 376. (\$)

ID 495 Var. Independent Study. Maximum of 10 credits allowed in course.

ID 496A-B Var [1-3]. Group Study. Written consent of instructor. Maximum of 10 credits allowed in course.

A) Program skills. B) Design application.

ID 550 03(3-0-0). Universal Design. F. Prerequisite: DM 501 or concurrent registration.

Analysis and evaluation of universal design as it applies to diverse population segments and interior environments.

ID 575 Var [1-8]. Problems-Interior Design. F, S. Prerequisite: Nine credits of interior design.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

ID 578 03(2-0-1). Trends/Issues in Interior Design. F. Prerequisite: Written consent of instructor.

ID 675 Var [1-8]. Problems-Interior Design. F, S. Prerequisite: Four credits of ID 575.

INTERNATIONAL EDUCATION COURSES (IE)

Office of International Programs Provost's Office

IECC 116/A CC 116 03(3-0-0). Plants and Civilizations. (AUCC 3E). F, S. Credit not allowed for both IECC 116 and A CC 116.

Worldwide origin of plants and products as basis for food, spices, perfumes, medicine, art, mythology, religion, wars, exploration, slavery.

IECC 270/A CC 270 03(3-0-0). World Interdependence-Population and Food. (AUCC 3E). S. Credit not allowed for both IECC 270 and A CC 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 450/SW 450 03(2-0-1). International Social Welfare and Development. F. Credit not allowed for both IE 450 and SW 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, SS.

Current global issues, topics, traditions studies in one or more countries of the region. A) Africa. B) Asia. C) Australia/Oceania. D) Canada/North America. E) Europe. F) Latin America and the Caribbean. G) Middle East.

IE 492 03(0-0-3). International Development Seminar. S.

Key aspects of international development and current and emerging issues.

***IE 517/*PY 517 03(0-0-3). Perspectives in Global Health.** S. Prerequisite: STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311. Credit not allowed for both IE 517 and PY 517.

Science, skills, and beliefs directed at the maintenance and improvement of health for all people.

IE 550/PL 550 03(3-0-0). Ethics and International Development. F. Prerequisite: Written consent of instructor. Credit not allowed for both IE 550 and PL 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 (IN)

College of Liberal Arts

IN 300 03(0-0-3). Approaches to International Studies. F. Prerequisite: Nine credits from AUCC categories 3C, 3D, 3E and/or 3F; one year of a foreign language.

Interdisciplinary and comparative analytical approaches to the field of international studies.

IN 492A-C 03(0-0-3). Seminar. Prerequisite: A) HYCC 120, HYCC 220, IN 300. B) HY 354, IN 300. C) Two courses in European history, IN 300.

A) Asia. B) Latin America. C) Europe.

INTRA-UNIVERSITY COURSES (IU)

Office of Provost/Academic 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 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, and 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, and written consent of instructor.

Individual personal leadership styles; relationship between personal skill development and successful leadership.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

TECHNICAL JOURNALISM COURSES (JT)

Department of Journalism and Technical Communication College of Liberal Arts

JTCC 100 03(3-0-0). Introduction to Mass Media. (AUCC 3C and 3F). F, S.

Role of media in American democracy, impact of media on individuals and social institutions, comparative communication.

JT 192 03(1-4-0). Journalistic Writing. F, S, SS. Prerequisite: admission to major. Credit not allowed for both JT 192 and JT 210.

Basic journalism skills; newsgathering and newswriting.

JT 200 03(1-0-2). Professional Writing. F, S. Prerequisite: COCC 150.

Basic elements of writing for professional and specialized audiences.

JT 210 03(1-4-0). Newswriting. F, S, SS. Prerequisite: Satisfactory performance on typing and diagnostic test. Credit not allowed for both JT 210 and JT 192.

Theory and practice in newswriting.

JT 211 03(3-0-0). Computer-Mediated Visual Communication. F, S. Prerequisite: JT 192 or JT 210.

Theory, techniques for using computer-related techniques for visual presentation of news, specialized, and technical information.

JT 250 03(3-0-0). Advertising. F, S.

Advertising principles and techniques used to develop effective advertising campaigns.

JTCC 300 03(3-0-0). Professional and Technical Communication. (AUCC 2A2). F, S, SS. Prerequisite: COCC 150.

Professional writing and presentation skills applied to students' major fields. (Ω-O)

JT 301 03(2-0-1). Business Communication. F, S. Prerequisite: COCC 150.

Principles and practice of effective business communication with emphasis on written professional reports. (Ω-O)

JT 310 04(2-4-0). Copy Editing and Production. F, S. Prerequisite: JT 192 or JT 210; JT 211.

Theory and practice of copy preparation and editing; publication design and layout. Introduction to commercial printing processes.

JT 311 03(3-0-0). History of Media. F, S.

Media development, growth, trends within context of political, social, and economic change.

JT 316/ET 316 03(3-0-0). Multiculturalism and the Media. S. Credit not allowed for both JT 316 and ET 316.

Media and multiculturalism with emphasis on race, ethnicity, and other protected groups.

JT 320 03(1-4-0). Reporting. F, S. Prerequisite: JT 192 or JT 210; JT 211.

Theory, methods, and practice of gathering information and reporting news.

JT 326 03(2-2-0). Online Journalism. F, S. Prerequisite: JT 192 or JT 210; JT 211.

Website and message design and creation for media practitioners based on understanding of online attributes and technological context of journalism.

JT 335 03(2-2-0). Digital Photojournalism. F, S.

Basic photojournalistic theory and practice using analog and digital cameras, and digital image processing technology. Access to 35mm camera required. (\$)

+JT 340 03(2-2-0). Video Editing. F, S. Prerequisite: JT 211.

Theory and technique of editing picture and sound on analog and digital platforms. (\$)

JT 341 03(2-2-0). Broadcast News. F, S. Prerequisite: JT 192 or JT 210; JT 211.

Practical application of principles, techniques used in broadcast newswriting and radio and television reporting. (\$)

JT 342 03(2-2-0). Writing for Specialized Electronic Media. F. Prerequisite: JT 192 or JT 210; JT 211.

Audience and subject research; script structure and development; narrative techniques; visual story and role of visual media as change agents.

+JT 345 03(2-2-0). Electronic Field Production. F, S. Prerequisite: JT 340.

Theory, techniques of videotape field production emphasizing news, current affairs, and special interest programs. (\$)

JT 350 03(3-0-0). Public Relations. F, S.

Public relations principles and practices of business, industry, education, and public agencies. (Ω-O)

JT 351 03(2-2-0). Public Relations Practices. F, S. Prerequisite: JT 192 or JT 210; JT 211 and JT 350.

Planning, preparation, and application of public relations techniques.

JT 353 03(3-0-0). Public Relations Campaigns. F, S. Prerequisite: JT 192 or JT 210; and JT 211 and JT 350.

Development of professional public relations programs and campaigns, including analysis and research, strategy, implementation and evaluation.

JT 361 03(2-2-0). Writing for Specialized Magazines. S. Prerequisite: JT 192 or JT 210; JT 211.

Writing articles for agricultural, business, hobby, technical, trade, and other specialized periodicals whose readers use information to make decisions. (Ω-O)

JT 372 03(2-2-0). Web Design and Management. F, S. Prerequisite: JT 192 or JT 210; JT 211.

Design, development, and management of World Wide Web content.

JT 410 02(2-0-0). Newspaper Editing. F. Prerequisite: JT 310.

Editorial techniques, responsibilities, news evaluation.

JT 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.

JT 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.

JT 413 03(3-0-0). New Communication Technologies and Society. F, S.

Political, economic, social, philosophical, legal, and educational impacts of new technologies. (Ω-O)

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

JT 414 03(3-0-0). Media Effects. F, S.

Perspectives on audience processes and media effects on individuals and society.

JT 415 03(3-0-0). Communications Law. F, S.

Constitutional, statutory law of political speech, obscenity, advertising, libel; privacy, copyright, information ownership and access.

JT 420 03(3-0-0). Advanced Reporting. F, S. Prerequisite: JT 320.

Advanced techniques for gathering and evaluating information; interpretive reporting of public affairs issues.

JT 435 03(2-3-0). Documentary Video Production. F. Prerequisite: JT 345.

Writing, directing, and editing of long-form television documentaries. (\$)

+JT 440 03(2-2-0). Advanced Electronic Media Production. F, S. Prerequisite: JT 345 or JT 372.

Techniques and concepts used in advanced media production for television, multimedia applications, and Internet distribution. (\$)

JT 441 03(2-2-0). Advanced Television News Production. F. Prerequisite: JT 341.

Advanced theory and practice of producing television news; basics of broadcast news management.

JT 450 03(2-2-0). Public Relations Cases S. Prerequisite: JT 310, JT 351.

Preparation of materials, use of media to achieve objectives with target audiences; work with nonprofit organizations in actual campaigns.

JT 456/LB 456 03(2-2-0). Documentary Film as a Liberal Art. F. Prerequisite: Senior standing. Credit not allowed for both JT 456 and LB 456.

Documentary film and its role in human history, culture, and social interaction.

JT 460 03(3-0-0). Media Management. F, S.

Advertising, audience, editorial, and management problems of media.

JT 461 03(2-2-0). Writing about Science, Health, and Environment. F. Prerequisite: JT 192 or JT 210; JT 211.

Writing about science, health, and the environment for lay audiences from a journalistic perspective.

JT 464 03(2-2-0). Technical Writing. F, S. Prerequisite: JT 310, JT 361.

Writing technical information for a variety of media.

JT 465 03(2-2-0). Technical/Specialized Editing. S. Prerequisite: JT 461 or JT 464.

Editorial purpose, techniques, and evaluation of technical and specialized print and online information.

JT 471 03(3-0-0). Communication Research Methods. F. Prerequisite: One statistics course. Credit not allowed for both JT 471 and JT 500.

Quantitative, qualitative methods of analyzing process and effects of mass and interpersonal communication.

JT 484 Var [1-3]. Supervised College Teaching. F, S.

JT 487 Var [1-3]. Internship.

JT 490 Var [1-3]. Workshop.

JT 495A-G Var [1-3]. Independent Study.

A) Electronic reporting. B) Editing. C) Photojournalism. D) Public relations. E) Readings. F) Reporting. G) Technical communication.

JT 496 Var [1-3]. Group Study.

JT 500 03(3-0-0). Communication Research and Evaluation Methods. F. Prerequisite: Three credits of statistics. Credit not allowed for both JT 500 and JT 471.

Theory and applied communication research and evaluation methodologies for assessing and improving communication in technological environment.

JT 501 03(3-0-0). Process and Effects of Technical Communication. F. Corequisite: JT 500.

Examination of technical communication including communicator credibility, messages, channels, audiences, and information, behavior, and attitude change.

JT 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.

JT 544 03(2-3-0). Corporate and Institutional Media Production. S.

Advanced techniques in media production and management in corporate and institutional settings. (\$)

JT 550 03(3-0-0). Public Relations. F, S. Offered only off campus.

Contemporary public relations principles and practices. (Ω)

JT 560 03(3-0-0). Managing Communications Systems. S. Prerequisite: JT 501.

Examination of role, responsibilities of communication managers in translating theory into effective, applied communication programs.

JT 568A-C Var [1-3]. Journalism for High School Advisers. F, S, SS.

A) Journalism concepts. B) Newspapers. C) Yearbooks.

JT 614 03(3-0-0). Public Communication Campaigns. F. Prerequisite: JT 501 or written consent of instructor.

Conceptual, methodological issues and decisions underpinning determination of communication campaign effects, planning, implementation, and evaluation.

JT 640 03(3-0-0). Telecommunication. S. Prerequisite: JT 501.

Theory and application of telecommunication in information age.

JT 650 03(3-0-0). Public Relations Management. F. Prerequisite: JT 501 or concurrent registration.

Theoretical and practical management techniques for public relations campaigns including societal, ethical, and legal issues involved.

JT 660 03(3-0-0). Communication in Technology Transfer. F. Prerequisite: JT 501 or concurrent registration.

Communication's role in technology transfer as related to nature, process, and effects of technology transfer, knowledge dissemination, and utilization.

JT 661 03(3-0-0). Information Design. S. Prerequisite: JT 501.

Theoretical and empirical review of creation, presentation, storage, and distribution of information.

JT 662 03(3-0-0). Communicating Science and Technology. S. Prerequisite: JT 501.

Examination of theoretical and empirical studies concerning communication of science and technology subject matter.

JT 684 Var. Supervised College Teaching. F, S, SS. Prerequisite: Written consent of instructor.

Philosophy, techniques, and approaches to teaching journalism skills courses, as supervised by faculty.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

JT 687 Var [1-3]. Internship. Prerequisite: Written consent of instructor.

JT 690 Var [1-3]. Workshop. Prerequisite: Written consent of instructor.

JT 695 Var [1-3]. Independent Study. Prerequisite: Written consent of instructor.

JT 698 02(0-0-2). Research. Prerequisite: JT 500.
Development of theoretical basis and methodology for thesis.

JT 699 Var. Thesis.

KEY ACADEMIC COMMUNITY COURSES (KA)

Office of Provost/Academic Vice President

KA 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.

FOREIGN LANGUAGES AND LITERATURES COURSES (L)

Department of Foreign Languages and Literatures College of Liberal Arts

L 105 05(5-2-0). First-Year Language I. F, S, SS. Prerequisite: Registration allowed only for students with no previous study in the language. Credit not allowed for both L 105 and L 106.

Essentials of the language for the beginner: aural comprehension, speaking, reading, writing. C) Chinese. F) French. G) German. I) Italian. J) Japanese. K) Korean. R) Russian. S) Spanish.

L 106 03(3-2-0). First-Year Language Review. F, S, SS. Prerequisite: Placement exam or instructor placement. For students with minimal proficiency. Credit not allowed for both L 106 and L 105.

Basic review of essential skills: aural comprehension, speaking, reading, writing. F) French. J) Japanese. S) Spanish.

L 107 05(5-2-0). First-Year Language II. F, S, SS. Prerequisite: L 105 or L 106.

Essentials of the language for the continuing student: aural comprehension, speaking, reading, writing. C) Chinese. F) French. G) German. I) Italian. J) Japanese. K) Korean. R) Russian. S) Spanish.

L 108 05(5-2-0). Intensive Language I. F. Prerequisite: Grade of A in L 105 or L 106 and written consent of instructor; or placement by exam.

Accelerated practice in speaking, reading, writing, and aural comprehension. F) French. G) German. S) Spanish.

L 109 05(5-2-0). American Sign Language. F.

Vocabulary, grammar and basic conversational skill in ASL, with information on deaf culture.

L 120 03(3-0-0). Reading for Proficiency. F, S, SS. Credit for L 120 not allowed if L 107 or L 108 has been completed.

Essentials of language for developing reading proficiency. F) French. G) German. S) Spanish.

***L 152 03(3-0-0). Classical Greek I.** S.

Essentials of the language, reading, and translation.

***L 153 03(3-0-0). Classical Greek II.** S. Prerequisite: L 152.

Essentials of the language, reading, and translation.

L 154 05(5-0-0). Intensive Latin. F.

Essentials of Latin grammar, vocabulary, and phonology.

L CC 192 03(3-0-0). Modern Languages/Cultures: Italian and Japanese. (AUCC 3E). S.

Language, cultural issues, and historical heritage of modern Italian and Japanese societies.

L CC 200. Second-Year Language I. (AUCC 2A3). F, S, . Prerequisite: L 107 or L 108 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing. C) Chinese 05(5-2-0). F) French 03(3-2-0). G) German 03(3-2-0). I) Italian 03(3-2-0). J) Japanese 05(5-2-0). R) Russian 03(3-2-0). S) Spanish 03(3-2-0).

L CC 201. Second-Year Language II. (AUCC 2A3). F, S. Prerequisite: L CC 200 or placement exam.

Grammar review and extensive practice in conversation, reading, and writing. C) Chinese 05(5-2-0). F) French 03(3-2-0). G) German 03(3-2-0). I) Italian 03(3-2-0). J) Japanese 05(5-2-0). R) Russian 03(3-2-0). S) Spanish 03(3-2-0).

L 202 03(3-2-0). Intermediate Language and Culture I. F, S, SS. Prerequisite: Prerequisite: J) L 107J. K) L 107K.

A) Arabic. J) Japanese. K) Korean.

L 203 03(3-2-0). Intermediate Language and Culture II. F, S, SS. Prerequisite: L 202.

A) Arabic. J) Japanese. K) Korean.

L 205 03(3-0-0). Intermediate Written Chinese. S. Prerequisite: L CC 200C or placement exam.

Development of fundamental language skills emphasizing writing and reading.

L 208 05(5-0-0). Intensive Language II. S. Prerequisite: L 108.

Accelerated practice in speaking, reading, writing, and aural comprehension. F) French. G) German. S) Spanish.

L CC 215 03(3-0-0). Translation Between Cultures and Languages. (AUCC 3E). F, S, SS.

General issues involved in translation, with special attention to poetry and other writing in which language decisively shapes expression.

L CC 250 03(3-0-0). Language, Literature, Culture in Translation. (AUCC 3B or 3E). F, S.

Selected works in translation from different periods and genres which represent the interrelationship of language, literature, and culture. C) Chinese. F) French. G) German. I) Italian. J) Japanese. R) Russian. S) Spanish.

L CC 255 03(3-0-0). Crossing Cultures. (AUCC 3E). F, S.

Study of immigration literature; experiences of people who have crossed or are constantly crossing cultures.

L 290 Var [1-3]. Theatre Workshop in a Foreign Language. F, S. Prerequisite: L 105.

Application of communication skills in a foreign language through informal staging of dramatic scripts.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

L 296 Var [1-5]. Group Study. Prerequisite: L 107 or L 108.

Group study in language/literature/culture. C) Chinese. G) German. I) Italian. J) Japanese. R) Russian. S) Spanish. X) General.

L CC 300 03(3-0-0). Reading and Writing for Communication. (AUCC 2A3). F, S, SS. Prerequisite: L CC 201 or L 208.

Development of reading and writing proficiency through an in-depth examination of contemporary writing. F) French. G) German. S) Spanish.

L 301 03(3-0-0). Oral Communication. Prerequisite: L CC 201.

In-depth language study to improve proficiency in all language skills emphasizing oral. F) French. F, S, G) German. S, S) Spanish. F, S.

L 304 03(3-0-0). Third-Year Language I. F. Prerequisite: L CC 201 or placement exam.

Development of reading comprehension, communicative competence, and cultural understanding. J) Japanese. R) Russian.

L 305 03(3-0-0). Third-Year Language II. S. Prerequisite: L 304 or placement exam.

Enhanced development of reading comprehension, communicative competence, and cultural sensitivity. J) Japanese. R) Russian.

L 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.

L 310 03(3-0-0). Approaches to Literature. F, S. Prerequisite: F) and S) L CC 300 or written consent of instructor. G) L CC 201G or L 208G.

Appreciation and critical readings of representative works in prose, drama, and poetry. F) French. G) German. S) Spanish.

L 312 03(3-0-0). Introduction to Spanish Linguistics. F. Prerequisite: L CC 300S or concurrent registration.

Phonetics, phonology, morphology, syntax, semantics, and pragmatics.

L 313 03(3-0-0). Introduction to Translation and Interpreting. F, S. Prerequisite: L CC 300 or written consent of instructor.

Translation and interpreting of written and oral texts into and from the foreign language. F) French. G) German. S) Spanish.

L 326 03(3-0-0). Phonetics. F, S. Prerequisite: L CC 300 or concurrent registration.

Phonetic principles and their application to language sound system; intensive practice in pronunciation, intonation. F) French. G) German. S) Spanish.

L 335 03(3-0-0). Issues in Culture. Prerequisite: L CC 201 or L 208.

Historical context of contemporary issues in the culture of French-, German-, or Spanish-speaking countries. F) French. S, G) German. S, S) Spanish. F.

L 336 03(3-0-0). Introduction to Spanish-American Civilization. F. Prerequisite: L CC 201S or L 208S.

Geography, major social and cultural developments in the civilization of Spanish-American countries.

L 345 03(3-0-0). Business Language. F, S, SS. Prerequisite: F, G, S) L CC 300. J) L 305J.

Business and commercial aspects of the target language and culture. F) French. G) German. J) Japanese. S) Spanish.

L 346 03(3-0-0). Spanish for Health Care. F, S. Prerequisite: L CC 300S.

Specific linguistic and cultural issues necessary to function in the Hispanic health care world.

L 355 03(3-0-0). Twentieth-Century Literature. F, S. Prerequisite: L 310.

Representative literary works from the twentieth century. F) French. G) German.

L 379 01(0-2-0). Service Learning. F, S, SS. Prerequisite: Concurrent registration with 300-level language course with written consent of instructor.

Language-related voluntary community work. F) French. G) German. J) Japanese. R) Russian. S) Spanish.

L 400 03(3-0-0). Advanced Communication Skills. F. Prerequisite: L CC 300.

Development of speaking, reading, and writing proficiency through an in-depth examination of representative writings and media communications. F) French. G) German. S) Spanish.

L 413 03(3-0-0). Advanced Translation and Interpreting. F, S. Prerequisite: L 313 or written consent of instructor.

Advanced practice in translation and interpreting of written and oral texts into and from the target language. F) French. G) German. S) Spanish.

L 433A-B 03(3-0-0). Advanced French/Francophone Culture. F. Prerequisite: L 335F.

French and Francophone cultural identities and their history. A) Representations. B) Center and margins.

L 434 03(3-0-0). Advanced German Culture. F, S. Prerequisite: L 335G.

Critical examination of selected topics in culture and cultural history of German-speaking countries.

°L 435 03(3-0-0). Caribbean Culture in Hispanic Literature. S. Prerequisite: L 335S.

Hispanic-Caribbean cultures with emphasis on African heritage and cultural identity.

L 436 03(3-0-0). Advanced Latin American Culture. F, S. Prerequisite: L 335S.

Latin American cultural identities and their history.

L 437 03(3-0-0). Advanced Spanish Culture. F, S. Prerequisite: L 335S.

Cultural characteristics of Spanish society through the ages.

L 441 03(3-0-0). Advanced Business Language. F, S. Prerequisite: L 345 or written consent of instructor.

Advanced business and commercial aspects of the target language and culture. F) French. G) German. S) Spanish.

L 443 03(3-0-0). Spanish Theatre. F, S. Prerequisite: L CC 300S, L 310S.

Major authors and works of Spanish theatre.

L 445 03(3-0-0). Women Writers in the Hispanic Worlds. F. Prerequisite: L CC 300S, L 310S.

Selected Hispanic women writers in a variety of genres emphasizing relationships among gender, culture, and writing.

L 449 03(3-0-0). Spanish-American Literary Movements and Periods. F. Prerequisite: L CC 300S, L 310S.

Studies in selected literary movements and periods of Spanish America such as classicism, realism, naturalism, existentialism.

L 450 03(3-0-0). Selected Literary Movements and Periods. F, S. Prerequisite: L CC 300, L 310. May be taken up to 3 times for credit.

Studies in selected literary movements and periods of France, Germany, or Spain, such as classicism, realism, naturalism, existentialism. F) French. G) German. S) Spanish.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

L 452 03(3-0-0). Genre Studies. F, S. Prerequisite: L CC 300, L 310. May be taken up to 3 times for credit.

Development of critical approaches to major works in literature through selected literary genres and subgenres. F) French. G) German. S) Spanish.

L 453 03(3-0-0). Author Studies. F, S. Prerequisite: L CC 300, L 310. May be taken up to 3 times for credit.

Development of critical approaches to authors through the appreciation and analysis of selected works. F) French. G) German. S) Spanish.

L 454 03(3-0-0). Topic Studies. F, S. Prerequisite: L CC 300, L 310. May be taken up to 3 times for credit.

Selected topic studies such as themes, topoi, and interdisciplinary subjects in literature. F) French. G) German. S) Spanish.

L 460 03(3-0-0). French/Francophone Women Writers. S. Prerequisite: L CC 300F, L 310F.

Selected French and Francophone women writers in a variety of genres emphasizing relationships among gender, culture, and writing.

L 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.

L 470 03(3-0-0). Spanish Grammatical Constructions. S. Prerequisite: L 400S.

Linguistic analysis of selected Spanish grammatical constructions (word order, word formation, and sentence structure), their relationship to meaning.

L 479 01(0-2-0). Service Learning. F, S, SS. Prerequisite: Concurrent registration with 400-level language 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. F) French. G) German. J) Japanese. R) Russian. S) Spanish.

L 487 Var [1-12]. Internship.

L 492 03(0-0-3). Language, Literature, and Society. F S. Prerequisite: L 310 F, G, or S, and two 400-level courses; senior status.

Integrative study of language, literature, and society. F) French. G) German. S) Spanish X) General.

L 495 Var [1-6]. Independent Study. Prerequisite: Three years of the same language at college level.

C) Chinese. F) French. G) German. I) Italian. J) Japanese. R) Russian. S) Spanish.

L 496 Var [1-5]. Group Study. Prerequisite: R) L 305.

Group study in language/literature/culture. C) Chinese. J) Japanese. R) Russian.

L 500 03(3-0-0). Language Analysis/Stylistics. F. Prerequisite: L 400 or written consent of instructor.

Analysis of language structure through the examination of style in literary and non-literary texts. F) French. G) German. S) Spanish.

L 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.

L 508 04(3-3-0). Intensive Language-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. F) French. G) German. S) Spanish.

L 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.

L 514 01(1-0-0). Issues in Teaching Language. F, S. Prerequisite: Concurrent graduate teaching assistantship.

Current theory and practice in second-language instruction; technological applications. F) French. G) German. S) Spanish.

L 516 03(3-0-0). Theory/Methods-Foreign Language Instruction. F. Prerequisite: Admission to graduate studies in foreign languages or written consent of instructor.

Foreign language teaching methodology.

L 525 03(3-0-0). History of the Language. S. Prerequisite: L 400.

Investigation of both internal (strictly linguistic) and external (sociolinguistic) factors in development of the language. F) French. G) German. S) Spanish.

L 530 3(3-0-0). Literary Theory and Criticism. F. Prerequisite: Written consent of instructor.

Theoretical and critical approaches to foreign literatures.

L 535 03(3-0-0). Graduate Studies in Civilization. S. Prerequisite: L 433A-B or L 434 or L 436 or L 437.

Critical and analytical approaches to a foreign civilization and culture. Research related to language of specialization.

L 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.

L 549 03(3-0-0). Literary Periods of Spanish America. F. Prerequisite: Undergraduate degree in the language or written consent of instructor.

Advanced studies in critical approaches to selected literary movements or periods of Spanish America.

L 551 03(3-0-0). Selected Literary Movements/Periods. F. Prerequisite: Undergraduate degree in the language or written consent of instructor.

Advanced studies in and critical approaches to selected literary movements or periods. F) French. G) German. S) Spanish.

L 552 03(3-0-0). Advanced Studies in Literary Genres. F. Prerequisite: Undergraduate degree in the language or written consent of instructor.

Advanced studies in and critical approaches to literary genres through study of major works in foreign literatures. F) French. G) German. S) Spanish.

L 553 03(3-0-0). Advanced Author Studies. S. Prerequisite: Undergraduate degree in the language or written consent of instructor.

Critical approaches to the study of selected authors through appreciation and analysis of their major works. F) French. G) German. S) Spanish.

L 554 03(3-0-0). Advanced Topic Studies. S. Prerequisite: Undergraduate degree in the language or written consent of instructor.

Selected topics (theme, topoi, and interdisciplinary subjects) in foreign literatures. F) French. G) German. S) Spanish.

L 684 Var. Supervised College Teaching. F, S.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

L 692 03(0-0-3). Seminar. Prerequisite: Undergraduate degree in the language or written consent of instructor.

Treatment of selected topics in seminar. F) French. G) German. S) Spanish.

L 695 Var [1-6]. Independent Study.

F) French. G) German. S) Spanish.

L 699 Var [1-6]. Thesis.

LANDSCAPE ARCHITECTURE COURSES (LA)

Department of Horticulture and Landscape Architecture

College of Agricultural Sciences

LA 110 03(1-2-1). Introduction to Landscape Architecture. F.

Introductory theories, methods, and applications of landscape studies.

LA 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.

LA 230 04(2-4-0). Drawing the Landscape. F.

Visual communication techniques; exploration of symbology, model building, design development drawing, and construction documentation draughting. (\$)

LA 240 04(1-4-1). Fundamentals of Landscape Design Process. S.

Prerequisite: LA 230.

Initiation of formal exploration of design elements, materials, and principles, and introduction of design process as a defensible methodology. (\$)

LA 241 03(1-4-0). Environmental Analysis. S. Prerequisite: LA 230;

concurrent registration in LA 240.

Exploration and understanding of natural and cultural landscapes through analytical simulation techniques. (\$)

LA 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.

LA 360 03(0-6-0). Basic Landscape Design and Construction. F.

Prerequisite: LA 240.

Site programming, analysis, design, and construction, including skill development in specifying earthwork, drainage, and vegetative composition. (\$)

LA 361 03(2-2-0). Digital Methods. F. Prerequisite: LA 360 or concurrent registration.

Landscape research, analysis, and design with ARCVIEW, AutoCAD, Microstation, and Photoshop. (\$)

LA 362 03(0-6-0). Form and Expression in Garden Design. S.

Prerequisite: LA 361.

Formal decision making for site scale environments, including creative processes for form-giving, and generation of experimental solutions. (\$)

LA 363 04(2-4-0). Advanced Landscape Site Engineering. S. Prerequisite: LA 360.

Understanding and documenting the built environment with emphasis on construction and surveying as integral parts of design process. (\$)

LA 364 04(1-6-0). Design and Nature. S. Prerequisite: LA 361.

Computer-aided processes for siting, organizing, and evaluating cultural activities within ecologically fragile, landscape-scale environments. (\$)

LA 365 03(2-2-0). Landscape Contract Drawing and Specifications. F.

Prerequisite: LA 363.

Construction details, design development, and construction documentation emphasizing implementation of design projects.

LA 366 04(0-8-0). Landscape Design Expression. S. Prerequisite: LA 365.

Idea, values, and process landscape form applied to interactions of natural, cultural systems at the site and community scale; design competitions. (\$)

LA 368/H 368 03(2-2-0). Landscape Irrigation and Water Conservation. F, S. Prerequisite: LA 110 or H CC 100 or written consent of instructor. Credit not allowed for both LA 368 and H 368.

Practical approaches and methods of irrigation, water conservation, and water management in the designed landscape.

LA 384 Var [1-5]. Supervised College Teaching. F, S, SS. Maximum of ten credits allowed in course.

LA 392 02(0-0-2). Seminar-Designed Landscapes-Theory and Criticism. S. Prerequisite: LA 365.

Readings, discussions, and writing in landscape architectural design theory; critical analysis of the designed and constructed landscape.

+LA 444 03(3-0-0). Ecology of Landscapes. S. Prerequisite: LA 360, one course in biology.

Theories, methods, and practices for interpreting, describing, and representing natural and human modified landscapes. (\$)

LA 446 04(0-8-0). Urban Design. F. Prerequisite: LA 366.

Designing the urban landscape, including precedent exploration about overall image, materials, and structure of the city and its components. (\$)

LA 447 04(0-8-0). Comprehensive Landscape Design. S. Prerequisite: LA 446.

Terminal studio; research, analysis, and synthesis for comprehensive project identified by student and approved in advance by faculty committee. (\$)

LA 449 01(1-0-0). Professional Practice. S. Prerequisite: LA 447 or concurrent registration.

Theory and skills of landscape architectural professional practice including functional, human, business, legal, and political aspects.

LA 454 05(1-6-1). Landscape Field Studies. SS. Prerequisite: LA 366.

Field observation of spatial and temporal landscape patterns resulting from natural and cultural processes and interactions.

LA 455 05(1-6-1). Travel Abroad-European Landscape Architecture. SS. Prerequisite: LA 362 or written consent of instructor.

Exploration of major theoretical platforms in design through drawing, photographing, and measuring landscape architecture precedents in Europe.

LA 495A-B Var [1-4]. Landscape Architectural Independent Study.

A) Design projects. B) Field service.

LA 496 Var [1-8]. Group Study.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

***LA 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.

°LA 520 03(1-4-0). Geographic Information Systems. S. Prerequisite: LA 241 or written consent of instructor.

Theories and applications of geographic information systems in spatial analysis and land planning.

LA 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.

LIBERAL ARTS COURSES (LB)

College of Liberal Arts

LBCC 170 03(3-0-0). World Literatures to 1500. (AUCC 3E). F, S.

Culturally significant literary texts from the beginnings of writing to 1500 from Europe, Asia, and Africa. (GT-AH2)

LBCC 171 03(3-0-0). World Literatures-The Modern Period. (AUCC 3E). F, S.

Culturally significant literary texts from 1500 to the present from Europe, Asia, Africa, the Americas. (GT-AH2)

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 455/SP 455 03(2-2-0). Narrative Fiction Film as a Liberal Art. S. Prerequisite: Senior standing. Credit not allowed for both LB 455 and SP 455.

Narrative fiction film and its role in human history, culture, and social interaction.

LB 456/JT 456 03(2-2-0). Documentary Film as a Liberal Art. F. Prerequisite: Senior standing. Credit not allowed for both LB 456 and JT 456.

Documentary film and its role in human history, culture, and social interaction.

LB 487 Var [1-3]. Internship.

LB 492 02(0-0-2). Liberal Arts Capstone Seminar. F, S.

Capstone course for liberal arts majors. (Ω-O)

LB 495 Var. Independent Study.

LIBRARY INFORMATION COURSE (LI)

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. (Ω-O)

LIFE SCIENCE COURSES (LS)

Office of Provost/Academic Vice President

LSCC 102 04(3-3-0). Attributes of Living Systems. (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.

LS 103 04(3-3-0). Biology of Organisms-Animals and Plants. F, S, SS. Prerequisite: LSCC 102.

Diversity of animals and plants; their structural and functional characteristics. (\$)

LSCC 201A-B 03(3-0-0). Introductory Genetics. (AUCC 3A) F, S. Prerequisite: LSCC 102 or college-level introductory biology course. Credit not allowed for both LSCC 201A and LSCC 201B.

A) Emphasis on applied genetics, population genetics, and conservation/ecological genetics. B) Emphasis on molecular, immunological, and developmental genetics.

LS 202A-B 01 (0-0-1). Introductory Genetics Recitation. F, S. Prerequisite: A) Concurrent registration in LSCC 201A. B) Concurrent registration in LSCC 201B. Credit not allowed for both LS 202A and LS 202B.

Case studies and problems solving in: A) applied genetics, population genetics, and conservation/ecological genetics. B) molecular genetics.

LS 203 01(0-3-0). Introductory Genetics Laboratory. S. Prerequisite: LSCC 201A or concurrent registration or LSCC 201B or concurrent registration.

Basic molecular genetics and molecular aspects of development laboratory.

LS 205 03(3-0-0). Survey of Microbial Biology. F, S. Prerequisite: C CC 107 or C 113 and LSCC 102.

Introduction to the microbial world, covering both eukaryotic and prokaryotic microbes; emphasis on applied and environmental microbiology.

LS 206 02(0-4-0). Microbial Biology Laboratory. F, S. Prerequisite: LS 205 or concurrent registration. (\$)

LS 210 03(3-0-0). Introductory Eukaryotic Cell Biology. F, S. Prerequisite: LSCC 102; C CC 111, C CC 112 or concurrent registration.

Solid understanding of a cell, different cell types, molecular aspects of cellular and subcellular biology and biochemistry.

LS 211 01(0-0-1). Eukaryotic Cell Biology Recitation. F, S. Prerequisite: LS 210 or concurrent registration.

Molecular aspects of cellular and subcellular biology and introductory biochemistry recitation.

LS 212 01(0-3-0). Introductory Cell Biology Laboratory. F, S. Prerequisite: C CC 112; LS 210 or concurrent registration.

Molecular aspects of cellular and subcellular biology and introductory biochemistry laboratory.

LS 230 03(3-0-0). Ecology. F, S. Prerequisite: LSCC 102, LS 103; M CC 141 or M CC 155 or M CC 160.

Interrelationships between organisms and the environment, with emphasis on quantitative thought.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

MATHEMATICS COURSES (M)

Department of Mathematics College of Natural Sciences

M CC 117 01(1-0-0). College Algebra in Context I. (AUCC1B). F, S, SS. Prerequisite: Satisfactory performance on the Colorado State Mathematics Placement Examination. Credit allowed for only one of the following: M CC 117, M CC 120A-B.

Functions as mathematical models. Linear, quadratic, and polynomial functions considered symbolically, graphically, numerically, and contextually.

M CC 118 01(1-0-0). College Algebra in Context II. (AUCC1B). F, S, SS. Prerequisite: M CC 117. Credit not allowed for both M CC 118 and M CC 121.

Reciprocals of linear functions, rational functions, and power functions considered symbolically, graphically, numerically, and contextually.

M CC 120A-B 01. College Algebra I. (AUCC1B). F, S, SS. Prerequisite: Satisfactory performance on Colorado State Mathematics Placement Examination. Credit allowed for only one of the following: M CC 117, M CC 120A-B.

A) 01(1-0-0). Polynomials, linear equations and inequalities, systems of linear equations, factoring, rational equations, graphs and asymptotes, applied problems. B) 01(0-2-0). Content of M CC 120A with review of essential background material.

M CC 121 01(1-0-0). College Algebra II. (AUCC1B). F, S, SS. Prerequisite: M CC 120A-B or placement. Credit not allowed for both M CC 121 and M CC 118.

Integer and fractional exponents, radical expressions, quadratic functions, quadratic formula, combinations and permutations, binomial theorem.

M CC 124 01(1-0-0). Logarithmic and Exponential Function. (AUCC1B). F, S, SS. Prerequisite: M CC 118 or M CC 121 or placement.

Definition and graphs of exponential and logarithmic functions, properties of logarithmic functions, exponential and logarithmic equations, applications.

M CC 125 01(1-0-0). Numerical Trigonometry. (AUCC1B). F, S, SS. Prerequisite: M CC 118 or M CC 121 or placement.

Definition and graphs of trigonometric functions, laws of sines and cosines, solutions of right and oblique triangles, applications.

M CC 126 01(1-0-0). Analytic Trigonometry. (AUCC1B). F, S, SS. Prerequisite: M CC 125 or placement.

Inverse trigonometric functions, trigonometric identities, solving trigonometric equations.

M CC 130 03(2-2-0). Math in the Social Sciences. (AUCC1B). F, S, SS. Prerequisite: Satisfactory performance on Colorado State Mathematics Placement Examination.

Voting theory, power indices, fair division, apportionment, circuits and trees, list processing, descriptive statistics, probability.

M CC 133 03(2-2-0). Financial Mathematics. (AUCC1B). F, S, SS. Prerequisite: Satisfactory performance on Colorado State Mathematics Placement Examination. Calculator required.

Pricing, taxes, insurance, interest, annuities, amortization, investments using financial calculators and spreadsheets.

M CC 135 03(2-0-1). Patterns of Phenomena I. (AUCC1B). F.

Prerequisite: Satisfactory performance on the Colorado State Mathematics Placement Examination.

Applications of mathematical ideas and mode of thought in the arts and humanities, focusing on classification, recognition.

M CC 141 03(3-0-0). Calculus in Management Sciences. (AUCC1B). F, S, SS. Prerequisite: M CC 118 or M CC 121. Credit allowed for only one of the following sequences: M CC 141; M CC 155, M CC 255; M CC 160, M CC 161, M 261.

Analytic geometry, limits, equilibrium of supply and demand, differentiation, integration, applications of the derivative, integral.

M CC 155 04(4-0-0). Calculus for Biological Scientists I. (AUCC 1B). F, S, SS. Prerequisite: M CC 124, M CC 125. Credit allowed for only one of the following sequences: M CC 141; M CC 155, M CC 255; M CC 160, M CC 161, M 261.

Limits, continuity, differentiation, and integration of elementary functions with applications in the biosciences. Programmable graphing calculator required. (GT-MA1)

M CC 160 04(3-2-0). Calculus for Physical Scientists I. (AUCC 1B). F, S, SS. Prerequisite: M CC 126; concurrent registration in M CC 124. Credit allowed for only one of the following sequences: M CC 141; M CC 155, M CC 255; M CC 160, M CC 161, M 261.

Limits, continuity, differentiation, and integration of elementary functions with applications; conic sections. (GT-MA1)

M CC 161 04(3-2-0). Calculus for Physical Scientists II. (AUCC 1B). F, S, SS. Prerequisite: M CC 124, M CC 160. Credit allowed for only one of the following sequences: M CC 141; M CC 155, M CC 255; M CC 160, M CC 161, M 261.

Transcendental functions, integration techniques, polar coordinates, sequences and series, with mathematical software.

M 166/CS 166 04(4-0-0). Discrete Structures. F, S. Prerequisite: C SCC 153 (with a C [2.0] or better); M CC 124. Credit not allowed for both M 166 and CS 166.

Algorithms, mathematical induction, graphs and trees, counting methods, difference equations, recursion, probability, introduction to mathematical logic.

M 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.

M 229 02(2-0-0). Matrices and Linear Equations. F, S, SS. Prerequisite: M CC 141 or M CC 155 or M CC 160.

Linear systems, matrix arithmetic, homogeneous coordinates, complex numbers, eigenvalues, eigenvectors, applications to discrete dynamical systems.

M CC 255 04(4-0-0). Calculus for Biological Scientists II. (AUCC 1B). F, S. Prerequisite: M CC 155; concurrent registration in M CC 126. Credit allowed for only one of the following sequences: M CC 141; M CC 155, M CC 255; M CC 160, M CC 161, M 261.

Derivatives and integrals of functions of several variables, differential and difference equations, matrices, applications in the biosciences. Programmable graphing calculator required.

M 261 04(4-0-0). Calculus for Physical Scientists III. F, S, SS. Prerequisite: M CC 161. Credit allowed for only one of the following sequences: M CC 141; M CC 155, M CC 255; M CC 160, M CC 161, M 261.

Vector functions, partial differentiation, cylindrical and spherical coordinates, multiple integrals, line integrals, Green's theorem.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

M 301 03(3-0-0). Introduction to Combinatorial Theory. F. Prerequisite: M CC 160. Credit not allowed for both M 301 and M 330.

Matrices, orthogonal Latin squares, designs, difference sets, sets, binomial coefficients, inclusion and exclusion, recurrence, Ramsey's theorem, SDRs.

M CC 315 04(4-0-0). Mathematics for Economists. (AUCC 1B). F. Prerequisite: M CC 141.

Functions of several variables, matrix algebra, optimization, and applications to economics.

M 317 04(4-0-0). Advanced Calculus of One Variable. F, S, SS. Prerequisite: M CC 161.

Convergence of sequences, series: limits, continuity, differentiation, integration of one-variable functions; development of skills for proving theorems.

M 330 03(2-2-0). Discrete Mathematics for Educators. F. Prerequisite: M CC 161, ED 331. Credit not allowed for both M 330 and M 301.

Voting theory, power, fair division, graph theory, scheduling, digraphs, linear programming, probability, teaching and learning in small groups.

M 331 03(3-0-0). Introduction to Mathematical Modeling. F. Prerequisite: M CC 161 or concurrent registration ; M 229 or concurrent registration.

Mathematical modeling, applied linear algebra, systems of linear and nonlinear ordinary differential equations, stability theory.

M 332 03(3-0-0). Partial Differential Equations. S. Prerequisite: M 340 or M 345. Credit not allowed for both M 332 and M 532.

Partial differential equations, separation of variables, Fourier series and transforms, Laplace, heat, and wave equations.

M 340 04(3-2-0). Introduction to Ordinary Differential Equations. F, S, SS. Prerequisite: M CC 255 or M 261. Credit allowed for only one of the courses M 340, M 345, M 355.

First and second order equations, series, Laplace transforms, linear algebra, eigenvalues, first order systems of equations, numerical techniques.

M 345 04(3-2-0). Differential Equations. F, S. Prerequisite: M 229; M CC 161 or M CC 255. Credit allowed for only one of the courses M 340, M 345, M 355.

First and second order equations, Laplace transforms, first order systems of equations, numerical methods, applied linear algebra, linearization.

M 350 04(3-2-0). Introduction to Numerical Analysis I. F. Prerequisite: M 340 or M 345, knowledge of a programming language.

Systems of linear and nonlinear equations, matrix eigenvalue problems, interpolation, approximation, computing.

M 351 04(3-2-0). Introduction to Numerical Analysis II. S. Prerequisite: M 350.

Numerical integration and differentiation, numerical solution of ordinary and partial differential equations, optimization problems, computing.

M 355 04(3-2-0). Differential Equations for the Life Sciences. S. Prerequisite: M 229, M CC 255 or M 261. Credit allowed for only one of the courses M 340, M 345, M 355.

Exponential growth, logistic equation, equilibria and stability, linear and nonlinear systems, partial differential equations, numerical methods.

M 360 03(3-0-0). Mathematics of Information Security. F. Prerequisite: M 229.

Codes, ciphers, Chinese remainder theorem, primality testing, public key ciphers, RSA, finite fields, discrete algorithms, advanced encryption standard.

M 366 03(3-0-0). Introduction to Abstract Algebra. F, S, SS. Prerequisite: M CC 161.

Sets, integers, polynomials, real and complex numbers, groups, integral domains, and fields; development of skills for proving theorems.

M 369 03(3-0-0). Linear Algebra. F, S, SS. Prerequisite: M CC 161, M 229.

Vector spaces, linear transformations, matrices, similarity, eigenvalues and eigenvectors, canonical forms.

M 384 01(1-0-0). Supervised College Teaching. F, S. Prerequisite: M CC 161 or M CC 255 or M CC 315; written consent of instructor. Maximum of 1 credit allowed in course; may not be used to satisfy degree requirements in mathematics.

Skills for effective tutoring of precalculus mathematics; design and implementation of the Individualized Mathematics Program.

M 400A-D 03(3-0-0). Topics in Mathematics. F, S. Prerequisite: Written consent of instructor.

A) Differential geometry. B) Fractals. C) Number theory. D) Topology.

M 417 03(3-0-0). Advanced Analysis. S. Prerequisite: M 261, M 317, M 369.

Limits, continuity, differentiation, integration of functions of several variables, transformations and maps, improper integrals, Stieltjes integrals.

M 419 03(3-0-0). Introduction to Complex Variables. F, S. Prerequisite: M 261.

Analyticity, Cauchy integral theorem and formula, Taylor and Laurent series, residue calculus, conformal mapping and harmonic functions.

M 425 03(3-0-0). History of Mathematics. F. Prerequisite: ED 331 and two of the following courses: M 317, M 366, M 369.

Historical development of geometry, arithmetic, algebra, and calculus from ancient times to 20th century.

M 435 03(1-4-0). Projects in Applied Mathematics. F. Prerequisite: M 229, M 340 or M 345 or M 355; preparedness to do programming in a standard language.

Open-ended projects with emphasis on problem identification and formulation, team approach, and reporting results.

M 460 03(3-0-0). Information and Coding Theory. F. Prerequisite: M 360, M 369, and ST 321.

Entropy, mutual information, channel capacity, channel coding theorem, syndrome decoding, BCH codes, recent developments.

M 466 03(3-0-0). Groups, Rings, and Fields. F. Prerequisite: M 366, M 369.

Groups, rings, fields, isomorphism theorems, finite fields, Galois theory.

M 470 03(3-0-0). Euclidian and Non-Euclidian Geometry. S. Prerequisite: M 229, M 261.

Topics from real Euclidean, affine metric and non-Euclidean geometries emphasizing methods and connections with other areas of mathematics.

M 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.

M 484 Var [1-3]. Supervised College Teaching. F, S. Maximum of 6 credits allowed in course; may not be used to satisfy degree requirements requiring mathematics courses.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

M 487 Var [1-16]. Internship.

A work-learn experience integrating classroom theory with practical experience.

M 495 Var. Independent Study.

M 498 Var [1-3]. Undergraduate Research in Mathematics. F, S, SS. Prerequisite: M 261 and written consent of instructor.

Research skills and techniques taught to suit student's level and interests. Includes both oral and written communication of results.

M 501 03(3-0-0). Combinatorics I. F. Prerequisite: M 301 or M 366 or M 460.

Permutations and combinations, generating functions, recurrence relations, inclusion-exclusion, Polya counting, connectedness and traversability.

M 502 03(3-0-0). Combinatorics II. S. Prerequisite: M 501.

Trees, circuits, cutsets, planarity, domination and coloring, networks, matchings, designs, geometries, schemes.

M 505 03. Teaching Problem Solving in Mathematics K-12. F, S. Prerequisite: Teacher licensure or written consent of instructor. Offered as telecourse only.

Problem-solving strategies, cooperative learning, and manipulatives for K-12 classroom. (Ω -T)

M 510/EG 510 03(3-0-0). Linear Programming and Network Flows. F, S, SS. Prerequisite: M 261 or M CC 315. Credit not allowed for both M 510 and EG 510.

Optimization methods; linear programming, simplex algorithm, duality, sensitivity analysis, minimal cost network flows, transportation problem.

M 517 03(3-0-0). Introduction to Mathematical Analysis I. F. Prerequisite: M 417.

Euclidean spaces, metric spaces, sequences, series, limits, continuity, differentiability, Riemann-Stieltjes integral.

M 518 03(3-0-0). Introduction to Mathematical Analysis II. S. Prerequisite: M 369, M 517.

Sequences and series of functions. Differential and integral calculus of functions of several variables.

M 519 03(3-0-0). Complex Variables I. F. Prerequisite: M 317.

Analytic functions, complex integration theory, singularities, elementary functions, and mappings.

M 520 03(3-0-0). Nonlinear Programming. S. Prerequisite: EG 510/M 510.

Theoretical, computational, practical aspects of nonlinear programming (NLP); unconstrained, constrained NLP; quadratic programming; large-scale NLP.

***M 525 03(3-0-0). Optimal Control.** F. Prerequisite: M 340 or M 345.

Theory and application of optimal control and optimal estimation theory; continuous and discrete time systems; Pontryagin maximum principle.

M 531 03(3-0-0). Discrete Models of Physical Systems. F. Prerequisite: M 340 or M 345.

Discrete models for physical systems; systems of ordinary differential equations, applied linear algebra; introduction to finite elements.

M 532 03(3-0-0). Continuous Models of Physical Systems. S, SS. Prerequisite: M 340 or M 345. Credit not allowed for both M 532 and M 332.

Continuous models for physical systems, integral transforms, and eigenfunction expansions for solving partial differential equations.

M 540 03(3-0-0). Dynamical Systems. F. Prerequisite: M 369, M 417.

Linear and nonlinear systems, orbits, phase space, flows of vector fields, stability, bifurcation theory, chaos, strange attractors and applications.

M 545 03(3-0-0). Partial Differential Equations I. F. Prerequisite: M 340 or M 345.

Second order linear PDEs, elliptic and parabolic equations, equations of math physics, separation of variables, Fourier series.

M 546 03(3-0-0). Partial Differential Equations II. S. Prerequisite: M 545.

Laplace's equation, Green's functions, complex variable methods, eigenfunction expansions.

M 550 03(3-0-0). Difference Methods-Partial Differential Equations. S. Prerequisite: M 532 or M 545; knowledge of a programming language.

Explicit, implicit methods for second order equations, higher-dimensional problems, stability analysis, method of characteristics.

M 560 03(3-0-0). Linear Algebra. F. Prerequisite: Written consent of instructor.

Finite dimensional vector spaces, inner products, dual spaces, transformations, projections, adjoints, norms, eigenvalues, eigenvectors.

M 561 04(4-0-0). Numerical Analysis I. S. Prerequisite: M 369 and preparedness to do programming in a standard language.

Numerical linear algebra, solving nonlinear systems, least squares, and minimization.

M 566 03(3-0-0). Introduction to Abstract Algebra I. F. Prerequisite: M 366.

Analysis of algebraic structures including groups, rings, fields, and vector spaces.

M 567 03(3-0-0). Introduction to Abstract Algebra II. S. Prerequisite: M 566.

Field theory, Galois theory, and advanced linear algebra.

M 570 03(3-0-0). Topology I. F. Prerequisite: Twelve credits of mathematics at 300 level or above.

Point-set topology including basic set theory, continuity, product and quotient spaces, metrization, compactness, and connectedness.

M 571 03(3-0-0). Topology II. S. Prerequisite: M 566, M 570.

Fundamental group, free groups and presentations, and manifolds.

M 584 01(1-0-0). Supervised College Teaching. F, S.

M 592 01(0-0-1). Seminar in Mathematics. F, S, SS.

M 601 03(3-0-0). Advanced Combinatorics I. F. Prerequisite: M 502, M 566.

Special numbers, mobius inversions, transversals, partial orders, different sets, codes, t-designs.

M 602 03(3-0-0). Advanced Combinatorics II. S. Prerequisite: M 601.

Hypergeometric functions, graph algorithms, hadamard matrices, strongly regular graphs, association schemes.

M 617 04(4-0-0). Real Analysis I. S. Prerequisite: M 517.

Measure and integration, Fubini's theorem, Lp spaces, differentiation theory.

M 618 03(3-0-0). Real Analysis II. F. Prerequisite: M 560, M 617.

Normed linear spaces, Banach and Hilbert spaces, elements of functional analysis.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

M 619 03(3-0-0). Complex Variables II. S. Prerequisite: M 519.

Infinite products, entire functions, analytic continuation, Riemann surfaces, other topics.

M 620 03(3-0-0). Variational Methods and Optimization I. F. Prerequisite: M 518, M 560; or written consent of instructor.

Unconstrained and constrained infinite dimensional optimization, calculus of variations, applications.

M 621 03(3-0-0). Variational Methods and Optimization II. S. Prerequisite: M 620 or written consent of instructor.

Unconstrained and constrained infinite dimensional optimization, variational inequalities, Lagrange multipliers, control, applications.

M 640 03(3-0-0). Ordinary Differential Equations I. F. Prerequisite: M 340 or M 345, M 369, M 517.

Existence and uniqueness, continuation, continuous dependence, linear systems, and stability.

M 641 03(3-0-0). Ordinary Differential Equations II. S. Prerequisite: M 640.

Topics selected from nonlinear boundary value problems, periodic phenomena, differential operators, and others.

***M 645 03(3-0-0). Advanced Partial Differential Equations I.** F. Prerequisite: M 545.

Abstract methods for linear partial differential equations.

°M 646 03(3-0-0). Advanced Partial Differential Equations II. S. Prerequisite: M 645.

Problems in nonlinear partial differential equations.

M 651 04(4-0-0). Numerical Analysis II. F. Prerequisite: M 369 and preparedness to do programming in a standard language.

Interpolation, approximation, quadrature, initial and boundary value problems.

***M 652 04(4-0-0). Finite Element Methods.** S. Prerequisite: M 560.

Rayleigh-Ritz, Galerkin, and collocation methods, variational inequalities approximations over rectangles and triangles, applications and computing.

M 666 03(3-0-0). Advanced Algebra I. F. Prerequisite: M 567.

Theory of rings and algebras with applications.

M 667 03(3-0-0). Advanced Algebra II. S. Prerequisite: M 666.

Advanced topics from algebra: representation theory, Wedderburn theory, bilinear forms, multilinear and homological algebra.

°M 670 03(3-0-0). Introduction to Differential Manifolds. S. Prerequisite: M 518, M 560.

Finite-dimensional differential manifolds, submanifolds, vector fields and flows, Lie groups and algebras.

M 672 03(3-0-0). Projective Geometry I. F. Prerequisite: M 567 or written consent of instructor.

Algebraic sets in projective space, the Nullstellensatz, rational maps and functions, coordinate rings, Hilbert functions, dimension, degree.

M 673 03(3-0-0). Projective Geometry II. S. Prerequisite: M 672.

Topics selected from curves and surfaces, sheaf theory, algebraic geometry, singularity theory, vector bundles.

M 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.

M 687 Var [1-9]. Internship.

A work-learn experience integrating classroom theory with practical experience.

M 693 03(0-0-3). Seminar in Mathematics. F, S, SS.

M 695 Var. Independent Study. F, S, SS.

M 699 Var. Thesis.

°M 717 03(3-0-0). Functional Analysis I. F. Prerequisite: Written consent of instructor.

Topological vector spaces; Banach and Hilbert spaces.

***M 718 03(3-0-0). Functional Analysis II.** S. Prerequisite: M 717.

Spectral theory, operator theory, semigroups of transformations, and distribution theory.

M 750 03(3-0-0). Numerical Methods and Models I. F. Prerequisite: M 561.

Derivation of model equations, introduction to solution techniques and computing.

M 751 03(3-0-0). Numerical Methods and Models II. S. Prerequisite: M 561.

Convergence, stability, error estimates and computing.

M 793 Var. Seminar in Mathematics. F, S, SS.

M 798 Var. Research.

M 799 Var. Dissertation.

MICROBIOLOGY COURSES (MB)

*Department of Microbiology, Immunology,
and Pathology*

*College of Veterinary Medicine and
Biomedical Sciences*

MBCC 149 03(3-0-0). The Microbial World. (AUCC 3G). F, S.

Importance of microbiology in daily life, with emphasis on positive and negative roles of microbes, infectious disease, and current microbiology issues.

MB 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.

MB 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.

MB 298 Var. Introductory Research. F, S, SS.

Freshman/sophomore research experience in a working research environment.

MB 300 03(3-0-0). General Microbiology. F, S, SS. Prerequisite: BZCC 110 or BZCC 120 or LSCC 102; C 245 or C 345 or concurrent registration.

Structure, function, development, physiology, and molecular biology of microorganisms emphasizing bacteria.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

MB 301 01(0-3-0). Fundamental Microbiology Laboratory Techniques.

F. Prerequisite: MB 300 or concurrent registration.

Microbiological techniques for students in the physical sciences and engineering. (\$)

MB 302 02(0-4-0). General Microbiology Laboratory.

F, S. Prerequisite: MB 300 or concurrent registration.

Laboratory skills and techniques for isolating, characterizing, and identifying bacteria. (\$)

MB 334 03(3-0-0). Food Microbiology.

F. Prerequisite: LS 205 or MB 300.

Microorganisms in production of foods, in preservation and spoilage, and in food-borne diseases. Control of microorganisms in foods.

°MB 335 02(0-4-0). Food Microbiology Laboratory.

F. Prerequisite: LS 206 or MB 301 or MB 302; MB 334 or concurrent registration.

Laboratory skills and techniques related to the presence of microorganisms in food, production, and preservation.

MB 342 04(3-0-1). Immunology.

S, SS. Prerequisite: MB 300; C 245 or C 340 or C 341 or C 345.

Principles of immunology: components of the immune system, interactions of humoral and cellular elements, and clinical applications of basic concepts.

MB 343 02(0-4-0). Immunology Laboratory.

S. Prerequisite: MB 301 or MB 302; MB 342 or concurrent registration.

Techniques used in research and clinical immunology, including diagnostic problem solving and data analysis.

MB 350 03(3-0-0). Microbial Diversity.

F. Prerequisite: MB 300.

Physiological, taxonomic, and phylogenetic aspects of microbial diversity.

Yeasts and filamentous fungi as microbial entities.

MB 351 03(3-0-0). Medical Bacteriology.

S. Prerequisite: MB 342.

Bacteria which cause human and veterinary diseases; host-parasite relationships; disease mechanisms, prevention, and therapy.

MB 352 03(0-6-0). Medical Bacteriology Laboratory.

S. Prerequisite: MB 301 or MB 302; MB 351 or concurrent registration.

Laboratory skills and techniques necessary for identifying medically important bacteria.

MB 384 Var [1-5]. Supervised College Teaching.

F, S, SS. Maximum of 10 credits allowed in course.

MB 400A-F 02(2-0-0). Capstones in Microbiology.

F, S. Prerequisite: MB 342; MB 351 or MB 420 or concurrent registration in MB 351 or MB 420.

A) Medical microbiology. B) Biotechnology. C) Immunology. D) Microbial diversity, ecology. E) Microbial genetics. F) Virology. G) Service learning.

MB 420 04(4-0-0). Medical and Molecular Virology.

F. Prerequisite: MB 342; BC 351 or BC 401 or concurrent registration.

Principles of animal virology: structure, classification, assay, diagnosis, control, replication, genetics, host-parasite relationships.

MB 425 02(0-4-0). Virology and Cell Culture Laboratory.

F. Prerequisite: MB 301 or MB 302; MB 420 or concurrent registration.

Isolation and characterization of viruses. Viral diagnostic and cell culture techniques.

***MB 432 04(3-3-0). Aquatic Microbiology.** S. Prerequisite: MB 301 or MB 302.

Microorganisms and their functions in aquatic environments; effects of pollution on aquatic microbial communities; sanitary microbiology.

***MB 436 04(2-4-0). Industrial Microbiology.** F. Prerequisite: LS 206 or MB 301 or MB 302.

Use of microorganisms for producing commercially valuable products.

MB 443 04(3-0-1). Microbial Physiology. S. Prerequisite: MB 300; BC 351 or BC 401.

Structure, function of bacterial constituents; comparison with other organisms. Bacterial growth, energy production, biosynthesis.

MB 450 03(3-0-0). Microbial Genetics. F. Prerequisite: MB 300; BC 351 or BC 401 or concurrent registration.

Principles of genetics at molecular level: mutation, recombination, complementation, suppression, control of gene expression, and recombinant DNA.

Principles of genetics at molecular level: mutation, recombination, complementation, suppression, control of gene expression, and recombinant DNA.

MB 462/BZ 462/BI 462 05(3-4-0). Parasitology and Vector Biology. F.

Prerequisite: BZCC 110 or LS 103; MB 301 or MB 302 or LS 206 or BZ 212. Credit allowed for only one of the following: MB 462, BI 462, BZ 462,

Protozoa, helminths, and insects and related arthropods of medical importance; systematics, epidemiology, host damage and control.

MB 495 Var. Independent Study. Prerequisite: MB 300.

MB 498 Var. Research. Prerequisite: MB 301 or MB 302.

***MB 530 03(3-0-0). Advanced Molecular Virology.** S. Prerequisite: BC 351 or BC 401; MB 450.

Animal virus structure, replication; viral latency, oncogenicity, and genetics. Comparative virology.

***MB 533/*EH 533 03(2-0-1). Epidemiology of Infectious Diseases/Zoonoses.** S. Prerequisite: MB 300. Credit not allowed for both MB 533 and EH 533.

Epidemiologic features of infectious and parasitic diseases that have a major impact on community medicine.

MB 540 02(2-0-0). Biosafety in Research Laboratories. S. Prerequisite: MB 300 or written consent of instructor.

Practical applications of biosafety principles, including lab practices and regulatory aspects of research involving infectious microorganisms and rDNA.

MB 540 02(2-0-0). Biosafety in Research Laboratories. S. Prerequisite: MB 300 or written consent of instructor.

Practical applications of biosafety principles, including lab practices and regulatory aspects of research involving infectious microorganisms and rDNA.

MB 550 04(2-6-0). Microbial and Molecular Genetics Laboratory. S.

Prerequisite: MB 301 or MB 302; MB 450, written consent of instructor.

Use of both in vivo genetics and in vitro molecular techniques to study gene structure, function, and regulation in bacteria.

°MB 562/°BI 562 05(1-8-0). Field Ecology of Disease Vectors. S.

Prerequisite: MB 462/BZ 462/BI 462 or MB 300; BI 302. Credit not allowed for both MB 562 and BI 562.

Evolution, morphology, life cycles, and field biology of disease vectors; field techniques and experience in surveillance of arthropods and pathogens.

°MB 562/°BI 562 05(1-8-0). Field Ecology of Disease Vectors. S.

Prerequisite: MB 462/BZ 462/BI 462 or MB 300; BI 302. Credit not allowed for both MB 562 and BI 562.

Evolution, morphology, life cycles, and field biology of disease vectors; field techniques and experience in surveillance of arthropods and pathogens.

MB 576/BI 576 03(3-0-0). Bioinformatics. F, S. Prerequisite: BC 463 or BY 310 or CM 501 or MB 450. Access to campus network. Credit not allowed for both MB 576 and BI 576.

Technical computing across platforms using bioinformatics tools in molecular analyses.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

°**MB 578/°BZ 578 04(3-0-1). Genetics of Natural Populations.** F. Prerequisite: One course in genetics, one course in statistics. Credit not allowed for both MB 578 and BZ 578.

Theoretical and empirical aspects of the genetics of natural populations; current molecular techniques and statistical analysis.

***MB 579/*BZ 579 04(0-8-0). Laboratory in Population Genetics.** F. Prerequisite: MB 578/BZ 578 or written consent of instructor. Credit not allowed for both MB 579 and BZ 579.

Molecular and statistical techniques in discrete and quantitative genetics. Students design and complete practical exercises. (\$)

°**MB 624 02(1-0-1). Microbial Ecology.** F. Prerequisite: MB 300 or relevant ecology course.

Concepts in ecology as applied to microbial systems including analysis of communities, interactions, and biogeochemical cycling.

***MB 630 03(3-0-0). Advances in Microbial Physiology.** F. Prerequisite: MB 443.

Contemporary developments in bacterial structure, function, metabolism, and genetics.

°**MB 636 04(3-0-1). Mechanisms of Viral Infection and Disease.** S. Prerequisite: MB 420 or MB 530.

Cytopathic mechanisms, pathogenetic events in viral diseases; host response and antiviral immunity; cancer induction by DNA and RNA viruses.

***MB 651 03(3-0-0). Immunobiology.** F. Prerequisite: MB 342.

Structure, function, regulation of immunoglobulins and the immune system. Cellular immunity including transplantation and cancer.

MB 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.

MB 699 Var. Thesis.

MB 700 01(1-0-0). Topics in Microbiology. F, S. Prerequisite: MB 300.

Current literature in bacteriology, virology, genetics, and immunology.

°**MB 720 02(1-3-0). Methods in Carbohydrate Analysis.** S. Prerequisite: C 346.

Structural analysis of complex carbohydrates using gas chromatography, mass spectrometry, and nuclear magnetic resonance.

°**MB 740 03(2-0-1). Microbial and Molecular Genetics.** S. Prerequisite: MB 450.

Molecular biology and genetics of prokaryotic and eukaryotic cells and their viruses; strategies for genetic manipulation.

°**MB 760 03(2-0-1). Mechanisms of Bacterial Pathogenesis.** F. Prerequisite: BC 351, MB 342.

Mechanisms of bacterium-host interaction at molecular and cellular levels in pathogenesis of bacterial disease.

MB 792 01(0-0-1). Seminar.

MB 795 Var. Independent Study.

MB 799 Var. Dissertation.

CONSTRUCTION MANAGEMENT COURSES (MC)

Department of Construction Management College of Applied Human Sciences

MC 110 0 3(2-0-1). Team Problem Solving and Leadership. F, S, SS.

Current and emerging tools, skills, and techniques of leadership and systems improvement utilized by modern organizations emphasizing team approach. (\$)

MC 131 03(1-4-0). Graphic Communications/CAD. F, S, SS.

Reading technical drawings, manual drafting techniques, reprographic technologies. CAD applications are introduced. (\$)

MC 136 03(1-4-0). Computer-Aided Design. F, S, SS. Prerequisite: BD 150 or written consent of instructor.

Introduction to and application of computer-aided design and drafting software. Applications using the latest release of AutoCAD. (Ω-O)

MC 151 03(2-2-0). Construction Materials and Methods. F, S.

Applied introduction to construction materials, processes, and systems. (\$)

MC 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. (Ω-C)

MC 235 03(2-2-0). Construction Graphics. S. Prerequisite: ID 210, ID 256.

Principles and procedures required in interpreting and producing building site plans, floor plans, elevations, sections, and interior details. (\$)

MC 241 03(2-2-0). Energy Controls for Industry. F, S, SS.

Selection, application, and evaluation of electronics and fluidics-based control systems. (\$)

MC 251 03(2-2-0). Materials Testing and Processing. F, S. Prerequisite: MC 151.

Process of separating, shaping, joining, and conditioning of materials used in manufacturing and construction industries. (\$)

MC 261 03(2-3-0). Construction Surveying. F, S, SS. Prerequisite: MC 131 or ID 166, M CC 125 or M CC 160.

Surveying fundamentals to field of construction, building layout, measurement procedures, vertical controls, line and grade, surveying, instrument operation. (\$)

MC 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.

MC 317 02(2-0-0). Safety Management. F, S.

Safety management in construction, corporate, and institutional environments.

MC 331 03(3-0-0). Structure Influence on Tactics and Strategy. F, S. Prerequisite: Admission to fire service emphasis. 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. (Ω)

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

MC 332 03(3-0-0). Fire Suppression Leadership. F, S. Prerequisite: Admission to fire service emphasis. Offered only through the Division of Continuing Education.

Management of large-scale emergency incidents, including mitigation strategies and organizational management of resources and personnel. (Ω)

MC 333 03(2-0-1). Proposals/Reports in Fire Service Management. F, S, SS. Prerequisite: Admission to fire service emphasis. 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. (Ω)

MC 334 01(1-0-0). Career Development Portfolio. F, S, SS. Prerequisite: Admission to fire service emphasis. 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. (Ω)

MC 335 03(3-0-0). Trends in Fire Science Technologies. F, S, SS. Prerequisite: Admission to fire service emphasis. Offered only through the Division of Continuing Education.

Analytical tools designed to evaluate, align, select, and implement emerging fire science technologies. (Ω)

MC 361 03(3-0-0). Mechanical and Electrical Systems. F, S. Prerequisite: MC 241 or ID 276; MC 363 or concurrent registration or ID 256 or concurrent registration.

Systems approach to the functions and components of electrical, plumbing, heating, ventilating, and cooling systems.

MC 362 02(2-0-0). Construction Contracts. F, S. Prerequisite: MC 363 or concurrent registration.

Commercial construction planning, bidding, and contract administration.

MC 363 03(1-4-0). Plan Reading for Estimating. F, S. Prerequisite: MC 131, MC 151; MC 261 or concurrent registration.

Fundamentals of architectural plan reading and quantity surveying based upon examples from the different CSI divisions. (\$)

MC 364 03(2-2-0). Advanced Construction Systems. F, S. Prerequisite: MC 151, MC 261 or concurrent registration or MC 363 or concurrent registration.

Commercial construction field procedures: sitework, foundations, concrete, steel, wood, enclosures, finishes. (\$)

MC 365 03(2-2-0). Construction Estimating. F, S. Prerequisite: MC 363, MC 364.

Industry-recognized methods for work item analysis, quantity surveying, resource estimating, and bid development using work breakdown structures. (\$)

MC 366 03(2-2-0). Construction Equipment and Methods. F, S. Prerequisite: MC 261.

Equipment/methods in heavy and highway construction; equipment selection, productivity, and costs. Infrastructure, tunneling, and trenchless technology.

MC 384 Var [1-5]. Supervised College Teaching. F, S, SS. Maximum of 10 credits allowed in course.

MC 386D Var [1-3]. Practicum-Construction Management. Prerequisite: Admission to Teacher Licensure Program.

MC 430 03(2-0-1). Industrial Processes and Fire Protection. F, S, SS. Prerequisite: Admission to fire service emphasis. Offered only through the Division of Continuing Education.

Industrial processes and fire protection managed by fire and safety personnel. (Ω)

MC 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. (Ω)

MC 436 03(3-0-0). Fire Protection Through Model Building Codes. F, S, SS. Prerequisite: Admission to the fire service emphasis. 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. (Ω)

MC 437 03(3-0-0). Advanced Fire Administration. F, S. Prerequisite: Admission to fire service emphasis. Offered only through the Division of Continuing Education.

Fire service administrative theory, practice and process; organization, management, planning, personnel, finance and intergovernmental relations. (Ω)

MC 442 03(2-2-0). Electronics in Manufacturing. F, S.

Use of electronic devices and systems in controlling and monitoring manufacturing operations. (\$)

MC 450/ID 450 03(3-0-0). Travel Abroad-Sustainable Building. SS. Credit not allowed for both MC 450 and ID 450.

Major components of sustainable design and construction, energy, healthy buildings, natural resources, and other environmental issues.

MC 461 03(2-2-0). Construction Project Scheduling and Cost Control. F, S. Prerequisite: MC 365.

Strategies and techniques for efficient scheduling of project activities and control of project costs; emphasis on Critical Path Method.

MC 462 03(3-0-0). Financial Management for Construction. F, S. Prerequisite: BA 205, BN 305; MC 362 or concurrent registration.

Financial statements, financial ratios, applications of engineering economy, cash flow analysis, construction financing, and cost information systems.

MC 464 02(1-2-0). Construction Project Administration. F, S. Prerequisite: MC 362, MC 461 or concurrent registration.

Administrative procedures, planning processes, and coordination required to successfully complete construction projects on time and budget.

MC 465 02(0-4-0). Construction Management Professional Practice. F, S. Prerequisite: MC 461, MC 464 or concurrent registration, MC 487A or MC 487E. Construction management majors only.

Professional practice using an understanding of the contractual and working relationships among all participants in the design/construction process.

MC 487A-E Internship.

A) Construction management. 06(0-18-0). Prerequisite: MC 267, MC 317, 500 hours documented work experience. D) Construction management I. 03(0-9-0). Prerequisite: MC 267 and MC 317. E) Construction management II 03(0-9-0). Prerequisite: MC267, MC 317, 500 hours documented work experience.

MC 495B Var. Independent Study-Construction.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

MC 496A Var. Group Study-Construction. Maximum of 9 credits allowed per subtopic.

MC 500 03(3-0-0). Models of Disciplined Inquiry. F. Prerequisite: Admission to the MTCM graduate program or written consent of instructor.

Models and methods of disciplined inquiry used in diverse organizations; applying disciplined inquiry methods to solve problems.

MC 501B-C Var [1-3]. Special Problems in Technology Education. F, S, SS.

B) Manufacturing. (\$) C) Energy and transportation. (\$)

MC 530 03(2-2-0). Computer-Aided Design Applications. F, SS. Prerequisite: Written consent of instructor.

Advanced CAD techniques: 3-D modeling, I/O devices, design, and analysis.

MC 540 03(3-0-0). Computerized Industrial Electronics. S, SS. Prerequisite: Written consent of instructor.

Recent innovations in industrial electronics.

MC 560 03(3-0-0). Applied Project Management. F. Prerequisite: Admission to the master's program or written consent of instructor.

Project development, planning, and control relevant to construction, manufacturing and technology education professionals.

MC 561 03(3-0-0). Applied Productivity Improvement. S. Prerequisite: Admission to the master's program in MTCM or written consent of instructor.

Existing and emerging tools for productivity enhancement in project and production environment.

MC 562 03(3-0-0). Issues and Trends in MTCM. F. Prerequisite: Admission to the MTCM master's program or written consent of instructor.

Current issues and trends related to management of technology in fields associated with manufacturing and construction industries.

MC 565 03(3-0-0). Legal Aspects of Construction Process. S. Prerequisite: Admission to the MTCM graduate program or written consent of instructor.

Common points of dispute; methods of avoiding disputes among owner, architect, engineer, and contractor.

MC 566 03(3-0-0). Advanced Construction Estimating. F. Prerequisite: MC 365.

Advanced estimating procedures dealing with special application and techniques in construction.

MC 567 03(3-0-0). Preservation and Rehabilitation of Buildings. F. Prerequisite: Restricted to upper-division undergraduates, graduate students, or written consent of instructor.

Theory and applications of preservation technology used in the management and rehabilitation of historic and archaic buildings.

MC 569 03(3-0-0). Regulatory Impact on Construction. S.

Role government plays in the design and construction of the built environment.

MC 570 03. Grantsmanship and Proposal Writing. F, S, SS. Offered as correspondence course only.

Mechanics of proposal writing, including intangibles of the grant-seeker's art. (Ω-C)

MC 571 03(3-0-0). Facility Planning and Management. S. Prerequisite: Admission to the MTCM master's program or written consent of instructor.

Planning, organizing, and managing large educational and/or commercial facilities.

MC 572 03(2-0-1). Sustainable Technology in Built Environments. F, S. Prerequisite: MC 450/ID 450 or written consent of instructor.

Major components of creating environmentally sustainable built environments.

MC 575 03(3-0-0). Managerial Decision Making for Constructors. F. Prerequisite: Admission to the master's specialization in construction management or written consent of instructor.

Construction and real estate development applications of multi-disciplinary managerial analysis and decision-making techniques.

MC 590 Var. Workshop. (\$)

MC 592 Var. Seminar.

MC 600 03(3-0-0). Research Methods. F.

Identification, analysis of research problems in applications of technology.

MC 610 03(3-0-0). Technology Change Management. S. Prerequisite: MC 562.

Methods of planning and implementing change within institutional settings.

MC 672 02(2-0-0). Technology Curriculum Development. S, SS.

Curriculum development and organization, task analysis, accountability, and evaluation utilizing interdisciplinary and clustering approach.

MC 677 02(2-0-0). Leadership in Technology Studies. F, SS. Prerequisite: Admission to the master's program or written consent of instructor.

Administration, supervision, management, and planning techniques necessary for successful education and training environments.

MC 684 Var. Supervised College Teaching. F, S, SS.

MC 687 Var [1-6]. Internship. Maximum of 6 credits allowed in course.

MC 695A-B Var. Independent Study.

A) Construction management. B) Technology education and training.

MC 696A-B Var. Group Study. Prerequisite: Written consent of instructor.

A) Construction management. C) Technology education and training.

MC 698 Var. Research in MTCM.

MC 699 Var [1-6]. Thesis.

MECHANICAL ENGINEERING COURSES (ME)

Department of Mechanical Engineering College of Engineering

ME 120 03(2-2-0). Introduction to Computer-Aided Design. S. Prerequisite: ME 121 or concurrent registration.

3-D visualization, solid modeling of parts and assemblies, drawing production and drawing practice.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

ME 121 01(0-0-1). Mechanical Engineering Shop Practicum. F, S, SS.

Basic hand tools, cutting, grinding, the lathe mill; introduction to numerical control, shop safety. (\$)

ME 192 02(1-2-0). Introduction to Mechanical Engineering. F. Restricted to first-year students in mechanical engineering.

History and development of engineering disciplines with specific emphasis on mechanical engineering; the mechanical engineer in the information age.

ME 237 03(3-0-0). Introduction to Thermal Sciences. F, S. Prerequisite: PHCC 142.

First and second laws of thermodynamics, properties of materials, energy conversion, statistical aspects, heat transfer.

ME 250 02(2-0-0). Computer Applications in Mechanical Engineering. F, S. Prerequisite: M 340 or concurrent registration .

Computer oriented approaches to solving mechanical engineering analysis and design problems.

ME 304 03(3-0-0). Engineering Design. S. Prerequisite: ME 120; ME 250, ME 307, ME 324, ME 325, ME 331, ME 338, ME 344, CE 363 or concurrent registration in ME 250, ME 307, ME 324, ME 325, ME 331, ME 338, ME 344, CE 363.

Design fundamentals, including design processes, project planning, creativity, manufacturing, and human factors.

ME 307 04(3-3-0). Mechatronics and Measurement Systems. F, S. Prerequisite: CE 261, EE 204, M 340.

Instrumentation and measurement system analysis and design; sensors and actuators; computer data acquisition and control.

ME 324 04(3-2-0). Dynamics of Machines. F. Prerequisite: ME 121, CE 261 or concurrent registration; M 340 or concurrent registration.

Analysis and synthesis of moving machinery.

ME 325 03(3-0-0). Machine Design. F, S. Prerequisite: CE 360.

Design of mechanical components to avoid failure during operation. Stress analysis, failure theories, and specific mechanical components in design context.

ME 331 04(3-2-0). Introduction to Engineering Materials. F, S. Prerequisite: C CC 112, C 113, PHCC 142.

Characteristics of metallic, plastic, and ceramic material; basic principles which relate properties of materials to their atomic and microstructure.

ME 337 03(3-0-0). Thermodynamics. F, S. Prerequisite: M 261, ME 237.

First and second laws, characteristic functions, power and refrigeration cycles, introduction to statistical thermodynamics, applications.

ME 338 01(0-3-0). Thermosciences Laboratory. F, S. Prerequisite: ME 337, concurrent registration in ME 344.

Experimental methods in heat transfer, fluid flow, and thermodynamics.

ME 342 03(3-0-0). Mechanics and Thermodynamics of Flow Processes. F, S. Prerequisite: M 340; ME 237.

Engineering details of viscous flow with losses, measurements, compressibility, turbomachinery, convective heat transfer.

ME 344 03(3-0-0). Heat and Mass Transfer. F, S. Prerequisite: ME 342.

Transport and rate processes, conduction, convection, and radiation.

ME 408 03(2-0-1). Manufacturing Simulation. F. Prerequisite: M 340, ME 250.

Design of simulation models for manufacturing and other engineering systems.

ME 411 03(3-0-0). Manufacturing Engineering. S. Prerequisite: CE 360, ME 331.

Casting, forming, machining, and welding processes used in manufacturing operations.

ME 417 03(2-2-0). Control Systems. F. Prerequisite: M 340, ME 304.

Feedback and forward loop control design and simulation; discrete time and frequency domain methods with implementation considerations.

ME 424 03(3-0-0). Advanced Dynamics. S. Prerequisite: ME 324.

Kinematics and dynamics of rigid bodies. Hamilton's principle and Lagrange's equations for lumped parameter extended bodies and distributed systems.

ME 431 03(3-0-0). Metals and Alloys. F. Prerequisite: ME 331.

Engineering metals and alloys, modification of properties by alloying, plastic deformation, and heat treatment. Fundamentals of physical metallurgy.

ME 437 03(2-0-1). Internal Combustion Engines. F. Prerequisite: ME 344.

Application of thermodynamics, heat transfer, and fluid mechanics to internal combustion engines.

ME 448/EV 448 03(3-0-0). Pollution Prevention. F. Prerequisite: CE 300 or CH 331 or ME 342. Credit not allowed for both ME 448 and EV 448.

Prevention of environmental problems by modification of industrial processes.

ME 460 03(3-0-0). Aeronautics. S. Prerequisite: ME 342.

Thermodynamics and fluid mechanics principles applied to the mechanics, aerodynamics, performance, stability, and control of airplanes.

ME 463 03(2-2-0). Building Energy Systems. S. Prerequisite: ME 344. Credit not allowed for both ME 463 and ME 676.

Comfort, psychrometrics, loads, solar radiation, heating and cooling system design, transport, solar system design, economics.

ME 467 03(3-0-0). Energy Conversion Engineering. F. Prerequisite: ME 237, EE 204.

Energy resources and consumption patterns; direct and conventional energy conversion systems and components; economic considerations.

ME 486A-B 03(0-12-0). Engineering Design Practicum. A) F. B) S. Prerequisite: A) ME 304. B) ME 486A.

Capstone engineering design project; transition experience to the mechanical engineering profession in industry and graduate education. A) Practicum I. B) Practicum II.

ME 495 Var. Independent Study.

ME 509 03(3-0-0). Manufacturing Quality Design and Control. S. Prerequisite: STCC 309, M 340, ME 250.

Design of decision-making models for industrial engineering. (Ω-O)

***ME 510 03(2-0-1). Capital Budgeting.** S. Prerequisite: ME 304, STCC 309.

Interdependencies among proposals, minimum attractive rate of return, continuous and discrete cash flows, complete and incomplete information.

***ME 512 03(3-0-0). Reliability Engineering.** F. Prerequisite: STCC 309.

Models to predict time to failure of mechanical or electronic devices, reliability data analysis and case studies.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ME 513 03(3-0-0) Simulation Fundamentals. F, S, SS. Prerequisite: STCC 309.

Theoretically-based and commercial simulation languages, input processes, statistics, interdependencies, manufacturing and service operations. (Ω-O)

°ME 514 03(2-2-0). Manufacturing and Robotic Systems. S. Prerequisite: ME 417.

Examination of electromechanical systems of manufacturing applications and robotics.

ME 520 04(3-3-0). Computer-Aided Engineering. F. Prerequisite: M 340 or written consent of instructor.

Techniques for computer modeling of engineering objects, analysis, and display.

ME 524 03(3-0-0). Principles of Mechanics. F. Prerequisite: ME 324.

Kinematics and dynamics of rigid body motion; Lagrangian and Hamiltonian formulations of mechanics; applications to engineering problems.

ME 526 03(3-0-0). Vehicle Dynamics. S. Prerequisite: ME 324.

Kinetics of vehicle suspensions, steady-state and transient stability and control, tires, wheel and suspension geometry and loads, dampers, steering.

ME 529 03(3-0-0). Advanced Mechanical Systems. S. Prerequisite: ME 307.

Modeling, analysis, and synthesis of practical mechanical devices in which dynamic response is dominant consideration.

ME 530 03(3-0-0). Advanced Composite Materials. F. Prerequisite: CE 360, ME 331.

Materials aspects of advanced composite constituents and how their combination yields synergistic results.

ME 531 03(3-0-0). Materials Engineering. S. Prerequisite: ME 331 or ME 431.

Structural engineering materials and their selection on basis of property, processing, and economic considerations.

ME 532/BE 532 03(3-0-0). Materials Issues in Mechanical Design. F. Prerequisite: ME 331. Credit not allowed for both ME 532 and BE 532.

Failure mechanisms from materials viewpoint with emphasis on use in design. Fracture, creep, fatigue, and corrosion.

ME 538 03(3-0-0). Mechanical Engineering Thermodynamics. F. Prerequisite: ME 337.

First and second laws of thermodynamics applied to engineering devices and systems. Introduction to availability, exergy, and lost work analysis.

°ME 551 03(3-0-0). Physical Gas Dynamics I. F. Prerequisite: ME 342.

Characteristics of real gases in reacting and nonequilibrium systems; equilibrium air; statistical mechanics; chemical thermodynamics.

***ME 558 03(3-0-0). Combustion.** F. Prerequisite: ME 342.

Combustion processes: explosions, detonations, flame propagation, ignition, generation of pollutants in moving and stationary energy conversion systems.

***ME 561 04(4-0-0). Space Propulsion and Mission Analysis.** S. Prerequisite: M 340.

Analysis of space flight missions and propulsion systems.

***ME 563 03(3-0-0). Air Pollution Control.** S. Prerequisite: ME 337.

Abatement of emissions from mobile and stationary sources; monitoring, dispersion, air quality standards, electrostatic precipitation, energy consumption.

***ME 564 03(3-0-0). Fundamentals of Robot Mechanics and Controls.** S. Prerequisite: ME 417.

Kinematics of robots, controls for robots.

°ME 567 03(3-0-0). Broad-Beam Ion Sources. S. Prerequisite: M 340.

Physical processes in broad-beam electron-bombardment ion sources for space propulsion and ion machining applications.

***ME 569/*EE 569 03(3-0-0). Micro-Electro-Mechanical Devices.** S. Prerequisite: ME 344 with grade of C- or better or EE 331. Credit not allowed for both ME 569 and EE 569.

Micro-electro-mechanical processes and applications in sensors, optics, and structures.

***ME 570/*BE 570 03(3-0-0). Bioengineering.** F. Prerequisite: ME 307, ME 324. Credit not allowed for both ME 570 and BE 570.

Physiological and medical systems analysis using engineering methods including mechanics, fluid dynamics, control, electronics, and signal processing.

ME 571/BE 571 03(3-0-0). Biomechanics. S. Prerequisite: BE 470 or BE 570/ME 570. Credit not allowed for both ME 571 and BE 571.

Mathematical approach to analysis of living systems, their function, diseases, and replaceable parts.(Ω-T)

ME 573/BE 573 03(3-0-0). Structure and Function of Biomaterials. S. Prerequisite: ME 331. Credit not allowed for both ME 573 and BE 573.

Structure-function relationships of natural biomaterials; application to analysis of biomimetic materials and biomaterials used in medical devices.

°ME 620 03(3-0-0). Advanced Computer-Aided Engineering. S. Prerequisite: ME 520.

Advanced applications in computer-aided engineering. Parametric and variational geometry, feature representation, non-manifold modeling.

***ME 628 03(3-0-0). Applied Fracture Mechanics.** S. Prerequisite: CE 560.

Stress distribution near cracks; energy criteria for fracture; design criteria; fracture toughness testing.(Ω-T)

°ME 644 03(3-0-0). Conduction Heat Transfer. F. Prerequisite: ME 344.

Linear and nonlinear, isotropic and nonisotropic conduction; analytical, numerical techniques; inverse methods.

***ME 645 03(3-0-0). Radiation Heat Transfer.** S. Prerequisite: ME 344.

Radiation fundamentals; properties; spectral, directional variations; transfer between surfaces; participating media; numerical, Monte Carlo methods.

°ME 646 03(3-0-0). Convection Heat Transfer. S. Prerequisite: ME 344.

Fundamentals; conservation, constitutive equations; second law; forced, free convection; internal, external flows; laminar, turbulent flows.

°ME 661 04(3-3-0). Theory/Control of Internal Combustion Engines. S. Prerequisite: ME 324, ME 337.

Theory and applications of internal combustion engines. Alternative fuels, engine control, and pollution prevention.

ME 675 03(3-0-0). Solar and Alternative Energies. F. Prerequisite: M 340.

Solar radiation, flat-plate and concentrating collectors, energy storage, space heating and cooling, power generation, agricultural applications.

ME 676 03(2-2-0). Building Energy Design. S. Prerequisite: ME 675. Credit not allowed for both ME 676 and ME 463.

Design of space heating and cooling systems. Solar thermal electric power systems, industrial and agricultural process heat.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

ME 684 Var. Supervised College Teaching. F, S, SS.

ME 692 Var. Seminar. F, S.

ME 695A-K 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.

ME 699A-K 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.

°ME 721 Var. Special Topics in Design and Manufacturing. S.
Prerequisite: ME 514 or ME 620.

Special topics in engineering design and manufacturing.

***ME 727 03(3-0-0). Continuum Mechanics.** S. Prerequisite: CE 502.

Mechanics of continuous media; cartesian tensors, vector analysis, kinematics of deformation, balance of momentum, mass and energy, constitutive equations.

ME 729 03(3-0-0). Special Topics in Mechanics and Materials. S.
Prerequisite: ME 524 or ME 530.

Advanced topics in discipline of engineering mechanics and materials; associated analysis and manufacturing techniques.

ME 784 Var. Supervised College Teaching. F, S, SS.

ME 799A-K 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.

MILITARY SCIENCE COURSES (MS)

Department of Military Sciences

Office of Provost/Academic Vice President

+MS 110 02(2-0-0). Military Skills I. F, S.

Leadership principles and techniques; first aid; weapons common to U.S. forces; rifle marksmanship; branches of the Army; physical fitness training. (\$)

+MS 121 02(2-0-0). Military Skills II. S.

Small unit leadership; survival techniques; knots, rappelling; map reading, land navigation; plant/animal identification; physical fitness training. (\$)

+MS 210 02(2-0-0). Contemporary Management Principles. F.

Leadership assessment; principles of war; small unit operations; basic management skills; oral communication; counseling/behavioral evaluation techniques. (\$)

+MS 221 02(2-0-0). Dynamics of Military Operations. S.

Operation orders; theories of conflict; small unit operations; troop leading procedures; observing and classifying behavior; physical fitness training. (\$)

MS 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.

MS 294 Var [1-2]. Independent Study. Prerequisite: MS 110, MS 121.

MS 295 Var [1-2]. Independent Study.

+MS 310 03(3-1-0). Leadership Assessment. F.

Leadership theory review; leadership assessment program to further develop leadership and management skills; physical fitness training. (\$)

+MS 320 03(3-1-0). Applied Leadership. S. Prerequisite: MS 310 or written consent of instructor.

Command and staff functions; operations orders; tactical unit operations; military skills; physical fitness training; field training exercises. (\$)

MS 386 08(1-12-1). Advanced Camp Practicum. SS. Prerequisite: MS 320.

Leadership principles and skills applied to actual field situations.

MS 395 Var [1-3]. Independent Study.

Leadership theory and skills as applied to the military.

MS 401/HY 401 03(3-0-0). The American Military Experience. F. Credit not allowed for both MS 401 and HY 401.

Role of the armed forces in American society; development of military traditions, institutions, and practices.

+MS 420 03(3-1-0). Role and Ethics of the Officer. S. Prerequisite: MS 320, MS 401/HY 401.

Role of the officer; ethics and professionalism; military justice; law of land warfare; preparation for active duty; physical fitness training. (\$)

+MS 492 02(0-1-1). Seminar-Leadership and Management.

Military staff functions and issues in leadership. (\$)

MS 495 Var [1-3]. Independent Study.

Role of the Army officer, ethics, professionalism, military justice, and law of land warfare.

MUSIC COURSES (MU)

Department of Music, Theatre, and Dance

College of Liberal Arts

MUCC 100 03(3-0-0). Music Appreciation. (AUCC 3B). F, S, SS. Previous musical training not necessary.

Survey of music from a wide range of periods and styles. (\$, Ω-O)

MUCC 111 03(3-0-0). Music Theory Fundamentals. (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: MUCC 111 or satisfactory completion of placement examination.

Introduction to diatonic harmony and part-writing; basic sight singing, ear training, and keyboard harmony skills. (\$)

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

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. (\$)

MUCC 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. (S)

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(0-2-0). 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 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. (S)

MU 230 03(3-0-0). Music of Black Americans. S.

Music indigenous to or composed by Black Americans.

MUCC 231 03(3-0-0). Women in Music. (AUCC 3B). 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) Low strings. F) High 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.

MU 272A-V Var [1-2]. Applied Music Instruction. F, S. Corequisite: 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. Prerequisite: MU 118 and MUCC 131.

One or two half-hour lessons per week.

MU 286 01(0-2-0). Practicum-Music Education. (S)

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(0-3-0). University Singers. F, S. Prerequisite: Written consent of instructor.

Rehearsal and performance of choral literature emphasizing extended works with orchestral accompaniment. (\$))

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

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 and 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 334 03(3-0-0). Music History I. F, S. Prerequisite: MU 118; MUCC 100 or MUCC 131.

Music of the medieval, Renaissance, and baroque periods.

MU 335 03(3-0-0). Music History II. S. Prerequisite: MU 118; MUCC 100 or MUCC 131.

Music of the classical, Romantic, and contemporary periods.

MU 342 03(3-0-0). Psychology of Music. F. Prerequisite: PYCC 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: STCC 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). University Chamber Singers. 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. F. Prerequisite: MU 204, MU 356.

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.

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, BS 300.

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: Admission to professional curriculum.

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.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

°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 and MU 265B; concurrent registration in MU 472QV.

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. 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. Prerequisite: A) Piano proficiency. B) Admission to teacher licensure.

A) Music therapy. (\$) B) Music education. (\$)

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: ED 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: ED 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.

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 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.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

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.

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. M) Macmillan music. 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 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. F, S, SS.

Supervised assistance in instruction.

MU 686 03(0-6-0). Music Therapy Practicum. 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 (NB)

Office of Provost/Academic 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 BS 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 BS 500.

Membrane properties of nerve and muscle; molecular mechanisms of synaptic function; neuromuscular units.

NB 502 02(1-3-0). Techniques in Neuroscience I. F. Prerequisite: One college-level course with laboratory in each: biology, biochemistry, physics, and written consent of instructor.

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: BS 325 or BS 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 and NB 502.

Current research projects in the laboratories of neuroscience faculty.

NB 600/PY 600D 03(3-0-0). Advanced Psychology-Sensation and Perception. S. Prerequisite: PY 456 and fifteen credits in psychology or written consent of instructor. Credit not allowed for both NB 600 and PY 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 750 02(2-0-0). Physiology of Ion Channels. S. Prerequisite: BS 500, written consent of instructor.

Physiological and structural analysis of membrane ion channels.

NB 793 01(0-0-1). Neuroscience Seminar.

NB 795 Var. Independent Study.

NB 796A-C Var. Group Study.

A) Ion channels. B) Neuronal growth and regeneration. C) Topics in Neurosciences.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

NATURAL RESOURCES COURSES (NR)

College of Natural Resources

NR 120A-B. Environmental Conservation. F, S.

Overview of natural resources environmental concerns including population, pesticides, energy, and pollution. A) 03(3-0-0). (Ω-O) B) 04(3-3-0). Prerequisite: Participation in University Honors Program.

+NRCC 130 03(3-0-0). Global Environmental Systems. (AUCC 3A) F, S. Credit not allowed for both NRCC 130 and ERCC/G CC 130.

Studies of the earth's lithosphere, hydrosphere, atmosphere, and biosphere systems, and their interrelations with 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: BZCC 120 or LS 103; M CC 121.

Ecology of Rocky Mountain ecosystems. Basic measurements and integrated management of natural resources. Pingree Park Campus. (\$)

NR 224/A 224 03(2-0-1). Integrated Resource Management I. F. Prerequisite: A 192A or B. Credit not allowed for both NR 224 and A 224.

Introduction to integrated ranch system concepts through describing complex organizations and building decisions support systems.

NR 272 03(3-0-0). Oceanography I. F.

General survey of the geology and physics of the oceans and their basins.

NR 274 03(3-0-0). Oceanography II. S.

General survey of the chemistry, sedimentation, biology, and pollution of the oceans.

NR 300 03(2-0-1). Biological Diversity. S. Prerequisite: NR 120A or B 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.

NRCC 320 03(3-0-0). Natural Resources History and Policy. (AUCC 3D and 3F). 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 B or written consent of instructor.

Social, political, cultural, and economic considerations in natural resource management.

NR 355 03. Contemporary Environmental Issues. F, S, SS. Prerequisite: One course in biology or written consent of instructor. Offered as telecourse only.

Fundamental concepts of energy, population, and ecology applied to range of contemporary environmental issues. (Ω-T)

NR 365 03(3-0-0). Environmental Education. S. Prerequisite: RR 100, BY 220.

Principles of interpretation related to natural resource management and public informal education.

NR 367 02(2-0-0). Concepts in Vertebrate Nutrition. S. Prerequisite: C 245.

Concepts in suborganismal and organismal vertebrate nutrition.

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/A 383 02(0-2-1). U.S. Travel-Integrated Resource Management. S. Credit not allowed for both A 383 and NR 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: NRCC 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: SPCC 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: Senior standing; BY 320, NR 220, and NRCC 320.

Natural resource management exercises; quantitative integration techniques, group dynamics. (\$)

NR 421 03(3-0-0). Natural Resources Sampling. S. Prerequisite: STCC 201 or STCC 301; NR 220.

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.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

NR 424/A 424 03(2-0-1). Integrated Resource Management II. S. Prerequisite: NR 224/A 224. Credit not allowed for both NR 424 and A 424.

Application of enterprise planning analysis for use in ranch resource management. Continued emphasis on interdisciplinary systems analysis.

NR 425 03(3-0-0). Sustainability of Renewable Resources. S. Prerequisite: F 325 or written consent of instructor.

Aspects of the sustainability of managed renewable resources.

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. (Ω-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. (Ω-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. (Ω-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. (Ω-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. (Ω-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. (Ω-C)

NR 440 03(2-2-0). Land Use Planning. F.

Integration of natural resource, social, institutional factors in regional resource planning. (Ω-O)

NR 444 03(3-0-0). Fire Economics and Policy. S. Prerequisite: ECCC 202 or EACC 202 or written consent of instructor.

Development of wildlife and fuel management economics integrated with critical federal policies.

+NR 460 03(3-0-0). Wilderness Management. S. Prerequisite: BY 220, NR 300, RR 431 or written consent of instructor.

Management of wilderness in the U.S. National Wilderness Preservation System and equivalent international wildlands. (\$)

NR 484 Var [1-5]. Supervised College Teaching. F, S, SS. 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 or written consent of instructor.

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. (Ω-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.

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: STCC 301 or ST 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: STCC 301, NR 322, NR 323, or written consent of instructor.

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. (Ω-C)

°NR 521 02(2-0-0). Natural Resource Administration. F. Prerequisite: NRCC 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/ST 523 03(3-0-0). Quantitative Spatial Analysis. S. Prerequisite: STCC 301 or STCC 307/EHCC 307. Credit not allowed for both NR 523 and ST 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.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

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. (Ω)

NR 555 02(2-0-0). Preparation of Grant Proposals. S. Prerequisite: STCC 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: M CC 255, ST 304, RS 452.

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: LA 520 or NR 322; CS 110

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: C 245, SC 240, and 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. F, S, SS. Prerequisite: Written consent of instructor.

NR 687 Var [1-8]. Natural Resources Internship. Prerequisite: Written consent of instructor.

Field experience and exercises in international natural resources management.

NR 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 SCIENCES COURSES (NS)

College of Natural Sciences

NSCC 101 04(2-2-1). Phenomena of Matter and Energy. (AUCC 3A)F. Prerequisite: University admissions requirements for high school mathematics and science.

Physical sciences for non-technical majors considered in historic and philosophic context and from the viewpoints of multiple disciplines.

NS 192 02(0-0-2). Introductory Seminar. F.

Introduction to the culture and values of science and the College of Natural Sciences.

NS 384 Var [1-3]. Supervised College Teaching. F, S. Prerequisite: Written consent of instructor.

Supervised experience in computer lab.

NS 590A-H. Workshop in Instruction. A-B) Concurrent registration not allowed in NS 590A-B and ED 590C and ED 591B.

A) Science instruction in rural Colorado. Var [1-3]. B) Mathematics instruction in rural Colorado. Var [1-3]. 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).

NS 596 Var [1-3]. Small-Scale Science Group Study.

NS 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 (OT)

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. (Ω-O)

OT 215 01(0-0-1). Medical Terminology. F, S. Definition and use of medical terms. (Ω-O)

OT 355 02(1-0-1). Handicapped Individual in Society. F, S. Prerequisite: PYCC 100 or S CC 100.

Description and exploration of handicapping conditions; review of support systems including legal and financial implications.

OT 590 Var [1-9]. Workshop.

OT 594 Var [1-9]. Independent Study.

OT 596 Var [1-9]. Group Study.

OT 602 03(0-0-3). Occupational Therapy Theories. S.

Critical analysis of occupational therapy theory base including history, philosophy, and models of practice.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

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 or written consent of instructor.

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: Written consent of instructor.

Delivery of OT using educational and consultative approaches.

OT 608 03(3-0-0). Occupational Therapy Process. F. Corequisite: 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. Corequisite: 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. Corequisite: 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. Corequisite: 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.

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.

Theory and practice related to occupational performance, assessment, and intervention for individuals with biomechanical impairments.

OT 625 01(0-2-0). Biomechanical Intervention Laboratory II. S. Prerequisite: OT 522; concurrent registration in OT 624.

Application of theory related to occupational performance and occupational therapy process for individuals with biomechanical impairment.

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 533 01(0-2-0). Neurobehavioral Intervention Laboratory I. F. Prerequisite: OT 508; concurrent registration in OT 532.

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.

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: O.T.R. or 10 credits of OT 688 I-Z.

Leadership and administration process applied in occupational therapy.

OT 646 03(0-0-3). Program Development, Funding and Evaluation. F. Prerequisite: OT 651.

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 or written consent of instructor.

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: O.T.R., admission to M.S. program, or written consent of instructor.

Leadership and management processes as applied to occupational therapy settings.

OT 684 Var. Supervised College Teaching. F, S.

OT 686A-B Var [1-18]. Occupational Therapy Practicum I.

A) OT practice. B) OT practice and seminar.

OT 688I-Z [1-24]. Field Placement. Prerequisite: Degree in occupational therapy.

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. Prerequisite: OT 602.

OT 694 Var. Independent Study.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

OT 696 Var. Group Study.

OT 698 Var. Research.

OT 699 Var. Thesis.

PATHOLOGY COURSES (PA)

*Department of Microbiology, Immunology,
and Pathology
College of Veterinary Medicine and
Biomedical Sciences*

PACC 101 03(3-0-0). Introduction to Human Disease. (AUCC 3A). S.
Prerequisite: High school biology or LSCC 102 or concurrent registration.
Survey of human systems and diseases.

PA 315A-B. Human and Animal Disease. F, S. Prerequisite: BS 230 or
BS 300. Credit not allowed for both PA 315A and PA 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).

PA 495A-D Var. Independent Study.

A) Pathology. B) Clinical pathology. C) Veterinary parasitology. D)
Biochemical pathology.

PA 555 03(3-0-0). Principles and Mechanisms of Disease. F.
Prerequisite: BS 300.

Principles of disease processes; emphasis on reactivity of the diseased
cell, tissue, organ, or organism.

***PA 670 03(3-0-0). Molecular Immunology and Immunogenetics.** F.
Prerequisite: MB 651.

Molecular basis and genetics of immune response. Biochemistry of
immunologically mediated diseases.

PA 698 Var. Research.

PA 699 Var. Thesis.

***PA 765 02(1-2-0). Comparative Neuropathology.** S.

Spontaneous diseases of nervous system of domesticated, laboratory,
and wild animals.

***PA 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.

PA 784 Var. Supervised College Teaching. F, S, SS.

PA 786A-D Var. Practicum.

A) Comparative gross and histologic pathology. B) Surgical pathology.
C) Clinical pathology. D) Comparative medicine.

PA 792A-E Var [1-3]. Seminar. Maximum of 3 credits allowed per
subtopic.

A) Histopathology. B) Research. D) Clinical pathology. E) Anatomic
pathology.

PA 795A-D Var. Independent Study.

A) Pathology. B) Clinical pathology. C) Veterinary parasitology. D)
Biochemical pathology.

PA 796 Var. Group Study.

PA 798 Var. Research.

PA 799 Var. Dissertation.

PERFORMING ARTS COURSES (PF)

*Department of Music, Theatre, and Dance
College of Liberal Arts*

PFCC 110 03(2-0-1). Performing Arts Around the World. (AUCC 3E).
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. Prerequisites: MU
272Q; TH 151 or D 120A or B or C or written consent of instructor.

Skills and techniques used in music, theatre, and dance. Brief history and
technical production overview of musical theatre.

PHYSICS COURSES (PH)

*Department of Physics
College of Natural Sciences*

PHCC 110 03(3-0-0). Descriptive Physics. (AUCC 3A). F, S, SS. Credit
not allowed for both PHCC 110 and PHCC 121.

Conceptual aspects of physics applied to phenomena in everyday life
and to problems in other fields of science. (\$)

PHCC 111 01(0-2-0). Descriptive Physics Laboratory. (AUCC 3A). F, S,
SS. Prerequisite: PHCC 110 or concurrent registration.

Experiments dealing with basic physics concepts including explorations
of everyday phenomena.

PHCC 121 05(3-2-1). General Physics I. (AUCC 3A). F, S, SS.
Corequisite: M CC 125. Credit not allowed for both PHCC 121 and PHCC
110; or for both PHCC 121 and PHCC 141.

Concepts of force, torque, energy, momentum, work used to cover
fluids, waves, sound, temperature, heat; biological, physical examples
(noncalculus). (\$, GT-SC1)

PHCC 122 05(3-2-1). General Physics II. (AUCC 3A). F, S. Prerequisite:
PHCC 121. Credit not allowed for both PHCC 122 and PHCC 142.

Electricity including electrostatics and simple circuits; magnetism;
optics; nuclear physics; radiation; biological, physical examples
(noncalculus). (\$, GT-SC1)

PHCC 141 05(3-2-1). Physics for Scientists and Engineers I. (AUCC
3A). F, S, SS. Prerequisite: M CC 126; M CC 155 or M CC 160. Students
who have had high school physics may enroll in M CC 155 or M CC 160
concurrently. Credit not allowed for both PHCC 141 and PHCC 121.

Forces, energy, momentum, angular momentum, oscillations, waves,
heat, thermodynamics (calculus based). (\$)

PHCC 142 05(3-2-1). Physics for Scientists and Engineers II. (AUCC
3A). F, S. Prerequisite: PHCC 141, concurrent registration in M CC 161 or
M CC 255. Credit not allowed for both PHCC 142 and PHCC 122.

Electricity and magnetism, circuits, light, optics (calculus based). (\$)

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C =
correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course
fulfills. (See Introduction for more information.)

Courses of Instruction

PH 160 03. Basic Physics and Physical Worldview. F, S, SS. Prerequisite: High school algebra or M CC 121, M CC 126. Offered as telecourse only.

Physics, cultural and historical background of physical thought, humans' relationship to physical world. (Ω -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: M CC 161, PHCC 142.

AC circuits, physical bases and applications of electronic devices.

PH 298 Var [1-6]. Introductory Research.

PH 314 04(4-0-0). Introduction to Modern Physics. S. Prerequisite: PHCC 142, concurrent registration in M 261.

Relativity; quantum mechanics; atomic structure; applications to solid-state, nuclear, and elementary particle physics.

PH 315 02(0-4-0). Modern Physics Laboratory. S. Corequisite: PH 314. Experiments in modern physics.

PH 325 02(0-4-0). Advanced Physics Laboratory. S. Prerequisite: PH 315, concurrent registration in JTCC 300.

Advanced experiments in electricity and magnetism, statistical physics and quantum mechanics.

PH 341 04(4-0-0). Mechanics. F. Prerequisite: M 340, PHCC 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: M 340, PHCC 142.

Electrostatics, magnetostatics, currents, time-dependent electric and magnetic fields, radiation.

PH 353 04(3-3-0). Optics and Waves. F. Prerequisite: M 261, PHCC 142.

Geometrical optics; wave optics; interference, diffraction, and polarization; quantum optics.

PH 361 03(3-0-0). Physical Thermodynamics. S. Prerequisite: M 261, PHCC 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. F, S, SS. Prerequisite: PHCC 121 or PHCC 141, written consent of department head. Maximum of 10 credits allowed in course.

Participation as a physics tutor.

PH 451 03(3-0-0). Introductory Quantum Mechanics I. F. Prerequisite: M 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: M 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.

Preparation and presentation of seminars on selected modern topics.

PH 495 Var [1-6]. Independent Study.

PH 498 Var [1-6]. Research.

PH 521 03(3-0-0). Introduction to Lasers. S. Prerequisite: M 340, PH 314 or C 476.

Stimulated emission; laser resonators; theory of laser oscillation; specific laser systems; applications.

PH 522 01(0-2-0). Introductory Laser Laboratory. S. Corequisite: PH 521.

Experiments providing hands-on experiences with lasers.

PH 531 03(3-0-0). Introductory Solid State Physics. S. Prerequisite: PH 314, PH 361.

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, concurrent registration in PH 462.

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 314.

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: M 340.

Vector analysis, eigenvalues and eigenvectors, infinite series, method of Frobenius, complex variables, contour integration.

PH 572 03(3-0-0). Mathematical Methods for Physics II. S. Prerequisite: PH 571.

Partial differential equations, Sturm-Liouville theory, special functions, Green's functions, Fourier series, Fourier and Laplace transforms.

PH 621 03(3-0-0). Classical Mechanics. F. Prerequisite: PH 341, PH 571.

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 451, 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 571.

Electrostatics in a vacuum and a medium, general solution of Laplace's equation, Green's functions, magnetostatics in a vacuum and a medium.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

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/EE 672 03(3-0-0). Principles of Semiconductors. S. Prerequisite: PH 531 or EE 471. Credit not allowed for both PH 672 and EE 672.

Electronic properties of semiconductors: band structure, statistics, transport properties, photoelectric properties, potential barriers, interfaces.

PH 692 01(0-0-1). Seminar.

PH 693 03(0-0-3). Current Topics in Physics Research.

PH 698 Var. Research.

PH 699 Var. Thesis.

PH 722 03(3-0-0). Quantum Electronics. S. Prerequisite: PH 451 or C 476 or 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, PH652.

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.

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: PH652.

Formal scattering theory; relativistic quantum mechanics, quantum theory of radiation, symmetries and statistics, many-body theory.

PH 784 Var [1-5]. Supervised College Teaching.

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.

PH 799 Var. Dissertation.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

PHILOSOPHY COURSES (PL)

Department of Philosophy College of Liberal Arts

PLCC 100 03(3-0-0). Appreciation of Philosophy. (AUCC 3B). F, S, SS. Basic issues in philosophy including theories of knowledge, metaphysics, ethics, and aesthetics. (GT-AH3)

PL 101 03. Practical Thinking. S. Credit not allowed for both PL 101 and PLCC 110. Offered as correspondence course only.

Analyzing and judging passages of argument; identifying tacit assumptions; recognizing necessary/sufficient conditions. (Ω-C)

PLCC 103 03(3-0-0). Moral and Social Problems. (AUCC 3F). F, S, SS.

Contemporary ethical issues in the United States, such as abortion, euthanasia, and genetic engineering.

PL 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.

PL 106 03(3-0-0). Wisdom of the East-Oriental Philosophy. F, S.

Major philosophical issues and world views of the Orient.

PLCC 110 03(3-0-0). Logic and Critical Thinking. (AUCC 2B). F, S, SS. Credit not allowed for both PLCC 110 and PL 101.

Identify, analyze, and evaluate real arguments in everyday life, politics, the sciences, and the professions. (GT-AH3)

PL 112 03(3-0-0). Reasoning and Problem Solving. F.

Creative and critical techniques in problem solving and decision making.

PLCC 120 03(3-0-0). History and Philosophy of Scientific Thought. (AUCC 3D). F, S.

Historical development of western, scientific world view from ancient times to the 20th century.

PLCC 130 02(2-0-0). Bioethics and Society. (AUCC 3G). S.

Major issues in bioethics.

PLCC 170 03(2-0-1). World Philosophies. (AUCC 3E). F.

Philosophies of North America, Mesoamerica, West Africa, South Asia, and East Asia.

PL 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.

PL 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.

PL 192 03(0-0-3). Conceptions of the Good Life. F, S.

Explores conceptions of happiness and human flourishing in philosophy and everyday life.

PL 204 03. Ethics in America. F, S, SS. Offered as telecourse only.

Ethical problems in contemporary society.

PL 205 03(3-0-0). Introduction to Ethics. F, S. Prerequisite: Sophomore standing or higher or written consent of instructor.

Problems and theories concerning values and standards, right action, and the good life.

Courses of Instruction

PL 206 03(3-0-0). Knowledge and Existence-An Introduction. F, S. Prerequisite: Sophomore standing or higher or written consent of instructor. Problems and theories concerning knowledge, being, nature of the world.

PL 210 03(3-0-0). Introduction to Formal Logic. F, S. Prerequisite: Sophomore standing or higher or written consent of instructor. Elementary principles, techniques in propositional and predicate logic.

PL 251 03(3-0-0). Feminist Philosophies. F. Conceptual, moral, and social analysis of women's issues from a variety of philosophical feminist perspectives.

PL 270 03(3-0-0). Issues in the Study of Religion. F, S. Prerequisite: Sophomore standing or higher or written consent of instructor. Contemporary religion, its nature, types, forms of expression.

PL 295 Var [1-3]. Independent Study.

PL 297 Var [1-3]. Group Study.

PL 300 03(3-0-0). Ancient Greek Philosophy. F, S, SS. Prerequisite: PL 205 or PL 206 or PL 210. Philosophy of ancient Greece emphasizing Plato and Aristotle.

PL 301 03(3-0-0). 17th and 18th Century European Philosophy. S. Prerequisite: PL 206 or PL 210 or PL 300. Philosophy from the scientific revolution through Kant.

°PL 302 03(3-0-0). 19th-Century Philosophy. F. Prerequisite: PL 301. Major figures, movements, concepts in Europe and America from about 1800 to early 20th century.

PL 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.

PL 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.

°PL 315 03(3-0-0). Philosophy of Language. S. Prerequisite: PL 105 or PL 205 or PL 206 or PL 210 or any upper-division course in philosophy. Basic concepts and principles in the theory of language.

PL 318 03(3-0-0). Aesthetics-Visual Arts. F, S. Central, traditional, and contemporary theories of the nature of visual arts.

PL 325 03(3-0-0). Philosophy of Natural Science. F. Prerequisite: PL 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.

PL 327 03(3-0-0). Philosophy of Behavioral Sciences. S. Prerequisite: PL 105 or PLCC 120 or PL 205 or PL 206 or PL 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.

PL 330/A 330 03(3-0-0). Agricultural Ethics. S. Credit not allowed for both PL 330 and A 330. Basic concepts in ethics and their application to agriculture.

PL 345 03(3-0-0). Environmental Ethics. F, S. Prerequisite: Sophomore standing or higher or written consent of instructor. Scientific, philosophical, and religious concepts of nature as they bear on human conduct; an ecological perspective.

°PL 348 03(3-0-0). Philosophy of Literature and the Arts. S. Aesthetic and philosophical issues in literature and the arts.

PL 349 03(3-0-0). Philosophy of Tao and Zen. S. Prerequisite: Written consent of instructor. Philosophical view of China and Japan.

PL 350 03(3-0-0). Social and Political Philosophy. F, S. Prerequisite: PL 105 or PL 205 or PL 206 or any upper-division course in philosophy. Moral relationships between persons and institutions.

PL 351 03(3-0-0). Interpreting the New Testament. S. Contemporary methods of New Testament interpretation.

***PL 352 03(3-0-0). Philosophy of History.** S. Prerequisite: PL 105 or PL 205 or PL 206 or any upper-division course in philosophy. Conceptions of human existence in its historical, social, cultural dimensions.

°PL 355 03(3-0-0). Philosophy of Religion. F. Prerequisite: PL 106 or PL 171 or PL 172 or PL 270. Philosophical analysis of nature of religion and structure of meaning in religious discourse.

°PL 359 03(3-0-0). Philosophy of Humans. F. Prerequisite: PL 105 or PL 205 or PL 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.

PL 360 03(3-0-0). Topics in Oriental Philosophy. S. Prerequisite: Sophomore standing or higher or written consent of instructor. Examination of major philosophical topics from ethics, sociopolitical philosophy, metaphysics, aesthetics.

PL 366 03(3-0-0). Philosophy of Aging. S. Philosophical problems related to experience of growing old.

PL 370 03(3-0-0). Contemporary Western Religious Thought. F. Prerequisite: PL 106 or PL 171 or PL 172 or PL 270. Contemporary interpretations of significant Western religious traditions.

°PL 371 03(3-0-0). Contemporary Eastern Religious Thought. S. Transformation of Indian and Chinese religious thought in the modern period.

***PL 372 03(3-0-0). Meaning and Truth in Religion.** F. Prerequisite: PL 106 or PL 171 or PL 172 or PL 270. Nature, variety, functions, interpretation, evaluation of religious language.

PL 375 03(3-0-0). Science and Religion. S. Prerequisite: PL 106 or PL 171 or PL 172 or PL 270. Encounter of religious belief with Western science, influences on each other, present relations.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

PL 379 03(3-0-0). Mysticism East and West. F. Prerequisite: PL 106 or PL 171 or PL 172 or PL 270.

Varieties of mystical experience in selected Eastern and Western representatives.

PL 384 Var [1-5]. Supervised College Teaching. F, S. Maximum of 10 credits allowed in course.

Teaching basic philosophy courses.

PL 407 03(3-0-0). Phenomenology and Existentialism. F. Prerequisite: PL 205 or PL 206 or PL 300 or PL 301.

Methods, epistemology, metaphysics, axiology, ethics of 20th-century phenomenologists and existentialists.

PL 409 03(3-0-0). 20th-Century Philosophy. S. Prerequisite: PL 301.

Major figures, trends, and concepts in 20th-century philosophy:

PL 410 03(3-0-0). Formal Logic. F, S. Prerequisite: PL 210 or CS 270.

Quantification theory; axiomatic systems; rigorous axiomatization of some logical or mathematical theory.

PL 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.

PL 425 03(3-0-0). Epistemology. S. Prerequisite: PL 210 or PL 300 or PL 301.

Concepts, problems, and theories of knowledge.

PL 435 03(3-0-0). Metaphysics. F. Prerequisite: PL 210 or PL 300 or PL 301.

Philosophical problems concerning nature, structure, and basic constituents of reality.

°PL 438 03(3-0-0). Philosophy of Mind. S. Prerequisite: PL 300 or PL 301 or PL 302 or PL 315 or PL 325 or PL 327 or PL 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.

PL 447 03(3-0-0). Ethical Theory. F. Prerequisite: PL 205 or PL 300 or PL 301.

Fundamental problems and options in ethical theory.

PL 455 03(3-0-0). Islamic Philosophy. S. Prerequisite: PL 206, PL 210, or written consent of instructor.

Development of philosophical thought in early, middle, and late Muslim civilization.

PL 460 03(3-0-0). Seminar in Great Philosophers. F. Prerequisite: PL 300 or PL 301 or PL 302. Maximum of 9 credits allowed in course.

Works of one major figure in the history of philosophy.

PL 461 03(3-0-0). Topics in Philosophical Problems. S. Prerequisite: PL 300 or PL 301 or PL 302.

Thorough examination of a major philosophical problem.

PL 462 03(0-0-3). Capstone Seminar. F, S. Prerequisite: Senior standing and any two of the following courses: PL 300, PL 301, PL 302, PL 409.

In-depth, integrative study of major topics, texts, and problems in both philosophy and religion.

PL 463 03(0-0-3). Seminar in Religious Studies. F, S, SS.

PL 479 03(3-0-0). Comparative Religions-Suffering and Evil. F. Prerequisite: PL 171 or PL 172 or PL 270; 300-level religious studies course.

Comparative study of experiences and concepts of suffering and evil in several world religions.

PL 495 Var [1-9]. Independent Study.

PL 497 Var [1-9]. Group Study.

PL 499 03(0-0-3). Thesis. Prerequisite: Written consent of department head.

PL 500 03(0-0-3). Seminar in Major Philosophical Texts. F. Prerequisite: Admitted graduate student or written consent of instructor.

Intensive study of one or two major works in the history of philosophy.

PL 525 03(0-0-3). Seminar in Epistemology. F. Prerequisite: PL 425.

Analysis of contemporary theories of knowledge.

PL 527 03(0-0-3). Seminar in Philosophy of Science. S. Prerequisite: PL 325 or PL 327 or PL 415.

Systematic survey of major 20th-century philosophies of science.

°PL 545 03(3-0-0). Concept of Natural Value. S. Prerequisite: PL 345.

Philosophical analysis of nature as a value carrier. Types of value associated with nature, their interrelations.

PL 547 03(0-0-3). Seminar in Ethical Theory. S. Prerequisite: PL 447.

Systematic and historical overview of 20th-century theories of meta-ethics.

PL 550/IE 550 03(3-0-0). Ethics and International Development. F. Prerequisite: Written consent of instructor. Credit not allowed for both PL 550 and IE 550.

Ethical reflection applied to development goals, strategies of Third World countries; relations between developed and developing countries.

***PL 555 03(0-0-3). Seminar in Philosophical Models of Nature.** F. Prerequisite: Written consent of instructor.

Comparative inquiry into the Anature@ of nature as viewed by philosophers of the past and present.

***PL 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.

°PL 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.

°PL 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.

PL 570 03(0-0-3). Seminar in Contemporary Philosophical Theory. S. Prerequisite: PL 500.

Major concepts and problems in current philosophical theory.

PL 593 03(0-0-3). Seminar.

PL 662 03(0-0-3). Seminar. F, S, SS.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

°PL 666/°CM 666 03(3-0-0). **Science and Ethics.** S. Credit not allowed for both PL 666 and CM 666.

Ethical issues of research on humans and animals; biosafety; fraud and deception in science; genetic engineering.

PL 684 Var [1-5]. **Supervised College Teaching.** F, S.

PL 695 Var [1-9]. **Independent Study.**

PL 697 Var [1-9]. **Group Study.**

PL 699 Var [1-9]. **Thesis.**

POLITICAL SCIENCE COURSES (PO)

Department of Political Science *College of Liberal Arts*

POCC 101 03(3-0-0). American Government and Politics. (AUCC 3C and 3F). F, S, SS. Credit not allowed for both POCC 101 and POCC 192A.

Principles, structures, and processes of American national government.

POCC 103 03(3-0-0). State and Local Government and Politics. (AUCC 3C and 3F). F, S. Credit not allowed for both POCC 103 and POCC 192B.

Principles, organization, and operation of American state and local government.

POCC 131 03(3-0-0). Current World Problems. (AUCC 3D or 3E). F, S. Background and nature of international political events.

POCC 232 03(3-0-0). International Relations. (AUCC 3C or 3D). F, S. Credit not allowed for both POCC 232 and POCC 192C.

Basic concepts and approaches in international relations.

POCC 241 03(3-0-0). Comparative Government and Politics. (AUCC 3C or 3E). S. Credit not allowed for both POCC 241 and POCC 192D.

Major foreign political systems stressing cross-national comparison of political forces, parties, ideologies, and institutions. (Ω-O)

PO 301 03(3-0-0). Political Parties and Interest Groups. F. Prerequisite: POCC 101.

Institutional and behavioral features of American political parties and interest groups.

PO 304 03(3-0-0). Legislative Politics. F, S. Prerequisite: POCC 101.

Structure, organization, behavior, processes, and policy implications of U.S. legislatures.

PO 305 03(3-0-0). Judicial Politics. F. Prerequisite: POCC 101.

Allocation of powers among judicial structures in American federal system.

PO 306 03(3-0-0). Executive Politics. F. Prerequisite: POCC 101.

Structure, organization, behavior, processes, and policy implications of U.S. executive leadership.

PO 309 03(3-0-0). Urban Politics. F, S. Prerequisite: POCC 101 or POCC 103.

Governmental structures and political processes in urban government.

PO 320 03(3-0-0). Empirical Political Analysis. F, S.

Methods of empirical political inquiry.

PO 321 01(0-2-0). Empirical Political Analysis Laboratory. F, S. Corequisite: PO 320.

Laboratory applications of empirical research methods.

PO 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.

PO 332/EC 332 03(3-0-0). International Political Economy. F, S. Prerequisite: EACC 202 or ECCC 202 and POCC 232. Credit not allowed for both PO 332 and EC 332.

Theories on relations between international politics and economics. Policy implications of different theories and case studies.

PO 341 03(3-0-0). Western European Government and Politics. F. Prerequisite: POCC 241.

Politics in Western European countries such as Britain, France, and Germany, and countries influenced by European traditions.

PO 345 03(3-0-0). Russian, Central, and East European Politics. S. Prerequisite: POCC 241.

Political structures and processes in Russia, Central and East Europe, and selected post-Communist countries.

PO 351 03(3-0-0). Public Administration. F, S, SS. Prerequisite: POCC 101.

Government organization and management; decision processes; political and intergovernmental relations in administration.

PO 361 03(3-0-0). U.S. Environmental Politics and Policy. F, S, SS. Prerequisite: POCC 101.

Public and contemporary issues relating to U.S. environmental policy. (Ω-O)

PO 362 03(3-0-0). Global Environmental Politics. F, S, SS. Prerequisite: POCC 232 or POCC 241.

Cross-national and international contexts of environmental politics and policy.

PO 371 03(3-0-0). U.S. Space Policy. F.

Analysis of U.S. space politics, space law, and space policy making (Ω-O)

PO 405 03(3-0-0). Race and Ethnicity in U.S. Politics. S. Prerequisite: POCC 101.

Relationships among American racial/ethnic groups, political attitudes, behavior; race and ethnicity roles in elections; implications for public policy.

PO 409 03(3-0-0). Regional Governance. F, S. Prerequisite: POCC 101 or POCC 103.

Governance processes and public policies in metropolitan regions.

PO 410 03(3-0-0). American Constitutional Law. F. Prerequisite: POCC 101.

Allocation of powers among structures in American federal system.

PO 413 03(3-0-0). U.S. Civil Rights and Liberties S, SS. Prerequisite: POCC 101.

U.S. Constitutional provisions and cases pertaining to the rights and liberties of individuals.

PO 420 03(3-0-0). Western Political Theory. F, S.

Issues and texts related to tradition of Western political theory. (Ω-O)

PO 421 03(3-0-0). Modern Political Theories. F.

Major political theories and ideologies of modern times.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

PO 423 03(3-0-0). American Political Theories. S. Prerequisite: POCC 101.

Major American theories and ideologies: their development and present uses.

PO 431 03(3-0-0). International Law. F, S. Prerequisite: POCC 232.

Rules and obligations for conduct of relations among states and other international entities.

PO 433 03(3-0-0). International Organization. F, S. Prerequisite: POCC 232.

History, development, structure, process, and activity of selected public international organizations.

PO 435 03(3-0-0). United States Foreign Policy. F, S, SS. Prerequisite: POCC 232.

Institutions, responsibilities, processes, and issues in formulation and execution of U.S. foreign policy.

PO 436 03(3-0-0). Comparative Foreign Policy. S. Prerequisite: POCC 232; POCC 241.

Effect of varying international and domestic contexts on foreign policy choices and outcomes across different countries, cultures, issues, and time.

PO 437 03(3-0-0). American Security Policy. F, S.

Formulation and execution of U.S. security policy. (Ω-O)

PO 444 03(3-0-0). Comparative African Politics. S, SS. Prerequisite: POCC 241.

African political systems focusing on precolonial, colonial influences; rise of nationalism; approaches to new political order; influences of development.

PO 445 03(3-0-0). Comparative Asian Politics. F, SS. Prerequisite: POCC 241.

East and South Asian political systems emphasizing issues of development, political culture, and institutional change.

PO 446 03(3-0-0). Politics of South America. F, S. Prerequisite: POCC 241.

South American political actors and institutions with emphasis on themes of development, democracy, revolution, and international affairs.

PO 447 03(3-0-0). Politics in Mexico, Central America, Caribbean. F, S. Prerequisite: POCC 241.

Mexican politics with comparison to one or more Central American and Caribbean countries.

PO 460 03(3-0-0). Public Policy Process. F, S. Prerequisite: POCC 101.

Explanations of policy formation, implementation, and impact.

PO 486A-B. Practicum.

+A) Legislative politics 06(0-8-2). (\$ B) Government Var [1-6].

PO 492 03(0-0-3). Capstone Seminar. Prerequisite: Upper-division course in at least four subfields of political science.

PO 495 Var. Independent Study.

PO 500 03(3-0-0). Governmental Politics in the U.S. F, S. Prerequisite: Three upper-division credits in American politics with grade of B or better.

Selected primary source materials on performance of government officials and institutions at federal, state, and local levels.

PO 501 03(3-0-0). Citizen Politics in the U.S. F, S. Prerequisite: Three upper-division credits in American politics with grade of B or better.

Selected primary source materials on behavior of individuals and groups in American politics.

PO 520 03(3-0-0). Theories of Political Action. F, S. Prerequisite: PO 420 or PO 421 or written consent of instructor.

Intensive review of primary material on Western political thought.

PO 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.

PO 531 03(3-0-0). Policy Making, Diplomacy, and World Politics. F, S. Prerequisite: Three upper-division credits in international relations with grade of B or better.

Theories of policy making and bargaining in international politics as applied to different countries, organizations, and historical periods.

PO 532 03(3-0-0). Governance of the World Political Economy. F, S. Prerequisite: 9 upper division credits in international relations with grade of B or better or written consent of instructor.

Theoretical and practical debates on the organization and governance of the world political economy.

PO 540 03(3-0-0). Comparative Politics. F, S. Prerequisite: Three upper-division credits in comparative politics with grade of B or better.

Theories, methods, and approaches to study of comparative politics.

PO 541 03(3-0-0). Political Economy of Change and Development. F, S. Prerequisite: Three upper-division credits in comparative politics with grade of B or better.

Responses of the state and its institutions to political, economic, and social change.

PO 550 03(3-0-0). Advanced Public Administration. F, S. Prerequisite: PO 351, written consent of instructor.

Overview of study of public administration; recent developments in theory and practice.

PO 552A-C 03(3-0-0). Topics in Public Administration. F, S. Prerequisite: PO 351 and GPA of 3.00 or better.

A) Personnel. B) Budgeting and finance. C) Regulation.

PO 620 03(3-0-0). Approaches to the Study of Politics. F. Prerequisite: Fifteen credits in political science.

PO 621 03(3-0-0). Qualitative Methods in Political Science. S. Prerequisite: S 311 or PO 620 or concurrent registration. Credit not allowed for both PO 621 and S 610.

Research design, data gathering and organization, ethical issues, and computer applications in qualitative political research.

PO 625 03(3-0-0). Quantitative Methods of Political Research. S. Prerequisite: PO 320.

Quantitative approaches and methods for study of political life.

PO 626 01(0-2-0). Political Research Laboratory. S. Prerequisite: PO 321, concurrent registration in PO 625.

PO 652 03(0-0-3). Public Organization Theory. F. Prerequisite: PO 351 or written consent of instructor.

Theories of behavior of individuals and organizations in government bureaucracies.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

PO 660 03(3-0-0). Theories of the Policy Process. F, S. Prerequisite: PO 351 or PO 460.

Recent developments in policy analysis.

PO 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.

PO 684 Var [1-3]. Supervised College Teaching. F, S, SS. Prerequisite: One year of graduate work.

PO 692 03(0-0-3). Seminar in Environmental Policy.

Topics in domestic and/or global environmental policy.

PO 695 Var. Independent Study.

PO 699 Var. Thesis.

PO 709 03(3-0-0). Environmental Politics in the U.S. F, S. Prerequisite: PO 500 or PO 501; PO 670.

Selected primary materials on governmental performance, groups, and mass public in American environmental politics.

PO 729 03(3-0-0). Political Theory and the Environment. F, S. Prerequisite: PO 520, PO 670.

Political thought applied to questions of the environment.

PO 739 03(3-0-0). International Environmental Politics. F, S. Prerequisite: PO 530, PO 670.

Theories and methodologies used in analyzing international environmental politics and policy.

PO 749 03(3-0-0). Comparative Environmental Politics. F, S. Prerequisite: PO 670; PO 540 or PO 541.

Application of comparative political theory to analysis of environmental politics.

PO 759 03(3-0-0). Environmental Policy and Administration. F, S. Prerequisite: PO 670.

Effects of regulation, intergovernmental relations, and resource availability on federal environmental programs in U.S.

PO 795 Var. Independent Study.

PO 799 Var. Dissertation.

PSYCHOLOGY COURSES (PY)

Department of Psychology ***College of Natural Sciences***

PYCC 100 03(3-0-0). General Psychology. (AUCC 3C). F, S, SS.

Principles of psychology emphasizing empirical approaches; theories and research on learning, individual differences, perception, social behavior. (Ω-T)

PY 121 01(1-0-0). Health and the Mind. F, S.

Maintenance of positive mental health.

PY 175/HD 175 03. Developmental Psychology Across the Life Span. F, S, SS. Credit not allowed for both PY 175 and HD 175. Offered as telecourse only.

Theory and research on physical, cognitive, and psychosocial human development across the life span. (Ω-T)

PYCC 228 03(3-0-0). Psychology of Human Sexuality. (AUCC 3G). F, S, SS.

Physiology, psychology of human sexuality; cross cultural issues, development, social perspectives, values, sexual dysfunction. (Ω-C)

PY 250 04(4-0-0). Experimental Psychology. F, S, SS. Prerequisite: PYCC 100.

Design, analysis, and reporting of psychological research; learning, motivation, psychophysics, magnitude estimation, and signal detection.

PY 260 03(3-0-0). Child Psychology. F, S, SS. Prerequisite: PYCC 100.

Description and explanation of development of human behavior emphasizing theory and research concerned with infant and child.

°PY 275 03(3-0-0). Psychology of Creativity. F. Prerequisite: PYCC 100, PY 250.

Psychological and context influences on creativity; creativity implications and outcomes.

¹PY 295 Var [1-3]. Independent Study.

Individual investigation of a special topic in psychology under direction of faculty.

¹PY 296 Var [1-3]. Group Study.

Collective investigation of a special topic in psychology under direction of faculty.

PY 310 03(3-0-0). Basic Counseling Skills. S. Prerequisite PYCC 100.

Psychologically-based interpersonal communication skills; rapport thinking, gathering information and bringing about change in others.

PY 315 03(3-0-0). Social Psychology. F, S, SS. Prerequisite: PYCC 100.

Social psychological theory and research findings emphasizing research methodology; applications to contemporary social problems.

PY 316 03(3-0-0). Environmental Psychology. F, S, SS. Prerequisite: PYCC 100.

Social psychological theory and research on effects of behavior on the environment; environmental influences on behavior. (Ω-C)

PY 317 02(0-4-0). Social Psychology Laboratory. F, S, SS. Prerequisite: PY 250; concurrent registration in PY 315.

Review of research techniques in social psychology. Computer simulations with applications to contemporary social problems.

PY 320 03(3-0-0). Abnormal Psychology. F, S, SS. Prerequisite: PYCC 100.

Definition and description of behavior pathology; theory and research on factors in etiology and treatment of behavior disorders. (Ω-T)

PY 325 03(3-0-0). Psychology of Personality. F, S, SS. Prerequisite: PYCC 100.

Theory and research related to personality as a psychological concept; analytic, phenomenological, and behavioristic views.

¹Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PY 295, PY 296, PY 384, PY 486, PY 488, PY 495, PY 496, PY 498, PY 499; enrollment limited to one per student per semester.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

PY 327 03(2-0-1). Psychological Perspectives on Female Experience. S. Prerequisite: PYCC 100.

Contemporary theory and research focusing on emotional, cognitive, biosocial, and interpersonal contributions to female identity and sex role.

***PY 330 03(3-0-0). Clinical and Counseling Psychology.** S. Prerequisite: PYCC 100.

Specialty areas, conceptualization of clients, assessment, intervention techniques for behavior change, research methods, ethical issues.

PY 340 03(3-0-0). Organizational Psychology. F. Prerequisite: PYCC 100, STCC 201, concurrent registration in PY 341.

Theories and research on interpersonal relations, work group processes, decision making, power, and change strategies within organizations.

PY 341 01(0-2-0). Organizational Psychology Laboratory. F. Prerequisite: PY 250; concurrent registration in PY 340, departmental statistics requirement.

Application of organizational psychology through simulations and field involvements.

PY 352 03(3-0-0). Psychology of Learning. F, S, SS. Prerequisite: PYCC 100 or written consent of instructor.

Current research and theoretical issues on reinforcement, punishment, extinction, generalization, discrimination learning, transfer, and retention.

PY 370 03(3-0-0). Psychological Measurement and Testing. F, S. Prerequisite: PYCC 100, STCC 301 or STCC 311, concurrent registration in PY 371.

Measurement theory including scale properties, reliability, and validity; construction and evaluation of psychological tests.

PY 371 01(0-2-0). Psychological Measurement and Testing Laboratory. F, S. Corequisite: PY 370.

Exercises and problems in test administration, norming, reliability, validity, and scale construction. (\$)

¹PY 384 Var [1-3]. Supervised College Teaching. F, S, SS. Prerequisite: PYCC 100, written consent of department head. Maximum of 10 credits allowed in course.

Supervised teaching, training, and discussion leadership in undergraduate courses.

PY 401 03(3-0-0). History and Systems of Psychology. F, S, SS. Prerequisite: PYCC 100; PL 105 or PLCC 120.

Philosophical and scientific underpinnings of psychology; major historical developments in psychology; schools of psychological thought.

PY 437 03(3-0-0). Psychology of Gender. F.

Psychology of gender in cultural context.

PY 440 03(3-0-0). Industrial Psychology. S. Prerequisite: PYCC 100, STCC 201, concurrent registration in PY 441.

Problems and procedures in selection and classification of personnel; work motivation; job satisfaction; leadership.

PY 441 01(0-2-0). Industrial Psychology Laboratory. F. Prerequisite: PY 250; concurrent registration in PY 440; departmental statistics requirement.

Laboratory and field experiences in job analysis, selection strategies, performance appraisal, and criterion development.

PY 452 03(3-0-0). Cognitive Psychology. F, S. Prerequisite: PYCC 100 or written consent of instructor.

Human thinking and information processing as related to attention, pattern recognition memory, forgetting, hypothesis testing, and problem solving. (Ω-C)

PY 453 02(0-4-0). Cognitive Psychology Laboratory. F, S, SS. Prerequisite: PY 250; PY 452 or concurrent registration.

Exercises in laboratory research in perceptual processes, attention, memory, language, problem solving, and decision making.

PY 454A-B 03. Physiological Psychology. F, S. Prerequisite: A) PYCC 100 or written consent of instructor. B) PY 250.

Neuroanatomical and neurophysiological basis of behavior, relationships among anatomy and physiology and motivation, emotion, learning, memory, and sleep. A) 03(3-0-0). B) 03(2-0-1).

PY 455A-B 02(0-4-0). Physiological Psychology Laboratory. F, S, SS. Prerequisite: PY 250; concurrent registration in PY 454A or B.

Research techniques in physiological psychology: A) Animal research emphasis; animal care, surgery, brain stimulation and recording, histology. (\$) B) Human research emphasis; functional neuroanatomy (human brains), clinical neuropsychology. (\$)

PY 456 03(3-0-0). Sensation and Perception. F. Prerequisite: PY 250.

Review of research on physiological substrates of sensation; methods of scaling sensory experience; role of perception in behavioral adaptation.

PY 457 02(0-4-0). Sensation and Perception Laboratory. F, S, SS. Prerequisite: PY 250; PY 456 or concurrent registration.

Review of research on physiological substrates of sensation; methods of scaling sensory experience; role of perception in behavioral adaptation.

PY 460 03(3-0-0). Child Exceptionality and Psychopathology. F, S, SS. Prerequisite: PYCC 100.

Definition and description of child exceptionality and psychopathology; theory and research in etiology, educational implications, and treatment.

PY 465 03(3-0-0). Adolescent Psychology. F, SS. Prerequisite: PYCC 100.

Contemporary theory and research on adolescence including physiological and psychological changes, social influences.

¹PY 486 Var [1-3]. Practicum.

Supervised work experience in approved psychological setting with periodic consultation of faculty.

¹PY 488 Var [1-3]. Field Placement. F, S, SS.

Supervised affiliation with and/or service work in approved psychological setting.

PY 492 Var [1-3]. Seminar. Prerequisite: For psychology majors or written consent of instructor.

Special topics in psychology; may include psychology of women, psychology of religion, and clinical psychology.

¹PY 495 Var [1-3]. Independent Study.

Individual investigation of a special topic in psychology under direction of faculty.

¹PY 496 Var [1-3]. Group Study.

Collective investigation of a special topic in psychology under direction of faculty.

¹PY 498 Var [1-3]. Research.

Independent research project culminating in formal research paper.

¹PY 499 Var [1-6]. Thesis.

Independent research project culminating in a thesis presented to a faculty committee.

^oPY 515 03(0-0-3). Women's Health. F. Prerequisite: WS 200 or written consent of instructor.

Current issues in women's health.

^o Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

***PY 517/*IE 517 03(0-0-3). Perspectives in Global Health.** S. Prerequisite: STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311. Credit not allowed for both PY 517 and IE 517.

Science, skills, and beliefs directed at the maintenance and improvement of health for all people.

PY 595 Var. Independent Study.

Individual investigation of a special topic in psychology under direction of faculty.

PY 596 Var. Group Study.

Collective investigation of a special topic in psychology under direction of faculty.

PY 600A-L 03(3-0-0). Advanced Psychology. F, S. Prerequisite: 15 credits in psychology. A) PY 401. B) and C) PY 454A or B. D) PY 456. E) PY 352. F) and L) PY 452. G) PY 315. H) PY 260. I) PY 325. K) PY 370. Credit not allowed for both PY 600D and NB 600.

A) History. B) Physiological. C) Neuropsychology. D) /NB 600 Sensation and perception. E) Animal learning. F) Human learning and memory. G) Social. H) Developmental. I) Personality. K) Measurement. L) Human performance: motor and intellectual capacities.

PY 610 02(2-0-0). Counseling and Clinical Pre-practicum I. F. Prerequisite: Written consent of instructor.

Basic assessment and intervention skills; accurate observation, conceptualization, and response.

PY 611 02(1-0-1). Counseling and Clinical Pre-practicum II. S. Prerequisite: PY 610.

Counseling and clinical techniques; assessment and intervention strategies; special applications.

PY 643 03(3-0-0). Industrial/Organizational Psychology I. F. Prerequisite: PY 340, PY 440.

Integration of multiple perspectives for examining work organizations, roles, and relationships, and organizational entry and socialization.

PY 644 03(3-0-0). Industrial/Organizational Psychology II. S. Prerequisite: PY 643.

Multiple perspectives for examining individual and organizational development, orientation to organizations, and science and practice in industrial/organizational psychology.

PY 645 02(2-0-0). Industrial/Organizational Psychology at Work I. F. Prerequisite: PY 644, concurrent registration in PY 686C or PY 786C.

Integrating theory, research, and practice in industrial/ organizational settings. Assessment and development of applications of psychology in organizations.

PY 646 02(2-0-0). Industrial/Organizational Psychology at Work II. S. Prerequisite: PY 645, concurrent registration in PY 686C or PY 786C.

Development and application of scientific, ethical, and professional standards and competencies in applying psychology in industrial/organizational settings.

PY 652 04(3-2-0). Methods of Research in Psychology I. F. Prerequisite: STCC 201.

Psychological research emphasizing hypothesis testing and simple research designs, introducing general linear model approach.

PY 653 04(3-2-0). Methods of Research in Psychology II. S. Prerequisite: PY 652.

Advanced research designs emphasizing general linear model approach.

PY 655A-C 03(3-0-0). Research Issues and Models in Psychology. S. Prerequisite: PY 250.

Generation and development of research ideas, evaluating approaches, interpreting and reporting findings. A) Counseling. B) General-experimental. C) Industrial-organizational.

PY 670 03(3-0-0). Psychological Measurement-Personality. F. Prerequisite: PY 370.

Construction, administration, interpretation of objectional measures of personality including aptitudes, abilities, interests.

PY 672 03(3-0-0). Psychological Assessment. S. Prerequisite: PY 610, PY 670.

Use of test data to determine cognitive functioning and predict behavior; supervised test administration and interpretation.

PY 675 03(3-0-0). Ethics and Professional Psychology Practice. F. Prerequisite: PY 611.

Ethical practice of psychology, duty-to-warn statutes, Colorado law, problematic ethical situations.

PY 686A-D Var. Practicum. Prerequisite: PY 611 or PY 692B or C or D.

A) Counseling and diagnosis I. B) Experimental I. C) Industrial-organizational I. D) School I.

PY 692A-E Var. Seminar.

A) Counseling. B) General-experimental. C) Physiological. D) Social. E) Developmental.

PY 699A-C Var. Thesis.

A) Counseling. B) General-experimental. C) Industrial-organizational.

PY 720 03(3-0-0). Psychopathology. F. Prerequisite: PY 320.

Adult and child behavior pathology; theory, research, and methods related to etiology, defining characteristics, and maintaining causes.

PY 721 03(3-0-0). Models of Psychotherapy. F. Prerequisite: PY 720.

Overview of therapy theory including psychodynamic, behavioral, philosophical, information, systems, integrative/eclectic treatment approaches.

PY 722 03(3-0-0). Empirically Validated Therapies. S. Prerequisite: PY 720.

Outline of major empirically validated approaches to assessment and treatment including cognitive-behavioral therapies, interpersonal therapy.

PY 727 03(3-0-0). Theories of Vocational Development. S, SS. Prerequisite: PY 325.

Nature and current status of vocational development theory with implications for career counseling.

PY 729 03(3-0-0). Counseling and Psychotherapy II. S. Prerequisite: PY 721, PY 722.

Theory and practice of group psychotherapy and counseling.

***PY 754 03(3-0-0). Multivariate Analysis in Behavioral Sciences.** S. Prerequisite: PY 653.

Multivariate analysis, including factor and component analysis, applied to psychological research.

PY 775 03(3-0-0). Diversity Issues in Counseling. F. Prerequisite: PY 611.

Diversity issues in clients and counselors such as gender, race, age, sexual orientation, education, religion, disability, socioeconomic status.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

PY 784 Var. Supervised College Teaching. F, S.

Philosophy, approaches, and techniques of college-level instruction; supervised teaching with consultation of faculty.

PY 786A-F Var. Advanced Practicum. Prerequisite: PY 686A or B or C or D.

A) Counseling and diagnosis II. B) Experimental II. C) Industrial-organizational II. D) School II. E) Clinical. F) Supervision.

PY 787 Var. Internship.

Supervised work experience under departmental guidelines in approved psychological agency or setting.

PY 792A-G Var. Advanced Seminar. Prerequisite: PY 692A or B or C or D or E.

A) Counseling. B) General-experimental. C) Industrial-organizational. D) Learning. E) Physiological. F) Social. G) Sensation and perception.

PY 795 Var. Independent Study. Primarily for doctoral candidates in psychology.

Individual investigation of a special topic under direction of faculty.

PY 799A-C Var. Dissertation.

A) Counseling. B) General-experimental. C) Industrial-organizational.

RADIOLOGICAL HEALTH SCIENCES COURSES (R)

*Department of Environmental and Radiological Health Sciences
College of Veterinary Medicine and Biomedical Sciences*

R 300 03(3-0-0). Introduction to Radiation Biology. S. Prerequisite: LSCC 102, PHCC 121.

Genetic and somatic effects of radiation on cells, tissues, and the whole organism; tumor therapy; carcinogenesis; risks vs. benefits of radiation.

R 400 03(2-3-0). Radioisotope Techniques. F. Prerequisite: C CC 112, PHCC 122, R 300.

Radiation measurement, radiochemistry, waste management, radiotracer experiments. Prepares student to act as principal user in radiation laboratory.

R 455 03(2-2-0). Interactive Information Processing in Biology. F. Prerequisite: STCC 201.

Data management and analysis for biologists via interactive terminals.

R 530 03(3-0-0). Radiological Physics and Dosimetry I. F. Prerequisite: PHCC 122.

Theory and detection of ionizing radiation; measurement and calculation of exposure and dose.

R 532 02(1-3-0). Nuclear Instruments and Measurements. S. Prerequisite: R 530 or concurrent registration.

Instrument systems for measurement and identification of ionizing radiations.

R 550 05(5-0-0). Principles of Radiation Biology. S. Prerequisite: BY 310; R 300 or R 530.

Dose-response relationships; physical, chemical, and biological modification of radiation damage; radiation oncology; radiation genetics and oncogenesis.

R 561 02(2-0-0). Radiation Public Health. F, S. Prerequisite: R 530, R 550 or concurrent registration; or R 300 and R 400 with written consent of instructor.

Aspects of radiation public health for students in health physics with emphasis on contemporary issues in radiation protection.

R 563 02(2-0-0). Environmental Contaminant Modeling I. S. Prerequisite: M CC 155.

Mathematical modeling of radionuclide and chemical transport in aquatic and terrestrial ecosystems.

R 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.

R 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.

R 630 03(3-0-0) . Radiological Physics and Dosimetry II. S. Prerequisite: R 530.

Calculations and measurement techniques for dosimetry shielding and protection from ionizing radiations.

R 632 01(0-3-0). Techniques in Radiation Dosimetry. F. Prerequisite: R 630 or concurrent registration.

Techniques for determining the absorbed dose in tissue from ionizing radiations.

R 633 01(0-3-0). Radiation Detection Methods in Radiobiology. S. Prerequisite: R 630 or concurrent registration.

Detection and measurement of ionizing radiation appropriate for radiobiologists.

R 665 03(2-3-0). Radiochemistry. S. Prerequisite: C 114, M CC 155; R 530 or concurrent registration.

Radionuclide separation and measurement and radiotracer applications in physical and biological systems.

R 671 01(0-3-0). Experimental Radioecology. S. Prerequisite: Concurrent registration in R 570; R 400 or R 532.

Experimental techniques used in radioecological and environmental radioactivity studies.

R 699 Var. Thesis.

R 701 Var. Radiographic Technique. F, S, SS. Prerequisite: VM 786A or B.

Radiographic techniques and special procedures.

R 711 Var. Radiographic Interpretation. F, S, SS. Prerequisite: VM 786A or B.

Radiographic interpretation of disease processes of all major systems in large and small animals.

R 721 Var [1-3]. Radiation Oncology. F, S, SS.

Management of spontaneous and experimental tumors with emphasis on radiation therapy.

***R 751 03(3-0-0). Advanced Radiation Biology I.** F. Prerequisite: R 550.

Molecular and cellular mechanisms of radiation damage and repair; mammalian radiation genetics.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

°R 753 03(3-0-0). Advanced Radiation Biology II. S. Prerequisite: R 550.

Perturbations in cell cycle and cell population growth kinetics by radiation; radiation effects on normal tissues; radiation oncogenesis.

R 765 01(0-3-0). Environmental Contaminant Modeling II. SS.

Prerequisite: R 563, R 570.

Development and analysis of advanced computer models for radionuclide and chemical transport in aquatic and terrestrial ecosystems.

R 770 01(0-0-1). Radiation Biology Basic to Tumor Therapy. F, S, SS.

Prerequisite: Written consent of instructor.

Current aspects of radiation biology pertinent to improvements in radiation therapy.

R 784 Var. Supervised College Teaching. F, S, SS.

R 786 Var. Practicum. Prerequisite: R 530.

R 792 01(0-0-1). Seminar.

R 795A-M Var. Independent Study.

A) Small animal radiology. B) Large animal radiology. C) Special techniques in radiology. D) Radiation therapy. E) Radiation physics. F) Dosimetry. G) Radiation chemistry. H) Radiation biology. I) Radiological health. J) Radiation ecology. M) Space radiation health.

R 796 Var. Group Study.

R 799 Var. Dissertation.

RESTAURANT/RESORT MANAGEMENT COURSES (RM)

Department of Food Science and Human Nutrition

College of Applied Human Sciences

RM 101 03(3-0-0). Hospitality Industry. F, SS.

Food service, lodging, and tourism industries; exploration of various industry segments and career opportunities.

RM 200 03(3-0-0). Resort Operations. S. Prerequisite: RM 101 or written consent of instructor.

Front office and housekeeping management as related to resorts and hotels. Computer application, financial controls, employee and guest relations.

RM 330 02(2-0-0). Alcohol Beverage Control and Management. S. Prerequisite: C CC 103 or C CC 107.

Classification, production, and service of controlled beverages; management of facilities and people; safe service training; financial controls.

RM 350 03(3-0-0). Restaurant and Resort Marketing. F. Prerequisite: RM 101.

Restaurant and resort operations marketing, including planning, promotion, and special industry considerations.

RM 400 03(2-0-1). Food and Society. S. Prerequisite: S CC 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.

RM 415 03(0-6-0). Catering Techniques and Culinary Arts. F, S. Prerequisite: FN 311.

Management of advanced techniques in culinary technique; catering of food and beverages for special functions. (\$)

RM 460/RR 460 03(3-0-0). Event and Conference Planning. F, S.

Prerequisite: RM 101 or RR 100 or RR 270. Credit not allowed for both RM 460 and RR 460.

Foundation in planning, organizing, and producing special events and conferences. Functions and strategies for effective event management.

RM 492 03(3-0-0). Seminar on Restaurant and Resort Management. Prerequisite: RM 350.

Capstone seminar in strategic restaurant and resort management using case studies, term papers, group presentations, and strategic planning proposals.

NATURAL RESOURCE RECREATION AND TOURISM COURSES (RR)

Department of Natural Resource Recreation and Tourism

College of Natural Resources

RR 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.

RR 231 03(3-0-0). Principles-Parks/Protected Area Management. F.

Tools and strategies used by managers in parks and protected areas.

RR 261 03(3-0-0). Principles of Interpretation. F.

Principles for using interpretation as a tool for managing natural and cultural resources.

RR 270 03(3-0-0). Principles of Natural Resource Tourism. F.

Tourism and private commercial outdoor recreation industry in America.

RR 320 03(3-0-0). International Issues-Recreation and Tourism. F, S.

History, development, and preservation of international parks, preserves, tourist and historical sites.

RR 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.

RR 331 03(2-3-0). Management of Parks and Protected Areas. S. Prerequisite: RR 231, RR 330.

Comprehensive assessment of problems confronted by park professionals and the techniques and tools applied to their solution. (\$)

RR 350 03(2-2-0). Wilderness Leadership. F.

Practical and philosophical aspects of wilderness usage including safety, group dynamics, and backcountry skills.

RR 351 03(2-2-0). Wilderness Instructors. S. Prerequisite: RR 350 or written consent of instructor.

Preparation to safely lead and instruct groups in outdoor wilderness programs; further refine skills including judgment and leadership.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

RR 363 03(2-2-0). Outdoor Recreation Programming. F, S. Prerequisite: RR 231 or RR 261 or RR 270.

Develop administrative and program planning skills for private, public, and nonprofit recreation/tourism organizations.

RR 370 03(3-0-0). Managing Tourism in the E-Commerce Era. F, S. Prerequisite: RR 270.

E-commerce foundations, business models, and practices in the recreation and travel industry.

RR 371 03(2-1-0). Techniques in Interpretation. F. Prerequisite: RR 261.

Intermediate techniques in interpretation including exhibit design and construction, personal program development and visitor studies.

RR. 372 03(3-0-0). Tourism Promotion. F, S. Prerequisite: RR 270.

Planning development and implementation of marketing programs specifically applied to the recreation, travel, and tourism industries.

RR 375 03(2-2-0). Budgeting and Revenue Resources. F. Prerequisite: RR 231 or RR 261, or RR 270.

Budget development, presentation, types, techniques; computer-aided budgeting using spread sheets; revenue generating sources.

RR 376 03(2-2-0). Recreation Measurements. F, S. Prerequisite: STCC 201.

Recreation measurement techniques.

RR 384 Var. Supervised College Teaching. F, S, SS.

+RR 431 03(3-0-0). Park and Protected Area Management. S. Prerequisite: RR 231, RR 330.

Park management practices; preparation of park operation plans. (\$)

RR 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. (Ω-C)

RR 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. (Ω-C)

RR 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. (Ω-C)

RR 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. (Ω-C)

RR 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. (Ω-C)

RR 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. (Ω-C)

RR 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. (Ω-C)

RR 439 03(3-0-0). Open Space and Natural Area Management. S. Prerequisite: NR 440 or RR 431.

Acquisition of, planning for, and management of local government and private open space and natural areas.

RR 441 03(2-2-0). Spatial Analysis of Protected Areas. S. Prerequisite: NR 322 and RR 331.

Spatial analytical techniques used in planning and managing protected areas, including locating, managing, and assessing parks.

RR 442 03(3-0-0). Tourism Planning. F, S. Prerequisite: RR 270.

Planning for regional tourism resources and programs.

RR 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. (Ω-C)

RR 451 03. National Wilderness Preservation System. F, S, SS. Prerequisite: RR 450. Offered as correspondence course only.

Early history and key components of the Wilderness Act, wilderness legislation since 1964, and related natural systems. (Ω-C)

RR 452 04. Management of the Wilderness Resource. F, S, SS. Prerequisite: RR 451. Offered as correspondence course only.

Ecosystem characteristics, basic principles of wilderness management, and management of specific resources and nonconforming uses. (Ω-C)

RR 453 03. Management of Recreation Resources. F, S, SS. Prerequisite: RR 451. Offered as correspondence course only.

Managing for quality visitor experiences and for minimal recreation impacts; techniques for wilderness education/information. (Ω-C)

RR 454 03. Wilderness Management Planning. F, S, SS. Prerequisite: RR 451. Offered as correspondence course only.

Agency differences in planning, basic planning concepts, and the Limits of Acceptable Change. (Ω-C)

RR 455 03. Wilderness Management Skills and Projections. F, S, SS. Prerequisite: RR 451. Offered as correspondence course only.

Using primitive means to achieve management objectives, no-trace camping methods and volunteers, and expectations for the future. (Ω-C)

RR 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. (Ω-C)

RR 458 03. Planning for Off-Highway Vehicle Recreation. F, S, SS. Prerequisite: RR 457. Offered as correspondence course only.

Develop working knowledge of the planning tools, concept, and process for off-highway vehicle recreation. (Ω-C)

RR 459 03. Managing Off-Highway Vehicle Recreation. F, S, SS. Prerequisite: RR 457. Offered as correspondence course only.

Developing working knowledge of the management tools, techniques, trends, and challenges with off-highway vehicle recreation. (Ω-C)

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

RR 460/RM 460 03(3-0-0). Event and Conference Planning. S. Prerequisite: RM 101 or RR 100 or RR 270. Credit not allowed for both RR 460 and RM 460.

Foundation in planning, organizing, and producing special events and conferences. Functions and strategies necessary for effective event management.

RR 462 03(3-0-0). Environmental Communication-Natural Resources. S. Prerequisite: NR 365 or RR 261.

Exploration and application of theories, concepts, and techniques for successful environmental communication in natural resources.

RR 470 03(3-0-0). Tourism Impacts. F, S. Prerequisite: RR 270.

Social, cultural, physical, and economic impacts of tourism; techniques for assessing impacts.

RR 471 03(3-0-0). Starting and Managing Tourism Enterprise. F, S. Prerequisite: RR 231 or RR 261 or RR 270.

Aspects of starting and managing a tourism enterprise.

RR 483 Var [1-18]. Off-Campus Study. F, S, SS.

RR 487 Var. Internship.

RR 495A-C Var. Independent Study.

A) Administration. B) Management. C) Interpretation.

RR 496 Var. Group Study.

RR 499 Var. Senior Thesis.

Independent research project culminating in thesis presented to faculty mentor.

RR 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.

RR 550 03(3-0-0). Ecotourism. S. Prerequisite: RR 470.

Concept of ecotourism, impacts associated with ecotourism, and role of education/interpretation in mitigating these impacts.

RR 565 03(3-0-0). Research-Human Dimensions Natural Resources. F.

Theory, research, literature review, hypothesis development, scientific writing, proposal development.

RR 605 03(3-0-0). Recreation Behavior Theory. S. Prerequisite: RR 330.

Application of theories and conceptual approaches from social sciences to study of recreation behavior and natural resource issues.

RR 665 03(2-2-0). Survey Research and Analysis. S. Prerequisite: RR 565, STCC 301.

Survey research, design, and analysis in human dimensions of natural resources.

RR 695A-D Var. Independent Study.

A) Administration. B) Management. C) Interpretation. D) Landscape planning.

RR 698 Var. Research.

RR 699 Var. Thesis.

RR 765 03(2-2-0). Applied Multivariate Analysis. F. Prerequisite: RR 665.

Application and interpretation of multivariate statistics to human dimensions in natural resources, recreation, and tourism.

RR 784 Var. Supervised College Teaching. F, S, SS.

RR 798 Var. Research.

RR 799 Var. Dissertation.

RANGELAND ECOSYSTEM SCIENCE COURSES (RS)

Department of Forest Rangeland Watershed

Stewardship

College of Natural Resources

RS 300 03(3-0-0). Principles of Range Management. F, S, SS. Prerequisite: BZCC 120 or LS 103.

Conservation and management of rangeland-ecosystem values using sustainable practices. (Ω-O)

RS 320/SC 320 03(3-0-0). Forage and Range Management. S. Prerequisite: One course in biological sciences. Credit not allowed for both RS 320 and SC 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: RS 300, BZ 223 or F 210 or NR 220.

Production characteristics and ecological niches of important plants and their rangeland communities.

+RS 332 02(1-3-0). Range Measurements. F. Prerequisite: STCC 201 or STCC 301 or STCC 307/EHCC 307; RS 300 or concurrent registration; NR 220 or RS 331.

Field measurements of rangelands emphasizing vegetation sampling. (\$)

RS 351 03(3-0-0). Range Plant Production and Decomposition. F. Prerequisite: BY 220, RS 300, SC 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/SC 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 or written consent of instructor.

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/SC 320.

Secondary productivity and consumer functions at the organismal and ecosystem level. (Ω-O)

RS 470 02(2-0-0). Rangeland Economics and Analysis. F. Prerequisite: EA/EACC 202, RS 300.

Economics of rangeland resource use; analytical techniques for allocation of rangeland resources.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

RS 471 02(2-0-0). Rangeland Planning and Grazing Management. F. Prerequisite: RS 470 or concurrent registration.

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: BY 220 or BZ 450 or F 311; SC 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. (Ω-O)

RS 501 03(3-0-0). Range Habitat Manipulation. F. Prerequisite: RS 300 or RS 320/SC 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/SC 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. (Ω-O)

+°RS 532 03(3-0-0). **Range Ecosystem Sampling.** F. Prerequisite: STCC 301, ecology course.

Measurement, analysis techniques for rangeland vegetation. Applications to management emphasized.

RS 552 04(3-0-1). Range Animal Production and Management. F, S, SS. Prerequisite: One course in ecology and one course in animal or wildlife management.

Biological and ecological basis for production of meat from rangelands. (Ω-O)

°RS 578 03(3-0-0). **Ecology of Disturbed Lands.** S. Prerequisite: BY 220, SC 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: STCC 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. (Ω-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.

SOCIOLOGY COURSES (S)

Department of Sociology *College of Liberal Arts*

S CC 100 03(3-0-0). General Sociology. (AUCC 3C and 3F). F, S, SS.

Analysis of human societies in the U.S. and abroad; major institutions, groups, and interaction patterns from the sociological perspective.

S CC 105 03(3-0-0). Social Problems. (AUCC 3C and 3F). F, S.

Analysis of global and domestic social problems.

S 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.

S CC 205 03(3-0-0). Contemporary Race-Ethnic Relations. (AUCC 3E). F, S.

People of color and white ethnic groups in the U.S. and internationally.

S 253 03(3-0-0). Introduction to Criminal Justice. F, S, SS. Prerequisite: S CC 100 or S CC 105.

Criminal justice as a system. History, philosophy, components and administration of criminal justice.

S 301 03(3-0-0). Development of Sociological Thought. F, S. Prerequisite: S CC 100 or S CC 105.

Central themes in sociological thought from Enlightenment to present.

S 302 03(3-0-0). Contemporary Sociological Theory. F, S, SS. Prerequisite: S CC 100 or S CC 105.

Theoretical approaches and models in sociology.

S 310 03(3-0-0). Quantitative Sociological Analysis. F, S. Prerequisite: M CC 120A-B or M CC 117.

Application of quantitative concepts and methodology to investigation of social problems.

S 311 03(3-0-0). Methods of Sociological Inquiry. F, S, SS. Prerequisite: S CC 100 or S CC 105.

Application of sociological concepts to sociological problems including problem formulation, data gathering, and research design.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

S 313 01(1-0-0). Computer Methods in Sociology. F. Prerequisite: S 310 or written consent of instructor.

Experimental introduction to typical uses of computers in sociology with emphasis on data analysis.

S 320 03(3-0-0). Population-Natural Resources and Environment. F. Prerequisite: S CC 100 or S CC 105.

Population studies; world growth patterns and their relationship to natural resources and environment.

S 330 03(3-0-0). Social Stratification. F. Prerequisite: S CC 100 or S CC 105.

Theories of social inequality and mobility and their ramifications in American society. (Ω-O)

S 331 03(3-0-0). Community Dynamics and Development. F. Prerequisite: S CC 100 or S CC 105.

Nature of community: its institutions, problems and processes, including growth, disintegration, and development.

S 332 03(3-0-0). Comparative Majority-Minority Relations. S. Prerequisite: S CC 100 or S CC 105.

Discrimination, ideology, power, policy issues in the U.S. and selected societies; application of basic concepts in student's self appraisal.

S 333 03(3-0-0). Gender Roles in Society. F. Prerequisite: S CC 100 or S CC 105.

Analysis of social organization of gender in contemporary society, emphasizing roles and institutional linkages.

S 340 03(3-0-0). Bureaucracy and Modern Organizations. S. Prerequisite: S CC 100 or S CC 105.

Structure and function of large-scale organization: coordination of activities between organizations and society.

S 341 03(3-0-0). Sociology of Rural Life. S. Prerequisite: S CC 100 or S CC 105.

Rural life in U.S. and Third World societies: analysis of sociocultural systems, social differentiation, social institutions, and problems of social change. (Ω-T)

S 342 03(3-0-0). Leisure and Society. F, S, SS. Prerequisite: S CC 100 or S CC 105.

Nature and purpose of leisure and work in society; influences of culture and social structure on leisure values and behavior.

S 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.

S 352 03(3-0-0). Criminology. F, S, SS. Prerequisite: S CC 100 or S CC 105.

Crime in contemporary society; behavioral, causation, prevention, and justice issues.

S 354 03(3-0-0). Law Enforcement and Society. F, S. Prerequisite: S 253.

Rise and development of law enforcement as a societal reaction to crime.

S 355 03(3-0-0). Sociology of Law. F. Prerequisite: S 253.

Social origins, functions, and procedures of law in society.

S 358 03(3-0-0). Correctional Organizations. S. Prerequisite: S 253.

Social and organizational issues in the administration of punishment and correction.

S 359 03(3-0-0). Criminal Justice Ethics. F. Prerequisite: S 253.

Definitions and analysis of standards of ethical conduct in law enforcement, the courts, and corrections.

S 360 03(3-0-0). Political Sociology. S. Prerequisite: S CC 100 or S CC 105.

Analysis of power as a sociological concept, emphasizing competing theories of the state and power.

S 362 03(3-0-0). Social Change. S. Prerequisite: S CC 100 or S CC 105.

Sources of stability and stress in changing societies, consequences of planned and unplanned change; future trends.

S 364 03(3-0-0). Agriculture and Global Society. S. Prerequisite: S CC 100 or S CC 105.

Analysis of relationships between global agriculture and social change.

S 366 03(3-0-0). Peoples and Institutions of Latin America. F. Prerequisite: S CC 100 or S CC 105.

Change in the cultures and institutions of contemporary Latin America.

S 371 03(3-0-0). Symbolic Interaction. F, S. Prerequisite: S CC 100 or S CC 105.

Basic concepts and issues in sociological perspective of social action and interactionism.

S 372 03(3-0-0). Sociology of Deviance. F, S, SS. Prerequisite: S CC 100 or S CC 105.

Description, comparison, and analysis of theories and research of deviance.

S 375 03(3-0-0). Sociology of Religion and Medicine. F. Prerequisite: S CC 100 or S CC 105.

Descriptions and analyses of the roles and relationships of religion and medicine as modern social institutions.

S 403 03(0-0-3). Capstone Seminar. F, S. Prerequisite: S 310, S 311; S 301 or S 302; S 313.

Student demonstration of central concepts and procedures currently employed in sociology discipline.

***S 422/*AP 422 03(3-0-0). Comparative Legal Systems.** S. Prerequisite: APCC 100 or S CC 100. Credit not allowed for both S 422 and AP 422.

Traditional approaches to law, competing concepts of law in the global system, and experiences of minorities in state legal systems.

***S 429 03(3-0-0). Comparative Urban Studies.** S. Prerequisite: S CC 100 or S CC 105.

World urbanization and metropolitan development, measurement of growth and change in cities, and sociological perspective in planning.

S 444/ET 444 03(3-0-0). Federal Indian Law and Policy. S. Credit not allowed for both S 444 and ET 444.

Indian policy processes and their impact on Native lives and culture, particularly Native sovereignty.

S 460 03(3-0-0). Technology, Society, and Environment. F. Prerequisite: S CC 100 or S CC 105.

Technology as a social phenomenon interacting with social organization and the natural environment.

***S 461 03(3-0-0). Sociology of Water Resources.** S. Prerequisite: S CC 100 or S CC 105.

Social aspects of water resource utilization; interface of social organization with physical environment.

S 463 03(3-0-0). Sociology of Disaster. S. Prerequisite: S CC 100 or S CC 105.

Determinants and consequences of behavior and response to environmental extremes including floods, earthquakes, wind, severe storms, and technological emergencies.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

S 644 03(3-0-0). Environmental Justice. F, S. Prerequisite: S CC 100 or S CC 105.

Unequal distribution of environmental risks, benefits, policies, and regulatory practices across different populations.

***S 474 03(0-0-3). Social Movements and Collective Behavior.** S. Prerequisite: S CC 100, any ET course, or written consent of instructor.

Theory and research on causes, organizational structure, and outcomes of social movements and collective behavior.

S 487 03(0-9-1). Internship. Prerequisite: S 301 or S 302, S 310, S 311, S 313.

Academic-based work experience with selected organizations or agencies. Supervised application of sociological principles and seminar participation.

S 492 01(0-0-1). Seminar. F, S, SS. Prerequisite: S 301 or S 302; S 310; S 311; S 313; concurrent registration in S 487.

Examination of work-oriented instruction in seminar setting where sociological principles are analyzed using internship experience.

S 495 Var. Independent Study.

S 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.

S 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.

***S 502 03(3-0-0). Foundations of Theoretical Sociology.** F. Prerequisite: S 500 or concurrent registration.

Contributions of major sociological theorists prior to mid-20th century.

***S 510 03(3-0-0). Sociological Methods I.** F. Prerequisite: S 310 or S 311.

Linkage of sociological theory and conceptual models; case studies; data-gathering techniques.

***S 511 03(3-0-0). Sociological Methods II.** S. Prerequisite: S 510.

Linkage of sociological theory and conceptual models; case studies; data-gathering techniques.

***S 566/EA 566 03(3-0-0). Contemporary Issues of Developing Countries.** S. Prerequisite: Two or more courses in sociology and/or economics. Credit not allowed for both S 566 and EA 566.

Social, economic, and technological factors in developing countries.

***S 602 03(3-0-0). Contemporary Sociological Theory.** S. Prerequisite: S 502.

Contributions of major sociological theorists since mid-20th century.

***S 610 03(0-0-3). Seminar in Methods of Qualitative Analysis.** S. Prerequisite: S 311 or PO 620 or concurrent registration. Credit not allowed for both S 610 and PO 621.

Examination and application of qualitative techniques of analysis.

***S 612 03(0-0-3). Seminar in Methods of Evaluational Research.** S. Prerequisite: S 511.

Quantitative and qualitative techniques of evaluating social action programs.

***S 613 03(0-0-3). Seminar in Multiple Regression and Path Analysis.** F. Prerequisite: S 511.

Analysis and application of techniques for multiple regression and path analysis.

***S 614 03(3-0-0). Comparative Sociology.** S. Prerequisite: S 500.

Examination of problems and prospects in extending and carrying out sociological research across social systems.

***S 630 03(3-0-0). Social Stratification.** S. Prerequisite: S 500.

Theory and research on class structure, status attainment, ideology, and social change.

***S 631 03(3-0-0). Sociology of Rural Development.** F. Prerequisite: S 500.

Rural social organization and development, modernization, and social change as it relates to rural social systems; underdeveloped regions of world.

***S 633 03(3-0-0). Theories of Modern Organizations.** S. Prerequisite: S 340.

Comparison of various theoretical perspectives on functioning of modern large-scale organizations.

***S 639/CE 639 03(3-0-0). Technology Assessment and Social Forecasting.** F. Prerequisite: S 500. Credit not allowed for both S 639 and CE 639.

Interrelationship between technology and society emphasizing procedures for evaluating impacts and forecasting alternatives.

***S 660 03(3-0-0). Theories and Issues in Developmental Change.** F. Prerequisite: S 500.

Central concepts, issues, and approaches in sociology of development.

***S 661 03(0-0-3). Gender and Global Society.** S. Prerequisite: S 500.

Gender relations and social change in global society.

S 662 03(0-0-3). Seminar in Sociological Policy Analysis. S. Prerequisite: S 500.

Examination of sociological perspectives on formulation and impact of policies to deal with social problems.

***S 663 03(3-0-0). Sociology of Sustainable Development.** S. Prerequisite: S 500.

Social dimensions of sustainable Third World development and implications for policy.

***S 664 03(3-0-0). Sociology of Water Resources.** F. Prerequisite: S 500.

Social organization, conflict, and power in arid environments.

S 665 03(3-0-0). Sociology of Science and Technology. F. Prerequisite: Ten credits of undergraduate natural sciences; S CC 100.

Examination of connections among science, technology, and social development in national and global context.

***S 666 03(0-0-3). Globalization and Socioeconomic Restructuring.** S. Prerequisite: S 500.

Sociological theories and issues in globalization; socioeconomic restructuring of the world economy.

S 667 03(1-0-2). Theories of State, Economy, and Society. S. Prerequisite: S 500.

Major classical and contemporary sociological theories of state-economy-society relations emphasizing development.

S 669 03(0-0-3). International Stratification and Change. F. Prerequisite: S 500.

Major issues in global stratification and change from a historical and contemporary perspective.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

S 671 03(0-0-3). Metatheoretical Issues in Sociology. F. Prerequisite: S 502.

Analysis of metatheoretical concepts and issues in sociological theory.

S 695 Var. Independent Study.

S 696 Var [1-3]. Group Study. Maximum of 8 credits allowed in course.

S 699 Var. Thesis.

***S 708 03(0-0-3). Seminar in Theory Construction.** F. Prerequisite: S 602; S 610 or S 612 or S 613.

Techniques of integrating theory and research methods for macrosociological analysis.

***S 750 03(0-0-3). Seminar in Strategies of Applied Social Change.** F. Prerequisite: S 660.

Review and critique of intervention strategies.

°S 752 03(0-0-3). Seminar in Utopian Thought. F. Prerequisite: S 602.

Sociological analysis of major utopian writings.

***S 761 03(3-0-0). Social Choice.** S. Prerequisite: Two graduate-level courses in social science.

Evaluation of adequacy of traditional policy models as a basis for social action.

°S 763 03(0-0-3). Seminar in Social Conflict and Development. F. Prerequisite: S 660.

Critique of planning, social conflict, and development theories.

°S 768 03(3-0-0). Directed Social Change. S. Prerequisite: S 500.

Issues of directed social change.

S 784 Var. Supervised College Teaching. F, S, SS.

S 787 Var. Internship.

S 795 Var. Independent Study.

***S 797 03(0-0-3). Group Study in Developmental Change.** Prerequisite: S 660.

Critique of selected theories in developmental change.

S 799 Var. Dissertation.

STUDY ABROAD (SA)

Office of International Programs

SACC 482V. Study Abroad. (AUCC 3E).

Students participating in a semester study abroad program register for SACC 482V. This is not a course for credit.

SOIL AND CROP SCIENCES COURSES (SC)

Department of Soil and Crop Sciences College of Agricultural Sciences

SC 100 04(3-2-0). General Crops. F.

Production and adaptation of cultivated crops; principles affecting growth, development, management, and utilization.

SC 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.

SC 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.

SC 200 01(0-2-0). Seed Anatomy and Identification. F, S, SS. Prerequisite: One course in biology or SC 100 or H CC 100 or written consent of instructor.

Principles of seed anatomy including reproduction, identification, and seed characteristics of plant families. (Ω-C/O)

SC 201 01(0-2-0). Seed Development and Metabolism. F, S, SS. Prerequisite: One course in biology or SC 100 or H CC 100 or written consent of instructor.

Basic processes controlling seed development, maturation, dormancy, storage, germination, and how these factors relate to seedling growth. (Ω-C/O)

SC 240 04(3-2-0). Introductory Soil Science. F, S, SS. Prerequisite: C CC 107 or C CC 111.

Formation, properties, and management of soils emphasizing soil conditions that affect plant growth.

SC 300 02(0-4-0). Seed Purity Analysis. F, S, SS. Prerequisite: SC 200 or written consent of instructor.

Fundamentals for determining physical purity of a seed lot using established rules and procedures. (Ω-C/O)

SC 301 02(0-4-0). Seed Germination and Viability. F, S, SS. Prerequisite: SC 201 or written consent of instructor.

Seed viability tests including standard germination and tetrazolium, seed viability, dormancy, parameters of viability and evaluation. (Ω-C/O)

***SC 304 03(2-2-0). Seed Production, Conditioning, and Marketing.** S. Prerequisite: SC 100.

Scientific principles of seed development, maturation and testing including harvesting, conditioning, and marketing of seed crops.

SC 310 02(0-4-0). Agronomic Plant and Seed Identification. S. Prerequisite: SC 100 or H CC 100 or one course in biology.

Evaluate characteristics needed to identify agronomic plant and seed species.

SC 320/RS 320 03(3-0-0). Forage and Range Management. S. Prerequisite: One course in biological sciences. Credit not allowed for both SC 320 and RS 320.

Biology and management of introduced and native forage crops including production, preservation, and utilization.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SC 322 03(3-0-0). Principles of Microclimatology. S. Prerequisite: BY 220 or NR 220; PHCC 141.

Principles of microclimatology including energy balance concepts for soil and vegetation surfaces, and their application.

SC 330 03(3-0-0). Principles of Genetics. F, S, SS. Prerequisite: BZCC 110 or BZCC 120 or LSCC 102.

Transmission, population, and molecular genetics; practical applications.

SC 331 01(0-2-0). Genetics Laboratory. F, S. Prerequisite: SC 330 or concurrent registration.

Experimental techniques in transmission and molecular genetics.

SC 350 03(3-0-0). Soil Fertility Management. F. Prerequisite: SC 240.

Managing soil fertility and fertilizers to meet plant nutrient requirements in an environmentally sound manner with emphasis on nutrient cycling.

SC 351 01(0-2-0). Soil Fertility Laboratory. F. Prerequisite: SC 350 or concurrent registration.

Soil chemical analyses and development of fertilizer recommendations for crops.

SC 370 03(3-0-0). Irrigation Principles and Management. S. Prerequisite: H CC 100 or SC 100, SC 240.

Application and measurement of irrigation water, measurement of soil water, soil-water-plant and irrigation efficiency-environment relationships.

+SC 377/CE 377 03(2-2-0). Geographic Information Systems in Agriculture. F. Prerequisite: CS 110. Credit allowed for only one of the following: SC 377, CE 377, or SC 577.

Introduction to geographic information systems and global positioning systems with applications to agriculture. (\$)

SC 384 Var [1-5]. Supervised College Teaching. F, S, SS. Maximum of 10 credits allowed in course.

SC 414 03(2-3-0). Agricultural Experimental Design. S. Prerequisite: STCC 201 or STCC 301.

Design of agricultural experiments and statistical analysis of resulting data.

SC 420 03(3-0-0). Crop and Soil Management Systems I. S. Prerequisite: H CC 100 or SC 100, SC 240.

Principles of crop, soil management emphasizing environmental factors influencing crop growth and development, interactions with soil organic matter.

SC 421 04(3-2-0). Crop and Soil Management Systems II. F. Prerequisite: H CC 100 or SC 100, SC 240.

Principles of crop and soil management with emphasis on soil erosion control, water conservation, and plant-water relationships.

SC 430 03(3-0-0). Applications of Plant Biotechnology. S. Prerequisite: SC 330.

Current and potential applications of DNA-based biotechnology in crop agriculture and other plant disciplines.

SC 440 04(2-3-1). Pedology. F. Prerequisite: SC 240.

Process of soil formation, characterization, classification of soils; soil survey methods.

SC 442 03(3-0-0). Forest and Range Soils. F. Prerequisite: SC 240.

Soil and water relationships in forest and rangeland ecosystems; significant properties in their management.

°SC 446 02(2-0-0). Physiology of Seeds. S. Prerequisite: BZ 440.

Effects of environmental factors on germination, dormancy, and longevity of seeds.

°SC 448/AN 448 03(2-2-0). Manure Management and the Environment. F. Prerequisite: AN 101 or 102, SC 240; or written consent of instructor. Credit not allowed for both SC 448 and AN 448.

Manure management; maximizing benefits to soils and crops; minimizing air and water quality hazards; complying with regulations.

SC 455 03(3-0-0). Soil Microbiology. F. Prerequisite: MB 300 or SC 240.

Microbial activities in agricultural, forest, and grassland soils; in soil-plant relationships; and in maintenance of environmental quality.

SC 456 01(0-3-0). Soil Microbiology Laboratory. F. Prerequisite: SC 455 or concurrent registration.

Techniques used in study of ecology and activities of soil microorganisms.

SC 460/H 460 03(3-0-0). Plant Breeding. S. Prerequisite: SC 330. Credit not allowed for both SC 460 and H 460.

Theory and practice of plant breeding using principles of genetics and related sciences.

SC 461/H 461 01(0-2-0). Plant Breeding Laboratory. S. Prerequisite: SC 460/H 460 or concurrent registration. Credit not allowed for both SC 461 and H 461.

Techniques and procedures used in public and commercial plant breeding programs.

SC 467 03(3-0-0). Soil Chemistry. S. Prerequisite: C 331, SC 240.

Thermodynamic equilibrium constants, mineral solubility diagrams, adsorption, cation exchange, clay minerals, organic matter, geochemical computer model.

SC 470 03(3-0-0). Soil Physics. F. Prerequisite: SC 240.

Physical properties of soils emphasizing mechanical composition, moisture, aeration, temperature, and structure related to management, plant growth.

SC 471 01(0-3-0). Soil Physics Laboratory. F. Prerequisite: SC 470 or concurrent registration.

Familiarization of techniques and equipment used in evaluation of soil physical properties.

SC 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.

SC 478 03(3-0-0). Environmental Soil Sciences. S. Prerequisite: SC 470, SC 467 or concurrent registration; or written consent of instructor.

Chemical, biological, and physical aspects of prevention and remediation of soil and water pollution; environmental impact assessment.

SC 479 01(0-3-0). Environmental Soil Science Laboratory. S. Prerequisite: SC 478 or concurrent registration.

Laboratory and field studies of soil and groundwater contamination, including monitoring and remediation.

SC 487 Var [1-12]. Internship.

SC 492 01(0-0-1). Seminar.

SC 495 Var. Independent Study.

SC 496 Var. Group Study.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

SC 522 03(3-0-0). Plant Canopy Meteorology. S. Prerequisite: BY 220 or BZ 440; PHCC 141; M CC 155 or written consent of instructor.

Principles of microclimatology including energy balance concepts for soil and crop surfaces and methods of estimating evapotranspiration.

***SC 535 03(3-0-0). Origin and Evolution of Cultivated Plants.** F. Prerequisite: SC 330.

Origin of crops from viewpoints of archaeology, history, botany, and taxonomy, and continued evolution of plants under cultivation.

***SC 540 03(3-0-0). Soil-Plant-Nutrient Relationships.** S. Prerequisite: SC 350.

Soil and plant factors affecting nutrient uptake, mechanistic models of uptake, availability and functions of essential elements, diagnostic techniques.

***SC 550 03(3-0-0). Advanced Soil Genesis.** S. Prerequisite: SC 440.

Modern concepts of specific mechanisms involved in formation of genetic soil groups and their relationship to environmental factors.

SC 560 03(3-0-0). Chemical Equilibria in Soils. F. Prerequisite: SC 240 or nine credits of chemistry.

Chemical reactions, solubility relationships, speciation in solution, mineral weathering, redox reactions, metal chelation, fixation of nutrients.

°SC 564 03(3-0-0). Soil Chemical Analysis. S. Prerequisite: C 331, SC 240.

Theory and applications of soil testing. Total and available nutrients, CEC, salinity, isotopes, and instrumentation.

+SC 577 03(2-2-0). Principles/Components: Precision Agriculture. F. Prerequisite: A 140 or CS 110; SC 240 or written consent of instructor. Credit allowed for only one of the following: SC 377, CE 377, and SC 577.

Principles and components of precision agriculture, including GPS, GIS, remote sensing, and their applications in soil and crop management. (\$)

°SC 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.

SC 675 01(1-0-0). Presentations for Scientific Audiences. F.

Organization and presentation of scientific information to audiences in oral and poster format.

SC 699 Var. Thesis.

***SC 720 . 04(4-0-0). Advanced Plant Breeding.** S. Prerequisite: SC 460/H 460, ST 302.

Systems of mating and selection in plants to maximize genetic gain. Evaluation of heterosis, germplasm diversity, strategies, and new technologies.

***SC 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.

SC 730 01(1-0-0). Topics in Plant Breeding and Genetics. F.

Current literature regarding mechanisms used for plant improvement.

°SC 740/BI 740 03(3-0-0). Plant Molecular Genetics. F. Prerequisite: BC 351, SC 330. Credit not allowed for both SC 740 and BI 740.

Advances in study of organization and function of nuclear and organellar genomes, gene expression in higher plants, and plant-microbe interactions.

***SC 755 03(3-0-0). Advanced Soil Microbiology.** S. Prerequisite: MB 624 or SC 455.

Ecology of soil microorganisms emphasizing population and activity relationships, nitrogen fixation, and microbe-pesticide interactions.

°SC 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.

***SC 770 04(3-2-0). Advanced Soil Physics.** S. Prerequisite: M 261 or SC 470.

Description and analysis of principles of storage and movement of water, solutes, heat, and gases in soils.

SC 784 Var. Supervised College Teaching. F, S, SS.

SC 792 01(0-0-1). Seminar.

SC 795 Var. Independent Study.

SC 796 Var. Group Study.

SC 799 Var. Dissertation.

SPEECH COMMUNICATION COURSES (SP)

Department of Speech Communication College of Liberal Arts

SPCC 100 03(3-0-0). Communication and Popular Culture. (AUCC 3B). F, S, SS.

Classical tradition of speech communication, its extension to broadcasting, and integration of both in contemporary culture.

SPCC 192 03(0-0-3). Introduction to Intercultural Communication. (AUCC 3E). F.

Analysis of communication differences and similarities across cultures and co-cultures; effective communication in intercultural interactions.

SPCC 200 03(3-0-0). Public Speaking. (AUCC 2A1). F, S, SS.

Fundamentals of public speaking emphasizing content, organization, delivery, audience response.

SPCC 201 03(3-0-0). Rhetoric in Western Thought. (AUCC 3B). F, S.

Major concepts of Western rhetoric from Greece to modern times and their relationship to present-day approaches to communication.

SP 205 03(3-0-0). Group Communication. F, S. Prerequisite: SPCC 200.

Principles and methods of group communication emphasizing face-to-face and electronically mediated problem solving and decision making.

SPCC 207 03(3-0-0). Rhetoric and Argumentation. (AUCC 2B). F, S.

Principles of logical reasoning in speeches of advocacy including analysis, use of evidence, inductive and deductive reasoning.

SP 215 01(0-2-0). Intercollegiate Forensics. F, S. Maximum of 4 credits allowed in course.

Principles of debate, public speaking, and oral interpretation practiced in intramural, local, and/or novice intercollegiate events.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SP 217 03(3-0-0). Nonverbal Communication. S.

Nonlanguage symbols in communication; systems and functions of nonverbal communication behaviors.

SP 231 03(3-0-0). Oral Reading. F, S.

Analysis and reading of rhetorical and poetic writing leading to understanding, appreciation, and expressive communication.

SP 300 03(0-0-3). Advanced Public Speaking. F, S, SS. Prerequisite: SPCC 200.

Advanced technique in public speaking; emphasis on argument construction and refutation, style, and manuscript delivery.

SP 302 03(3-0-0). Parliamentary Procedure. SS.

History, principles, and effective practice of parliamentary procedure and law.

SP 303 03(3-0-0). Business and Professional Speaking. S. Prerequisite: SPCC 200.

Principles and practice of communication in business and professional settings, emphasizing interviews and personal presentations.

SP 305 03(3-0-0). Intercultural Communication. F, S.

Cultural influences on communication between people of different nations; communication rules/norms in specific cultures; cultural adaptation.

SP 306 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.

SP 309 03(3-0-0). Conflict Management and Communication. S.

Theories and principles of communication in conflict management; application to conflict resolution situations.

SP 310 03(3-0-0). Interpersonal Communication Skills. S, SS.

Analysis, exploration, and skill enhancement strategies for interpersonal communication in friendship, couple, family, and business relationships.

SP 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.

SP 315 01(0-2-0). Public Discussion and Debate. F, S. Prerequisite: SP 215. Maximum of 4 credits allowed in course.

Advanced principles of debate, public speaking, and oral interpretation with practical application at intercollegiate forensics tournaments.

SP 317 03(3-0-0). Women and Communication. F.

Analysis and exploration of communication as it relates to women, their roles, and their identities.

SP 341 03(3-0-0). Evaluating Contemporary Television. F.

Rhetorical standards applied to content, ethical, and artistic aspects of American televised discourse; emphasizing non-entertainment programming.

SP 342 03(3-0-0). Critical Media Studies. F, S.

Analysis of communication media; history; structure, regulation, policy, and impact upon society.

SP 346 03(2-2-0). Virtual Culture and Communication. F, S. Prerequisite: SPCC 100 or SP 342.

Rhetorical theory applied to planning, producing, and evaluating computer-mediated messages.

SP 347 03(2-2-0). Visual Rhetoric. F, S. Prerequisite: SPCC 100 or SP 342.

Rhetorical theory applied to planning, producing, and evaluating video messages and using video technology.

SP 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.

SP 354 03(1-4-0). 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.

SP 355 03(2-2-0). Evaluating Contemporary Film. S. Prerequisite: SP 354.

Theory and development of film criticism; application of critical approaches to modern fiction and nonfiction film. (Ω-O)

SP 356 03(3-0-0). Rhetoric of Documentary Film. F. Prerequisite: SP 354.

History and evolution of documentary film. Analysis of conventions and rhetorical strategies of the genre.

SP 384 Var [1-3]. Supervised College Teaching. F, S, SS. Maximum of 10 credits allowed in course.

Open only to undergraduate students who are invited to assist in teaching selected courses.

SP 387 01(1-0-0). Communication Internship. Prerequisite: SPCC 100 or SP 342, SPCC 200, SPCC 201, SPCC 207; 2.0 GPA.

SP 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.

SP 407 03(3-0-0). Public Deliberation. F, S. Prerequisite: SPCC 200 and SP 207.

Principles and practice of communication in contemporary public policy decision-making, emphasizing oral performance and local civic engagement.

SP 409 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.

SP 411 03(3-0-0). Contemporary Speeches on American Issues. S.

Significant speeches and speakers as they reflect and affect issues, 1930 to present.

SP 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.

SP 415 03(3-0-0). Rhetoric and Civility. F. Prerequisite: SPCC 201 and SPCC 207.

Relationship between rhetoric and civility historically and in contemporary times.

SP 417 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.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

SP 420 03(3-0-0). Political Communication. F.

Rhetoric of political campaigns. (Ω-O)

SP 427 03(3-0-0). Communication in Organizations. F..

Communication theory and strategy for empowerment of non-supervisory and supervisory personnel.

SP 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.

SP 447 03(3-0-0). Television-Radio Programming and Management. F.

Prerequisite: SP 342.

Management of electronic media in contemporary American culture; emphasis on factors influencing program decision making.

SP 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. (Ω-O)

SP 450 02(0-0-2). Capstone Seminar. F, S.

Application of rhetorical and communication principles; student demonstration of speech communication theory and skills.

SP 454/ET 454 03(3-0-0). Chicano/a Film and Video. F.

Credit not allowed for both SP 454 and ET 454.

Emergence of Chicano/a cinema from a place of displacement, resistance, and affirmation found in contemporary Chicano/a film, video.

SP 455/LB 455 03(2-2-0). Narrative Fiction Film as a Liberal Art. S.

Prerequisite: Senior standing. Credit not allowed for both SP 455 and LB 455.

Narrative fiction film and its role in human history, culture, and social interaction.

SP 495 Var. Independent Study.

SP 496 Var. Group Study.

SP 503 03(3-0-0). Transformations in Rhetorical Theory. S.

Prerequisite: SPCC 201 or graduate status.

Changes in rhetorical theory from 1450 to 1950, including psychological, dramatic, literary, historical, and political influences.

SP 504 03(3-0-0). Rhetoric of Everyday Life. S. Prerequisite: Graduate

standing or SP 412 and 12 additional 300-400 SP credits.

Contemporary theories of rhetoric and of everyday life.

SP 505 03(3-0-0). Ethnography of Communication. F. Prerequisite:

Graduate standing or SP 306 and 12 additional 300-400 level credits in speech.

Theoretical and methodological concerns in the ethnography of communication; qualitative research/fieldwork; critical-cultural data interpretation.

SP 510 03(3-0-0). Theories of Interpersonal Communication. S.

Prerequisite: Graduate standing or SP 310 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.

SP 512 03(3-0-0). Rhetorical Criticism. F. Prerequisite: Fifteen 300-400 level credits in speech and/or English.

Traditional and contemporary methods for analyzing persuasive discourse.

SP 520 03(3-0-0). Rhetoric and Politics. F. Prerequisite: Graduate standing or SP 420 and 12 additional 300-400 level credits in speech.

Critique of political communication; the politics of rhetorical criticism; community-based research.

SP 523 03(3-0-0). Feminist Theories of Discourse. S. Prerequisite:

Graduate standing or SP 317 or WS 200 and 12 additional 300-400 level credits in speech.

Exploration and evaluation of contemporary feminist theories of rhetoric and discourse.

SP 530 03(3-0-0). Communication Research Methods. S. Prerequisite:

Graduate standing or 15 300-400 level credits in speech.

Historical and philosophical context of communication research; relationship between theory and method; dominant forms of communication research.

SP 540/ET 540 03(3-0-0). Rhetoric, Race and Identity. F. Prerequisite:

Graduate status or SP 412 and 12 additional 300-400 SP credits. Credit not allowed for both SP 540 and ET 540.

Critical race theory and its relevance to rhetorical studies.

SP 546 03(3-0-0). Media Criticism. S. Prerequisite: Graduate standing

or SP 341 or SP 342 and 12 additional 300-400 level credits in speech.

Text-based and audience-oriented methods of media criticism.

SP 601 03(3-0-0). Ancient and Medieval Rhetoric. F. Prerequisite:

Fifteen 300-400 level credits in speech and/or English.

Rhetorical theories: Greek, Roman, and medieval times.

SP 620 03(3-0-0). Communication Theory. F. Prerequisite: Fifteen

300-400 level credits in speech and/or English.

Examination of communication philosophies and perspectives; analysis of modern theories of face-to-face communication.

SP 623 03(3-0-0). Contemporary Theories of Discourse. S. Prerequisite:

Fifteen 300-400 level credits in speech, English, or philosophy.

Contemporary perspectives on rhetoric, discourse, and human communication.

SP 646 03(3-0-0). Theories of Mediated Communication. S. 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.

SP 684 Var [1-3]. Supervised College Teaching. F, S, SS.

SP 692 Var. Seminar. Prerequisite: SP 620.

SP 695 Var. Independent Study.

SP 696 Var. Group Study.

SP 699 Var. Thesis.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

STATISTICS COURSES (ST)

Department of Statistics College of Natural Sciences

STCC 101 03(2-2-0). Activity Based Statistics. (AUCC 2B). F, S, SS. Prerequisite: Satisfactory performance on the Math Placement Exam.

Population, sample, variation, data, relationships, probability and risk, polls, prediction, margin of error, critical assessment of studies.

STCC 110 03(2-0-1). Statistical Thinking: Concepts and Applications. (AUCC 2B). F, S. Prerequisite: Satisfactory performance on the Math Placement Exam.

Use of statistical tools in real-life problems using computer packages; integration of critical thinking skills using case studies.

ST 192 01(0-0-1). First-Year Seminar in Mathematical Sciences. S.

Richness and variety of problems encountered in the mathematical sciences.

STCC 201 03(2-0-1). General Statistics. F, S, SS. (AUCC 2B). Prerequisite: M CC 117 or M CC 120A-B. Intended as a one-semester terminal course. Credit not allowed for both STCC 201 and STCC 204.

Graphs, descriptive statistics, confidence intervals, hypothesis tests, correlation and simple regression, tests of association.

STCC 204 03(2-2-0). Statistics for Business Students. (AUCC 2B). F, S, SS. Prerequisite: M CC 117 or M CC 120A-B. Credit not allowed for both STCC 204 and STCC 201.

Surveys, sampling, descriptive statistics, confidence intervals, contingency tables, control charts, regression, exponential smoothing, forecasting.

STCC 301 03(3-0-0). Introduction to Statistical Methods. (AUCC 2B). F, S, SS. Prerequisite: M CC 118 or M CC 121. Credit allowed for only one course: STCC 301, STCC 307/EHCC 307, STCC 309, STCC 311.

Techniques in statistical inference; confidence intervals, hypothesis tests, correlation and regression, analysis of variance, chi-square tests. (SGT)

ST 302 03(3-0-0). Design of Experiments. F, SS. Prerequisite: STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311.

Analysis of variance, covariance; randomization; completely randomized, randomized block, latin-square, split-plot, factorial and other designs.

ST 303/EE 303 03(3-0-0). Introduction to Communications Principles. F. Prerequisite: M 261. Credit not allowed for both ST 303 and EE 303.

Basic concepts in design and analysis of communication systems.

ST 304 03(3-0-0). Multiple Regression Analysis. S, SS. Prerequisite: M 229, STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311.

Estimation and testing for linear, polynomial, and multiple regression models; analysis of residuals; selection of variables; nonlinear regression.

ST 305 03(3-0-0). Sampling Techniques. F. Prerequisite: STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311.

Sample designs; simple random, stratified, systematic, cluster, unequal probability, two phase; methods of estimation and sample size determination.

STCC 307/EHCC 307 03(3-0-0). Introduction to Biostatistics. (AUCC 2B). F, S, SS. Prerequisite: M CC 118 or M CC 121. Credit allowed for only one course: STCC 301, STCC 307/EHCC 307, STCC 309, STCC 311.

Biostatistical methods; confidence intervals, hypothesis tests, simple correlation and regression, one-way analysis of variance.

STCC 309 03(3-0-0). Statistics for Engineers and Scientists. (AUCC 2B). F, S, SS. Prerequisite: M CC 161 or M CC 255. Credit allowed for only one course: STCC 301, STCC 307/EHCC 307, STCC 309, STCC 311.

Calculus-based probability and statistics: distribution theory, estimation, hypothesis testing, applications to engineering and the sciences.

ST 310 03(3-0-0). Data Analysis and Database Management Tools. F. Prerequisite: STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311.

Principles and practice of database management, statistical packages, graphics, and Internet resources.

STCC 311 03(3-0-0). Statistics for Behavioral Sciences I. (AUCC 2B). F. Prerequisite: M CC 118 or M CC 121. Credit allowed for only one course: STCC 301, STCC 307/EHCC 307, STCC 309, STCC 311.

Classification, descriptive statistics; inference, testing, estimation; categorical data analysis; odds ratio.

ST 312 03(3-0-0). Statistics for Behavioral Sciences II. S. Prerequisite: STCC 311 or written consent of instructor.

One-way analysis of variance, factorial designs, blocked designs, multiple comparisons of means, and multiple regression.

ST 321 03(3-0-0). Elementary Probabilistic-Stochastic Modeling. S. Prerequisite: M CC 155 or M CC 160; knowledge of a computer language.

Probabilistic and stochastic models of real phenomena; distributions, expectations, correlations; averages; simple Markov chains and random walks.

ST 420 03(3-0-0). Probability and Mathematical Statistics I. F. Prerequisite: M CC 255 or M 261.

Probability, random variables, distribution functions, and expectations; joint and conditional distributions and expectations; transformations.

ST 430 03(3-0-0). Probability and Mathematical Statistics II. S. Prerequisite: ST 420.

Theories and applications of estimation, testing, and confidence intervals; sampling distributions including normal, gamma, beta X^2 , t, and F.

ST 460 03(3-0-0). Applied Multivariate Analysis. S. Prerequisite: ST 304.

Principles for multivariate estimation and testing; multivariate analysis of variance, discriminant analysis; principal components, factor analysis.

ST 472 03(0-0-3) Statistical Consulting. S. Prerequisite: ST 310 or concurrent registration or written consent of instructor.

Statistical consulting skills including data analysis, problem solving, report writing, oral communication, and planning experiments.

ST 495 Var. Independent Study. Prerequisite: STCC 301, written consent of instructor.

ST 498 Var [1-3]. Undergraduate Research in Statistics. F, S, SS. Prerequisite: ST 430 or ST 302 and ST 304; written consent of instructor.

Research skills and techniques; include both oral and written communication of results.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

ST 500 01(0-2-0). Statistical Computer Packages. S. Prerequisite: ST 302, ST 304.

Comparison, evaluation, and use of computer packages for univariate and multivariate statistical analyses.

ST 501 01(1-0-0). Statistical Science. F.

Overview of statistics: theory; use in agriculture, business, environment, engineering; modeling; computing; statisticians as researchers/consultants.

ST 511 04(3-0-1). Design and Data Analysis for Researchers I. F.

Prerequisite: STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311 or written consent of instructor.

Statistical methods for experimenters and researchers emphasizing design and analysis of experiments.

ST 512 04(3-0-1). Design and Data Analysis for Researchers II. S.

Prerequisite: ST 511 or written consent of instructor.

Statistical methods for experimenters and researchers emphasizing design and analysis of experiments.

ST 515 03(2-2-0). Statistical Science and Process Improvement. S.

Prerequisite: ST 511 or ST 540 or BQ 570 or written consent of instructor.

Statistical methods in process design; statistical methods; measurement processes; customer evaluation.

ST 520 04(4-0-0). Introduction to Probability Theory. F. Prerequisite: M 340.

Probability, random variables, distributions, expectations, generating functions, limit theorems, convergence, random processes.

ST 521 03(3-0-0). Stochastic Processes I. S. Prerequisite: ST 520.

Characterization of stochastic processes, Markov chains in discrete and continuous time, branching processes, renewal theory, Brownian motion.

ST 522 03(3-0-0). Stochastic Processes II. F, SS. Prerequisite: ST 521.

Martingales and applications, random walks, fluctuation theory, diffusion processes, point processes, queueing theory.

ST 523/NR 523 03(3-0-0). Quantitative Spatial Analysis. S. Prerequisite: STCC 301 or STCC 307/EHCC 307. Credit not allowed for both ST 523 and NR 523.

Techniques in spatial analysis: point pattern analysis, spatial autocorrelation, trend surface and spectral analysis.

ST 525 03(3-0-0). Analysis of Time Series I. F. Prerequisite: ST 430.

Trend and seasonality, stationary processes, Hilbert space techniques, spectral distribution function, fitting ARIMA models, linear prediction.

ST 526 03(3-0-0). Analysis of Time Series II. S, SS. Prerequisite: ST 525.

Spectral analysis; the periodogram; spectral estimation techniques; multivariate time series; linear systems, optimal control; Kalman filtering, prediction.

ST 530 03(3-0-0). Mathematical Statistics. S. Prerequisite: ST 520.

Sampling distributions, estimation, testing, confidence intervals; exact and asymptotic theories of maximum likelihood and distribution-free methods.

ST 540 03(3-0-0). Data Analysis and Regression. F. Prerequisite: Six credits of upper-division statistics courses or written consent of instructor.

Introduction to multiple regression and data analysis with emphasis on graphics and computing.

ST 544/EH 544 03(3-0-0). Biostatistical Methods for Quantitative Data.

S. Prerequisite: EHCC 307/STCC 307 or STCC 301. Credit not allowed for both ST 544 and EH 544.

Regression and analysis of variance methods applied to both observational studies and designed experiments in the biological sciences.

ST 547/CE 547 03(3-0-0). Statistics for Environmental Monitoring. S.

Prerequisite: STCC 301. Credit not allowed for both ST 547 and CE 547.

Applications of statistics in environmental pollution studies involving air, water, or soil monitoring; sampling designs; trend analysis; censored data.

ST 560 03(3-0-0). Applied Multivariate Analysis. F, S. Prerequisite: ST 520, ST 540.

Multivariate analysis of variance; principal components; factor analysis; discriminant analysis; cluster analysis.

ST 570 03(3-0-0). Nonparametric Statistics. S, SS. Prerequisite: ST 430 or written consent of instructor.

Distribution and uses of order statistics; nonparametric inferential techniques, their uses and mathematical properties.

ST 586 01(0-2-0). Practicum in Consulting Techniques. Prerequisite: ST 540.

Instruction on planning studies, writing reports, and interacting with clients. Attend and critique consulting sessions.

ST 592 01(0-0-1). Seminar.

ST 600 03(3-0-0). Statistical Computing. F, S. Prerequisite: ST 520, ST 540.

Optimization and integration in statistics; Monte Carlo methods; simulation; bootstrapping; density estimation; smoothing.

ST 604/BG 604 02(2-0-0). Managerial Statistics. F. Prerequisite: Admission to the MBA Program. Credit not allowed for both ST 604 and BG 604.

Introduction to statistical thinking and methods used to support managerial-decision making. (Ω -V)

ST 605 03(3-0-0). Theory of Sampling Techniques. S. Prerequisite: STCC 301 or STCC 307/EHCC 307 or STCC 309 or STCC 311, ST 430.

Survey designs; simple random, stratified, cluster samples; theory of estimation; optimization techniques for minimum variance or costs.

ST 640 04(4-0-0). Design and Linear Modeling I. S. Prerequisite: ST 540 or written consent of instructor.

Introduction to linear models; experimental design; fixed, random, and mixed models.

ST 645 03(3-0-0). Categorical Data Analysis and GLIM. S. Corequisite: ST 640.

Generalized linear models, binary and polytomous data, log linear models, quasilielihood models, survival data models.

ST 650 03(3-0-0). Design and Linear Modeling II. F. Prerequisite: ST 640 or written consent of instructor.

Mixed factorials; response surface methodology; Taguchi methods; variance components.

ST 675A-L Var [1-3]. Topics in Statistical Methods. F, S, SS. Prerequisite: ST 430 or written consent of instructor.

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. L) Medical/pharmaceutical statistical methods.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

ST 684 Var [1-3]. Supervised College Teaching. F, S, SS. Prerequisite: Enrollment in M.S./Ph.D. program in statistics.

Guidance and instruction in effective teaching of college courses in statistics.

ST 695 Var. Independent Study.

ST 699 Var. Thesis.

ST 720 04(4-0-0). Probability Theory. S. Prerequisite: M 517, ST 520.

Measure theoretic probability, characteristic functions; convergence; laws of large numbers; central limit, extreme value, asymptotic theory.

ST 721 03(3-0-0). Applied Probability and Stochastic Processes I. F, S. Prerequisite: ST 720.

General theory of processes; Markov processes in discrete, continuous time; review of martingales, random walks; renewal and regenerative processes.

ST 722 03(3-0-0). Applied Probability and Stochastic Processes II. F, S, SS. Prerequisite: ST 720.

Brownian motion, diffusion, stochastic differential equations; weak convergence, central limit theorems. Applications in engineering, natural sciences.

ST 725 03(3-0-0). Time Series and Stationary Processes. F, S, SS. Prerequisite: ST 720, ST 730.

Spectral theory of multivariate stationary processes; estimation, testing for spectral, linear, AR-MA representations; best linear predictors, filters.

ST 730 04(4-0-0). Advanced Theory of Statistics I. F. Prerequisite: ST 530, ST 720.

Minimal sufficiency, maximal invariance; Neyman-Pearson theory; Fisher, Kullback-Leibler information; asymptotic properties of maximum-likelihood methods.

ST 731 03(3-0-0). Advanced Theory of Statistics II. S, SS. Prerequisite: ST 730.

Decision-theory model; Bayes, e-Bayes, complete, and admissible classes; applications to sequential analysis and design of experiments.

ST 740 03(3-0-0). Advanced Statistical Methods. F, S. Prerequisite: ST 640, concurrent registration in ST 730.

Generalized additive models; recursive partitioning regression and classification; graphical models and belief networks; spatial statistics.

ST 750 03(3-0-0). Advanced Theory of Design. F, S. Prerequisite: ST 650 or written consent of instructor.

Information theory; design evaluation, factorial designs and optimal designs, orthogonal and balanced arrays, designs with discrete/continuous factors.

ST 760 03(3-0-0). Theory of Multivariate Statistics. F, SS. Prerequisite: ST 640, concurrent registration in ST 730.

Theory of multivariate normal; maximum-likelihood inference, union-intersection testing for single sample; theory of a multivariate linear model.

ST 770 03(3-0-0). Approximation Theory and Methods. F, S. Prerequisite: ST 730.

Edgeworth expansions, saddlepoint methods; applications of weak convergence and other approximation methods in mathematical statistics.

ST 792 01(0-0-1). Seminar.

ST 793 03(3-0-0). Seminar on Advanced Statistical Methods. F, S. Prerequisite: ST 640, concurrent registration in ST 730; may be taken up to two times for credit.

ST 795 Var. Independent Study.

ST 796 Var. Group Study.

Methodology, stochastic processes, experimental design, multidimensional statistics.

ST 799 Var. Dissertation.

SOCIAL WORK COURSES (SW)

School of Social Work

College of Applied Human Sciences

SWCC 110 03(2-0-1). Contemporary Social Welfare. (AUCC 3C). F, S, SS.

Principles, values and institutions of U.S. social welfare in context of human need within family, groups, and society.

SW 150 03(3-0-0). Introduction to Social Work. F, S. Prerequisite: PYCC 100 or concurrent registration; S CC 100 or SCC 105 or concurrent registration.

Historical development of social welfare. Knowledge, values, intervention skills, settings, and groups served by social workers. (Ω -T)

SW 233 03(3-0-0). Human Behavior in the Social Environment. F, S. Prerequisite: HDCC 101 or concurrent registration; SW 150 or concurrent registration.

Knowledge of human behavior and the social environment; knowledge building for social work practice from a systems perspective.

SW 286A-B 03(0-3-2). Practicum. Prerequisite: SW 286A and SW 286B must be taken in sequence. SW 233 or concurrent registration. 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.

SW 330 03(3-0-0). Human Diversity Practice Issues. F, S. Prerequisite: SW 233 or concurrent registration.

Knowledge about human differences and similarities essential for social work practice.

SW 340 03(0-0-3). Generalist Practice-Individuals and Families. F, S. Prerequisite: Progression into the major. SW 286B or concurrent registration.

Problem-solving approach applied to individuals and families within a generalist practice framework.

SW 341 03(0-0-3). Generalist Practice-Small Groups. F, S. Prerequisite: SW 340 or concurrent registration.

Problem-solving approach applied to small groups within a generalist practice framework.

SW 342 03(0-0-3). Generalist Practice-Organizations/Communities. F, S. Prerequisite: SW 340 or concurrent registration.

Problem-solving approach applied to organizations and communities within a generalist practice framework.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

SW 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.

SW 352/ET 352 03(3-0-0). Indigenous Women, Children and Tribes.

F. Credit not allowed for both SW 352 and ET 352.

Historical and contemporary lives of women, children, and tribal communities.

SW 370C-D 03(3-0-0). Social Work Practice. S. Prerequisite: SW 233; SW 340 or concurrent registration.

Application of practice processes in various settings. C) Schools. D) Community mental health.

SW 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.

SW 384 Var [1-5]. Supervised College Teaching. F, S, SS. Maximum of 10 credits allowed in course.

Assist instructor in teaching selected classes, group training, or discussion group leadership.

SW 410 03(3-0-0). Social Welfare Policy. F, S. Prerequisite: SW 342 or concurrent registration.

Issues and processes shaping social welfare institutions; definitions of social welfare policy; analytical framework for policy analysis.

SW 450/IE 450 03(3-0-0). International Social Welfare and Development. F. Credit not allowed for both SW 450 and IE 450.

Framework of social welfare and development in international area; social need with focus on cultures/countries in transition.

SW 488 Var [5-10]. Field Placement. F, S, SS. Prerequisite: S 311 or HSCC 300 or concurrent registration in S 311 or HSCC 300; SW 341, SW 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.

SW 490A-E Var [1-3]. Workshop.

A) Case management. C) Crisis intervention. D) Dysfunctional relationships. E) Grant writing.

SW 492 03(3-0-0). Seminar. Corequisite: SW 488.

Integrative seminar for field experience and social work knowledge, values, skills, methods, and processes.

SW 495 Var [1-12]. Independent Study.

SW 496 Var [1-12]. Group Study.

SW 500 03(3-0-0). Principles and Philosophy of Social Work. F, S, SS. Prerequisite: Eighteen credits of socio/behavioral sciences.

Knowledge, values, history, and philosophy of social work. (-T)

SW 510 03(0-0-3). Theoretical Analysis of Small Client Systems. F. Prerequisite: SW 500 or concurrent registration in SW 511.

Socio-behavioral principles relevant to generalist social work with individuals and families.

SW 511 03(0-0-3). Generalist Practice-Small Client Systems. F. Prerequisite: SW 500 or concurrent registration in SW 510.

Generalist practice perspective. Practice knowledge and skills related to intervention with individuals and families within a systems framework.

SW 512 01(0-2-0). Small Client Systems Skills Laboratory. F. Corequisite: SW 511.

Application of communication and relationship skills for professional practice.

SW 520 03(3-0-0). Social Welfare Policy Analysis. F. Prerequisite: Eighteen credits of socio/behavioral sciences.

Historical concept analysis and impact of social welfare policy.

SW 550 03(2-0-1). Anima Assisted Therapy/Human-Animal Bond. SS.

Nature of human-animal bond and animal assisted therapy as an intervention method.

SW 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.

SW 570/VE 570 03(0-0-3). Teamwork-Serving People With Special Needs. F, SS. Prerequisite: Written consent of instructor. Credit not allowed for both SW 570 and VE 570.

Teamwork approach to serving persons with special needs values, issues, and best practices related to creating desirable futures for them.

SW 588 Var [1-6]. Field Placement. Prerequisite: SW 511.

Supervised professional practice.

SW 590 Var [1-6]. Workshop.

SW 600 03(3-0-0). Methods of Research I. F. Prerequisite: STCC 201, concurrent registration in SW 520.

Social work research: role of practitioners as consumers and initiators of research.

SW 601 03(3-0-0). Methods of Research II. S. Prerequisite: SW 600.

Data analysis, computer processing in social work research, and methods for evaluating one's own practice.

SW 602A-B 02(0-0-2). Macro-Level Practice Research. A) F. B) S. Prerequisite: Concurrent registration in SW 688. A) SW 601. B) SW 602A.

Design and implementation of needs assessment, program implementation, and community research.

SW 603A-B 02(0-0-2). Direct Service Assessment and Evaluation. A) F. B) S. Prerequisite: Concurrent registration in SW 688. A) SW 601. B) SW 603A.

Selection and application of techniques for assessment and evaluation of direct practice activities.

SW 610 03(0-0-3). Theoretical Analysis of Large Client Systems. S. Prerequisite: SW 510.

Socio-behavioral principles relevant to generalist social work with groups, organizations, and communities.

SW 611 03(0-0-3). Generalist Practice-Large Client Systems. S. Prerequisite: SW 511.

Practice knowledge and skills to intervention with groups, organizations, and communities.

SW 630A-B 02(1-0-1). Advanced Generalist Practice. A) F. B) S. Prerequisite: SW 611. B) S. Prerequisite: SW 630A.

A) Individuals. B) Groups and families.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

SW 631A-B 02(1-0-1). Advanced Community Practice. A) F. Prerequisite: SW 611. B) S. Prerequisite: SW 631A.
Models for advanced generalist practice in rural/transitional communities and urban neighborhoods.

SW 632 02(0-0-2). Advanced Organizational Practice. F. Prerequisite: SW 611.
Models for advanced generalist practice in and with organizations.

SW 633 02(0-0-2). Advanced Social Welfare Policy Analysis. S. Prerequisite: SW 520.
Application of social welfare policy analysis models; normative aspects of policy analysis and assessment skills.

SW 688 Var [1-8]. Field Placement. F, S. Prerequisite: SW 588, SW 601, SW 610, SW 611. Maximum of 15 credits allowed in course.
Supervised professional practice.

SW 692 Var [1-3]. Seminar. Corequisite: SW 688. Maximum of 4 credits allowed in course.
Examination of practice; discussion of relevant practice issues.

SW 695 Var. Independent Study.

SW 696 Var. Group Study.

SW 698 Var [1-6]. Research. Prerequisite: SW 601. Maximum of 6 credits allowed in course.

SW 699 Var. Thesis. Maximum of 6 credits allowed in course.

SW 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.

SW 702 03(1-0-2). Social Welfare Policies in Selected Countries. S. Prerequisite: SW 701.
Social welfare policy analysis and impact on professional social work practice.

SW 703 03(1-0-2). Theoretical Analysis of Social Work Practice. SS. Prerequisite: SW 701.
Social work practice theories; building, evaluating, and teaching for social work educators.

SW 784 Var [1-3]. Supervised College Teaching. F, S, SS.

THEATRE COURSES (TH)

Department of Music, Theatre, and Dance College of Liberal Arts

+THCC 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. (S)

TH 151 03(1-5-0). Acting I. 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. (S)

TH 255 03(1-5-0). Directing I. F. Prerequisite: TH 151.
Basic principles of directing; experience in directing scenes.

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.
History of theatre, Restoration to present.

TH 351 03(1-5-0). Acting II. F. Prerequisite: TH 151.
Scene work and other appropriate training for acting students.

TH 355 03(1-5-0). Directing II. S. Prerequisite: TH 255.
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 or written consent of instructor.
Basic techniques and practical applications in scenic painting for the theatre. (S)

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.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

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.

Theatre majors will research, execute, and document a comprehensive project in performance, production, or scholarship directed by a faculty mentor.

TH 695 Var. Independent Study.

VE 425 04(4-0-0). Methods/Materials in Agricultural Education. F. Prerequisite: Admission to Teacher Licensure Program; concurrent registration in ED 450, ED 486J, VE 492.

Methods and procedures in teaching and evaluating agricultural education in the classroom and laboratory; vocational foundations; microteaching.

VE 431 04(4-0-0). Methods/Materials in Business Education. F. Prerequisite: Successful completion of Phase II of Teacher Licensure Program or written consent of instructor.

Methods for teaching business education. (Ω-O)

VE 441 01(1-0-0). Methods/Materials-Vocational Marketing Education. F. Prerequisite: VE 431 or concurrent registration; admission to Teacher Licensure Program or written consent of instructor.

Instructional methods and resource materials development for vocational marketing education. (Ω-O)

VE 451 04(3-2-0). Methods-Consumer and Family Studies Education. F. Prerequisite: Concurrent registration in ED 450.

Teaching methods, processes, and materials for consumer and family studies education.

VE 465 03(3-0-0). Methods and Materials in Technology Education. S. Strategies and practices of teaching in a technical laboratory setting.

VE 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. (Ω)

VE 472 01(0-0-1). Classroom Management. F, S, SS. Prerequisite: Admission to VATLP and VE 471, or full-time credential. Offered only through Continuing Education, School of Education.

Introduction to student management techniques and program management. Teachers will create a preliminary plan for instruction. (Ω)

VE 473 01(0-0-1). Communication Strategies. F, S, SS. Prerequisite: Admission to VATLP and VE 471, or full-time credential. Offered only through Continuing Education, School of Education.

Introduction to improved communication techniques, conflict resolution, performing occupational advisement, and facilitating leadership activities. (Ω)

VE 485 Var. Student Teaching. F, S,. Prerequisite: ED 450 and appropriate special (content) methods courses.

Teacher education candidates participate in an intensive and extensive on-site capstone experience within a public school setting.

VE 486 Var [1-6]. Practicum. Prerequisite: Admission to Teacher Licensure Program.

VE 492 Var. Seminar-Professional Relations. F, S. Prerequisite: ED 450 and appropriate special (content) methods course; concurrent registration in ED 485A or B or VE 485.

Collegial and professional discussions, support, and assistance.

VE 494 Var. Independent Study.

VE 496 Var. Group Study.

VE 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.

VOCATIONAL EDUCATION COURSES

(VE)

School of Education

College of Applied Human Sciences

VE 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. (Ω)

VE 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.

VE 386 Var. Practicum. Prerequisite: VE 300 or concurrent registration; admission to Teacher Licensure Program.

VE 387 Var. Internship.

Coordinated and supervised experiences in business, industry, or agriculture selected to strengthen the intern=s specialty through experience.

VE 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. (Ω)

VE 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. (Ω)

VE 420 03(3-0-0). Agricultural Experience and Adult Education. S.

Developing secondary agriculture experience programs. Organizing and teaching adult education classes in agriculture.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

VE 506 03(3-0-0). Human Resource Development. F. Prerequisite: Written consent of instructor.

Human resource development foundations and techniques related to vocational training and development for industry, business, education, and government.

VE 520 Var. Teaching Agricultural Education. SS. Prerequisite: VE 425.

Methods of teaching recent developments in the field of agriculture and allied industries.

VE 570/SW 570 03(0-0-3). Teamwork-Serving Persons with Special Needs. F, SS. Prerequisite: Written consent of instructor. Credit not allowed for both VE 570 and SW 570.

Teamwork approach to serving persons with special needs values, issues, and best practices related to creating desirable futures for them.

VE 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.

VE 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.

VE 575 04(4-0-0). Methods for Mild/Moderate Special Needs. S. Prerequisite: VE 572; teacher licensure.

Methods addressing learning of students with mild/moderate special needs and instructional accommodations in regular classes.

VE 590 Var. Workshop.

VE 601 03(3-0-0). Philosophy/Organization of Workforce Education. F, S, SS.

Principles, philosophy, practices, and innovations of workforce education and human resources.

VE 610 03(2-0-1). Principles of Supervision and Evaluation. F.

Supervision and evaluation of instruction including required Colorado evaluation training.

VE 612 03(0-0-3). Vocational Administrative Strategies. S, SS. Prerequisite: VE 601. 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. (Ω)

VE 618 03(0-0-3). School Law. S.

Legal framework for operation and management of public and private schools emphasizing legal responsibilities for administrators and teachers.

°VE 630 02(2-0-0). Organization of Business Education. SS. Prerequisite: VE 300.

Procedures for organizing new programs and for managing or modifying existing programs. (Ω-O)

°VE 631 02(2-0-0). Management of Business Departments. SS. Prerequisite: VE 300.

Preparation of teachers and administrators for implementation of vocational business and office education programs. (Ω-O)

°VE 640 02(2-0-0). Methods in Marketing Education. SS. Prerequisite: VE 441.

Instruction and curricula for secondary and postsecondary vocational marketing education. (Ω-O)

°VE 641 02(2-0-0). Programs in Marketing Education. SS. Prerequisite: VE 441.

Techniques used in determining need for and implementations of new or additional programs of vocational marketing education. (Ω-O)

VE 656 03(3-0-0). Tests and Assessment. S.

Use of tests in educational and vocational assessment.

VE 665 03(3-0-0). HRD Consultation and Analysis of Organizations. S. Prerequisite: ED 600.

Identify and evaluate human resource development and organization change needs and strategies in response to organization performance issues.

°VE 666 03(3-0-0). Program Evaluation. F. Prerequisite: ED 600.

Models and practices of program evaluation in both public and private sector organizations.

***VE 667 03(3-0-0). Power-Politics-Influence in Organizations.** SS. Prerequisite: VE 506.

Creation and execution of power relationships, political engagements, and communications in organizations.

***VE 668 03(3-0-0). Learning Transfer.** F. Prerequisite: VE 665.

Sixteen factors affecting learning transfer and their application in organizations.

***VE 669 03(3-0-0). Performance Management.** S. Prerequisite: VE 665.

Performance improvement and change process, with special attention to the roles and responsibilities of employees and managers.

°VE 670 03(3-0-0). Strategic Human Resource Development. SS. Prerequisite: VE 667, VE 668, VE 669.

Examine fundamentals of strategy from a HRD perspective, utilizing management tools, recent research and contemporary theory.

VE 684 Var. Supervised College Teaching. F, S, SS.

VE 687 Var. Internship.

VE 692B-E Var. Seminar.

B) Human resource development. E) Counseling.

VE 693 Var. Seminar.

VE 694 Var. Independent Study.

VE 696 Var. Group Study.

VE 698 Var. Research.

VE 699 Var. Thesis.

VE 700 03(3-0-0). Quantitative Research Methods. F, S. Prerequisite: ED 606 or concurrent registration.

Design, data analysis, interpretation of results, and evaluation of educational research studies.

VE 706 03(3-0-0). Analysis of Relationships. S, SS. Prerequisite: ED 606, VE 700 or concurrent registration.

Inferential and correlational data analysis.

VE 707 03(0-0-3). Quantitative Data Collection Methods/ Analysis. F. Prerequisite: VE 700.

Selection or development of questionnaires, tests, structured interviews, and observations. Reliability and validity. Reporting educational studies.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

°VE 765 03(3-0-0). Strategic Planning of Education for Work. F. Prerequisite: EC 504, VE 665.

Human capital as component of strategic planning of education; training and development at national, regional, and organizational levels.

VE 767 03(3-0-0). Cross-Culture and International Training. S. Prerequisite: AD 624, VE 506.

Issues, models, techniques of development and delivery of human resource development and training programs across cultural, interregional, national barriers.

***VE 768 03(3-0-0). Workforce Development.** S. Prerequisite: Admission to Ph.D. program or written consent of instructor.

Characteristics and elements of workforce development with special attention to the roles and responsibilities of employers and managers.

VE 786 Var. Practicum.

VE 792A-P Var. Seminar.

A) Human resource development. I) Data analysis/interpretation. M) Proposal development. O) Individual counseling. P) Group counseling.

VE 793 Var. Seminar.

VE 799 Var. Dissertation.

VM 624 03(2-2-0). Veterinary Feeds and Feeding. S. Corequisite: VM 623.

Description, advantages, and limitations of feedstuffs fed to domestic livestock; nutrient requirements and formulation of rations for various needs.

VM 625 01(1-0-0). Principles of Diagnostic Imaging. S. Prerequisite: Admission to professional curriculum in veterinary medicine.

Diagnostic radiography, computed tomography, ultrasound, magnetic resonance, and nuclear medicine.

VM 637 03(3-0-0). Veterinary Bacteriology and Mycology. S. Prerequisite: VM 606.

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: VM 606.

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.

Introduction to mechanisms of subcellular, cellular, tissue, and organ response to injury and associated pathological processes.

VM 648 02(2-0-0). Food Animal Production and Food Safety. S. Prerequisite: VM 601.

Basic orientation to food animal production units, herd health concepts, and issues of food safety from preharvest through processing and distribution.

VM 650 01(0-2-0). Veterinary Microbiology Laboratory Techniques. F. Prerequisite: VM 606, VM 637, VM 639 or concurrent registration.

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.

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.

Legal and professional issues affecting the practice of veterinary medicine.

VM 707 01(1-0-0). Emerging Issues in Infectious Disease. F. Prerequisite: VM 637 and VM 639.

Influence of microbial, host, and environmental changes on the emergence, control, and prevention of infectious disease of veterinary importance.

VM 712 04(4-0-0). Veterinary Practice Management. S. Prerequisite: VM 705.

Veterinary practice management including marketing, finance, information systems, personnel issues, and client relations.

VM 714 05(5-0-0). Veterinary Preventive Medicine. F. Prerequisite: VM 637, VM 639, and VM 640.

Principles of health promotion and disease prevention in populations.

VM 720 01(1-0-0). Alternative and Complementary Therapeutics. F. Prerequisite: Successful completion of second year of professional veterinary medicine curriculum.

Mechanisms and efficacy of alternative and complementary therapeutics used in veterinary medicine.

VETERINARY MEDICINE COURSES

(VM)

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.

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.

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.

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.

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: Enrolled in professional veterinary medicine 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.

Applied veterinary anatomy and husbandry of birds, reptiles, amphibians, and fish.

VM 623 02(2-0-0). Veterinary Nutrition and Metabolism. S. Prerequisite: Enrolled in professional veterinary medicine program.

Intermediary metabolism, nutrients, and animal nutrition.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

VM 722 04(4-0-0). Veterinary Pharmacology. F. Prerequisite: VM 619.
Basic and clinical pharmacology, therapeutic practice, and pharmacy management.

VM 724 06(4-0-2). Bioanalytical Pathology. F. Prerequisite: VM 640.
Mechanisms, interpretation, and applications of laboratory analyses for solving diagnostic problems.

VM 726 02(1-0-1). Principles of Imaging Interpretation I. S. Prerequisite: VM 625.
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: VM 726.
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: VM 619.
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: VM 722.
Principles and concepts of general and orthopedic surgery.

VM 737 02(2-0-0). Principles of Anesthesia. S. Prerequisite: VM 722.
Integration of physiological and pharmacological principles in clinical anesthesia.

VM 741 04(3-0-1). Biology of Disease II. F. Prerequisite: VM 637 and VM 639.
Pathogenesis of organ system diseases and integrated systemic pathology.

VM 742 01(0-0-1). Biology of Disease III. S. Prerequisite: VM 741.
Pathogenesis of disease in organ systems, systemic pathology.

VM 744 03(2-2-0). Theriogenology. S. Prerequisite: VM 619.
Reproductive function and disease, including mammary gland and endocrine regulation of reproduction and lactation.

VM 745 05(5-0-0). Clinical Sciences I. S. Corequisite: VM 742.
Diagnostic approaches to common medical problems of cardiovascular, urinary, and digestive-hepatic systems.

VM 747 04(4-0-0). Clinical Sciences II. S. Prerequisite: VM 745.
Diagnostic approaches to common medical problems of organ systems.

VM 749 05(5-0-0). Clinical Sciences III. F. Prerequisite: VM 747.
Diagnostic approaches to common medical problems of organ systems.

VM 751 01(1-0-0). Veterinary Clinical Toxicology. S. Prerequisite: VM 742.
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: VM 749.
Diagnostic approaches to common medical problems of organ systems.

VM 757 03(3-0-0). Bovine Herd Medicine. S. Prerequisite: VM 747.
Health management, and diagnosis and treatment of diseases of food animals.

VM 763 05(5-0-0). Equine Medicine and Surgery. S. Prerequisite: VM 747.
Health management, and diagnosis and treatment of diseases of horses.

VM 773 04(4-0-0). Small Animal Medicine and Surgery I. S. Prerequisite: VM 747.
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: VM 747.
Health management, and diagnosis and treatment of diseases of dogs and cats.

VM 778A-D. Special Animal Medicine. F, S. Prerequisite: A) VM 621 or written consent of instructor. B) VM 778A or written consent of instructor. D) VM 753.
Diagnosis and treatment of diseases of selected species of animals. A) Non-mammalian vertebrate medicine. 02(0-0-2). B) Biology and diseases of small mammals. 02(2-0-0). D) Small ruminants and camelids. 02(2-0-0).

VM 786A-B Var [1-22]. Practicum. Prerequisite: A) Completion of second year of professional veterinary medicine curriculum. B) VM 786A. A) Junior practicum. Var [6-8]. B) Senior practicum.

VM 795 Var [1-5]. Independent Study. Prerequisite: Admission to professional veterinary medicine program.

VM 796F-R. Group Study. Prerequisite: VM 786A or concurrent registration; R) VM 747.
F) Small animal diagnostic problems 01(1-0-0). J) Swine medicine 01(1-0-0). R) Food animal clinical problems 03(3-0-0).

CLINICAL SCIENCES COURSES (VS)

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: BZCC 110 or LS 103 or written consent of instructor.
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: BS 230 or BS 300. Credit not allowed for both BS/VS 331 and BS 330.
Analysis of animal cells, tissues and organs emphasizing light microscopy. (Ω-O)

VS 333 04(3-3-0). Domestic Animal Anatomy. F, S, SS. Prerequisite: LSCC 102 or BZCC 110. Credit allowed for only one of the following: VS 333, BS 230 and BS 231, BS 305.
Comparative functional anatomy of the dog, horse, and cow. (Ω-O)

VS 495 Var. Independent Study.

VS 570/A 570 02(2-0-0). Issues in Animal Agriculture. F. Credit not allowed for both VS 570 and A 570.
Issues that have a major impact on the direction of changes in animal agriculture.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Courses of Instruction

VS 575 01(5-1.5-0). Basic Principles/Techniques of Animal Surgery. S. Prerequisite: Admission to graduate program or written consent of instructor.

Basic principles and techniques of animal surgery to prepare students for experimental procedures.

VS 602 02(1-0-1). Critical Evaluation of Scientific Literature. F. Prerequisite: EHCC 307/STCC 307 or ST/STCC 301.

Method of evaluating scientific literature. Students present critiques of papers they have chosen.

²**VS 605 02(2-0-0). Comparative Anesthesiology.** S. Prerequisite: BS 450. Techniques in anesthesia for large and small animals.

²**VS 606 01(0-3-0). Comparative Anesthesiology Laboratory.** S. Prerequisite: VS 605 or concurrent registration.

Techniques in anesthesia for large and small animals.

VS 612 02(2-0-0). Plastic and Reconstructive Surgery. F. Prerequisite: VM 786B.

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.

²**VS 626 02(2-0-0). Infertility and Genital Disease.** F. Prerequisite: BS 500 or written consent of instructor.

Infectious and noninfectious causes of reproductive failure in food animals.

²**VS 630 03(3-0-0). Orthopedic Surgery.** F.

Techniques, devices, and prosthetic materials in rehabilitating musculoskeletal problems.

²**VS 631 01(0-3-0). Orthopedic Surgery Laboratory.** F. Prerequisite: VM 786A or B; VS 630 or concurrent registration.

Procedures applied to skeletal preparations and living animals.

VS 642 05(4-2-0). Ophthalmology. F. Prerequisite: Written consent of instructor.

Instrumentation, ocular therapeutics, and clinical ophthalmology.

²**VS 645 03(2-3-0). Surgery of the Eye.** S. Prerequisite: VS 642.

Techniques, indications, and complications.

²**VS 650 03(3-0-0). Comparative Abdominal Surgery.** F.

New techniques in surgery of abdominal viscera.

²**VS 651 01(0-3-0). Comparative Abdominal Surgery Laboratory.** F. Prerequisite: VM 786A or B; VS 650 or concurrent registration.

Reparative and reconstructive abdominal surgical procedures.

***VS 655 03(2-3-0). Echocardiography in Veterinary Medicine.** F. Prerequisite: Earned DVM degree or equivalent professional medicine degree or written consent of instructor.

Technical proficiency in obtaining echocardiographic images; fundamental understanding of diagnostic criteria for common cardiac disease in dogs and cats.

²**VS 660 03(3-0-0). Neurology and Neurosurgery.** S.

Diagnostic and surgical techniques for the nervous system.

²**VS 661 01(0-3-0). Neurology and Neurosurgery Laboratory.** S. Prerequisite: VM 786A or B; VS 660 or concurrent registration.

Production and correction of surgically amenable lesions in central and peripheral nervous system; electrodiagnosis.

²**VS 662/EH 662 03(2-0-1). Applied Research-Planning/Design/Analysis.** S. Prerequisite: EHCC 307/STCC 307. Credit not allowed for both VS 662 and EH 662.

Training to conceptualize and execute an independent research project.

²**VS 673 03(3-0-0). Thoracic and Cardiovascular Surgery.** F.

Surgical approaches to the thorax and the central and peripheral cardiovascular system.

²**VS 674 01(0-3-0). Thoracic and Cardiovascular Surgery Laboratory.** F. Prerequisite: VM 786A or B; VS 673 or concurrent registration.

Surgical procedures applied to the chest, heart, and vessels.

VS 699 Var. Thesis.

¹**VS 701 Var [1-3]. Postgraduate Medicine I.** F. Prerequisite: D.V.M. or written consent of department head.

Comprehensive review, update of immunology, emergency medicine, dermatology, and endocrinology.

²**VS 702 Var [1-3]. Postgraduate Medicine II.** S. Prerequisite: D.V.M. or written consent of department head.

Comprehensive review, update of neurology, gastroenterology, and ophthalmology.

²**VS 703 Var [1-3]. Postgraduate Medicine III.** F. Prerequisite: D.V.M. or written consent of department head.

Comprehensive review, update of oncology, cardiology, reproduction, ophthalmology, and radiology.

²**VS 704 Var [1-3]. Postgraduate Medicine IV.** S. Prerequisite: D.V.M. or written consent of department head.

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. F, S, SS.

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.

²Offered every third year.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

WATERSHED SCIENCE COURSES (WR)

*Department of Forest, Rangeland, and
Watershed Stewardship
College of Natural Resources*

WRCC 304 03(3-0-0). Principles of Watershed Management. (AUCC 3A). F, S.

Effects of land use practices on watersheds: hydrology, soil loss, and water quality.

+WR 406 03(2-3-0). Seasonal Snow Environments. S. Prerequisite: Written consent of instructor.

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: SC 240, STCC 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. Corequisite: 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: C CC 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. Corequisite: WR 418.

Sampling and determination of water quality parameters. (\$)

+WR 420 02(0-6-0). Watershed Field Practicum. F. Corequisites: WR 416 and WR 417 or written consent of instructor.

Field visits to watershed management projects and sites of significant field studies. (\$)

+WR 440 03(2-2-0). Watershed Problem Analysis. S. Prerequisite: CE 322/EV 322, WR 416.

Hydrologic analysis and problem solving in watershed management. (\$)

WR 465 04(3-3-0). Eolian and Fluvial Transport Processes. F. Prerequisite: PHCC 141 or written consent of instructor.

Fundamental physical principles of eolian and fluvial transport processes.

°WR 474 03(3-0-0). Snow Hydrology. F. Prerequisite: WR 416 or CE 322/EV 322.

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: CE 322/EV 322 or WRCC 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: PHCC 122.

Theory, estimation, measurement, simulation, and application of evapotranspiration processes in hydrology.

°WR 524/CE 524 04(3-0-1). Modeling Watershed Hydrology. S. Prerequisite: CE 322/EV 322 or WR 416, ST 304 or STCC 309. Credit not allowed for both WR 524 and CE 524.

Development and application of watershed models: structure, calibration, evaluation, sensitivity analysis, simulation.

***WR 574 04(3-0-1). Advanced Snow Hydrology.** F. Prerequisite: CE 322/EV 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: CE 322/EV 322 or WR 416 or written consent of instructor.

Hillslope hydrology and runoff processes in different environments; implications for management and modeling.

***WR 674 03(3-0-0). Advanced Topics in Snow Hydrology.** S. Prerequisite: WR 574.

Modeling spatial distribution of snow, snow-covered area, and snow melt: operational and research models.

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: WR 416 or CE 322/EV 322, ST 304.

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.

° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-*subcode*-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

WOMEN'S STUDIES COURSES (WS)

Office of Women's Programs and Studies Office of Provost/Academic 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 or written consent of instructor.

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 or written consent of instructor.

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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° Alternate year offering (odd); * Alternate year offering (even); + Field trips; \$ Special course fee; Ω Approved for nontraditional course offering (C = correspondence, O = online, T = telecourse, V = videotape); GT-subcode-State Guarantee Transfer course, the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

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