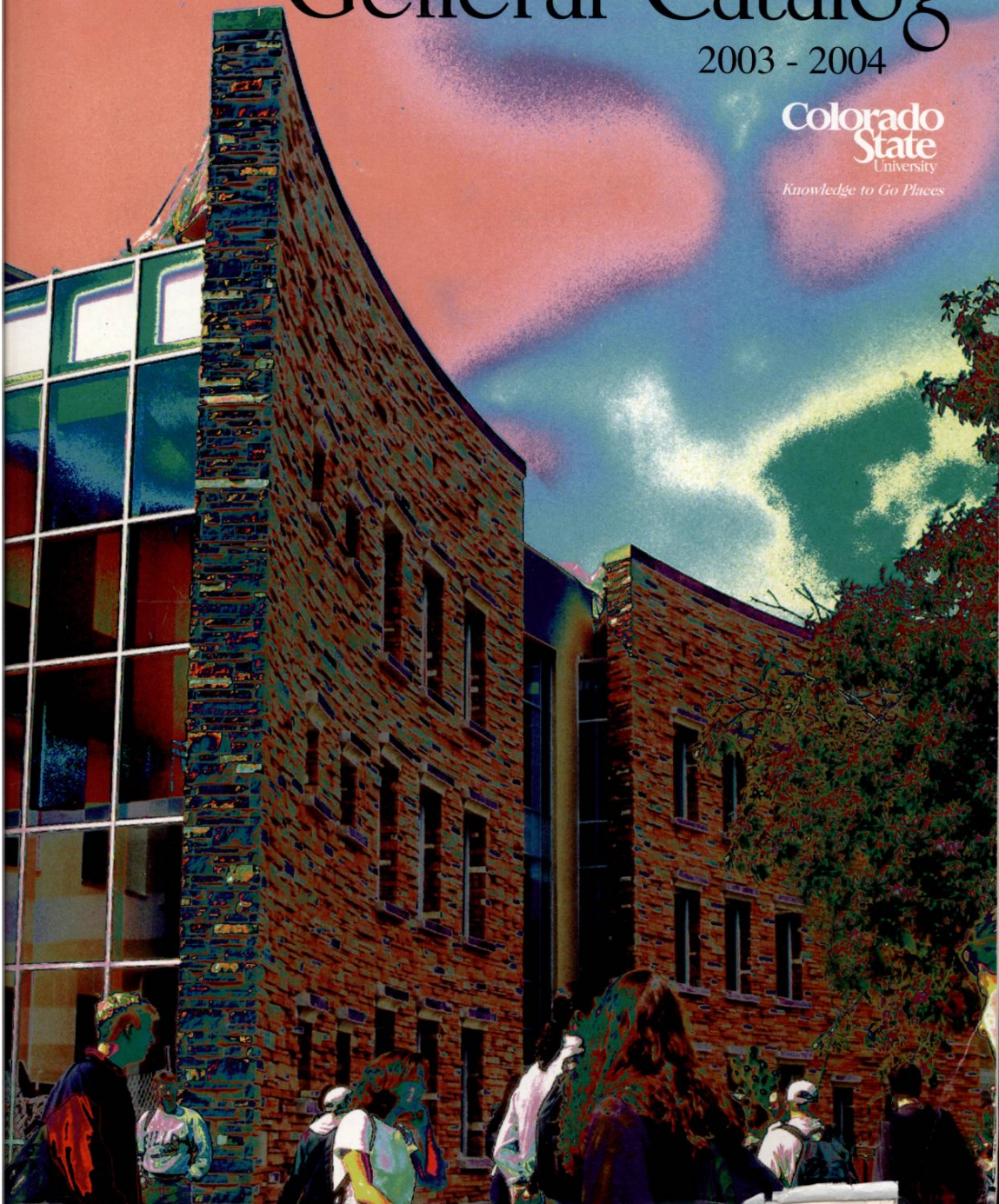


General Catalog

2003 - 2004

Colorado
State
University

Knowledge to Go Places



**Colorado State University
General Catalog
2003-2004**

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.

CHANCELLOR'S MESSAGE

Welcome to Colorado State University!

Education should prepare students not only to make a living, but to live full, rewarding lives. This academic program guide provides an introduction to the rich variety of experiences available to students who undertake this vital and challenging journey at Colorado State.

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. The educational experience at Colorado State involves more than just what students learn in the classroom. A Colorado State education is built around a rich variety of academic, cultural, and research experiences that prepare students to confront the challenges of a complex and demanding world.

Colorado State is known worldwide for its top research programs in such fields as engineering, water resources, forestry, agricultural sciences, atmospheric sciences, veterinary medicine, occupational therapy, and more. Still, our University's most important mission is to educate students—undergraduate and graduate. This education happens through a wide range of learning experiences including first year seminars, senior capstone courses, and a rigorous core curriculum. As well, the institution strives to provide you with the advising and academic resources needed to make the most of your experience.

Colorado State has been shaped by thousands of students with diverse interests and character—students who enliven the community through music, drama, and art; students who work with professors on important scientific breakthroughs; students who have built one of the nation's top student volunteer programs. Colorado State graduates have gone on to win Pulitzer Prizes, fly on space-shuttle missions, become leaders of industry, conduct important scholarly work, and much more. Our goal is to help all students pursue their individual dreams and realize their potential as educated citizens. This catalog is one of the best and most useful tools to aid you in that pursuit.

Again, welcome to Colorado State University!

Sincerely,

*Albert C. Yates
Chancellor, Colorado State University System*

Table of Contents

Directory	7
------------------------	----------

University Calendar	9
----------------------------------	----------

The University	13
-----------------------------	-----------

Colorado State University System	13
Board of Governors of the Colorado State University System	13
Accreditation	14
Mission of Colorado State University	14
University Aims	14
Assessment and Improvement of Program Quality	15
Facilities at Colorado State	15
University Libraries	16
Colorado State University Alumni Association	16
Nondiscrimination Policy	17
Sexual Harassment Policy	17

Undergraduate Admissions Policy and Procedures	19
-------------------------------------------------------------	-----------

Application Deadlines	19
Personal Identifier	19
Immunization Policy	19
Selective Service Registration	20
Application Information	20
For High School Graduates	20
For Non-High School Graduates	20
For Transfer Students	21
For Former Colorado State Students	22
For International Students	22

Financial Assistance	24
-----------------------------------	-----------

Scholarships, Grants, Loans, Work-Study	24
Application Procedures	25
Satisfactory Progress Standards	25
Fraudulent Receipt of Funds	25
Reporting Changes	25
Student Employment	25
Veterans' Benefits	25
Financial Support for Graduate Students	26

Tuition, Fees, Expenses, and Adjustments	27
-------------------------------------------------	-----------

Schedule of Tuition and Fees	27
Graduate Assistants	27
Continuing Education Courses	27

Special Fees	
Nonrefundable Fees	27
Research Fees	27
Special Course Fees	28
In-State Residency Classification for Tuition	
Purposes	28
Additional Expenses	29
International Students	30
Payment of Student Accounts	31
Late Payments, Holds, and Returned Checks	31
Housing Deposit	32
Tuition and Fees Adjustments	32

Student Rights and Responsibilities	33
--------------------------------------------------	-----------

Students' Rights	33
Students' Responsibilities	33
Victims' Rights	34
Students' Educational Records	34
Academic Integrity	35
Classroom Behavior	36
University Policy on Undergraduate Advising	37
University Policies Related to Student Life and Activities	37
Other University Policies and Regulations	40

Student Programs and Services	41
--------------------------------------------	-----------

Academic Support Services	41
Advocacy Programs	41
Intercollegiate Athletics	43
Campus Recreation	43
The Career Center	45
University Counseling Center	45
Student Financial Services	46
Hartshorn Health Service	46
Housing and Food Services	46
Charles A. Lory Student Center	49
Student Legal Services	50
Conflict Resolution & Student Conduct Services	51
University Police Department	51
University Parking Services	51

University Services and Outreach	52
-----------------------------------------------	-----------

Academic Computing and Networking Services	52
Colorado State University Visitor's Center	52
Conference Services	52
Division of Continuing Education	52
Office of Equal Opportunity	53
Office of Instructional Services	53
Summer Session	54
Agricultural Experiment Station	54

Colorado State Forest Service	55
Cooperative Extension	55

University-Wide Instructional Programs . 56

Environmental Studies	56
Life Sciences	58
University Interdisciplinary Studies Programs	59
American Ethnicity	59
Asian	62
Biomedical Engineering	63
Biotechnology	65
Conservation Biology	65
Criminal Justice	66
Diversity in Law	67
Environmental Affairs	67
Exercise Science and Nutrition Graduate Program ..	69
Food Science/Safety	69
Geospatial Science Graduate Program	72
Gerontology	72
Information Science and Technology	73
Integrated Resource Management	73
International Development	74
Latin American	76
Molecular Biology	77
Molecular, Cellular, and Neurosciences Graduate Program	79
Religious Studies	79
Russian, Eastern, and Central European	80
Water Resources	81
Women's	82
Interdisciplinary Graduate Degree Programs	
Cell and Molecular Biology	83
Ecology	83
Office of International Programs	83
International Education	84
International Research, Development, and Training .	84
International Student and Scholar Services	85
Study Abroad	85
Division of Armed Forces Services (ROTC)	86
<i>Department of Aerospace Studies</i>	86
Minor in Aerospace Studies	87
<i>Department of Military Science</i>	87
Minor in Military Science	87
University Honors Program	89
Honors Core Curriculum	89

Grading and Scholastic Standards 90

Grading	90
Grade Appeals	90
Incompletes	91
Repeat/Delete Policy	91
Final Examinations	92
Scholastic Standards	92
Minimum Cumulative Grade Point Average	92
Academic Probation	92
Academic Dismissal	93
Academic Fresh Start	93

Registration and Student Records 94

Registration	
Late Registration	94
Class Schedule	94
Faculty Advisers	94
Credit Load and Overload	94
Class Attendance Regulations	94
Senior Citizen Visitation Privilege	95
Repeating a Course	95
Auditors	95
Student Option Pass/Fail Grading	95
Schedule Change and Drop Periods	96
Independent Study	96
Student Records	
Transcripts	96
Undergraduate Classification	96
Change of Address	96
Full-Time/Half-Time Enrollment Status	96
Change of Undergraduate Major	97
Withdrawal and Retroactive Withdrawal	97
Taking Courses at Another Institution	97

All-University Core Curriculum 99

English Composition Requirement	103
Mathematics Requirement	104

Graduation Requirements 105

Student Bill of Rights	105
Major/Second Major/Concentration/Option/Minor Requirements	105
Second Bachelor's Degree	106
Changes in Undergraduate Curriculum	
Requirements	106
Course Restrictions	106
Exclusion of Courses from Bachelor's Degree	106
Graduation Credit Requirements	107
Nontraditional Credit Policies	
College-Level Courses Completed by High School	
Students	107
The College Board Advanced Placement Program .	107
College-Level Examination Program (CLEP)	108
International Baccalaureate	108
Challenging Colorado State Courses for Credit ...	108
Military Service/Service Schools	108
Credit for Study Abroad	109
Time Limitation on Credit Earned	109
Credit from Two-Year Colleges	109
Transfer Credit from Noncollegiate Institutions ...	109
Graduation Procedures	
Intent to Graduate	109
Contract for Graduation/Graduation List	109
Off-Campus Completion of Degree Requirements .	109
Good Standing Status	110
Commencement	110

Graduation with Distinction	110	<i>School of Education</i>	156
Graduation as a University Honors Scholar	110	Professional Licensure Requirements	(159)
Colorado State University Honor Societies	111	Career and Technical (Vocational) Teaching Endorsement Area Requirements	160
Degree Programs	112	<i>Department of Design and Merchandising</i> Major in Apparel and Merchandising	161
University Open Option	112	Apparel Design and Production Concentration	(162)
Undergraduate Degrees	112	Merchandising Concentration	(163)
Graduate Degrees	112	Minor in Merchandising	(164)
Undergraduate Minors	113	Major in Interior Design	164/(165)
College of Agricultural Sciences	115	<i>Department of Food Science & Human Nutrition</i> Major in Nutrition and Food Science	166/(167)
Major in Agricultural Education	116	Major in Restaurant and Resort Management	171/(172)
Agricultural Education Concentration	(116)	Minor in Nutrition	(173)
Agricultural Extension Education Concentration	(118)	<i>Department of Health & Exercise Science</i> Major in Health and Exercise Science	173/(174)
<i>Dept. of Agricultural and Resource Economics</i> Major in Agricultural Business	119/(119)	Health Promotion Concentration	(174)
Major in Agricultural Economics	120	Sports Medicine Concentration	(175)
Agricultural Economics Concentration	(121)	Minor in Coaching	176
Farm and Ranch Management Concentration	(122)	<i>Department of Human Development and Family Studies</i> Major in Human Development and Family Studies	176/(177)
Natural Resource Economics Concentration	(123)	Teacher Licensure in Early Childhood and Elementary Education	179
Minor in Agricultural and Resource Economics	(124)	<i>Department of Manufacturing Technology and Construction Management</i> Pre-MTCM Program	(180)
<i>Department of Animal Sciences</i> Major in Animal Science	124	Major in Construction Management	181/(181)
Industry Concentration	(124)	Minor in Construction Management	(182)
Science Concentration	(125)	Major in Technology Education and Training	182
Major in Equine Science	126	Technology Education (Licensure) Concentration	(182)
Industry Concentration	(127)	Technology Education (Non-Licensure) Concentration	(184)
Science Concentration	(128)	<i>Department of Occupational Therapy</i>	185
Preveterinary Medicine	129	<i>School of Social Work</i> Major in Social Work	185/(186)
<i>Department of Bioagricultural Sciences & Pest Management</i>	129	College of Business	188
Minor in Entomology	(130)	Major in Business Administration	188/(189)
Minor in Plant Health	(130)	<i>Department of Accounting</i> Accounting Concentration	(190)
<i>Department of Horticulture & Landscape Architecture</i> Major in Horticulture	130	<i>Dept. of Computer Information Systems</i> Information Systems Concentration	(192)
Floriculture Concentration	(131)	<i>Department of Finance and Real Estate</i> Finance-Real Estate Concentration	(192)
Horticultural Business Management Concentration	(132)	<i>Department of Management</i> Organizational Management Concentration	(194)
Horticultural Food Crops Concentration	(133)	<i>Department of Marketing</i> Marketing Concentration	(196)
Horticultural Science Concentration	(135)	College of Engineering	199
Major in Landscape Architecture	136/(137)	Major in Engineering Science	201/(202)
Major in Landscape Horticulture	138	Engineering Physics Concentration	(202)
Landscape Design and Contracting Concentration	(138)	Space Engineering Concentration	(203)
Nursery and Landscape Management Concentration	(139)	Liberal Arts Concentration	(203/225 or 230)
Turf Management Concentration	(141)	Major in Environmental Engineering	204/(205)
Minor in Horticulture	(142)	Minor in Environmental Engineering	206
Minor in Landscape Horticulture	(142)		
<i>Department of Soil and Crop Sciences</i> Major in Soil and Crop Sciences	142/(143)		
Agronomic Production Management Concentration	(144)		
Applied Information Technology Concentration	(145)		
Environmental Soil Science Concentration	(146)		
International Soil and Crop Sciences Concentration	(147)		
Plant Biotechnology, Genetics, & Breeding Conc.	(148)		
Soil Resources and Conservation Concentration	(150)		
Minor in Soil Resources and Conservation	(151)		
College of Applied Human Sciences	152		
Major in Consumer and Family Studies	153		
Consumer and Family Studies Concentration	(153)		
Consumer and Family Studies Education Concentration	(155)		

<i>Department of Atmospheric Science</i>	206	<i>Department of Foreign Languages and Literatures</i>	
<i>Department of Chemical Engineering</i>		Major in Languages, Literatures, and Cultures	248
Major in Chemical Engineering	207/(207)	French Concentration	(249)
<i>Department of Civil Engineering</i>		German Concentration	(250)
Major in Civil Engineering	208/(210)	Spanish Concentration	(251)
Major in Bioresource & Agricultural		Teaching Endorsement	(252)
Engineering	211/(211)	Minors in French, German, Japanese, Russian, and	
Agricultural Engineering Concentration	(212)	Spanish	(253)
Bioresource Engineering Concentration	(212)	<i>Department of History</i>	
<i>Department of Electrical and Computer</i>		Major in History	253
<i>Engineering</i>		Liberal Arts Concentration	(254)
Major in Computer Engineering	214/(214)	Social Studies Teaching Concentration	(255)
Major in Electrical Engineering	215	Minor in History	(257)
Electrical Engineering Concentration	(216)	<i>Department of Journalism and Technical Communication</i>	
Optoelectronic Engineering Concentration	(217)	Major in Technical Journalism	257/(258)
<i>Department of Mechanical Engineering</i>		News-Editorial Concentration	(258)
Major in Mechanical Engineering	218/(218)	Public Relations Concentration	(259)
		Specialized Communication Concentration	(259)
		Television News & Video Communication Concentration ..	(260)
		<i>Department of Music, Theatre, and Dance</i>	260
College of Liberal Arts	220	Major in Music (B.M.)	
Major in Liberal Arts	221	Composition Concentration	(261)
American Studies Concentration	(222)	Music Education Concentration	(262)
Arts and Humanities Concentration	(224)	Music Therapy Concentration	(264)
Arts and Humanities & Engineering Science Conc.	(225)	Performance Concentration	(265)
International Studies Concentration	(226)	Major in Music (B.A.)	268/(269)
Social Sciences Concentration	(228)	Minor in Music	(270)
Social Sciences Concentration with Social Studies		Major in Performing Arts	
Licensure	(229)	Dance Concentration	(270)
Social Sciences & Engineering Science Concentration	(230)	Theatre Concentration	(271)
Minor in Media Studies	(231)	Minor in Theatre-Acting/Directing	(273)
<i>Department of Anthropology</i>		Minor in Theatre-Design/Technical Theatre	(273)
Major in Anthropology	232/(232)	<i>Department of Philosophy</i>	
Minor in Anthropology	(233)	Major in Philosophy	273/(274)
<i>Department of Art</i>		General Philosophy Concentration	(275)
Major in Art (B.F.A.)	234/(234)	Philosophy & Religion Concentration	(275)
Drawing Concentration	(235)	Philosophy, Science, & Technology Concentration	(276)
Fibers Concentration	(235)	Minor in General Philosophy	(276)
Graphic Design Concentration	(236)	Minor in Religious Studies	(277)
Metalsmithing Concentration	(236)	<i>Department of Political Science</i>	
Painting Concentration	(236)	Major in Political Science	277/(278)
Photo Image Making Concentration	(236)	Minor in Political Science	(279)
Pottery Concentration	(236)	<i>Department of Sociology</i>	
Printmaking Concentration	(237)	Major in Sociology	279
Sculpture Concentration	(237)	Criminal Justice Concentration	(280)
Major in Art (B.A.)		General Sociology Concentration	(281)
Art Education Concentration	(237)	Minor in Sociology	(282)
Art History Concentration	(238)	<i>Department of Speech Communication</i>	
Studio Concentration	(239)	Major in Speech Communication	282/(283)
Minor in Art History	(240)	Communication in Media Concentration	(283)
Minor in Studio Art	(240)	Communication Theory Concentration	(283)
<i>Department of Economics</i>		Rhetoric Concentration	(284)
Major in Economics	240/(241)	Teacher Licensure Concentration	(284)
Minor in Economics	(242)	College of Natural Resources	287
<i>Department of English</i>		<i>Department of Fishery and Wildlife Biology</i>	
Major in English	242	Major in Fishery Biology	288/(289)
Creative Writing Concentration	(243)	Minor in Fishery Biology	(290)
English Education Concentration	(244)	Major in Wildlife Biology	291/(291)
Language Concentration	(245)		
Literature Concentration	(246)		
Writing Concentration	(247)		
Minor in English	(248)		

<i>Department of Forest Rangeland Watershed Stewardship</i>	
Major in Forestry	293/(294)
Forest Biology Concentration	(294)
Forest Fire Science Concentration	(295)
Forest Management Concentration	(295)
Forestry-Business Concentration	(296)
Major in Natural Resources Management	297/(298)
Major in Rangeland Ecology	298
Range and Forest Management Concentration	(299)
Rangeland Management Concentration	(300)
Restoration Ecology Concentration	(301)
Science Concentration	(302)
Major in Watershed Science	303/(304)
Minor in Forestry	(305)
Minor in Range Ecology	(305)
Minor in Spatial Information Management	(306)
Minor in Watershed Science	(306)
<i>Department of Geosciences</i>	
Major in Geology	307
Environmental Geology Concentration	(307)
Geology Concentration	(308)
Minor in Geology	(310)
<i>Dept. of Natural Resource Recreation & Tourism</i>	
Major in Natural Resource Recreation and Tourism	310
Environmental Communication Concentration	(311)
Global Tourism Concentration	(312)
Natural Resource Tourism Concentration	(313)
Parks & Protected Area Management Concentration	(314)
Minor in Wilderness Management	(315)
College of Natural Sciences 316	
Major in Natural Sciences	317
Biology Education Concentration	(317)
Biology/Natural Resources Education Concentration	(319)
Chemistry Education Concentration	(320)
General Science Education Concentration	(321)
Geology Education Concentration	(322)
Physical Science Concentration	(323)
Physics Education Concentration	(324)
<i>Department of Biochemistry & Molecular Biology</i>	
Major in Biochemistry	325/(326)
Minor in Biochemistry	(327)
<i>Department of Biology</i>	
Major in Biological Science	327/(328)
Major in Botany	329/(330)
Minor in Botany	(331)
Major in Zoology	332/(332)
Minor in Zoology	(333)
<i>Department of Chemistry</i>	
Major in Chemistry	334/(335)
ACS Certified Concentration	(335)
Non-ACS Certified Concentration	(336)
Minor in Chemistry	(336)
<i>Department of Computer Science</i>	
Major in Computer Science	337/(337)
Computational Statistics Concentration	(338)
Minor in Computer Science	(339)
<i>Department of Mathematics</i>	
Major in Mathematics	340
Actuarial Science Concentration	(340)
Applied Mathematics Concentration	(341)
Computational Mathematics Concentration	(342)
General Mathematics Concentration	(343)
Mathematics Education Concentration	(344)
Statistics Concentration	(345)
Minor in Mathematics	(346)
<i>Department of Physics</i>	
Major in Physics	346/(347)
Applied Physics Concentration	(348)
Physics Concentration	(348)
Minor in Physics	(348)
<i>Department of Psychology</i>	
Major in Psychology	349/(350)
<i>Department of Statistics 51</i>	
Minor in Statistics	(351)
College of Veterinary Medicine and Biomedical Sciences 352	
Doctor of Veterinary Medicine	353
Preprofessional Training	(354)
<i>Department of Biomedical Sciences 355</i>	
Minor in Biomedical Sciences	(355)
<i>Department of Clinical Sciences 355</i>	
<i>Department of Environmental and Radiological Health Sciences</i>	
Major in Environmental Health	356/(356)
<i>Department of Microbiology, Immunology, and Pathology</i>	
Major in Microbiology	357/(358)
Minor in Microbiology	(359)
Courses of Instruction 361	
Index 502	

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	491-6129	Campus Media (see Student Media)	491-1683
Academic Computing and Networking Services	491-5133	Career Center	491-5707
Academic Support Services	491-7095/0525/3658	Cashier's Office	491-6413
Academic Vice President's Office	491-6614	Cell and Molecular Biology Graduate Degree Program	491-0241
Accounting Department	491-5102	Chemical Engineering Department	491-5252
Accounts/Loans Receivable	491-6466	Chemistry Department	491-6381
Activities Center, Campus	491-6444	Civil Engineering Department	491-5048
Administrative Services Vice President's Office	491-5257	Clinical Sciences Department	491-1274
Admissions Office	491-6909	Colorado Cooperative Fish and Wildlife Research Unit	491-5396
Adult Learners, Resources for	491-2248	Colorado Institute for Irrigation Management	491-5247
Aerospace Studies Department (Air Force ROTC)	491-6476	Colorado State Forest Service	491-6303
Agricultural and Resource Economics Department	491-6325	Colorado State University Alumni Association	491-6533
Agricultural Engineering (see Civil Engineering Department)	491-5048	Colorado State University Foundation	491-7135
Agricultural Experiment Station	491-5371	Colorado State University System	303-534-6290
Agricultural Sciences College	491-6274	Colorado Water Resources Research Institute	491-6308
Alumni Relations	491-6533	Computer Information Systems Department	491-6203
American Ethnicity Interdisciplinary Studies Program	491-2418	Computer Science Department	491-5792
Anatomy and Neurobiology (see Biomedical Sciences Department)	491-6188	Conference Services	491-6222
Animal Sciences Department	491-6672	Conservation Biology Interdisciplinary Studies Program	491-1620/6519
Anthropology Department	491-5447	Consumer and Family Studies	491-5141
Applied Human Sciences College	491-6331	Continuing Education, Division of	491-5288
Art Department	491-6774	Cooperative Extension	491-6281
ASCSU (Associated Students of Colorado State University)	491-5931	Cooperative Institute for Research in the Atmosphere	491-8448
Asian/Pacific American Student Services	491-6154	Counseling Center, University	491-6053
Asian Interdisciplinary Studies Program	491-5917	Criminal Justice Interdisciplinary Studies Program	491-6044
Association for Student Activity Programming (ASAP)	491-2727	Degree Requirements	491-7159
Athletics, Intercollegiate	491-5300	Design and Merchandising Department	491-1629
Atmospheric Science Department	491-8360	Disabled Students, Resources for	491-6385
Bioagricultural Sciences and Pest Management Department	491-5261	Diversity in Law Interdisciplinary Studies Program	491-5421
Biochemistry and Molecular Biology Department	491-5602	Earth Resources (see Geosciences Department))	491-5661
Biology Department	491-7011	Ecology Graduate Degree Program	491-4373
Biomedical Engineering (Undergraduate and Graduate) Interdisciplinary Studies Program	491-1055	Economics Department	491-6324
Biomedical Sciences Department	491-6188	Education, School of	491-6316
Bioresource Engineering (see Civil Engineering Department)	491-5048	Educational Outreach (see Continuing Education)	491-5288
Biotechnology Interdisciplinary Studies Program	491-7051	El Centro Student Services	491-5722
Black Student Services	491-5781	Electrical and Computer Engineering Department	491-6600
Board of Governors	491-7707	Employment Services, Student	491-5714
Bookstore	491-6692	Engineering College	491-6603
Business College	491-6471	English Department	491-6428
		Enrollment Services	491-2127
		Environmental Affairs Interdisciplinary Studies Program	491-6468
		Environmental and Radiological Health Sciences Department	491-7038
		Equal Opportunity Office	491-5836
		Exercise Science and Nutrition Interdisciplinary Graduate Program	491-5081/6535
		Facilities	491-0099
		Finance and Real Estate Department	491-5062
		Financial Aid (see Student Financial Services)	491-6321
		Fishery and Wildlife Biology Department	491-5020
		Food Science and Human Nutrition Department	491-6535

Food Science/Safety (Undergraduate and Graduate) Interdisciplinary Studies Programs	491-6535	Natural Resources College	491-6675
Foreign Languages and Literatures Department	491-6141	Natural Sciences College	491-1300
Forest Sciences (see Forest Rangeland Watershed Stewardship Department)	491-6911	Occupational Therapy Department	491-6253
Forest Rangeland Watershed Stewardship Department	491-6911	Ombudsman, University	491-7165
Geosciences Department	491-5661	Orientation Services/PREVIEW	491-6011
Geospatial Science Graduate Interdisciplinary Studies Program	491-6817	Parking Services, University	491-7041
Gerontology Interdisciplinary Studies Program	491-6365	Pathology (see Microbiology, Immunology, and Pathology Department)	491-6136
Graduate School	491-6817	Philosophy Department	491-6315
Graduation Requirements	491-7159	Physics Department	491-6206
Health and Exercise Science Department	491-5081	Physiology (see Biomedical Sciences Department)	491-6188
Health Service, Hartshorn	491-7121	Pingree Park	491-7377
HELP/Success Center (see Academic Support Services)	491-7095/0525	Police Department	491-6425/911
History Department	491-6335	Political Science Department	491-5157
Honors Program	491-5679	President's Office	491-6211
Horticulture and Landscape Architecture Department	491-7019	Provost/Academic Vice President's Office	491-6614
Housing and Food Services	491-6511	Psychology Department	491-6363
Human Development and Family Studies Department	491-5558	Radiological Health Sciences (see Environmental and Radiological Health Sciences Department)	491-7038
Immunization Information	491-6548	Rangeland Ecosystem Science (see Forest Rangeland Watershed Stewardship Department)	491-6911
Information Desk, Student Center	491-6444	Records, Student	491-7148
Information Science and Technology Interdisciplinary Studies Program	491-6310	Recreation Center	491-6359
Information Systems	491-5491	Registration	491-7148
Instructional Services	491-1325	Religious Interdisciplinary Studies Program	491-5421
Insurance, Student Health	491-5118	Research and Information Technology Vice President's Office	491-7194
Integrated Resource Management Interdisciplinary Studies Program	491-6928	Residency for Tuition Classification	491-6321
International Development Interdisciplinary Studies Program (Undergraduate and Graduate)	491-5917	Russian, Eastern, and Central European Interdisciplinary Studies Program	491-5917
International Programs	491-5917	Scholastic Standards	491-7095
Journalism and Technical Communication Department	491-6310	Social Work, School of	491-6612
Languages and Literatures Department, Foreign Latin American Interdisciplinary Studies Program	491-6141	Sociology Department	491-6044
Legal Services, Student	491-1482	Soil and Crop Sciences Department	491-6517
Liberal Arts College	491-5421	Speech Communication Department	491-6140
Libraries, University	491-1841	Sports, Recreational	491-6359
Life Sciences Center (see Academic Support Services)	491-3658	State Board of Agriculture (see Board of Governors)	491-7707
Lory Student Center	491-6444	Statistics Department	491-7277
Management Department	491-5323	Student Accounts/Loans Receivable	491-6466
Manufacturing Technology and Construction Management Department	491-7353	Student Affairs Vice President's Office	491-5312
Marketing Department	491-5063	Student Center, Charles A. Lory	491-6444
Mathematics Department	491-1303	Student Financial Services	491-6321
Mechanical Engineering Department	491-6558	Student Media	491-1683
Microbiology, Immunology, and Pathology Department	491-6136	Summer Session	491-1590
Military Science Department (Army ROTC)	491-6506	Teacher/Educator Licensure	491-5292
Molecular Biology Interdisciplinary Studies Program	491-5602	Testing Service, University	491-6498
Molecular, Cellular and Integrative Neurosciences Interdisciplinary Graduate Program	491-0425	Transcripts	491-7148
Music, Theatre, and Dance Department	491-5529	Transfer Evaluation	491-7147
Native American Student Services	491-1332	University Advancement Vice President's Office	491-7328
Natural Resource Recreation and Tourism Department	491-6591	Veterans Certification	491-7148
		Veterinary Medicine and Biomedical Sciences College	491-7051
		Water Resources Interdisciplinary Studies Program	491-6308
		Women's Programs and Interdisciplinary Studies Program (Undergraduate and Graduate)	491-6384

University Calendar

Fall Semester - 2003

Aug. 21-22	Thursday, Friday. Orientation, advising, and registration for new students.
Aug. 25	Monday. Classes begin. Late registration fee assessed for adding first class.
Aug. 28	Thursday. End of limited drop period.
Sept. 1	Monday. End of initial and limited add period.
Sept. 1	Monday. Holiday - University offices closed.
Sept. 10	Wednesday. Registration closes. End of extended period for adding all courses. Last day for dropping courses without record entry, changes in grading options, and tuition and fee adjustments.
Oct. 20	Monday. End of "W" drop period.
Nov. 22	Saturday. Fall recess begins; no classes next week.
Nov. 27-28	Thursday, Friday. Holiday - University offices closed.
Dec. 1	Monday. Classes resume.
Dec. 12	Friday. Classes end.
Dec. 15-18	Monday through Thursday. Final examinations.
Dec. 19-20	Friday, Saturday. Commencement ceremonies.
Dec. 24-26	Wednesday through Friday. Holiday - University offices closed.

Spring Semester - 2004

Jan. 1	Thursday. Holiday - University offices closed.
Jan. 15-16	Thursday, Friday. Orientation, advising, and registration for new students.
Jan. 19	Monday. Holiday - University offices closed.
Jan. 20	Tuesday. Classes begin. Late registration fee assessed for adding first class.
Jan. 25	Sunday. End of limited drop period.
Jan. 26	Monday. End of initial and limited add period.
Feb. 4	Wednesday. Registration closes. End of extended period for adding all courses. Last day for dropping courses without record entry, changes in grading options, and tuition and fee adjustments.
March 13	Saturday. Spring recess begins.
March 22	Monday. Classes resume.
March 22	Monday. End of "W" drop period.
May 7	Friday. Classes end.
May 10-14	Monday through Friday. Final examinations.
May 14-15	Friday, Saturday. Commencement ceremonies.

Summer Session - 2004

May 17	Monday. First 4- and 12-week terms begin.
May 31	Monday. Holiday - University offices closed; classes in session.
June 11	Friday. First 4-week term ends.
June 14	Monday. 8-week term and second 4-week term begin.
July 5	Monday. Holiday - University offices closed. No classes.

July 9	Friday. Second 4-week term ends.
July 12	Monday. Third 4-week term begins.
Aug. 6	Friday. Last day of classes for all terms.

Fall Semester - 2004

Aug. 19-20	Thursday, Friday. Orientation, advising, and registration for new students.
Aug. 23	Monday. Classes begin.
Sept. 6	Monday. Holiday - University offices closed.
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. 13-16	Monday through Thursday. Final examinations.
Dec. 17-18	Friday, Saturday. Commencement ceremonies.
Dec. 22-24	Wednesday through Friday. Holiday - University offices closed.

Spring Semester - 2005

Dec. 31	Monday. Holiday - University offices closed.
Jan. 13-14	Thursday, Friday. Orientation, advising, and registration for new students.
Jan. 17	Monday. Holiday - University offices closed.
Jan. 18	Tuesday. Classes begin.
March 12	Saturday. Spring recess begins.
March 25	Monday. Classes resume.
May 6	Friday. Classes end.
May 9-12	Monday through Thursday. 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; classes in session.
June 11	Friday. First 4-week term ends.
June 14	Monday. 8-week term and second 4-week term begin.
July 4	Monday. Holiday - University offices closed.
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.

The University

In 1870 the Territorial Council and House of Representatives of the Territory of Colorado created the Agricultural College of Colorado. 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 and extension service, while state legislation added responsibility for the Colorado State Forest Service. Following several name changes, the College became Colorado State University in 1957 and earned recognition by the North Central Association of Colleges and Schools as a mature university in 1974.

COLORADO STATE UNIVERSITY SYSTEM

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

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.

Members of the Board of Governors

Voting Members

Donald Hamstra, President
Jeff Shoemaker, Vice President
Pat Broe
Connie Calaway
Patrick Grant
A. Fred Kerst
Wesley A. Segelke
Charles W. Smith
Reginald L. Washington

Ex-Officio Members

Albert C. Yates, Secretary/Treasurer
Beverly Michoski, Deputy Secretary

Non-Voting Members

Jesse Lauchner, Student Representative—Colorado State University
Tyson Valenzuela, Student Representative—Colorado State University-Pueblo
Paul Kugrens, Faculty Representative—Colorado State University
Jay Goodman, Faculty Representative—Colorado State University-Pueblo

ACCREDITATION

Colorado State is accredited by:

The Higher Learning Commission and a member of the
North Central Association

www.higherlearningcommission.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-The

International Association for Management Education

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.

THE MISSION OF COLORADO STATE UNIVERSITY

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

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 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.

IN SUPPORT OF CSU'S MISSION

Facilities at Colorado State

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

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 will be 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 \$9.3 million Argus Tumor Center for bone cancer research will be completed in fall 2002. 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*

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 Reserves 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.

Colorado State University Alumni Association

*Alumni Relations Office
Alumni Center, Corner of Shields and Laurel Streets*

The Colorado State University Alumni Association has been active since 1884 when it was organized by the first three graduates of Colorado Agricultural College.

The mission of the Alumni Association is "to advance and support the university; develop and strengthen life-long relationships among alumni, students, friends, and the university community; and serve as a catalyst for communication and involvement."

The Alumni Association is an organization governed by a 26-member Board of Directors. The Association sponsors over 150 events each year and offers a myriad of benefits designed to promote Colorado State and involve alumni in the life of the University. Some of these events and benefits include Distinguished Alumni Awards, Best Teacher Awards, Graduates of the Last Decade (GOLD), reunions, travel program, Homecoming activities, career and financial services, and much more.

In addition, Colorado State University in cooperation with the Alumni Association publishes *Colorado State University Alumni Magazine* three times a year.

GUIDING POLICIES

Nondiscrimination Policy

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. The Office of Equal Opportunity is located in 101 Student Services. 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

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.

Undergraduate Admissions Policy and Procedures

*Admissions Office in Spruce Hall
Mary Ontiveros, Executive Director*

All correspondence about undergraduate admissions should be addressed to the Office of Admissions, Colorado State University, Fort Collins, Colorado 80523-1020. Students interested in graduate admissions should request a copy of the [Graduate and Professional Bulletin](#).

Colorado State University's admissions evaluation process is designed to promote diversity within the student population and to assure equal opportunities to all applicants. The quality of the educational experience provided to all students at Colorado State University depends in part on the maintenance of diversity within the student population. The final admissions decision is based on a student's potential for attaining a degree at Colorado State University, and takes into account the student's past academic performance, test scores, leadership qualities, high school and community service, principal/counselor/teacher recommendations, geographic residence, 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 admissions evaluation process and the admissions decisions reflect and rest upon this range of factors. The University does not set quotas for members of particular groupings or for people possessing particular characteristics. However, to assure and increase the diversity of the students admitted, the University establishes and seeks to implement recruitment goals that provide guidelines for affirmative action to locate and identify a pool of qualified applicants.

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.

REQUIREMENTS AND PROCEDURES

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.

Consult individual college sections for additional admission information.

Application Deadlines

The deadline for submission of the application for admission and all required documentation is July 1 for fall semester and December 1 for spring semester. All applications and/or supporting documentation received after the deadline will be processed for the next term. Admission for any term may close whenever the University meets its enrollment limit. Therefore, 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.

Personal Identifier

All students are required to submit a social security number 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 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.*

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, Colorado State University, Fort Collins, CO 80523.

Selective Service Registration

In compliance with C.R.S. 23-5-118, Selective Service registration is required of male United States citizens born after December 31, 1959, who wish to enroll at Colorado institutions of higher education. Individuals providing false information are subject to penalty of law and disenrollment.

APPLICATION INFORMATION

For High School Graduates

Students applying for admission may use the online application at admissions.colostate.edu. Colorado high school seniors may also obtain their application from the high school counselor. Out-of-state students should write the Office of Admissions, Colorado State University, Fort Collins, CO 80523-1020 for an application. A \$50, 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.

Colorado State University selects for admission students who appear to be best qualified to benefit from and contribute to the educational environment of the University. All applications are carefully and individually reviewed. Those students accepted without condition usually meet the admission standards for first-time freshmen as defined by the Colorado Commission on Higher Education.

Minimum admission requirements are as follows:

1. Completion of high school requirements. Many students are admitted during the senior year. In such cases, admission is subject to successful completion of all entrance requirements and high school graduation.
2. Submission of scores from the American College Testing Program (ACT) or the Scholastic Aptitude Test (SAT) of The College Board. 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 American College Testing Program, P.O. Box 168, Iowa City, IA 52240, or The College Board, P.O. Box 592, Princeton, NJ 08540.
3. Satisfactory completion of 18 high school units during grades 9-12. Fifteen of these must be academic units and must include: a) four units of high school English including reading, composition, grammar, literature, and speech; b) five units of social science and natural science with a minimum of two from each; and c) three units of mathematics, including one unit of algebra I, one unit of geometry, and one unit of algebra II (or a comparable three-course sequence).

Grades of "D" and "F" do not constitute satisfactory completion and course work may be deemed deficient.

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.

It is highly recommended that at least one unit of natural science include laboratory work.

It should be noted that additional requirements may be stated by individual colleges; consult the individual college sections. For example, the College of Engineering requires one-half unit of trigonometry, one unit of chemistry, in addition to the required algebra and geometry.

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

For Non-High School Graduates

Individuals 18 years or older who have not graduated from high school and wish to be admitted to Colorado State may be considered for admission and should request application materials from the Office of Admissions. Students may also apply using the online application at: admissions.colostate.edu. A \$50 nonrefundable processing fee is required. See deadline information.

An applicant must submit transcripts showing all completed high school and collegiate courses, scores from the General Educational Development (GED) Test, and 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.

Scores from either the American College Testing Program (ACT) or the Scholastic Aptitude Test (SAT) of The College Board may be required. An interview may also be required.

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 requirements, are considered for admission on a case-by-case basis.

For Transfer Students

Undergraduate students who wish to transfer to Colorado State should request an application from the Office of Admissions. Students may also apply using the online application at admissions.colostate.edu. A \$50 nonrefundable processing fee is required.

Undergraduate students who have graduated from high school and completed more than nine 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 nine or fewer semester credits after high school must apply for admission as freshmen (see "For High School Graduates" above) and must also submit official transcripts of all collegiate work attempted.

The deadline for submission of the application for admission and **all** required documentation is July 1 for fall semester and December 1 for spring semester. All applications and/or supporting documentation received after the deadline will be processed for the next term. Earlier admission improves chances for financial aid and housing, and facilitates academic advising in the student's chosen major.

Applicants must submit official transcripts showing **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 will cancel admission or enrollment.* 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. Submit high school transcripts to determine if course work requirements have been met while attending high school.

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 (submit a high school transcript), 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..

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. Transfer students should plan to complete composition before applying for admission to Colorado State. Priority will be given to students who demonstrate the greatest academic potential for attaining a degree at 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 successfully 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. Consult individual college sections for additional admission information.

Course work taken at vocational-technical institutes or nonaccredited colleges generally is not counted toward the minimum number of credits required for admission of transfer students.

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

Good Standing Requirement

Transfer 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. While each case is decided on the basis of information furnished by the applicant and institution concerned, the general rule is applicants may be considered for admission to Colorado State for the term nearest the date they are eligible to return to their former institutions.

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 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 Appeals Process

Students may appeal a decision regarding the transferability of a specific course(s) and/or the decision regarding the placement of a specific course(s). Any questions concerning the transfer evaluation report should first be referred to the Degree and Transfer Evaluation Office. That Office will either satisfy the student's request or refer the student to an academic department for additional consideration. The student is responsible for supplying any supporting documentation from the student's transferring college along with the appeal. If the academic department does not satisfy the student's concern, the student may be referred to the Vice Provost for Undergraduate Studies, 108 Administration Building, who is the final institutional authority for the appeal. Appeals beyond the institution should be directed in writing to the Vice Chancellor for Academic Affairs of the Board of Governors of the Colorado State University System, 110 Sixteenth Street, Room 640, Denver, CO 80202.

Credit From Two-Year and Noncollegiate Institutions

See Nontraditional Credit Policies in the Graduation Requirements section of this catalog.

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 the appropriate readmission application. A \$50 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 in good standing and space is available in the University.

Students who have attended other collegiate institutions after attending Colorado State must file an application for readmission with the \$50 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. The deadline for submission of the application for admission and **all** required documentation is July 1 for fall semester and December 1 for spring semester.

For International Students

All applications from international students must be submitted at least three months prior to the beginning of the term for which admission is requested. 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. A \$50 nonrefundable processing fee is required. To obtain an international undergraduate application, contact the Office of Admissions. Students may also apply using the online application at admissions.colostate.edu. International applicants seeking admission to the Graduate School should refer to the *Graduate and Professional Bulletin*.

International applicants seeking admission to Colorado State University as entering freshmen must demonstrate a high level of English proficiency. Official secondary school transcripts and/or school leaving examinations must also be submitted. If transcripts are not in English, a certified English translation must also accompany each document.

International applicants wishing to transfer to Colorado State University must also submit an international application at least three months prior to the beginning of the term for which admission is being requested. Official transcripts of all university or college courses taken in the United States or abroad are required. Secondary school transcripts and/or school leaving examinations must be submitted. If transcripts are not in English, a certified English translation must also accompany each document.

All international applicants, except 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 a 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.

Students who knowingly falsify transcripts or test scores, or who fail to indicate all previously attended institutions will be denied admission to the University. Sponsoring agencies will be informed of this decision.

Undergraduate international students are not eligible for scholarship assistance from Colorado State University sources, and their employment possibilities are severely limited by law; consequently, international students need to explore scholarship and loan possibilities within their home countries.

Financial planning should include a thorough investigation of currency exchange and monetary transfer regulations between the home country and the U.S. See Costs for International Students in the Tuition, Fees, Expenses, and Adjustments section in this catalog.

Only U.S. citizens and permanent residents of the United States (and certain U.S. territories) may contact Student Financial Services for information on applying for assistance.



Financial Assistance

*Student Financial Services
Office in Administration Annex, Room 103
Sandy Calhoun, Director*

Colorado State offers a variety of financial assistance programs for deserving and needy students. Awards recognize scholastic achievement, encourage continual educational growth, and assist needy students.

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

FINANCIAL AID PROGRAMS

Scholarships

Undergraduate Colorado resident or nonresident students may be considered for the Creative and Performing Arts Award, University Scholars Award, Distinguished Scholars Award, Academic Achievement Award, University Advocacy Diversity Award, and President's Transfer Scholarship.

Undergraduate Colorado resident students may be considered for the President's Scholarship, the Monfort Scholarship, and First Generation Award.

Army and Air Force ROTC scholarships are available to qualified high school graduates interested in ROTC, and to students enrolled in ROTC programs. Interested students should contact the ROTC departments.

The University also administers scholarships offered by private agencies, foundations, service clubs, and individuals.

Scholarship information, including specific criteria, application requirements, and deadline dates is available on the web at sfs.colostate.edu, select Scholarships.

Grants

Colorado State administers a number of grant programs available to undergraduate students. Several are restricted to Colorado residents. These include: Colorado Student Grant and Colorado Leveraging Educational Partnership Program. Residents and nonresidents may qualify for a Federal Supplemental Educational Opportunity Grant.

Additionally, the University administers the Federal Pell Grant Program for qualified undergraduates. The federal government establishes the dollar limits on these grants each year.

All grants may be reawarded in subsequent years, providing the student reapplies for financial aid, continues to document need, and maintains satisfactory academic progress.

Loans

Colorado State participates in the Federal Perkins Loan Program, the Federal Direct Loan Programs, both subsidized and unsubsidized, the Federal Direct Parent Loan for Dependent Students (PLUS), the Health Professions Loan (HPL) Program, and its own short-term loan program. The Federal PLUS Program is available for parents of dependent, undergraduate students only. HPL is restricted to students enrolled in the D.V.M. degree program. Loan amounts vary depending on need, eligibility, and on maximum limits established by federal regulations.

Work-Study

The Work-Study Program, administered by Student Employment Services, provides part-time employment opportunities for qualified students. Students average 10-12 hours of work per week and earn between \$2,200 and \$2,500 total for an academic year. Both undergraduate and graduate students are eligible to apply for the work-study program. Awards are based on an evaluation of students' financial need.

A merit work-study program is also offered at the University. Students do not have to document financial need to receive merit work-study. 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.

APPLICATION PROCEDURES FOR NEED-BASED FINANCIAL AID

Students use the Free Application for Federal Student Aid (FAFSA) or FAFSA on the Web (www.fafsa.ed.gov) to apply for financial aid. Application information and procedures for any of the above programs may be obtained from Student Financial Services and is available on the web at sfs.colostate.edu.

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' total number of credits are also evaluated, and students may not exceed established credit limits. Additionally, if a student receives all "F," "U," and/or "W" grades, they will be required to verify the last date of attendance and may be required to return up to 50% of the financial aid received. Copies of the complete policy are available at Student Financial Services, in the Financial Aid Guide, and on the web at sfs.colostate.edu, select Policies.

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.

Student Financial Services retains the right to withdraw or cancel a student's aid if it is believed the student obtained the funds by fraudulent means.

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 have a bearing on their financial aid.

STUDENT EMPLOYMENT

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.

Students wishing to work on or off campus should contact Student Employment Services, Room 133, Student Services Building. Job postings may be viewed in person or on the Student Employment Web site at ses.colostate.edu.

All individuals who are currently enrolled at the University as resident instruction (RI) students and are carrying one or more RI credits may use the University's student employment services. Students who enroll less than half time as resident instruction students are subject to the Student Employee Retirement Program. 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.

Colorado State is an Equal Opportunity Employer which 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-study and student employment programs.

VETERANS' BENEFITS

The Records and Registration Office assists the Department of Veterans Affairs (VA) by providing certification for education benefits under Title 38, U.S. Code: Chapter 30 (New G.I. Bill), Chapter 31 (Vocational Rehabilitation), Chapter 32 (Post-Viet Nam Era - active duty between January 1977 and June 1985), and Chapter 35 (Dependents Educational Assistance); and Title 10, U.S. Code: Chapter 1606 (Selected Reserve Members). Students eligible for any of these benefits must contact the Records and Registration Office, Room 100, Administration Annex, at least six weeks prior to the expected date of enrollment. Applicants should apply to Colorado State in a degree-seeking major or for teacher licensure before applying for veterans' education benefits.

To receive full benefits, a student must maintain at least 12 undergraduate-level credits, or 9 graduate-level credits or research equivalent. However, different standards may apply for students enrolled in short-term courses. Students must

notify the Records and Registration Office of any change of address, major, or enrollment status. A description of the regulations governing receipt of veterans' education benefits, Standards of Progress, is available at the Records and Registration Office.

Students participating in the advance payment program must complete the necessary paperwork with the Records and Registration Office during registration. Requests for advance payment cannot be accepted after the VA's advance payment deadline for the applicable term has passed. Advance payment checks are disbursed from the Records and Registration Office on the first day of the term.

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 qualify based on financial aid guidelines.

Tuition, Fees, Expenses, and Adjustments

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

For the most current listing of tuition and fees at Colorado State, visit the Registrar's web page at registrar.colostate.edu.

In addition to the charges listed under each category, students pay any special course fees; see Special Fees in this section.

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. This fee is the ASCSU fee, the facilities construction fee, plus a fee determined by the principal and interest of the bonds on athletic facilities, the student center, the student health service, and the student recreation center.

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, spring, and summer 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. Students on summer assistantships have the option of registering for CR-ON or credit registration. Assistants may have tuition payments made in their behalf.

Students Registering 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 our web site at learn.colostate.edu.

Special Fees

Nonrefundable Fees

Admission application fee	\$ 50.00
Application fee for admission to professional program in occupational therapy	\$ 30.00
Application fee for admission to professional program in veterinary medicine	\$ 60.00
Composition Placement Examination fee (each time exam is taken)	\$ 15.00
Credit established by challenge examination per credit attempted	\$ 20.00
Dissertation microfilming fee	\$ 55.00
Language Placement Examination fee (one-time charge; no charge for retakes)	\$ 10.00
Late registration fee	\$ 50.00
Mathematics Placement Examination fee (one time charge; no charge for retakes)	\$ 15.00
Charge for Technology, per term ¹ ; (college-wide)	
Agricultural Sciences	\$ 75.00
Applied Human Sciences	\$ 66.00
Business	\$100.00
Engineering	\$147.50
Intra-University	\$ 36.00
Liberal Arts	\$ 55.65
Natural Resources	\$100.00
Natural Sciences	\$100.00
Veterinary Medicine and Biomedical Sciences	\$ 50.00
Transcript fee per copy	\$ 5.00

Research Fees

Graduate students may be responsible for all or part of the costs involved in the preparation of theses, dissertations, or other scholarly work required in the academic program. The expenses of an appropriate research or artistic project are

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

highly variable, depending on the discipline, the specific nature of the work involved, and the availability of resources from funded projects, students' sponsoring agencies, or the academic departments.

In some cases, students may pay such costs directly. In others, departments may request that funds be deposited in a special account in advance.

Special Course Fees

Certain courses require enrolled students to pay fees for special services and/or materials. Since the costs are determined annually, course fees may vary from the stated charge in the Courses of Instruction section of this catalog. For the most current listing of special course fees, visit the Provost/Academic Vice President's web page at http://www.provost.colostate.edu/index.asp?url=ug_studies

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

For some courses, enrolled students are assessed by the department variable fees 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; or 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 by the department variable fees based upon actual damage to or nonreturn 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.*

IN-STATE RESIDENCY FOR TUITION CLASSIFICATION PURPOSES

*Student Financial Services
Office in Administration Annex, Room 103
Sandy Calhoun, Director*

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 and 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" for Tuition Purposes

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 meet the definition of a "Qualified Person."

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 as 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.

Initial Classification

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 “nonresident.”

Petition for Reclassification

A petition may be filed if a student wishes to contest out-of-state classification or if (s)he believes (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 they have 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 nonresident 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 on the Student Financial Services web site at <http://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 instructions. Appeals must be submitted in writing, to Student Financial Services no later than two

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

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

ADDITIONAL EXPENSES

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.

Personal and Living Expenses

The amount of money spent by a student in an academic year (two semesters—August to May) for all other 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.

Estimated Yearly Expenses

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	\$2960	\$5920
Books and Supplies	\$ 450	\$ 900
Personal Expenses	\$1000	\$2000
Total of Estimated Costs	\$4410	\$8820

International Students

Students from other countries should anticipate expenses considerably higher than those quoted above. The above estimates **do not include** costs of deposits for off-campus housing, transportation, 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, 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 2002-2003. 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	\$ 11,925
For full time enrollment per INS regulations	
Required student fees	\$ 780
International Student Service charge	\$ 70
(with an initial fee of \$80 for the first semester)	
Mandatory health/accident insurance coverage	\$ 865
(12-month coverage)	
Books and supplies	\$ 800
Housing, food, miscellaneous personal	<u>\$ 8,100</u>
Total estimate	\$ 22,540

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 2002-2003. 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	\$ 12,438
For full-time enrollment per INS regulations	
Required student fees	\$ 780
International Student Service charge	\$ 70
(with an initial fee of \$80 for the first semester)	
Required student fees for summer	\$ 197
Mandatory health/accident insurance coverage	\$ 865
(12-month coverage)	
Books and supplies	\$ 800
Housing, food, miscellaneous personal	<u>\$ 10,800</u>
Total estimate	\$ 25,950

Married students and scholars who wish to bring their family to the United States need proof of additional financial 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	\$ 1,858	\$ 1,238 ¹
Housing, food, miscellaneous personal	<u>\$ 3,000</u>	<u>\$ 2,400²</u>
Total estimate ³	\$ 4,858	\$ 3,638
For two children		\$ 6,038
For three children		\$ 8,438
For four children		\$ 10,838

¹ For any number of children.

² Per child.

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

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.

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).

Third Party Billing

All agencies and other entities sponsoring international students, which utilize third party billing privileges, will be assessed a \$200 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.

<u>Charges</u>	<u>Fall</u>	<u>Spring</u>
	(Specific dates may vary)	
1/3 tuition, fees, and housing	August 10	January 10
1/3 tuition, fees, and housing*	September 10	February 10
1/3 tuition, fees, and housing**	October 10	March 10

*2/3 if not assessed on first statement

**all due if not assessed on first two statements

PAYMENTS AND ADJUSTMENTS

Payment of Student Accounts

Notwithstanding any other provision of this publication to the contrary, any student who completes registration agrees to pay the University according to the payment terms documented in the Colorado State University Class Schedule under the Payment of Accounts section. Late charges of 1.5% per month and other penalties specified therein may be assessed for late payment. Payment of all University charges is to be received in the University Cashier's office by the due date to avoid late payment penalties. Payments by check are processed on the day of receipt (future dates are not honored). Failure to pay amounts due may result in referral of outstanding balances to a collection agency for action. Further, the University reserves the right to impose a charge and a financial hold for returned checks. Contact the University Bursar's Office, 111 Johnson Hall, for the amount of the returned-check charge currently in effect.

Statements are mailed to students at the current address on file with Enrollment Services. For those students residing in the residence halls, the hall address will automatically become their "current" address when they move in. Students may arrange to have the statements sent to a separate billing address by filling out a billing address form available in Johnson Hall, the Administration Annex, and the Lory Student Center. Students are responsible for keeping the University informed of current addresses, and for arranging payments. The University will not register a student, confer a degree on a student, nor provide a final transcript to any student or former student who has any past due financial obligation to the University (other than a loan not yet due).

Students who are sponsored by a non-related 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. Arrangements for sponsor billing must be made prior to the Student Account Statement due dates to prevent late payment penalties.

Tuition, fees, and residence hall charges are due in three monthly installments each semester as follows:

All other charges for University services should be paid in the month billed.

Summer session tuition is due when billed.

Late Payments

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). Penalties will be assessed for late payment of student accounts for the purpose of encouraging prompt payment. Such penalties shall be assessed at a fixed percentage of the past due balance. **The current rate is 1.5% of the past due amount each month.**

Registration, Transcript, and Diploma Holds

Unpaid, past due balances may cause a hold to be placed on a student's registration, transcripts, and diploma. A student may not access the telephone registration system, receive official, academic transcripts, nor obtain a diploma, if a hold has not been cleared. Release of the hold can be expedited by making payment in person at the Cashier's Office, 108 Johnson Hall.

Returned Checks

Any person who presents to the University a check, either paper or electronic, 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 sends a notice to the person who presents a check that is not accepted for payment by the bank. In the case of students, the notice is mailed to the student's Fort Collins area address and permanent mailing address. (Every student is required to notify Enrollment Services promptly of any change in his or her Fort Collins area address or permanent address.) 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 of the invalid check plus penalty and fee if applicable. Failure to do so will result in action deemed appropriate under the circumstances. If the presentation of the check permits a student to register for an academic term and 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.

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 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.

Tuition and Fees Adjustments

Registration Cancellation

Before classes begin for a particular term, all courses can be canceled via the web registration system with no charge

Registration Changes

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 class schedule. After this deadline, there is no adjustment in tuition and fees if a student drops part of their schedule.

University Withdrawal

Once classes begin, students dropping all courses and leaving the University must contact the University's academic support services (northeast wing of Aylesworth Hall). Adjustments of tuition and fees will be made on a pro-rated basis according to the following chart:

Withdrawal Assessment for Fall and Spring¹

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%

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

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 Assistance 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 their 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.
5. Withdrawal as a result of serious illness, disabling accident, military draft, or activation of reserves or National Guard units, initiated at the University's academic support services (northeast wing of Aylesworth Hall), 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 Rights and Responsibilities

As in any community situation, an individual can be most effective and influential working through an established organization. At Colorado State, the two primary organizations are the department in which the student is majoring, and the University-wide student governing body, Associated Students of Colorado State University (ASCSU).

Academic department heads are required 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.

The student governing body, ASCSU, is authorized by the Board of Governors to establish a system of self-government, organized and administered by elected student representatives. It has the responsibility to advise and recommend to the University administration and to allocate funds designated by the Board in support of student programs and activities of authorized student groups and clubs. Additional information on student involvement is available through the ASCSU office and the Office of Campus Activities, both located in the Lory Student Center, and the Faculty Council Committee on Student Affairs.

Students' Rights

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.

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 Educational Rights and Privacy Act of 1974 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.

Students' Responsibilities

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 under the Academic Rights and Responsibilities of Students 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, identifications, 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 a 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, 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.)

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 Conduct Services to initiate criminal and/or disciplinary action. Victims also have the opportunity to receive personal support from appropriate University resources.

A complete, formal text of the Rights and Responsibilities of Students and disciplinary procedures is available in the Office of the Vice President for Student Affairs, 201 Administration Building.

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 a 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 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 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.

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 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.

UNIVERSITY POLICY ON UNDERGRADUATE ADVISING

In December 1999, an Advising Task Force of students, faculty, and staff, appointed by the Provost, endorsed the following statements from the June 7, 1999, Colorado Student Association Undergraduate Advising Policy:

“Academic advising is a relationship with mutual responsibilities between an advisor 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 professional staff person or a faculty member.

All students are entitled to a quality advising system to be provided by the college or university they attend. The following factors are characteristic of a quality advising system:

- Accessibility to students;
- An adequate amount of time spent in advising students;
- Familiarity with the requirements of a various university programs;
- Ability to relate successfully to a wide variety of students for the purpose of advising;
- Knowledge of resources available for the meeting of student’s needs and the keeping of adequate records.

Advisor Role and Responsibilities:

The academic advisor, whether faculty or staff member, serves as a coordinator of the students’ educational experiences. As such, the academic advisor’s responsibilities 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 linkages and relationships between instructional program and occupational. career. Assist students in identifying career opportunities. This includes utilizing on campus career centers and career counselors.
- Inform students of the nature of the advisor/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 advisor 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 advisor in order to strengthen the quality of advisement.
- Become familiar with career services and other campus resources.”

UNIVERSITY POLICIES RELATING TO STUDENT LIFE AND ACTIVITIES

A summary of established University policies dealing with a wide range of student life and activity follows. For more information please contact the [Office of the Vice President for Student Affairs](#).

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. Therefore, 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 obligations to other individuals and groups, to the academic community, and to the larger community of the city, the state, and the nation.

Peaceful Assembly

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

The University may, consistent with the Constitution, establish *reasonable* regulations regarding the time, place, and manner in which persons exercise their free speech rights to the extent necessary to prevent disruption of the normal conduct of University affairs or endangerment of health and safety of persons or damage to property. Accordingly persons planning such assemblies on the University campus must coordinate their activities and plans in advance through the Lory Student Center Event Planning Office. This coordination is requested so as to prevent disruption of normal University educational activities and avoid endangering the health or safety of persons or damage to property. The sponsoring individual or group must assume responsibility for compliance with all state and municipal laws and University policies. Assistance from staff is available to help plan such events, and the assistance of University police may be requested to help with traffic or crowds.

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

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 section and Student Rights and Responsibilities in this section of the catalog.

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 or 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.

Recognition of Student Organizations

Individuals associated with the University bring to the campus a wide variety of previously acquired interests and develop many new interests as part of the academic community. It is the policy of Colorado State University to enable interested persons to form and join organizations to promote their common interests and to foster the effective functioning of recognized organizations.

Student organizations are those formed for specific educational, professional, social, recreational, or other purposes which derive the majority of their membership and leadership from the student body.

The University recognizes student organizations in order to provide services, resources, and facilities for these organizations; to effectively and equitably allocate University resources; and to assist in the coordination of activities of various organizations. Organizations which are not recognized are limited in their access to the services and resources of the University.

To qualify for recognition, a student organization must have a clearly stated lawful purpose, which may be part of a constitution, must function with the counsel and guidance of a faculty or staff adviser, must have an adequate system of accounting for organizational funds, and must comply with University policies and regulations pertaining to organizations. Recognition is subject to periodic review and will be continued only as long as these conditions are fulfilled.

The Student Organizations Office shall develop and implement procedures for recognition of student organizations and shall be responsible for recognizing organizations which qualify. In cases of denial or revocation of recognition,

appeals may be made to the ASCSU Supreme Court. Further appeal may be made to the Vice President for Student Affairs and ultimately to the President of the University.

The University Policy on Peaceful Assembly affirms the rights and privileges of individuals and groups to gather on public property for the purposes of peaceful assembly. The policies on recognition of student organizations in no way limits this basic right.

Fraternities and Sororities

Under the joint sponsorship of the University and various national social fraternities and sororities, local chapters of the organizations have been established on the campus. There are 16 national sororities and 22 national fraternities whose activities are coordinated by the Interfraternity and Panhellenic Councils. Although given a broad degree of autonomy, the local chapters are subject to the dual supervision of their national organizations and the University. To the extent that effective self-regulation, in accordance with University policies, is maintained, supervisory intervention will be avoided.

Since the University expects to contribute such help as it can, guidelines concerning the scholastic, cultural, social, leadership, and ethical aspects of the organization have been developed to further the interests of both the University and the local chapter. Copies of these guidelines are available in the Greek Life Office, Lory Student Center or on the web at www.csugreeks.com.

The Board of Student Communications

Student communications media are an important way to develop, maintain, and enhance an atmosphere of free and responsible discussion and of intellectual exploration on campus. These media bring student concerns to the attention of the University and help formulate student opinion on larger societal issues. Consequently, responsible conduct and expression consistent with the objectives of the University is expected.

The University Board of Student Communications serves as publisher of those student communications media for which it allocates funds and is generally accountable to the University community, the student body, and the general public for the contents of the several media under its jurisdiction. As publisher, the Board is responsible through the Office of the Vice President for Student Affairs to the Board of Governors for activities involving financial management, media promotion and evaluation, as well as formulation of policy and procedure.

Religious Organizations

Colorado State recognizes the vital importance of spiritual influences on society, the campus community, and in the development of its students. Within the constraints placed on it as a public institution by virtue of the fundamental separation of church and state, the University cooperates in facilitating ministries conducted by and for the members of the University community - who by individual interest, family background, or church membership - are interested in a deeper involvement in the disciplines of their respective faiths. At the same time, the University considers inappropriate any invasion of the privacy of the individual in the campus community by any denominational or nondenominational body or organization.

Solicitations of or by Students

Sales - Recognized University organizations must be authorized by the Student Organizations Office of Campus Activities, Lory Student Center, before soliciting students or groups for the purpose of selling merchandise or services or obtaining contributions on or off campus. Proceeds from sales must be used toward fulfilling the purposes of the soliciting organization.

Solicitation by individuals or non-University groups is prohibited, except through established University sales outlets.

Information - Official University agencies and recognized student organizations may advertise and/or publicize by posters, banners, mobile sound systems, and handbills for promotional purposes if authorized by the Campus Activities Center and/or campus police.

Representatives of religious or political groups may request use of authorized campus solicitation facilities for dissemination of literature pertinent to the intent of the organization.

Raffles Sponsored by Student Organizations

All raffles conducted at Colorado State must be licensed by the Secretary of the State of Colorado and administered by the Colorado Games of Chance Administration. Only recognized University student organizations may request use of the ASCSU raffle license. Requests require the approval of the Director of Campus Activities in the Lory Student Center and are requested through the ASCSU office manager.

OTHER UNIVERSITY POLICIES AND REGULATIONS

For more information on the preceding and following policies, please contact the Office of the Vice President for Student Affairs, 201 Administration Building.

- Discipline Appeals and Procedures
 - Classification and Definition of Disciplinary Action
 - Use of University Vehicles by Students
 - Change of Address Policy
 - Dog Policy
 - Traffic Appeals System
 - Laws and City Ordinances Pertinent to Student Behavior
 - Rules Regarding Freedom of Expression at Colorado State Athletic Events
 - Sign and Poster Policy
 - Student Employee Grievance Procedure
-

Student Programs and Services

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

Student development programs and services, coordinated by the Division of Student Affairs, strive to develop graduates who assume their responsibilities as citizens. Much of citizen development takes place outside the classroom through student programs, activities, organizations, and services. Academic work and student life are interrelated. Student affairs faculty work closely with academic faculty to build an environment maximizing student growth.

ACADEMIC SUPPORT SERVICES

Orientation, Advising, Retention

*Offices in Aylesworth, Northeast Wing
Paul Thayer, Executive Director*

Colorado State University provides orientation programming which includes Preview Freshman Orientation and Registration, Next Step Transfer Orientation, The Premier, Ram Fest Welcome Week, and spring and fall orientation.

Advising services are provided for students enrolled in University Open Option, Open Option seeking art, business, computer science, restaurant and resort management, and engineering, Applied Human Sciences Open Option, Start-Up, GUEST, and other selected programs in the Division of Continuing Education. Several other University-wide services dealing with scholastic standards, University withdrawals, and absence letters to faculty are also provided.

Orientation Programs

All freshmen, transfer, readmitted, nontraditional, and international students attending Colorado State for the first time are urged to attend an orientation program. These programs are offered to help new students adjust to university life. During orientation, students meet with academic advisers and student orientation leaders, complete any necessary placement examinations, prepare class schedules, and register for first semester classes. Orientation introduces new students to the campus and its various programs, services, and activities in a personal and informal way.

New freshmen and their families are invited to attend the [Preview Orientation and Registration Program](#), a one-and-a-half day orientation program held during summer. Transfer students and their families are invited to attend the [Next Step](#)

Orientation Program. Students receive orientation information soon after they are admitted.

Advising Services

Advisers assist students in making academic and career choices, planning class schedules, and referring students to campus resources. Approximately 22 percent of students on campus have chosen to be open option while they are deciding on their majors. Through regular contact with advisers knowledgeable about all the academic options at Colorado State, students are able to explore and choose majors. For students interested in controlled majors (with special admission requirements), advisers provide assistance with the process of meeting the requirements as well as helping to explore other major alternatives if needed.

Advisers also assist students who are changing their major, who need assistance with improving academic performance or gaining admission to Colorado State University, and who are considering dropping classes or withdrawing from the University.

Colorado State University also offers a wide variety of retention-related services, including organization of Academic Key Communities, “early warning system” (as it relates to academic issues and building a sense of community for students living in the residence halls), and tracking variables that influence graduation rates in various majors. These are only a few examples of the university’s commitment to enhancing retention at the university.

ADVOCACY PROGRAMS

Asian/Pacific American Student Services

*Office in Lory Student Center, Room 212
Linda M. Ahuna, Director*

[Asian/Pacific American Student Services](#) exists to support the matriculation, retention, and graduation of Asian/Pacific American students at Colorado State University through direct service to students as well as through educational and cultural campus-wide programs. Committed to a philosophy of multiculturalism, Asian/Pacific American Student Services creates and supports opportunities for interaction among University and community constituencies to enhance a campus environment that welcomes all students.

Black Student Services

*Office in Lory Student Center, Room 204
Jennifer Williams Molock, Director*

Black Student Services assists African American/Black students by providing support and encouragement for their academic, professional, cultural, and personal development. The Office of Black Student Services works collaboratively with all areas of the University as well as various community agencies. The Office strives to provide a family-like support system of faculty, staff, and student organizations that help students succeed. The foremost goal of the office is to enhance students' knowledge of the culture, history, heritage, and traditions that are unique to the African American experience.

El Centro Student Services

*Office in Lory Student Center, Room 178
Guadalupe Salazar, Director*

El Centro Student Services provides services, information, and programs to all students; however, our primary focus is the Hispanic/Latino/a/Chicano/a population. El Centro offers a variety of services to assist students in their transition to the University, for example, academic and financial counseling, cultural activities, personal development, scholarship information, mentoring opportunities, and referrals to pertinent offices. The office provides students with work-study employment, internships, independent studies, and research opportunities. El Centro continues to provide and create an atmosphere that is safe and that fosters mutual respect and dignity.

Gay, Lesbian, Bisexual and Transgender Student Services

*Office in Lory Student Center, Lower Level
Randy McCrillis, Director*

The mission of the office of **Gay, Lesbian, Bisexual and Transgender Student Services** is to provide support services for gay, lesbian, bisexual, transgendered people and allies of the Colorado State University community. These services include advising, counseling, referrals to other University and external support programs, student group advising, educational outreach programs, and support to those individuals who have reported discrimination, harassment, or intimidation. The office will initiate, coordinate, and provide educational materials, programs, and professional development opportunities for all Colorado State University students, faculty, and staff members on GLBT issues to help enhance a campus environment that welcomes all students, faculty, and staff.

Native American Student Services

*Office in Lory Student Center, Room 218
Beverly Fenton, Director*

The mission of the Office of **Native American Student Services** is to assist Native students in their personal, social, and academic growth at Colorado State by empowering them with skills and strategies that will ensure a successful transition from their diverse cultures to university life. The office also serves the University and Fort Collins communities by educating others about Native American history, culture, traditions, and especially about the unique needs of Native American students.

Off-Campus Student Services/Resources for Adult Learners

*Lory Student Center, Lower Level
Jeannie Ortega, Coordinator*

The **Resources for Adult Learners** Office was established to provide support services to students age 23 and older, and other students of traditional age with nontraditional life circumstances. The office strives to assist adult learners to become oriented to the University, adjust to the demands of academic life, and identify and use appropriate student support services. It is also a meeting place for students to gather with others of similar age and concerns to discuss issues and share information.

Resources for Adult Learners provides information, counseling, and referral services to a network of University support people. The staff works to promote the self-development of adult learners by supporting them in the pursuit of their educational goals.

Resources for Disabled Students

*Office in General Services Building, Room 100
Rosemary Kreston, Director*

The Office of **Resources for Disabled Students** coordinates the University's efforts to seek full access to educational, cultural, and other programs sponsored by the University for any qualified student with a disability. Students with mobility, visual, hearing, or learning disabilities are eligible for support as well as students with chronic health conditions and temporarily disabled conditions. Accommodations, awareness, and advocacy services are available without charge. Student needs are assessed on an individual basis for all services and must be supported by appropriate documentation. Services include, but are not limited to: priority registration, note takers, readers, alternative text, interpreters, alternative testing, information on community resources, and advocacy to resolve individual situations.

Women's Programs and Studies

*Office in Student Services Building, Room 112
Karen J. Wedge, Director*

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.

These support services are designed to reflect and enhance the unique goals, expectations, and aspirations of the students. Programs and services also assist students in addressing contemporary issues confronting them.

Women's Programs and Studies provides the following services and programs: information, counseling, and referral; Sexual Assault Victim Assistance Team (VAT); Women's Interdisciplinary Studies Certificate Programs (undergraduate and graduate); campus-wide programs and symposia; Women's Resource Center Lending Library; and S.A.G.E. (The Student Alliance for Gender Education).

ATHLETICS

Intercollegiate Athletics

*Offices in the McGraw Athletic Center
Jeffrey Hathaway, Director of Athletics*

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. As part of its mission, the University is committed to providing equal opportunity for all students to learn about sports and sports-related subjects and to participate in athletics at all levels including recreational, intramural, club, and intercollegiate.

A strong intercollegiate athletic program gives talented student-athletes the opportunity to develop fully 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 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 Department of Intercollegiate Athletics is organized as an auxiliary enterprise 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.

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), and volleyball.

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.

Campus Recreation

*Office in Student Recreation Center
Judy Muenchow, Director*

The [Campus Recreation](#) Department, located in the Student Recreation Center, offers a variety of recreation services to students. These include *informal recreation, strength and fitness programs, physical therapy, intramural sports, club sports, and instructional non-credit classes, outdoor adventure programs, and a challenge ropes course.*

The Student Recreation Center is available to students paying full fees for *informal recreation* from early morning to late evening Monday through Friday and from late morning through evening on weekends. The Center houses:

- gymnasium with basketball/volleyball/badminton courts
- racquetball court
- exercise ball room
- aerobics rooms
- swimming pool
- sports equipment checkout
- spa pool
- sun deck
- outdoor volleyball and basketball courts
- weight/cardio room
- plyometrics area
- running track
- locker rooms
- lounge and meeting rooms
- staff offices
- in-line hockey arena
- heavy bag area

The Student Recreation Center includes a 10,000 square foot weight room composed of free weights, guided machines, plate loaded machines, and cardiovascular equipment.

A variety of fitness classes are offered throughout the day. A complete schedule of open hours and fitness classes are available at the Student Recreation Center and listed on the website.

The Strength & Fitness program offers a variety of health and fitness opportunities to promote a balance of the mind and body. Empowering students at CSU through our professional education and instructional fitness services serves as a key element in achieving this goal. The Strength & Fitness programs and services are available to all students.

In addition, the Strength & Fitness program offers fitness services including:

- fitness assessments
- fitness workshops
- personal training
- massage therapy

The Colorado State University Hartshorn Health Service provides *physical therapy* at the Student Recreation Center for students in need of rehabilitation. Initial assessment and appointments are made through the Health Service Physical Therapy Department.

The *intramural sports* program provides students an opportunity to compete against other Colorado State students in league sports, individual sports, and tournaments in women, men, and coed divisions during the fall and spring terms. League sports include:

- basketball
- flag football
- inertube water polo
- in-line hockey
- soccer
- softball
- volleyball
- Pepsiball

Individual sports and tournaments are one- or two-day activities including:

- 5-K run
- bowling
- golf
- indoor soccer
- paint ball
- softball
- ski race
- tennis
- racquetball

Most activities take place on the intramural fields and in Moby Complex, adjacent to the Student Recreation Center, however some take place at off-campus locations. Entries for all intramural programs are taken on the dates and times listed in the Program Calendar in the *Ram Recreation Guide*, available at the Intramural Sports Office in the Student Recreation Center.

Club sports at Colorado State are student-run sport organizations that are funded through student fees, dues, and club fundraising. The Club Sports program allows students to participate in sports activities that go beyond the scope of the intramural program. The clubs compete with other colleges and universities (not NCAA), travel, and play for national championships.

The philosophy of club sports include the highly competitive nature of competing against other schools and representing Colorado State University along with an educational component of leadership development. Students are involved in fundraising, scheduling, and budgeting/financial management of the team.

Currently the following club sports exist on campus from the highly competitive:

- alpine ski racing
- baseball
- bowling
- cycling
- equine polo
- field hockey
- ice hockey
- inline hockey
- lacrosse
- logging sports
- rodeo
- rugby
- soccer
- tennis
- trap and skeet
- triathlon
- ultimate
- underwater hockey
- volleyball
- water polo

Contact the Campus Recreation Office in the Student Recreation Center for the names of student officers of each club sport.

Instructional classes are noncredit classes providing opportunities for students to grow and learn outside of the classroom. Students have a chance to learn new skills while having fun. There are a variety of classes offered each semester including:

- dance
- martial arts
- yoga
- special interest
- massage

The *Outdoor Adventure* program offers a variety of outdoor experiences such as:

- backpacking
- ice climbing
- kayaking
- wilderness medicine
- mountain climbing
- rock climbing
- telemarking

The *outdoor rental* shop can outfit most student expeditions with equipment such as:

- sleeping bags
- tents
- backpacks
- snowboards
- cross country skis
- ice axes

The *Challenge Ropes Course* is the premier experience for team building on campus. Groups from 8 to 40 people can experience challenging events in 4, 6, or 8 hour blocks. For more information call the office at (970) 491-0969.

Other recreational programs are provided through residence halls, fraternities and sororities, and the Lory Student Center.

To learn more about the Colorado State recreation programs, pick up a copy of the *Ram Recreation Guide* on campus or check out the website at campusrec.colostate.edu.

THE CAREER CENTER

Office in Ammons Hall, Room 105
Ann Malen, Director

The Career Center provides career exploration, planning, and job/internship search services for Colorado State students. The Center serves all majors and colleges. Career Center services are designed to assist all students in exploring how interests, skills, and workstyle fit educational and career options. Students work with counselors to develop a strategy to establish and achieve career/life goals. Services offered are: career counseling; interest assessment; career resource library; workshops on skills, career decision making, interests and values, and majors; and the Career Center web site. Staff members work with students in group settings through workshops and class presentations as well as individually.

The career resource library has current job and labor market information to assist students in their career development and decision process. The resource center and web site also provide specific information on occupations and employers as well as opportunities for major-related summer jobs and internship positions.

The Career Center has a number of services, many of them web-based, which assist undergraduates and graduate students as well as alumni in obtaining career employment. These services include: two annual all-campus career fairs, graduate school fair, on-campus interviewing opportunities and employer information sessions, job vacancy information through JOBS ONLINE, Resume Referral, the Career Resource Library with numerous career and job resources, the Career Center website with extensive information and links (www.career.colostate.edu), and *The Career Resource Guide*. Students may arrange resume and job-related correspondence critiques, practice interviews, and job search counseling sessions. Staff members are also available to speak to classes and organizations regarding further information on the Career Center, resume writing, interviewing, and other job search strategies.

UNIVERSITY COUNSELING CENTER

Office in Clark Building, Room C 36
Charles O. Davidshofer, Director

Based on a mental health model stressing personal development and prevention as well as remediation of problems, the [Counseling Center](#) offers a variety of services and programs to students. These services include individual and group counseling, couples counseling, academic/vocational counseling, and stress management programs for the reduction of personal, test-taking, math, and public speaking anxiety.

The University Testing Service, a service of the Counseling Center, provides testing as an adjunct to counseling, assists faculty with automated test scoring, coordinates Colorado State challenge exams, administers high school equivalency testing through the GED program, and administers national admissions tests (e.g., SAT, ACT, MCAT, etc.). Some national tests are available on computer (GRE, TOEFL, GMAT, etc.). Call (970) 491-5060 for information and registration. The Testing Service is located in C 81, Clark Building.

The Counseling Center's Learning Assistance Program provides services in general learning strategies, time management, test-taking skills, memory and concentration enhancement, and textbook reading. In addition, diagnostic and limited remediation services are available for students with learning disabilities and Attention Deficit Disorder.

All counseling services are confidential. Hours of operation are 8:00 a.m.-5:00 p.m. Monday through Friday. Emergency consultation is available after hours by calling 491-7111. Call 491-6053 or stop by C 36 Clark Building to make an appointment or obtain further information.

STUDENT FINANCIAL SERVICES

*Administration Annex, Room 103
Sandy Calhoun, Director*

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.

See also, the Financial Assistance section of this catalog.

HARTSHORN HEALTH SERVICE

*Office in Hartshorn Health Service Building
Stephen D. Blom, Director
Pamela J. Zimdahl, Associate Director*

The **Hartshorn Health Service** is staffed and equipped to provide outpatient care to meet most student needs. Outpatient services are available 7:30 a.m.-5:00 p.m., Monday through Friday, closed weekends. X-ray, laboratory, pharmacy, physiotherapy, optometry, dermatology, allergy, dental services, health education, massage, nutrition services, and drug and alcohol education are available. A pediatric clinic is available for children of students. Hours vary during summer session, breaks, and holidays.

All students carrying six or more credits are eligible to use the Center. Part-time students and spouses/children may elect to pay the health fee for care by enrolling at the Center. The student health fee allows physician visits without charge to the user.

All students are required to complete a health history form prior to treatment at the Center. This history initiates the student's medical file and facilitates preventive medicine and emergency care. Medical records are confidential. No information is released without the patient's written consent.

The Hartshorn Health Service reserves the right to change services, charges, or hours of operation without notice due to financial or other reasons.

An optional health and accident insurance policy is available for students and student dependents at low cost. This is in addition to the Hartshorn Health Service program funded by student fees. Insurance coverage is in effect during the school year and vacation periods. This policy is optional; however,

all students are encouraged to have health insurance coverage while attending Colorado State University. *It is not necessary to have the student insurance in order to be treated at the Center.* A Student Health Insurance brochure is available through the Service.

OFFICE OF HOUSING AND FOOD SERVICES

*Office in Palmer Center, 1005 W. Laurel
James T. Dolak, Executive Director*

Residence Halls

Mary Ellen Sinnwell, Residence Life Director

Housing in the University **residence halls** provides services, programs, and facilities which are designed to enhance the student's 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 organization and educational programming opportunities. These activities provide experiences in leadership development and co-curricular education which 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 residence halls.* 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 Food Services, Palmer Center.

Reservation

The Residence Hall application form, along with an informational booklet, 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 Food Services.

Community Living Options

Colorado State University seeks to give students the opportunity to live in residence halls that provide special programs which support the “whole person.” Many of the programs allow residents the chance to interact with faculty members on a more informal basis, as well as provide special facilities for the use of the floor members.

The following programs are offered to give students a choice of environments in which to live. All inquiries should be directed to the Housing and Food Services Assignment office. More specific information regarding each program is available upon request.

Honors: The Honors option gives students the opportunity to meet with others to discuss thoughts, concepts, and ideas. Most freshmen on the floor take the same honors classes, so study partners are found nearby. The University Honors Program Office is located in this hall and faculty from the Honors Program are available to assist students and coordinate seminars and advising activities. A variety of activities are designed to integrate the Honors students into college life. Students must be accepted into the University Honors Program to live on these floors.

Key Academic Success Community: The Key Academic Success 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 will attend at least three classes with others in the Key Community. Some classes will be linked into clusters by common themes and subject areas. Group study sessions outside class with other Key students and “master students” will reexamine classroom material. A freshman seminar will challenge students to examine the ideas of great thinkers while providing an introduction to the University and methods for effective learning.

Natural Sciences–The Ingersoll Residential College: The residents of Ingersoll Residential College (IRC) have an interest in science and want to live with others who share that interest. Students admitted to a major in the College of Natural Sciences are invited to become part of the IRC. Majors include biochemistry, molecular biology, biological science, botany, 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. There are small review groups offered each semester. Sections of the College of Natural Sciences Freshman Seminar are taught in Ingersoll. In addition, there is a College of Natural Sciences Tutorial Study Hall and a well-equipped computer lab.

The resident assistants (RA’s) are all science majors. Residents and RA’s 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 topics such as careers and women in science.

Shared Interest Living

The Shared Interest Living (SIL) options 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 eight SIL options that are designed to be academic or co-curricular in their focus. Shared Interest Living floors often 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.

Substance Free: For students committed to enjoying college without using alcohol or drugs, this option offers a supportive place in which to do so. 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 all invited to participate in the program. Alcohol-free social events along with educational activities will be offered to the residents in a community supportive of personal choices. This program is only offered if an entire floor section can be filled with students requesting participation.

Engineering: This option offers an excellent academic environment for students majoring in engineering programs. Tutors are available weekly in the hall for support. The hall hosts several events specific for engineering students. The hall 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 may be expected from the College of Agricultural Sciences.

Leadership: This program provides students with on-campus and community leadership opportunities. Leadership skills are developed through workshops, class options, and information on how and where to get involved both on- and off-campus.

Personal Computer: This option is a place to share and gain knowledge of computer applications through study groups, advising and a valuable resource network of other PC users. A microcomputer lab equipped with Macintosh and IBM PCs,

is located in the hall. This program is offered on a men's floor only. 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 other will 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: This is a new community living option begun in 2002-2003. Located in Edwards Hall, this living option provides enthusiasm, energy, and opportunities that no other floors can offer! These floors are the ones that show the greatest spirit at football, volleyball, and basketball games. There are also opportunities to be involved with Homecoming, meet with prominent alumni, and start that life-long connection with Colorado State right from the start.

Wellness: The wellness option is a place for students interested in improving and maintaining their whole being through an all-around fitness program—the holistic concept of living. A special emphasis is placed on activities that help students learn how to define and fulfill their personal needs in the eight wellness dimensions: physical, emotional, human awareness, life planning, intellectual, sexual, social, and values clarification.

University Apartment Housing Apartment Life

*Office in Palmer Center
Alfred Flores, Jr., Apartment Life Director*

Family Housing

Aggie Village

[Aggie Village](#) offers 288 apartments with single-level floor plans in two-story buildings. Furniture options are available. Centralized laundry facilities, playground areas, a fitness center, and community center are located in the Village. A number of modified apartments for physically disabled students are available upon request. All utilities, including local telephone service and cable television hook-up, are included in the monthly rent. A limited number of high speed modems are available for a fee.

University Village

[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. There are 16 one-level apartments in this area which are wheelchair accessible. Furniture options are available in all three areas. Central laundry facilities and playground areas are provided. A community center, study area, and fitness center are located in the Village. All utilities, including local telephone service and cable television hook-up, are included in the monthly rent. Apartments at 1600 and 1700 W. Plum offer direct access to the University computer network. A limited number of high speed modems are available at 1500 W. Plum for a fee.

Once all student family and couple applicants have been placed, singles, faculty, and staff are considered for remaining space.

Single Student Apartments (Graduate and 23 or Older Undergraduate)

[Lory Apartments](#) are located on the northwest side of the main campus. These buildings consist of 72 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. All utilities, including local telephone service and cable television hook-up, are included in the monthly rent. Both Lory Apartments and International House offer direct access to the University computer network.

Housing Assignments

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 Food Services.

Priority for assignment is determined by date of application and availability of requests. Deposits are refundable in full, prior to assignment, upon request by the applicant. If the applicant is assigned to an apartment, the deposit is held as a damage deposit. Any credits and/or charges (including the damage deposit) will be submitted to the student's account within 30 days after the resident vacates the apartment.

Pingree Park Campus

William J. Bertschy, Director

Pingree Park, the mountain campus of Colorado State University, is located 53 miles west of Fort Collins. The 1,192-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 serves plentiful and nutritious meals. Meeting rooms offer audiovisual equipment and other conference set-ups.

The campus is open to the public for educational purposes. For further information, contact: Pingree Park Campus, Palmer Center, 1005 W. Laurel, Fort Collins, CO 80523, (970) 491-7377.

Off-Campus Housing

ASCSU Off-Campus Student Services

*Office in Lory Student Center, Lower Level
Jeannie Ortega, Director*

For those who desire to live off campus, **Off-Campus Student Services** coordinates a free rental housing listing service for houses, duplexes, mobile homes, apartments, condominiums, rooms-in-homes, and rentals-to-share. The office also provides numerous services to help the student have a successful off-campus living experience. This includes information on tenant's rights and responsibilities, lease interpretation, and roommate conciliation. Students planning to rent off-campus housing are encouraged to visit Off-Campus Student Services before completing any rental transactions and to personally inspect off-campus housing facilities before signing any rental agreements since the University takes no responsibility for these accommodations. Active listings are also available online at www.sc.colostate.edu/ocss_ral. For other information and services available, call (970) 491-2248.

CHARLES A. LORY STUDENT CENTER

The **Lory Student Center** is the dynamic hub for Colorado State University that both encourages the lifelong learning development of students, faculty, staff, and other community members, and serves the campus community's service needs. Colorado State University advocacy and support offices, Campus Activities, and student organization offices comprise a large portion of the learning opportunities.

The Lory Student Center services and programs aim to create a stimulating and supportive atmosphere to complement academic learning and social enrichment. The East Addition allows Asian/Pacific American Student Services, Black Student Services, and Native American Student Services to join El Centro in providing more inclusive learning opportunities and cultural diversity in the Lory Student Center. Campus Activities, the Off-Campus Student Services/Resources for Adult Learners, and ASCSU (student government) facilitate many enriching leadership development opportunities, support services, and programming venues. The University Ombudsman Office, Student Legal Services, Office of Service-Learning and Volunteer Programs, Gay, Lesbian, Bisexual and Transgendered Student Services, KCSU-FM, campus television, and *The Rocky Mountain Collegian* (the daily newspaper) are also located in the Lory Student Center.

The Lory Student Center offers services vital to student and campus community life: the CSU Bookstore, Curfman Gallery, University ID Office, photocopying service, lounges, video game room, hair salon, floral service, travel agency, credit union, bank, bike repair shop, outdoor equipment rental shop, convenience store, automated teller machines, and computer and technology store. Reservable space includes private dining and meeting rooms, ballrooms, and a 670-seat theater. An average day contains up to 70 meeting reservations with an attendance of 1,400. Student organizations frequently conduct meetings and co-curricular activities in the many available meeting rooms.

The Lory Student Center serves 15,000 Colorado State University community members each day. Dining choices include a full-service restaurant, coffeeshop, snackbars, fast-food restaurants, and a food court. Lory Student Center Catering can also complement any activity with a full range of dining services from banquets to small meetings.

The expansive lawn and lagoon west of the Lory Student Center provide wonderful views of the foothills and Long's Peak. The Plaza and Sutherland Sculpture Garden serve as gathering places for the Colorado State community.

Lory Student Center Governing Board

The Lory Student Center Governing Board is charged with the responsibility for developing and enforcing policies and guidelines for the appropriate use of the Lory Student Center.

Campus Activities Center

The purpose of the Campus Activities Center is to promote cultural, recreational, social, and educational opportunities for the University community. The mission is to provide aesthetic, intellectual, and experiential challenges in an atmosphere which promotes creative dialogue, debate, and a sense of personal accomplishment.

The Campus Activities Center facilitates several personal and leadership development classes and workshops. Some are for course credit, others are co-curricular in nature. In addition, Leadership Development Programs and ASAP programming board are coordinated by Campus Activities Center staff.

The Campus Activities Center includes the Greek Life Office, the Campus Information Services, Outdoor Adventure Program, and Student Organizations.

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, IFC, Panhellenic, and Order of Omega.

The *Campus Information Services* is a resource center for information which is shared via telephone, person-to-person contact, and printed materials.

The *Outdoor Adventure Program* offers a variety of participatory programs for students, faculty, and staff. Some of the classes include wilderness survival, rock climbing, cross-country skiing, kayaking, and cycling. An Outdoor Resource Library and Rental Shop are additional dimensions of this curricular-learning program.

Student Organizations assists recognized student organizations in program planning, public relations, financial/budgetary matters, and leadership development for organizational officers and members. More than 250 campus organizations reflect the wide range of student interests—academic, political, religious, and special interest.

Student Government

All full-time Colorado State students are members of [Associated Students \(ASCSU\)](#), the student governing body which promotes the interests and welfare of the student. Students are represented by student senators and the ASCSU cabinet.

Programs and services provided by ASCSU include renters' information, bookswap, and off-campus student services.

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

Student Media

Rocky Mountain Collegian

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. The newspaper publishes 150 editions during the academic year and weekly during the summer session. The *Collegian's* circulation is 11,000 newspapers, which are distributed to more than 130 locations on and around campus.

Campus Television

[Campus Television](#), located in the Student Media department in the Lory Student Center, is a student-run and campus-oriented television production group offering programs week nights 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, production, and promotion. Some work-study positions are available. Professional advisers include a faculty adviser from the Department of Journalism and Technical Communication and a broadcast operations manager.

KCSU-FM

Colorado State's campus radio station, [KCSU](#), is located in the Student Media department in the Lory Student Center. Programming for the 10,000-watt station at 90.5 on the FM band is determined by students and features campus-oriented news and public service announcements. The station offers students the opportunity to learn management, programming, news, and broadcast operations. In addition to the more than 80 students who are responsible for music, news, and other programming, KCSU's staff includes professionals who help ensure the station operates in compliance with FCC regulations.

STUDENT LEGAL SERVICES

Office in Lory Student Center, Room 200
Kevin Daley, Director

[Student Legal Services](#) is a group legal service providing legal advice and counsel to full fee-paying students on a variety of legal matters. Some of the more common cases involve tenant issues, traffic citations, consumer complaints, criminal matters, and divorces. The staff works to educate clients about their legal rights and responsibilities and assist in the resolution of legal problems. Clients are encouraged to learn about the methods and procedures necessary to deal with legal problems, including negotiation, mediation, and small claims court. The staff is available for educational presentations on campus.

CONFLICT RESOLUTION AND STUDENT CONDUCT SERVICES

Office in Lory Student Center, Room 200

The [Conflict Resolution and Student Conduct Services](#) reflects the vision of providing a comprehensive array of approaches to act on the institutional values of interpersonal civility and honoring of community standards. Service options include: informal coaching to help members of the community resolve difficulties at the lowest level possible; consultation with students, faculty, and staff regarding behavioral issues; training provided to the community on mediation, dealing with difficult behavior, classroom management, de-escalation strategies, and academic dishonesty; outreach, intervention, mediation services to residential communities and other groups experiencing conflict; response team approach to “hate incidents”; mediation of disputes; conduct student disciplinary hearings; conduct pre-admissions hearings for applicants with significant criminal records; facilitate the process of students making amends for harm (restorative justice); provide education and referrals for students to support their educational and personal success; and implement the DAY IV diversion program for students needing substance abuse treatment.

UNIVERSITY POLICE DEPARTMENT

*Office in Green Hall
Dexter Yarbrough, Chief of Police*

The [University 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 and the City of Fort Collins. 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.

University 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.

Visit the department website at <http://www.colostate.edu/Depts/CSUPD/csupd.html> for more program information and the Safety Update Report.

UNIVERSITY PARKING SERVICES

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

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 (970) 491-7041.

University Services and Outreach

UNIVERSITY SERVICES

Academic Computing and Networking Services

*Office in University Services Center, Sixth Floor
Patrick J. Burns, Director*

[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 may access CSUNet and the University's central 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 and Macintosh 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, printers, and network cabling systems and components. Cables, switch boxes, surge protectors, and some 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.

Colorado State University Visitors Center

Pitkin and College

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 and to specific departments for additional information. Visitor parking permits are available for purchase. Center hours are 8:00 a.m. to 5:00 p.m. Monday through Friday during the academic year and 7:30 a.m. to 5:00 p.m. in the summer.

Conference Services

Pitkin and College

The [Office of Conference Services](#) assists University and non-University program sponsors in organizing and conducting conferences, seminars, workshops, and other short-term educational activities. Support services are available all year for programs meeting on the campus, in Fort Collins hotels, and at other sites around the state. In addition, limited services are available for programs meeting throughout the United States. While campus lodging facilities are available only in summer months, certain campus meeting facilities can be used during the academic year and especially during University breaks. The Conference Services staff works with about 100 programs per year, accommodating over 20,000 participants.

Division of Continuing Education

Offices in Spruce Hall, South College, and downtown Denver

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, the Division 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. Computer courses are offered at the new South College Technology Center. Some noncredit programs offer continuing education units (CEUs), a measurement which enables organizations and professions to recognize participation in continuing education programs. The Division 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 the Division in a self-paced, independent learning format. Through the use of a course syllabus, textbooks, video, and additional reference materials which may include online, 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 University's academic support services (northeast wing of 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 Broadway and 16th. 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., construction management, organizational performance and change, and communication management. Facilities include a fully equipped microcomputer lab. The Denver Center provides numerous opportunities for professional development to metro Denver residents and businesses.

The Division of Continuing Education staffs offices at Spruce Hall on the main campus, a continuing education center and a technology lab at 2925 South College Avenue in Fort Collins, and the Denver Center. For more information, visit the Division's web site at www.learn.colostate.edu.

Office of Equal Opportunity

Office in 101 Student Services

Dana S. Hiatt, Director

Roselyn Cutler, Associate Director

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

Larry Preuss, Associate Director

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; development of computer-based (including Web-based) instructional materials; and other technological systems. A videotape library of over 6,500 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.

Summer Session

*Office in the Natural and Environmental Science Building,
Room A 317
Barbara Gotshall, Director*

The University provides a wide range of academic courses during summer session to meet the needs of a diverse group of students. New freshmen and transfer students mingle with continuing CSU students and summer-only students to create a substantial summer population. There are no formal

admission requirements for the summer session. The summer schedule is flexible, featuring four-, eight-, and twelve-week terms, along with several mini courses.

Graduate students and returning teachers pursue advanced study and conduct research during the summer. Numerous special institutes, conferences, and workshops are sponsored by the academic departments. A unique series called *The American West* Program offers lectures and presentations focused upon the history and culture of the American West. 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. The Web site is: www.summer.colostate.edu

The *Summer Class Schedule* is published and available on campus in mid-January and contains the course schedules, registration information and forms, housing information, summer programs and events, enrichment programs for youth, and campus activities. The publication may be requested by calling 1-800-854-6456 or locally at 491-7985. Requests for the summer class schedule can also be made from the summer homepage.

OUTREACH UNITS OF THE UNIVERSITY

Agricultural Experiment Station

*Office in Administration Building, Room 16
Lee E. Sommers, Director*

Agricultural research has been a part of Colorado State University since the institution's beginning. In 1888, the Colorado General Assembly established the [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 bread, beef, 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 11 off-campus research centers: ARDEC, Fort Collins; Arkansas Valley, Rocky Ford; Eastern Colorado, Akron; Mountain Meadow, Gunnison; 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

Administrative Officers:

James E. Hubbard, Director/State Forester

Tom Wardle, Assistant State Forester

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

Administrative Officer: Milan A. Rewerts,

Director

Cooperative Extension is the off-campus educational outreach arm of Colorado State University and provides non-credit educational programs for youth and adults throughout Colorado.

Function

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. Office locations and telephone numbers may be found in a local telephone directory under "Colorado State University Cooperative Extension" or "_____ County, Colorado State University Cooperative Extension." Extension staff in field offices get resource support and assistance from a staff of Extension specialists located in 16 departments and 5 of the University's 8 colleges.

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 ten high-priority areas: addressing growth decisions, engaging communities in transition, enhancing families and communities, expanding opportunities for Colorado's workforce, growing horticulture in Colorado, improving nutrition, food safety, and health, strengthening youth development, sustaining agriculture and the environment, and understanding biotechnology issues.

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
International Programs
Reserve Officers' Training Program
University Honors Program

ENVIRONMENTAL STUDIES

Colorado State University is second to none in terms of relevant academic, research, and outreach programs which address the environmental needs of Colorado, the nation, and the world. A key component of Colorado State's 21st-century, land-grant mission is to provide "liberal and practical" education in the science and technology of environmental management. The broad spectrum of environmental studies at Colorado State is uniquely dispersed over 100 majors and concentrations housed in 31 of the 55 departments of the University. At Colorado State it is hard to find a degree or department that does not directly connect with environmental issues.

Campus-wide participation in environmental science and management is a result of the fundamental linkages between basic science and management of critical environmental issues

Programs in Environmental Studies

College/Department

College of Agricultural Sciences

Agricultural and Resource Economics
(B.S., M.S., Ph.D.)

Bioagricultural Sciences and Pest Management
(Entomology/Plant Pathology and Weed Science)
(M.S., Ph.D.)

Horticulture and Landscape Architecture
(B.S., M.S., Ph.D.)

Environmental Program Focus

Water, land, and soil management; risk assessment; water quality; policy analysis; sustainable systems; natural resources and environmental management

Water, land, and soil management; ecology and ecosystem management; pollution control, natural resources management; water quality; biodiversity; risk assessment; pest management in ecosystems

Water, land, and soil management; ecology; plant, landscape, and ecosystem management; natural resources management; environmental design and planning

that are a part of the Colorado State culture. A unique strength of the campus is the integration of its many programs. Integration results from a long-standing institutional culture and commitment that is very supportive of interdisciplinary research, teaching, and service.

Regardless of the major or program of study selected by the student, the goal of each is to:

1. Understand that scientific knowledge, policy considerations, and ethical issues are necessarily joined;
2. Comprehend the interrelationships among the environment, natural resources, and human society;
3. Perceive the need to integrate diverse social, political, legal, institutional, and biophysical considerations inherent in attaining environmental goals;
4. Educate students to be articulate, sensitive, and knowledgeable about the complex environmental issues facing society;
5. Provide a balanced understanding of the natural and social processes as they relate to the environment.

All programs of study relating to environmental studies at Colorado State are incorporated in existing majors in the following departments.

College/Department

Environmental Program Focus

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

Water, land, and soil management; risk assessment; global warming; ecology and ecosystem management; pollution control; natural resources management; water quality; sustainable management

College of Applied Human Sciences

Manufacturing Technology and Construction Management
(B.S., M.S.)

Air and climate

College of Engineering

Atmospheric Science
(M.S., Ph.D.)

Air and climate; global warming; ecology and ecosystem management; pollution control

Chemical Engineering
(B.S., M.S., Ph.D.)

Water, land, and soil management; non-point source pollution control; water quality management, bioremediation; natural resources management

Civil Engineering
(includes agricultural and bioresource engineering)
(B.S., M.S., Ph.D.)

Water resources; water, land, and soil management; air and climate; irrigation engineering; groundwater hydrology; risk assessment and management; policy analysis; global warming; pollution control; natural resources management

Mechanical Engineering
(B.S., M.S., Ph.D.)

Air and climate; risk assessment and management; pollution control; waste minimization

College of Liberal Arts

Anthropology
(B.A., M.A.)

Policy analysis; ecology and ecosystem management

English
(B.A., M.A.)

Nature writing; interpretation

History
(B.A., M.A.)

Western natural resource management; water management; land management; historical preservation; environmental history

Philosophy
(B.A., M.A.)

Land and soil; policy analysis; normative policy ethics; environmental ethics; sustainable development ethics

Political Science
(B.A., M.A., Ph.D.)

Water management; air and climate; policy analysis; natural resources management; international and trans-boundary resource management; comparative environmental policy; pollution and hazardous waste

Sociology
(B.A., M.A., Ph.D.)

Water management; risk management; policy analysis, natural resources management; pesticide management; rural development

College of Natural Resources

Fishery and Wildlife Biology
(B.S., M.S., Ph.D.)

Water, land, and soil management; risk assessment and management; policy analysis; ecology and ecosystem management; pollution control; natural resource management; biodiversity; conservation biology

Forest Rangeland Watershed Stewardship
(B.S., M.S., Ph.D.)

Water, land, and soil management; risk assessment and management; policy analysis; global warming; ecology and ecosystem management; pollution control; geographical information systems; natural resource management; biodiversity; conservation biology; climate; riparian systems

College/Department**Environmental Program Focus****Geosciences**

(B.S., M.S., Ph.D.)

Water, land, and soil management; environmental monitoring, ecosystem management; risk assessment; geographic information systems; environmental equity; natural resource management; hydrogeology; surface and groundwater quality; alpine and wetland hydrology; environmental geology; sedimentology

Natural Resource Recreation and Tourism

(B.S., M.S., Ph.D.)

Natural resources management; historical preservation; human dimensions in natural resources; ecotourism; interpretation; park and protected area management; environmental education

Natural Resource Ecology Laboratory

Water, land, and soil management; air and climate; risk assessment and management; policy analysis; global warming; ecology and ecosystem management; pollution control; natural resources management

*College of Natural Sciences***Biology**

(B.S., M.S., Ph.D.)

Water, land, and soil management; risk assessment; global warming; ecology and ecosystem management; pollution control

Chemistry

(B.S., M.S., Ph.D.)

Water chemistry; water quality

Physics

(B.S., M.S., Ph.D.)

Pollution control

Psychology

(B.S., M.S., Ph.D.)

Policy analysis; ecology and ecosystem management; natural resources management

*College of Veterinary Medicine and Biomedical Sciences***Biomedical Sciences**

Environmental biology

Clinical Sciences

(M.S., Ph.D.)

Veterinary health management; zoological medicine

Environmental and Radiological Health Sciences

(B.S., M.S., Ph.D.)

Toxicology; epidemiology; industrial hygiene/occupational safety; public health; risk assessment; radiation protection/health physics; radioecology; radiobiology

Microbiology, Immunology, and Pathology

(B.S., M.S., Ph.D.)

Human and veterinary health; ecosystem function; causes and mechanisms of disease processes

LIFE SCIENCES**Open Option Advising Program**

*Academic Support Services
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.

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 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 provide 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 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.

American Ethnicity Interdisciplinary Studies Program

*Office in C 127 Clark Building,
Coordinated by a Faculty Advisory Board and the Director
of The Center for Applied Studies in American Ethnicity*

The [Center for Applied Studies in American Ethnicity](#) offers graduate research and undergraduate curricula leading to a certificate in American Ethnicity. 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 American Ethnicity Studies Program is dedicated to meeting the educational and research needs of students and faculty interested in issues such as self-concept, historical development of racial and ethnic beliefs, philosophical implications, social practice, or public policy. The program is designed to provide as well an instructional and resource base for in-service and future professionals working in fields or geographical areas where an understanding of ethnicity in America or of a particular ethnic group will enhance their professional effectiveness.

Students may pursue, in conjunction with their major, an interdisciplinary program of studies in one of five options. Four ethnic-specific options allow for the historical and sociocultural study of the four major racialized groups in the

United States: African American, Asian American/Pacific American, Chicana(o)/Latina(o) American, and Native American. The fifth option is a comparative framework for the study of race and ethnicity as a social construct in the shaping of U.S. national character, cultural values, and institutions. Each option contains a core of program courses and a choice of courses from various departments approved by the Center as appropriate for the option. Each student pursuing a certificate in any of the options is required to take the introductory courses, ETCC 200 and ET 292. A total of 24 credits is required for the certificate.

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.

Course	Title (Prerequisite)	Cr	AUCC
Required Courses			
ETCC 200	Ethnicity in America	3	3F
ET 292	Ethnic Studies Research Methods and Writing	3	
TOTAL		<u>6</u>	

Specific Option Courses (see specific option for list of courses) **12**

African American Studies Option

Select four courses from the following:

ETCC 250/ HYCC 250	African American History, 1619-1865	3	3D
ETCC 251/ HYCC 251	African American History Since 1865	3	3D
ET 310	African American Studies	3	
ET 312	African American Situation	3	
ET 410	African American Periods and Personalities	3	
ET 412	African and African Diaspora	3	

Asian American Studies Option

Select four courses from the following:

ETCC 252/ HYCC 252	Asian American History	3	3D
ET 260	The Asian Diaspora-Cultures and Communities	3	
ET 320	Ethnicity and Film: Asian American Experience	3	
ET 324	Asian Pacific Americans and the Law	3	
ET 420	Asian/Pacific American Families/Communities	3	
ET 424	Asian/Pacific American Literature and Culture	3	

Chicana/o/Latina/o Studies Option

Select four courses from the following:

ETCC 253	Chicana/o History and Culture	3	3D or 3E
ET 254	La Chicana in Society	3	

ET 261	Latina/o Populations in the U.S.	3	
ET 332	Contemporary Chicana/o/Latina/o Issues	3	
ET 430	Chican/o/Latina/o/ Creative Expression	3	
ET 432	Chicana/o/Latina/o Routes to Empowerment	3	

Ethnicity Studies Option

Select four courses from the following:

ETCC 204	Ethnicity in Colorado	3	3F
ETCC 205	Ethnicity and the Media	3	3B or 3E
ETCC 256	Americans in a Changing World	3	3B or 3E
ET 304	Race Formation in the United States	3	
ET 305	Ethnicity, Class, and Gender in the U.S.	3	
ET 492	Seminar	3	

Native American Studies Option

Select four courses from the following:

ETCC 255/ HYCC 255	Native American History	3	3D
ET 342	Indigenous Women, Children and Tribes	3	
ET 344	Native American Ceremony and the Sacred	3	
ET 414/ AP 414	Development in Indian Country	3	
ET 444/ S 444	Federal Indian Law and Policy	3	

Secondary Option Courses

Select at least three credits from an ethnic studies option other than the primary option:

A. CASAE Courses

ETCC 204	Ethnicity in Colorado ¹	3	3F
ETCC 205	Ethnicity and the Media ¹	3	3B or 3E
ET 234/ E 234	Native American Literature	3	
ET/ E 239	Introduction to Chicano Literature	3	
ETCC 240	Native American Cultural Expressions	3	3B
ETCC 250/ HYCC 250	African American History, 1619-1865 ²	3	3D
ETCC 251/ HYCC 251	African American History Since 1865 ²	3	3D
ETCC 252/ HYCC 252	Asian American History ³	3	3D
ETCC 253	Chicana/o History and Culture ⁴	3	3D or 3E
ET 254	La Chicana in Society ⁴	3	
ETCC 255/ HYCC 255	Native American History ⁵	3	3D
ETCC 256	Americans in a Changing World ¹	3	3B or 3E
ET 260	The Asian Diaspora-Cultures and Communities ³	3	
ET 261	Latina/o Populations in the U.S. ⁴	3	

ET	304	Race Formation in the United States ¹	3	AR	113	Native Art Survey	3	
ET	305	Ethnicity, Class, and Gender in the U.S. ¹	3	AR ET	208/ 208	Native American Art and Material Culture	3	
ET	310	African-American Studies ²	3	AR	311	Art of Africa (AR/ARCC 100 or AR 111 or AR 113)	3	
ET	312	African-American Situation ²	3	AR	312	History of Pre-Columbian Art (AR 110, AR 111)	3	
ET JT	316/ 316	Multiculturalism and the Media	3	AR	316	Art of the Pacific (AR/ARCC 100 or AR 111 or AR 113)	3	
ET AP	318/ 318	Peoples and Cultures of the Southwest (AP/APCC 100)	3	AR	318	Native American Art (AR 110; AR/ARCC 100 or AR 111 or AR 113)	3	
ET	320	Ethnicity and Film-Asian-American Experience ³	3	AUCC	100	Self/Community in American Culture, 1600-1877	3	3D
ET	324	Asian-Pacific Americans and the Law ³	3	AUCC	101	Self/Community in American Culture Since 1877	3	3D, 3F
ET	332	Contemporary Chicana/o/Latina/o Issues ⁴	3	E	356	Asian Literature	3	
ET	340	Native American Perspectives on Conquest	3	ECCC	212	Racial Inequality and Discrimination	3	3F
ET	342	Indigenous Women, Children, and Tribes ⁵	3	HYCC	120	Asian Civilizations I	3	3D or 3E
ET	344	Native American Ceremony and the Sacred ⁵	3	HYCC	220	Asian Civilizations II	3	3D or 3E
ET	410	African-American Periods and Personalities ²	3	HY	341	China in the Modern World, 1600-Present (HY/HYCC 101 or HY/HYCC 151 or HY/HYCC 171 or HYCC 215 or HYCC 274/HYCC 220 or written consent of instructor)	3	
ET	412	Africa and African Diaspora ²	3	HY	350	Mexico	3	
ET AP	414/ 414	Development in Indian Country ⁵	3	HY	352	Caribbean Civilization (HY/HYCC 101 or HY/HYCC 171 or HYCC 270/HY 354)	3	
ET	420	Asian/Pacific American Families/Communities ³	3	HY	354	Colonial Latin America (HY/HYCC 101 or HY/HYCC 171 or HYCC 238)	3	
ET	424	Asian/Pacific American Literature and Culture ³	3	HY	370	Civil War Era (HY/HYCC 150)	3	
ET	430	Chicana/o/Latina/o Creative Expression ⁴	3	HY	372	Reconstruction and the New South (HY/HYCC 150)	3	
ET	432	Chicana/o/Latina/o Routes to Empowerment ⁴	3	HY	469	United States Immigration History	3	
ET E	438/ 438	Contemporary Native American Literature	3	HY	472	American Southwest	3	
ET AP	442 442	Ethnographic Field School (AP/APCC 100, ET/ETCC 200 or written consent of instructor)	3	L	309	Contemporary Chinese Literature and the Arts	3	
ET S	444/ 444	Federal Indian Law and Policy ⁵	3	L	336	Introduction to Spanish-American Civilization (L/L CC 201S or L 208S)	3	
ET	492	Seminar ¹	3	L	449	Spanish-American Literary Movements and Periods (L/L CC 300S, L 310S)	3	
ET	495	Independent Study	Var	MU	230	Music of Black Americans	3	
B. Non-CASAE Courses				MU	309	Jazz Ensemble (written consent of instructor)	1	
AP	310	Peoples and Cultures of Africa (AP/APCC 100)	3	MU	332	History of Jazz	3	
AP	319	Latin American Peasantries (AP/APCC 100)	3	PL	106	Wisdom of the East-Oriental Philosophy	3	
AP	331	Peoples of Latin America	3	PL	309	Ideas in Oriental Art and Literature	3	
AP	350	Archaeology of North America (AP/APCC 140)	3	PL	349	Philosophy of Tao and Zen (written consent of instructor)	3	
AP	351	Archaeology of Europe and Asia (AP/APCC 140)	3	PL	360	Topics in Oriental Philosophy (sophomore standing or higher or written consent of instructor)	3	
AP	412	Indians of North America (AP/APCC 100 or AP/APCC 200 or AP 413 or AP 414/ET 414 or written consent of instructor)	3	PL	371	Contemporary Eastern Religious Thought	3	
AP	413	Indigenous Peoples Today (AP/APCC 200 or AP 412 or AP 414/ET 414)	3	PL	379	Mysticism East and West (PL 106 or PL 171 or PL 172 or PL 270)	3	
AR	112	History of Asian Art	3					

					<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
PO	331	Politics and Society Along Mexican Border	3					
PO	413	U.S. Civil Rights and Liberties (PO/POCC 101 or POCC 192A)	3					
PO	444	Comparative African Politics (POCC 192D or PO/POCC 241)	3					
PO	445	Comparative Asian Politics (POCC 192D or PO/POCC 241)	3					
PO	446	Politics of South America (POCC 192D or PO/POCC 241)	3					
PO	447	Politics in Mexico, Central America, Caribbean (POCC 192D or PO/POCC 241)	3					
S CC	205	Contemporary Race-Ethnic Relations	3	3E				
S	330	Social Stratification (S/S CC 100 or S/S CC 105)	3					
S	366	Peoples and Institutions of Latin America (S/S CC 100 or S/S CC 105)	3					
SPCC	192	Introduction to Intercultural Communication	3	1, 3E				
SP	306	Co-Cultural Communication	3					
PROGRAM TOTAL = 24 credits								

¹ May not be used as a secondary option course by students in the ethnicity studies option.

² May not be used as a secondary option course by students in the African American studies option.

³ May not be used as a secondary option course by students in the Asian American studies option.

⁴ May not be used as a secondary option course by students in the Chicana/o/Latina/o studies option.

⁵ May not be used as a secondary option course by students in the Native American studies option.

Asian Interdisciplinary Studies Program

Office in Laurel Hall

Coordinated by 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>
A minimum of 21 credits is required including 9 credits outside the student's major. Courses must be taken in at least <i>three</i> disciplines								
Core Courses (6 credits required)								
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 220	Asian Civilizations II	3	3D or 3E
					L CC 105C	First-Year Chinese I (no previous study in language)	5	
					L CC 105J	First-Year Japanese I (no previous study in language)	5	
					L CC 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 (AP/APCC 100 or AP/APCC 200)	3	
					AR 112	History of Asian Art	3	
					AR 316	Art of the Pacific (AR/ARCC 100 or AR 111 or AR 113)	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
					HY 302	Ancient Near East	3	
					HY 335	Tokugawa and Modern Japan, 1600-Present (HY/HYCC 101 or HY/HYCC 151 or HY/HYCC 171 or HYCC 215 or HYCC 274/HYCC 220 or written consent of instructor)	3	
					HY 337	Ancient China (HY/HYCC 100 or HYCC 273/HYCC 120 or HY/HYCC 170)	3	
					HY 339	Medieval China and Central Asia (HY/HYCC 100 or HYCC 115 or HYCC 273/HYCC 120 or HY/HYCC 170)	3	
					HY 341	China in the Modern World, 1600-Present (HY/HYCC 101 or HY/HYCC 151 or HY/HYCC 171 or HYCC 215 or HYCC 274/HYCC 220 or written consent of instructor)	3	
					HY 344	Muhammad and the Origins of Islam (HY/HYCC 100 or HYCC 115 or HYCC 273/HYCC 120 or HY/HYCC 170 or HY/HYCC 230)	3	
					HY 348	The Modern Middle East (HY/HYCC 101 or HY/HYCC 151 or HY/HYCC 171 or HYCC 215 or HY/HYCC 235)	3	
					HY 404	Ancient Israel	3	
					IE 271	India	3	

L	106J	First-Year Japanese Review (placement exam or instructor placement)	3	
L CC	107C	First-Year Chinese II (L/L CC 105C)	5	
L CC	107J	First-Year Japanese II (L/L CC 105J or L 106J)	5	
L CC	200C	Second-Year Chinese I (L/L CC 107C or placement exam)	5	2B3 ¹
L CC	200J	Second-Year Japanese I (L/L CC 107J or placement exam)	5	2B3 ¹
L CC	201C	Second-Year Chinese II (L/L CC 200C or placement exam)	5	2B3 ¹
L CC	201J	Second-Year Japanese II (L/L CC 200J or placement exam)	5	2B3 ¹
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/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 192D or PO/POCC 241)	3	

Supporting Field Courses (0-6 credits)
May be taken from courses approved by Advisory Board.

¹ See the All-University Core Curriculum section of the catalog for an explanation of which language courses will satisfy category 2B requirements (if so allowed by the student's major).

Biomedical Engineering Interdisciplinary Studies Program

Office in Engineering Building, Room A 101

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, 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, bioengineering, 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 from the Biomedical Engineering Program Office, College of Engineering.

Undergraduate

The undergraduate program requires completion of 21 credits. All undergraduates are required to complete 12 credits of core courses. The 9 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 (300AY/PS/BS 300)	3	
BE 486A-B	Biomedical Clinical Practicum (AY/PS/BS 300 and BE 470; or written consent of instructor)	4	
BS 300	Principles of Human Anatomy and Physiology (BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 102; C/C CC 103 or C/C CC 107 or C/C CC 111)	4	
OT 215	Medical Terminology	1	
TOTAL		12	
ELECTIVE COURSES (minimum of 9 credits)			
Engineering Courses			
Select at least one course from the following: ¹			
CE 260	Engineering Mechanics-Statics (M/M CC 160, PH/PHCC 141)	3	
CE 261	Engineering Mechanics-Dynamics (CE 260; CE 108 or CBCC/CHCC 192 or ME 101/MECC 192)	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 430	Process Control and Instrumentation (CH 332, CH 341, CH 420)	4	
EE 204	Introduction to Electrical Engineering (M/M CC 161, PH/PHCC 142)	3	
EE 303/ ST 303	Introduction to Communications Principles (M 261)	3	
EE 331	Electronic Principles I (EE 202 and M 340 or M 345)	4	
EE 341	Electromagnetic Fields and Devices I (M 340 or M 345)	3	
ME 307	Mechatronics and Measurement Systems (CE 261, EE 204, M 340)	4	
ME 331	Introduction to Engineering Materials (C/C CC 112, C 113, PH/PHCC 142)	4	
ME 342	Mechanics and Thermodynamics of Flow Processes (M 340; ME 237)	3	

PH	245	Introduction to Electronics (M/M CC 161, PH/PHCC 142)	3
TOTAL			3-7

Science and Other Non-Engineering CoursesSelect at least one course from the following:²

BC	351	Principles of Biochemistry (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 346 or concurrent reg. in C 346)	4
BS	325	Cellular Neurobiology (AY/PS/BS 300 or BY 310)	3
BS	345	Functional Neuroanatomy (AY/PS/BS 300)	4
BS	365	Nerve and Muscle-Toxins, Trauma, and Disease (AY/PS/BS 300 or BY 310)	3
BS	420	Cardiopulmonary Physiology (AY/PS/BS 300)	3
BS	430	Endocrinology (AY/PS/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/C CC 107 or C 113)	4
C	246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/C CC 112 or C 114; C 245 or concurrent reg.)	1
C	345	Organic Chemistry I (C 113, C 114)	4
C	346	Organic Chemistry II (C 345)	4
EX	303	Anatomical Kinesiology (AY/PS/BS 300)	3
EX	403	Physiology of Exercise (AY/PS/BS 300)	4
EX	405	Exercise Testing Instrumentation (EX 403)	2
EX	420	Electrocardiography and Exercise Management (EX 403)	3
EX	476	Rehabilitation Exercise (EX 240, EX 303)	3
LS	103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4
MB	300	General Microbiology (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 345 or concurrent reg.)	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/M CC 161 or M/M CC 255)	3
TOTAL			3-7

Animal Research/Bioethics/Entrepreneurship Courses

Select at least one from the following:

BN	420	New Venture Creation (BN 340)	3
BN	440	New Venture Management (BN 420)	3
PL	205	Introduction to Ethics (sophomore standing or higher or written consent of instructor)	3

PL	305E	Philosophical Issues in the Professions-Animal Science	3
TOTAL			3

PROGRAM TOTAL = 21 credits minimum¹ Non-engineering students must take at least two courses from this category.² Engineering students must take at least two courses from this category.**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
BE 586A-B	Biomedical Clinical Practicum (BE/ME 570; AY/PS/BS 300 or PS/BS 500 or written consent of instructor)	2-4
BS 500	Mammalian Physiology I (6 credits of biological sciences)	4
TOTAL		11

ELECTIVE COURSES (minimum of 10 credits)**Engineering Courses**Select at least one of the following:¹

CH 522/ BE 522	Bioseparation Processes (CH 331)	3
ME 571/ BE 571	Biomechanics (BE 470 or BE 570/ME 570)	3
ME 573/ BE 573	Structure and Function of Biomaterials (ME 331)	3
TOTAL		3-6

Science and Other Non-Engineering CoursesSelect at least one of the following:²

BS 550	Electron Microscopy-TEM, SEM, and X-ray (PH/PHCC 110)	3
BS 560	Theory and Practice of Animal Biotechnology (1 semester of biochemistry or written consent of instructor)	3
BS 620	Cardiovascular Physiology (PS/BS 500)	3
BS 631	Mechanisms of Hormone Action (PS/BS 430 or PS/BS 501)	2
CM 501	Advanced Cell Biology (BY 310 or written consent of instructor)	4
NB 501	Cellular and Molecular Neurophysiology (one college-level course in each: biology, biochemistry, physics, calculus)	2
NB 505	Neuronal Circuits, Systems and Behavior (AY/BS 325 or PS/BS 500 or NB 501)	3
ST 511	Design and Data Analysis for Researchers I (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311 or written consent of instructor)	4
ST 512	Design and Data Analysis for Researchers II (ST 511 or written consent of instructor)	4
TOTAL		4-7

Animal Research/Bioethics/Entrepreneurship Courses

Select at least one class from the following:

AN	565	Interpreting Animal Science Research (AN 100; ST/STCC 301 or ST/STCC 307 or EH/EHCC 307)	3
PL	547	Seminar in Ethical Theory (PL 447)	3
PL	564	Seminar in Animal Rights (written consent of instructor)	3
TOTAL			3

PROGRAM TOTAL = 21 credits minimum

¹ Non-engineering students must take at least 2 courses from this category.
² Engineering students must take at least 2 courses from this category.

Biotechnology Interdisciplinary Studies Program

Office in Anatomy/Zoology Building, Room W 102
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.

Course	Title (Prerequisite)	Cr	AUCC
Students must select a minimum of 21 credits from a combination of core and elective courses.			
Biochemistry Core		4-6	
BC 351	Principles of Biochemistry (BZ/BZCC 110 or BZ/BZCC 120 or BY/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 346 or concurrent reg. in C 346; M/M CC 155 or M/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 (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 345 or concurrent reg.)	3	
MB 302	General Microbiology Laboratory (MB 300 or concurrent reg.)	2	

Course	Title (Prerequisite)	Cr
MB 432	Aquatic Microbiology (MB 301 or MB 302)	4
MB 436	Industrial Microbiology (MB 301 or MB 302)	4
Process Engineering Core		4-6
BH 306	Bioprocess Engineering (C/C CC 107 or C/C CC 111; PH/PHCC 121 or PH/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/ EV 443	Mass Transfer and Separation Laboratory (CH 341 or CH 442/EV 442 or concurrent reg.)	2
Biotechnology		
BH 450	Topics in Biotechnology (BC 351 or BC 401, MB 300)	2
Electives (chosen from courses not required for graduation in the major and approved by the Advisory Board.)		

Conservation Biology Interdisciplinary Studies Program

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.

Course	Title (Prerequisite)	Cr	AUCC
Core Curriculum			
BY 220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/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/S CC 100 or S/S CC 105)	3	
SC 330	Principles of Genetics ² (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102)	3	

<i>Select at least three credits from the following:</i>			
BZ	478	Molecular and Developmental Evolution (BZ 220, M/M CC 155, ST/STCC 301 or ST/STCC 307 or EH/EHCC 307)	3
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, ST/STCC 301 or ST/STCC 307 or EH/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 (PO/POCC 101 or POCC 192A)	3
RS	331	Rangeland Ecogeography (RS 300, BZ 223 or F 210 or NR 220)	3
PROGRAM TOTAL = 20 credits			

¹ The number of credits taken must assure a minimum of 20 total credits in the program.

² BZ 350 may be substituted.

Criminal Justice Interdisciplinary Studies Program

*Office in Clark Building, Room B 258
Coordinated by a Faculty Advisory Board and the
Associate Dean, College of Liberal Arts*

The interdisciplinary studies program in criminal justice is designed as a component within a student's major in which free electives are used to complete 20-21 credits. The program has five basic objectives: to broaden students' understanding of criminal justice issues and problems in contemporary American society; to expose students to a number of disciplines dealing with a common area of knowledge; to enhance the students' major field of study with an area concentration that broadens the scope of their education; to enhance students' career options; and to promote cross-disciplinary and interdisciplinary cooperation among participating faculty and students.

Program details are available from the Department of Sociology, College of Liberal Arts.

Course	Title (Prerequisite)	Cr	AUCC
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A minimum of 18 semester credits of the total 20-21 credits required in the program must be in upper-division courses. Students must earn a minimum grade of "C" in each course comprising the Criminal Justice Interdisciplinary Studies Program.

Core Courses

PO	413	U.S. Civil Rights and Liberties (PO/POCC 101 or POCC 192A)	3
S	253	Introduction to Criminal Justice (S/S CC 100 or S/S CC 105)	3

S	352	Criminology (S/S CC 100 or S/S CC 105)	3
OR			
S	372	Sociology of Deviance (S/S CC 100 or S/S CC 105)	3
S	354	Law Enforcement and Society (S 253)	3
SW	371B	Social Work with Juvenile Offenders	3
OR			
SW	371C	Social Work with Adult Offenders	3
Internship			
OR			
Independent Study			
TOTAL			18

Supporting Courses

AP	315	Psychological Anthropology (AP/APCC 100, PY/PYCC 100)	3
AP	413	Indigenous Peoples Today (AP/APCC 200 or AP 412 or AP 414/ET 414)	3
HD	311	Adolescent/Early Adult Development in Context (HD/HDCC 101)	3
HD	403	Families in the Legal Environment	3
PO	305	Judicial Politics (PO/POCC 101 or POCC 192A)	3
PY	320	Abnormal Psychology (PY/PYCC 100)	3
PY	325	Psychology of Personality (PY/PYCC 100)	3
PY	465	Adolescent Psychology (PY/PYCC 100)	3
S	330	Social Stratification (S/S CC 100 or S/S CC 105)	3
S	332	Comparative Majority-Minority Relations (S/S CC 100 or S/S CC 105)	3
S	333	Gender Roles in Society (S/S CC 100 or S/S CC 105)	3
S	352	Criminology ¹ (S/S CC 100 or S/S CC 105)	3
S	372	Sociology of Deviance ¹ (S/S CC 100 or S/S CC 105)	3
SW	371A	Social Work with Children and Families	3
SW	371B	Social Work with Juvenile Offenders ¹	3
SW	371C	Social Work with Adult Offenders ¹	3
TOTAL			2-3

PROGRAM TOTAL = 20-21 credits

¹ Can be used to fulfill supporting course requirement if not used as a core course requirement.

Diversity in Law Interdisciplinary Studies Program

*Office in Clark Building, Room C 138
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 justics.

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

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select 6 credits from the following:</i>			
LBCC 192	College of Liberal Arts First Year Seminar ¹	3	1
POCC 101	American Government and Politics	3	3C, 3F
OR			
POCC 192A	Seminar in Politics-U.S. National Government and Politics	3	1, 3C or 3F
S CC 100	General Sociology	3	3C, 3F
S 253	Introduction to Criminal Justice (S/S CC 100 or S/S CC 105)	3	
TOTAL		6	

SOPHOMORE			
<i>Select 3 credits from the following:</i>			
ETCC 200	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 (AP/APCC 100 or S/S CC 100)	3	
HD 403/ JT 415	Families in the Legal Environment Communications Law ²	3	
OR			
SP 349/ PO 410	Freedom of Speech ² American Constitutional Law (PO/POCC 101 or POCC 192A)	3	
PO 413	U.S. Civil Rights and Liberties (PO/POCC 101 or POCC 192A)	3	
PO 431	International Law (POCC 192C or PO/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 (AP/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 342	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/S CC 100 or S/S CC 105)	3	
SP 305	Intercultural Communication	3	
SP 306	Co-Cultural Communication	3	
TOTAL		6	

PROGRAM TOTAL = 21 credits

¹ LBCC 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 B 258
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.

Course	Title (Prerequisite)	Cr	AUCC
Environmental Affairs Core			
Select three courses from the following:			
AP 330	Human Ecology (AP/APCC 100; AP 150/APCC 120 or BY 220 or BZ/BZCC 101)	3	

EA	375	Agricultural Law	3	
EA	460	Economics of World Agriculture (EA/EACC 202 or EC/ECCC 202)	3	
EA	478	Agricultural Policy (EA/EACC 202 or EC/ECCC 202 or EA/EACC 240 or EC/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 (BZ/BZCC 120 or BY/LS 103; M/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	
TOTAL			3	

PROGRAM TOTAL = 21 credits

¹ May be taken if not selected in the Environmental Affairs Core.
² Students may not get credit for both PO 361 and PO 362 in this program.

Exercise Science and Nutrition Interdisciplinary Graduate Program

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

This interdisciplinary graduate program is a cooperative effort offered by the Department of Health and Exercise Science and the Department of Food Science and Human Nutrition. It provides a unique opportunity for students to pursue combined educational interests 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/ FN 560	Exercise and Nutrition (EX 403, FN 350, undergraduate biochemistry course)	3
EX	600	Date Analysis for Research Design (one course in statistics)	3
EX	603	Advanced Topics in Exercise Physiology (EX 403)	3
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/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 minimum), and a selection of advanced courses (12 credits minimum) taken from at least three of the six collaborating departments: Animal Sciences; Environmental and Radiological Health Sciences; Food Science and Human Nutrition; Horticulture and Landscape Architecture; Microbiology, Immunology and Pathology; and Soil and Crop Sciences.

Course	Title (Prerequisite)	Cr	AUCC
Required Courses			
FT 400	Food Safety ¹ (6 credits in biology and/or chemistry)	3	
OR			
MB 334	Food Microbiology ¹ (MB 300)	3	
LS 205	Survey of Microbial Biology (C/C CC 107; or C 113 and BY/LS 103)	3	
OR			
MB 300	General Microbiology (BZ/BZCC 110 or BZ/BZCC 120 or BY/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 (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102)	4	
BC 401	Comprehensive Biochemistry I (C 245 or C 346 or concurrent registration in C 346; M/M CC 155 or M/M CC 160)	3	
C 245	Fundamentals of Organic Chemistry ² (C/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	
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/C CC 107 or C/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 100)	2	
AN 350B	Animal and Product Judging-Meats	1-3	
AN 360	Principles of Meat Science (C/C CC 107 or C/C CC 111)	3	
AN 460	Meat Processing (AN 360)	3	
BH 306	Bioprocess Engineering (C/C CC 107 or C/C CC 111; PH/PHCC 121 or PH/PHCC 141)	4	

EH 220	Environmental Health (BZ/BZCC 101 or BZ/BZCC 104 or BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102 or concurrent registration)	3	
EH 332	Principles of Epidemiology (EH/EHCC 307 or ST/STCC 307; MB/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/C CC 107, FN/FNCC 150)	3	
FN 350	Human Nutrition (AY/PS/BS 300 or PS/BS 310 or BZ 310; 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 (MB 300)	3	
MB 335	Food Microbiology Laboratory (MB 301 or MB 302)	2	
SC 330	Principles of Genetics (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102)	3	
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 100)	3	
AN 565	Interpreting Animal Science Research (AN 100, ST/STCC 301 or ST/STCC 307 or EH/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 student 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 – 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.		
AN 560	Issues in the Meat Industry (AN 100)	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 (EH/EHCC 307 or ST/STCC 307)	3
EH MB	533/ 533	Epidemiology of Infectious Diseases/Zoonoses (MB 300)	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
H	675	Plant Stress Physiology (BZ 440)	3
MB	335	Food Microbiology Laboratory (MB 301 or MB 302)	2
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	550	Microbial and Molecular Genetics Laboratory (MB 301 or MB 302; MB 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 A	570/ 570	Issues in Animal Agriculture	2

PROGRAM TOTAL = 14 credits

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 Watershed Stewardship and 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 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 GIS 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 (NR 260 or NR 500, ST/STCC 301 or ST 511)	4
NR 621	Design of Geographic Information Systems (LA 520 or NR 322; NR 260; 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, 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 (ST/STCC 301, NR 322, NR 323, or written consent of instructor)	3
NR 523/ ST 523	Quantitative Spatial Analysis (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307)	3
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 (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/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 requirement.

Gerontology Interdisciplinary Studies Program

Office in Gibbons Building, Room 201
College of Applied Human Sciences
Malcolm Scott, Director

The Gerontology Interdisciplinary Studies Program is a cooperative effort among faculty from different departments and colleges of the University who share a common interest in gerontology, the study of human aging. The primary purpose of the program is to provide students with background 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Core Requirements			
HD 312	Adult Development-Middle Age and Aging (HD/HDCC 101 or PY/PYCC 100 or S/S CC 100)	3	
HD 354	Biological Aspects of Aging (BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 102)	3	
HS 201	Perspectives in Gerontology (HD/HDCC 101 or PY/PYCC 100 or S/S CC 100 or written consent of instructor)	3	
SW 371F	Social Work with Social Gerontology	3	
TOTAL		12	
Elective Courses			
EX 444	Exercise and Aging (EX 403)	2	
FN 459	Nutrition in the Life Cycle (FN 350)	3	
HD 332	Death, Dying, and Grief (HD/HDCC 101)	3	
OT 355	Handicapped Individual in Society (PY/PYCC 100 or S/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 = 20-21 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
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Mathematics and Computer Applications Requirements – Before a student is admitted to this program (s)he must demonstrate mastery of the following skills:

- Mathematical concepts and models – demonstrated by completion of one of the following courses: M/M CC 141, M/M CC 155, M/M CC 160, or ST/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/M CC 141, M/M CC 155, or M/M CC 160)	3	
JT	413	New Communication Technologies and Society	3	
TOTAL			12	

Elective Courses – Select three of the following courses:

BD	240	Program Design and Construction	3	
BD	355	Business Database Systems (BD 220 and BD 240)	3	
CSCC	153	Java Programming (M/M CC 118 with grade of C or better or M/M CC 121 with grade of C or better)	4	2D
EE	421	Telecommunications I (EE 303/ST 303, EE 312)	3	
JTCC	300	Professional and Technical Communication (CO/COCC 150)	3	2B2
JT	372	Web Design and Management (JTCC 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 specialized coursework for training in integrated resource management. The core curriculum consists of courses in the departments of Agricultural and Resource Economics, Animal Sciences, and Forest Rangeland 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.

Course	Title (Prerequisite)	Cr	AUCC
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SOPHOMORE

A	224/	Integrated Resource Management I (A/A CC 192 or first-year seminar)	3
NR	224		
BY	220	Fundamentals of Ecology (1 course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160)	3
RS	300	Principles of Range Management (BZ/BZCC 120 or BY/LS 103)	3
RS	320/	Forage and Range Management (1 course in biological sciences)	3
SC	320		
SC	240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4
TOTAL			12-13

JUNIOR

A	424/	Integrated Resource Management II (A 224/NR 224)	3
NR	424		
AN	300E	Topics in Animal Science-Family Ranching	1
EA	305	Agricultural and Resource Enterprise Analysis (EA/EACC 202 or EC/ECCC 202)	3
EA	310	Agricultural Marketing (EA/EACC 202 or EC/ECCC 202)	3
S	341	Sociology of Rural Life (S/S CC 100 or S/S CC 105)	3
TOTAL			13

SENIOR

A	383/	U.S. Travel-Integrated Resource Management (A 224/NR 224)	2
NR	383		
AN	372	Sheep Production (AN 250, AN 310, AN 320, AN 330)	3
AN	478	Beef Production and Management (AN 250, AN 310, AN 320, AN 330)	3
EA	478	Agricultural Policy (EA/EACC 202 or EC/ECCC 202 or EA/EACC 240 or EC/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

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.

Course	Title (Prerequisite)	Cr	AUCC
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	
POCC 232	International Relations	3	3C or 3D
SPCC 192	Introduction to Intercultural Communication	3	1, 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 (AP/APCC 100)	3	
AP 329	Cultural Change (AP/APCC 100)	3	
AP 331	Peoples of Latin America	3	
AP 332	Peoples of the Caribbean (AP/APCC 100 or AP/APCC 200)	3	
AP 340	Medical Anthropology (AP/APCC 100)	3	
AP 441	Method in Cultural Anthropology (AP/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	
EA 415	International Agricultural Trade (EC/ECCC 204)	3	
EA 460	Economics of World Agriculture (EA/EACC 202 or EC/ECCC 202)	3	
EC 332/ PO 332	International Political Economy (EA/EACC 202 or EC/ECCC 202; and POCC 192C or PO/POCC 232)	3	
EC 370	Comparative Economic Systems (EC/ECCC 101 or EC/ECCC 202 or EA/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	Var.	
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 273/HYCC 120, HYCC 274/HYCC 220, IN 300)	3	
IN 492B	Seminar-Latin America (HYCC 270/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 192C or PO/POCC 232)	3	
PO 433	International Organization (POCC 192C or PO/POCC 232)	3	
PO 444	Comparative African Politics (POCC 192D or PO/POCC 241)	3	
PO 445	Comparative Asian Politics (POCC 192D or PO/POCC 241)	3	
PO 446	Politics of South America (POCC 192D or PO/POCC 241)	3	
PO 447	Politics in Mexico, Central America, Caribbean (POCC 192D or PO/POCC 241)	3	
RR 320	International Issues-Recreation and Tourism	3	

S	320	Population-Natural Resources and Environment (S/S CC 100 or S/S CC 105)	3
S	341	Sociology of Rural Life (S/S CC 100 or S/S CC 105)	3
S	364	Agriculture and Global Society (S/S CC 100 or S/S CC 105)	3
S	366	Peoples and Institutions of Latin America (S/S CC 100 or S/S CC 105)	3
S	429	Comparative Urban Studies (S/S CC 100 or S/S CC 105)	3
S	460	Technology, Society, and Environment (S/S CC 100 or S/S CC 105)	3
S	461	Sociology of Water Resources (S/S CC 100 or S/S CC 105)	3
SC	475	Tropical Soils, Crops, and Farming Systems	3
SP	305	Intercultural Communication Internship	1-3
TOTAL			12

PROGRAM TOTAL = 21 credits

Graduate

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) of internationally related undergraduate or graduate courses, e.g., foreign language, history and culture, international studies, cross-cultural communication.

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

Course	Title (Prerequisite)	Cr
Core Courses		
IE 692	International Development Seminar	3

<i>Select one course from the following:</i>			
EA	566/	Contemporary Issues of Developing Countries (2 or more courses in economics and/or sociology)	3
S	566		
EA	660	Economics of Agricultural Development (EA 460)	3
IE	470	Women and Development	3
IE	550/	Ethics and International Development (written consent of instructor)	3
PL	550		
NR	525	World Natural Resources (written consent of instructor)	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 100)	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/	Modeling Watershed Hydrology (CE 322/EV 322 or ER/WR 416, ST 304 or ST/STCC 309)	4
WR	524		
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/	Technology Assessment and Social Forecasting (CE 544 or S 500)	3
S	639		
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 (EC/ECCC 204)	3
EA	460	Economics of World Agriculture (EA/EACC 202 or EC/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	WR	589	Watershed Planning for Developing Countries (hydrology course or professional experience in watershed and soil conservation)	4
FN	661	International Nutrition (FN 350)	2				
FW	573	Travel Abroad-Wildlife Ecology/Conservation (written consent of instructor)	3			Internship	1-3
						Independent Study	1-3
GS	670	Interdisciplinary Agricultural Development (written consent of instructor)	3			TOTAL	6
PROGRAM TOTAL = 12 credits							
IE	471	Children and Youth in Global Context	3				
JT	412	International Mass Communication	3				
NR	550	Farming Systems Research and Development (written consent of instructor)	3				
PO	433	International Organization (POCC 192C or PO/POCC 232)	3				
PO	444	Comparative African Politics (POCC 192D or PO/POCC 241)	3				
PO	445	Comparative Asian Politics (POCC 192D or PO/POCC 241)	3				
PO	446	Politics of South America (POCC 192D or PO/POCC 241)	3				
PO	447	Politics in Mexico, Central America, Caribbean (POCC 192D or PO/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	764	World System Theory (S 660)	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 ERCC/WRCC 304)	2	HY	350	Mexico	3
				HY	352	Caribbean Civilization (HY/HYCC 101 or HY/HYCC 171 or HYCC 270/HY 354)	3

Latin American Interdisciplinary Studies Program

*Office in Laurel Hall
Coordinated by a Faculty Advisory Board and the Office of International Programs*

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 developmental 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 requirement 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 seven 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 (AP/APCC 100)	3	
AP 331	Peoples of Latin America	3	
AP 332	Peoples of the Caribbean (AP/APCC 100 or AP/APCC 200)	3	
AP 451	Andean Archaeology and Ethnohistory (AP/APCC 100 or AP/APCC 140)	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 (HY/HYCC 101 or HY/HYCC 171 or HYCC 270/HY 354)	3	

HY	354	Colonial Latin America (HY/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 (HYCC 270/HY 354, IN 300)	3	
JT	412	International Mass Communication	3	
L	335S	Issues in Culture-Spanish (L/L CC 201S or L 208S)	3	
L	336	Introduction to Spanish-American Civilization (L/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/L CC 300S, L 310S)	3	
L	449	Spanish-American Literary Movements and Periods (L/L CC 300S, L 310S)	3	
L	452S	Genre Studies-Spanish (L/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 192D or PO/POCC 241)	3	
PO	447	Politics in Mexico, Central America, Caribbean (POCC 192D or PO/POCC 241)	3	
S	366	Peoples and Institutions of Latin America (S/S CC 100 or S/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
Coordinated by a Faculty Advisory Board

Erwin Chargaff referred to molecular biology as “the practice of biochemistry without a license” due to the fact that most early molecular biologists were trained as chemists or physicists. This also serves to emphasize that molecular biology is an interdisciplinary field, primarily the study of macromolecular structure and of the replication and expression of the information in our hereditary material (DNA). Jacques Monod defined molecular biology as “the recognition that the essential properties of living beings could

be interpreted in terms of the structures of their macromolecules.”

Molecular biology is becoming increasingly recognized as a significant area of study, particularly for students interested in the rapidly emerging field of biotechnology. The course requirements for this program complement extant life science degree programs on campus. The certificate in the Molecular Biology Interdisciplinary Studies Program will provide recognition that the student has completed a body of coursework that provides both breadth and depth in this area. This program provides students with a strong, well-balanced background in the biological, physical, and mathematical sciences. It is ideally suited for undergraduates who wish to pursue advanced degrees in biochemistry, microbiology, molecular biology, or related life sciences; for pre-professional students in health related fields; and for students interested in employment in the biotechnology industry. The program includes study of macromolecular structure and function; cellular biochemistry; metabolism; gene expression, 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.

Course	Title (Prerequisite)	Cr	AUCC
Mathematics Core			
M CC 155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	2C
OR			
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
OR			
STCC 307/ EHCC 307	Introduction to Biostatistics (M/M CC 121)	3	2D
Physics Core			
10			
<i>Select one of the following pairs of courses:</i>			
PHCC 121	General Physics I (concurrent reg. in M/M CC 125)	5	3A
PHCC 122	General Physics II (PH/PHCC 121)	5	3A
OR			
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
Chemistry Core			
17			

Molecular, Cellular and Integrative Neurosciences Interdisciplinary Graduate Program

Office in Anatomy-Zoology Building, Room W 334
James R. Bamberg, Director

This interdisciplinary graduate research and education program has over 20 faculty participants from six departments in three 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>
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 (AY/BS 325 or AY/BS 500 or NB 501)	3
NB 586	Practicum-Techniques in Neuroscience II (NB 501 and NB 502)	1
NB 793	Neuroscience Seminar (2 semesters)	2
NB 795	Independent Study	Var.
NB 796A-C	Group Study (2 semesters)	2

Religious Interdisciplinary Studies Program

Office in Clark Building, Room C 138
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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
1.	Twenty-one credits, ordinarily seven courses, selected from approved courses in at least three disciplines.		
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 methods of studying and understanding religion are:		
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 from the following list:		
AP 312	Modern Indian Culture and Society (AP/APCC 100 or AP/APCC 200)	3	
AP 322	Religion and Society (AP/APCC 100 or AP/APCC 200)	3	
AP 324	Folk Religion	3	
AP 340	Medical Anthropology (AP/APCC 100)	3	
AP 539	Anthropology of Modernity	3	
AR 411	History of Medieval Art (AR 110)	3	
AR 496H	Group Study-Art History ¹	3	
E 160	Mythical and Biblical Backgrounds	3	
E 336	Goddess Religions	3	
E 337	Western Mythology	3	
E 460	Chaucer (E 160, E 341, and one other upper-division E prefix course)	3	
E 463	Milton (E 160, E 341, and one other upper-division E prefix course)	3	
ET 344	Native American Ceremony and the Sacred	3	
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	PL	371	Contemporary Eastern Religious Thought	3
HYCC	230	Medieval Europe	3	3D or 3E	PL	372	Meaning and Truth in Religion (PL 106 or PL 171 or PL 172 or PL 270)	3
HY	302	Ancient Near East	3		PL	375	Science and Religion (PL 106 or PL 171 or PL 172 or PL 270)	3
HY	310	Renaissance and Reformation Europe	3					
HY	335	Tokugawa and Modern Japan, 1600-Present (HY/HYCC 101 or HY/HYCC 151 or HY/HYCC 171 or HYCC 215 or HYCC 274/HYCC 220 or written consent of instructor)	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
HY	337	Ancient China (HY/HYCC 100 or HYCC 273/HYCC 120 or HY/HYCC 170)	3		PY	492	Seminar ³ (psychology majors or written consent of instructor)	3
					S	375	Sociology of Religion and Medicine (S/S CC 100 or S/S CC 105)	3
HY	339	Medieval China and Central Asia (HY/HYCC 100 or HYCC 115 or HYCC 273/HYCC 120 or HY/HYCC 170)	3					
HY	341	China in the Modern World, 1600-Present (HY/HYCC 101 or HY/HYCC 151 or HY/HYCC 171 or HY/HYCC 215 or HYCC 274/HYCC 220 or written consent of instructor)	3					
HY	344	Muhammad and the Origins of Islam (HY/HYCC 100 or HYCC 115 or HYCC 273/HYCC 120 or HY/HYCC 170 or HY/HYCC 230)	3					
HY	346	Crusades in the Near East (HY/HYCC 100 or HYCC 115 or HYCC 273/HYCC 120 or HY/HYCC 170 or HY/HYCC 230)	3					
HY	348	The Modern Middle East (HY/HYCC 101 or HY/HYCC 151 or HY/HYCC 171 or HYCC 215 or HY/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					

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

² Accepted only when designated selected religious themes.

³ Accepted only when designated "Psychology of Religion."

Russian, Eastern, and Central European 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 HY/HYCC 235)	3	
	HYCC	235	Slavic and East Central European Civilizations	3	3D or 3E
	PO	345	Russian, Central, and East European Politics (POCC 192D or PO/POCC 241)	3	
Elective Courses (12 credits minimum) No more than 9 credits can be taken from one department.					
	EC	370	Comparative Economic Systems (EC/ECCC 101 or EC/ECCC 202 or EA/EACC 202)	3	
	EC	376	Marxist Economic Thought (EC/ECCC 101 or EC/ECCC 202 or EA/EACC 202)	3	
	HY	319	Contemporary Europe	3	

HY	422	Habsburg Empire	3		WRCC 304	Principles of Watershed Management ²	3	3A
HY	423	Eastern Europe Since 1918	3			Elective	3	
HY	435	Germany Since World War I	3			TOTAL	21	
HY	440	Imperial Russia	3		ELECTIVE COURSES			
HY	442	The Soviet Union	3		AT 350	Introduction to Weather and Climate	2	
L		Any 200-level or above German course	3		BZ 315	Marine Ecology (BZ/BZCC 111 and BZ/BZCC 120 or BY/LS 103; C 245)	3	
L		Any 200-level or above Russian course	3		BZ 321	Aquatic Vascular Plants (BZ 223 or BZ 325 or written consent of instructor)	3	
L	450G	Selected Literary Movements and Periods-German (L/L CC 300G, L 310G)	3		CE 322/ EV 322	Basic Hydrology (CE 300 or CH 331 or ER/WR 416, ST/STCC 301 or ST/STCC 309 or CE 308; or written consent of instructor)	3	
L	454G	Topic Studies-German (L/L CC 300G, L 310G)	3		CE 413	Environmental River Mechanics (CE 300 or ER/WR 416)	3	
POCC	241	Comparative Government and Politics	3	3C or 3E	CE 423	Groundwater Engineering (CE 300 or CH 331 or ER/WR 416)	3	
PO	421	Modern Political Theories	3		CE 440	Nonpoint Source Pollution (one course in soil science, hydrology, or fluid mechanics)	3	
PO	437	American Security Policy	3		EA 340/ EC 340	Introduction to Economics of Natural Resources (EA/EACC 202 or EC/ECCC 202)	3	
Colloquia, seminars, independent study, group study, and study abroad courses as appropriate.					EA 346/ EC 346	Economics of Outdoor Recreation (EA/EACC 202 or EC/ECCC 202)	3	
					EA 375	Agricultural Law	3	
					GR 210	Physical Geography	3	
					PO 361	U.S. Environmental Politics and Policy (PO/POCC 101 or POCC 192A)	3	
					PY 316	Environmental Psychology (PY/PYCC 100)	3	
					S 320	Population-Natural Resources and Environment (S/S CC 100 or S/S CC 105)	3	
					SC 370	Irrigation Principles and Management (H/H CC 100 or SC 100, SC 240)	3	
					WR 416	Land Use Hydrology (SC 240, ST/STCC 201)	3	
					WR 417	Watershed Measurements (concurrent reg. in WR 416)	2	
					WR 418	Land Use and Water Quality (C/C CC 107, WR 416)	3	

Water Resources Interdisciplinary Studies Program

Office in University Services Center, Room 410 North
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/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
EA 342	Economic Analysis-Water Resource Development (EA/EACC 202 or EC/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/S CC 100 or S/S CC 105)	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 Program

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 fulfills 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 coursework to their own lives, helping them to make more informed choices about careers, education, relationships, and community participation.

The program's objectives are: to enable students to explore academic disciplines from a feminist perspective; to help develop an appreciation of the historic and contemporary contributions of women of all cultures; to explore the ideological assumptions regarding women implicit in social institutions; to create opportunities for all students to acquire 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 (2.00) or better in each course completed for undergraduate certification credit.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Core Courses (minimum of 15 credits required)			
E 330	Images of Women in Literature	3	
E 332	Modern Women Writers	3	
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 (PY/PYCC 100)	3	
S 333	Gender Roles in Society (S/S CC 100 or S/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 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.

¹ Required.

Graduate Program

The graduate-level certification in Women's Studies at Colorado State is for students who for professional and/or personal reasons wish to supplement their graduate programs of study. The program presumes a background in women's studies courses or their equivalent. Entering students should be able to demonstrate competency in the methodology and subject matter of an introduction to women's studies course and one upper-division women's studies course.

Students will complete 12 credit hours in women's studies courses and an independent study or thesis, and will participate in non-credit colloquia. Each participant's program of study will be approved by an advisory committee representing the Women's Studies Board.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>
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 Courses			
<ul style="list-style-type: none"> Students may select one or more graduate-level courses approved by the Women's Studies Advisory Board. A current list of suggested courses is available to students in the Office of Women's Programs and Studies. Students may select no more than one course from the upper-division Women's Studies undergraduate offerings as a supporting course. 			
		TOTAL	3-6
PROGRAM TOTAL = 12 credits			

¹ Required.

² Ordinarily interdisciplinary work in women's studies and the candidate's major discipline. The thesis is subject to Women's Studies Board oversight and is separate from departmental thesis/dissertation.

³ Colloquium meets twice a semester with faculty and students presenting on-going research and scholarship in women's studies.

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 Professional Bulletin*, and details are available from the program office.

Ecology

*Office in Natural and Environmental Sciences
Building, Rooms A 116, A 118
Daniel E. Binkley, 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.

OFFICE OF INTERNATIONAL PROGRAMS

*Office in Laurel Hall
Jerome Bookin-Weiner, Executive Director*

The mission of the Colorado State University Office of International Programs is to promote expansion of the world view of all its constituencies—Colorado State University students, faculty, staff, and the larger community—through programs, activities, and services that are carried out in an ethical, client-centered, focused, collaborative, innovative,

professional, and caring manner.

The office is organized into four functional units: [International Education](#); [International Research, Development, and Training](#); [International Student and Scholar Services](#); and [Study Abroad](#).

International Education

Office in Laurel Hall

Martha A. Denney, Director

Colorado State encourages students and faculty to gain knowledge for living and working in an increasingly internationalized and interdependent world. The Office of International Programs, through International Education, 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, interdisciplinary international area studies certificate programs, internships abroad, and ongoing campus programs that offer opportunities to learn about the world. International Education also coordinates linkages between Colorado State University and foreign institutions, and provides programming for international visitors. The Peace Corps Masters International Program and the Peace Corps representative on campus are 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](#). They may also enroll in 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 or IE 692) to provide an opportunity for discussion and for a comprehensive view of development issues. For specific program descriptions, please refer to the University Interdisciplinary Studies Programs in this section.

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 others 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 “real world” 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. Historically these projects were supported by the U.S. Agency for International Development, with other funding coming from multilateral banks and private foundations. 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. International Research, Development, and Training solicits funding for projects and

coordinates the many units that participate in their implementation.

Colorado State University also offers a variety of short courses and nondegree 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. Although short courses are not part of a formal degree program, many are available for academic credit.

More comprehensive nondegree training programs are offered through each of the eight colleges; the International Center for Agriculture and Resource Development; 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. Also offering short-term training opportunities are the Colorado Institute for Irrigation Management and the International Institute for Civil Engineering. For more information regarding short courses and nondegree training programs, contact the Office of International Programs.

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. Other support services such as pre-arrival information, on-campus orientation and various workshops, cross-cultural adjustment and advising information are included. 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.

Housing information: 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).

Transitions is an integrated series of programs and services for international students, scholars, and their families at Colorado State University. It is designed as a series of ongoing programs that address cultural adjustment needs, academic success, immigration requirements, health and wellness topics (including the mandatory health insurance and immunization requirement), 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. *Transitions* events include International Fest, the International Leadership Conference, Day in the Mountains (a unique one-day interactive cross-cultural seminar), and other cross-cultural experiences. *Transitions* also includes 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.

Study Abroad

*Office in Laurel Hall
Kara Bingham, Director*

Colorado State University encourages its students to incorporate study outside the United States to enhance their academic program, broaden their perspectives on international affairs, and increase their understanding of other cultures. Colorado State offers a variety of economical semester, academic year, and summer programs throughout the world for qualified students which are managed and administered by Study Abroad. Study Abroad also provides advising to students considering study abroad, and other support services such as pre-departure and returnee information, orientation, assistance with financial aid and credit transfer, and serves as a liaison to academic departments and other campus offices while the student is abroad.

All students considering study abroad are required to work with study abroad advisers in the Office of International Programs in preparation for their time abroad. Advance planning helps assure that study abroad programs will not prolong the period of time needed to get a degree. With approval, credit from study abroad may be applied towards a students' overall program. Deadlines for most programs are in October for the spring semester and March for the fall semester or summer. Students participating in any study abroad program, even those sponsored by another institution or organization, will register in the study abroad course (SACC 482V) and pay an administrative charge. Further information on deadlines, policies, financial aid, and costs related to study abroad may be found at <http://www.studyabroad.colostate.edu>.

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 Study Abroad office maintains information on many of these opportunities in the International Resource Center in the Office of International Programs, Laurel Hall.

Various competitive scholarships are available for international study, including NSEP, Gilman, and Rotary International fellowships. Students interested in scholarships should contact the Office of International Programs at least 18 months before planning to go abroad. The University also formally sponsors reciprocal exchange programs that offer economical study abroad opportunities.

DIVISION OF ARMED FORCES SERVICES

Reserve Officers' Training Corps (ROTC)

History

An Act of Congress dated July 2, 1862, provided for military science and tactics instruction in federal land-grant colleges. Such instruction has been given at Colorado State University since its establishment. In 1919, the Department of Military Science and Tactics of the institution was included in the Reserve Officers' Training Corps under the provisions of the First National Defense Act, July 3, 1916. The ROTC Vitalization Act of 1964 provides for a two-year ROTC program in addition to the traditional four-year program and authorizes ROTC scholarships.

General Information

The Army and Air Force four-year programs complement the four college years and include one summer encampment. Students satisfactorily completing Army or Air Force departmental requirements will be commissioned as second lieutenants in the Army or Air Force.

Additionally, each service offers a two-year program whereby a student may earn a commission after completing two years of ROTC training during the junior and senior undergraduate years or during a two-year graduate degree program. This program is designed for transfer students or students unable to take ROTC training during their freshman and sophomore years.

Each student entering the junior year (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 may 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 of 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, Room 204A
Colonel Mark Fry, 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 five-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 Dynamics of Military Operations	2	
MS 221		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/ HY 401	The American Military Experience	3	
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
Lieutenant Colonel Jackson Self, Professor of Military Science

Army ROTC

The Army ROTC program provides professional education and leadership training to those students who desire to serve our country as officers in the U.S. Army upon graduation. Successful completion of the program qualifies ROTC cadets for both a commission as a second lieutenant in the Army and an opportunity to serve at least three years on active duty or at least six years in the reserve component (Army Reserve or Army National Guard).

The successful ROTC cadet may choose one of 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 Dynamics of Military Operations	2	
MS 221	Basic Camp Leader Internship ^{1,2}	2	
MS 250	Independent Study	2-8	
MS 295	Credit awarded for prior military service ³	1-2 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	
MS 386	Advanced Camp Practicum ⁴ (MS 320) Independent Study	8	
MS 395	The American Military Experience	1-3	
MS 401/ HY 401		3	
MS 420	Role and Ethics of the Officer (MS 320, MS 401/HY 401) Seminar	3	
MS 492		2	

TOTAL 14

PROGRAM TOTAL = 22 credits

¹ Taken 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.

² Students 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.

³ Students may be given transfer credit for prior military service that can be applied to lower division credits.

⁴ Attendance 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 Program

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 E 203
Robert R. Keller, Director*

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 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 rather than academic acceleration and "hard" courses. Approximately 900 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 Core Curriculum is to provide an exceptional program of humanistic and scientific studies that incorporates breadth and perspectives, in-depth studies, and Honors elective courses. The integrated curriculum of interdisciplinary Honors seminars and Honors sections of regular courses develops successful habits of the mind and promotes life-long learning. The four Honors seminars begin with the first year seminar and culminate with the senior seminar and the senior thesis. These courses satisfy a large proportion 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.

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 by the Honors Program and during the colleges' commencement ceremonies, 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** in this catalog.

3. *Admission to the Program*

The application and selection process 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. 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. Honors students, especially first-year

students, are encouraged to take advantage of this special opportunity. Newsom Hall is home to the Honors office and Honors 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 study lounge is located across from the Honors Program office.

Honors Core Curriculum

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
HPCC 192	First Year Seminar (participation in University Honors Program)	4	1
HPCC 193	Seminar (HPCC 192, participation in University Honors Program)	3	2A
TOTAL		<u>7</u>	
SOPHOMORE			
Honors course ¹		<u>3</u>	
TOTAL		3	
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	
Honors course ²		<u>3</u>	
TOTAL		7	
SENIOR			
HPCC 492	Senior Seminar (HPCC 392, participation in University Honors Program)	3	3C
HP 499	Senior Honors Thesis (HP 399)	<u>3</u>	
TOTAL		6	
PROGRAM TOTAL = 23 credits³			

¹ Sophomore-level Honors course in the student's major, department, and/or college.

² Upper-division Honors course in the student's major, department, and/or college.

³ Students completing the Honors Core Curriculum will fulfill the All-University Core Curriculum (AUCC) core competency requirements in the following categories: 1 – First-Year Seminar; 2A – Written Communication; 2B1 – 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.

Grading and Scholastic Standards

GRADING

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.

<u>Grade</u>		<u>Grade points per credit</u>
A+		4.00
A	(Excellent)	4.00
A-		3.67
B+		3.33
B	(Good)	3.00
B-		2.67
C+		2.33
C	(Satisfactory)	2.00
C-		1.67
D+		1.33
D	(Poor, but passing)	1.00
D-		0.67
I	(Incomplete)	*
F	(Failure)	0.00
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 the 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 # 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 Appeals section.

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 code. If the request is received prior to or during the summer session when the

instructor(s) who assigned the grade or other faculty members 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 chairperson 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.

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. After successful completion of the makeup requirements, incomplete grades will be changed by the instructor of record or the department head, in the absence of the instructor of record. After one year or at the end of the semester in which the student graduates (whichever comes first), 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.

Students Called to Active Duty

Any student reservist called to active military duty may, upon presentation of a copy of her/his orders to the University's academic support services (northeast wing of Aylesworth Hall), 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 taking of an incomplete) that is most appropriate to that student's situation.

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 department head of record, or it will revert to a grade of F. University academic support services (northeast wing of Aylesworth Hall) and the Office of Records and Registration will assist students with any academic issues related to their active duty.

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 (Repeat/Delete) will be used in calculating the student's GPA, regardless of whether the repeated grade is higher, the same as, or lower than the initial grade received. The initial grade will remain on the transcript, but will not be used in calculating the GPA when the Repeat/Delete option is applied.
2. It is the student's responsibility to request the Repeat/Delete option from the Registrar, 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 nine (9) credit hours.
4. If a 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.

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 shall meet only at the times indicated on the final examination schedule.
5. Any exception of regulations 1, 3, or 4 above, e.g., special types of examinations which need more time or special locations to conduct, must be approved by the Assistant Registrar in Classroom Scheduling prior to the second week of class and announced in classes by the second week.
6. 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.
7. 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.

SCHOLASTIC STANDARDS

*University Academic Support Services
Offices in Aylesworth Hall, Northeast Wing
Paul Thayer, Executive Director*

Scholastic standards are mandated by the faculty through the University Scholastic Standards and Awards Committee. Procedures relative to scholastic standards are administered through the University's academic support services (northeast wing of Aylesworth Hall). Those students whose scholastic achievement is less than that required for graduation are placed on probation or dismissed from the University.

Policies on scholastic standards are within the purview of the faculty of Colorado State and may be changed at any time and for any reason. 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 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 2.00 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 a 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 to University academic support services (northeast wing of Aylesworth Hall) 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 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.

Registration and Student Records

*Office of Records and Registration
Administration Annex, Room 100*

REGISTRATION

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: <http://ramweb.colostate.edu>. 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 class schedule. Being prepared to register 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. 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 and some colleges.

Late Registration

A late registration charge of \$50 is assessed for adding the first course on or after the first day of classes or for late adds after the registration period.

Class Schedule

The class schedule, which is available to students prior to the beginning of registration, announces registration procedures and courses to be offered during a given term. Enrollment must conform to the courses listed in the class schedule or its official addendum.

Faculty Advisers

A faculty adviser provides students with pertinent information about a major and assists in planning a program of study. The faculty adviser is associated with a student's major department or field and is assigned by the department head or college dean.

Close cooperation and understanding between student and adviser is to a student's advantage. Therefore, students are

responsible for seeking out their advisers for aid in solving academic problems, especially before each registration.

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, 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 semester must have an overload approved by their adviser and major department head. Graduate students should consult the *Graduate and Professional Bulletin*. Approval of an overload for graduate students must be obtained from the department head and graduate dean.

Full-Time/Half-Time Enrollment Status

See information listed under [Student Records](#) in this section.

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.

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, 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 and 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 visitors.

Repeating a Course

Students may register for and complete a course more than once. However many times a course is taken, a course is only used once 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 Grading and Scholastic Standards section of this catalog.

Auditors

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 in the course 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.

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 or minor or for 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.)

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*](#).

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 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 [class schedule](#) for the deadlines for each course.

The drop period begins after the schedule change period and closes at the end of the eighth week of the term. During this period courses may be dropped and a W (withdrawal) will be recorded on the academic record. No drops may be made after this 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 Tuition, Fees, Expenses, and Adjustments section of this 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 but must contact University Academic Support Services (northeast wing of Aylesworth Hall). See also [Withdrawal from Colorado State](#) in this section.

Discontinuing a Class

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.

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, via telephone or Internet, or by other forms of communication) is expected.

When a student registers for an independent study (-94, -95) course, the instructor and the student shall specify in writing the requirements the student shall fulfill to complete the course, including due date, contact expectations, number of credits, and other pertinent information. Instructor, student, and department head shall sign this statement, and each shall 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.

STUDENT RECORDS

Administration Annex, Room 100

Transcripts

[Transcripts](#) of students' official academic records are maintained by and may be requested from the Office of Records and Registration.

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

Change of Address

Each student is required to maintain a current mailing address with the University. To change the mailing address on file, log onto RAMweb at <http://ramweb.colostate.edu>.

Full-Time/Half-Time Enrollment Status

Enrollment status (full-time, half-time) is determined by the number of credits which the student has completed or is pursuing for the term in which the certification is requested. Courses from which the student has withdrawn or is auditing are not included. (The following schedule for enrollment status differs from the full-time/part-time schedule for tuition and fees. See [Tuition, Fees, Expenses, and Adjustments](#) section of this catalog.) 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

Contact the Office of Records and Registration for certification of enrollment status, level (class), grade average, and term(s) of attendance.

Change of Undergraduate Major

Any undergraduate student regularly enrolled in the University may transfer from one major to another, exclusive of those majors that have admission requirements (controlled majors).

Students wishing to transfer from one noncontrolled major to another can obtain information about the transfer process and a change of major form from the Office of Records and Registration. All changes of major are processed through this office.

Information and help with choosing a major, including reviewing the admission requirements for controlled majors can be obtained from University academic support services (northeast wing of Aylesworth Hall).

Withdrawal from Colorado State

University withdrawal (to drop *all* courses and leave the University) is different from dropping one or more classes. If the first day of the semester has not yet begun, students may cancel their course schedule on the web registration system without any charge. Once classes have started, students who are planning to drop all courses and leave the University for any reason during a term *must* contact University academic support services (491-7095, northeast wing of Aylesworth Hall) prior to their departure. 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.

Retroactive Withdrawal

A student may request that all grades in an academic period (one or more semesters of continuous enrollment) be retroactively removed and be replaced by entries of W on his/her transcript. A retroactive withdrawal may be granted only when a student has experienced circumstances or an incident of such trauma and major proportions that reasonably he/she could not have been expected to have possessed normal capabilities necessary to complete the academic period satisfactorily. The student must submit a written request with supporting documentation for the retroactive withdrawal to University academic support services (491-7095, northeast wing of Aylesworth Hall).

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.

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, [International Programs, Study Abroad](#), in the University-Wide Instructional Programs section of this catalog.

Community College Cooperative Registration Agreements

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 at:

<i>Aims Community</i>	<i>Colorado State</i>
Fall quarter	Fall semester
Winter or spring quarter	Spring semester
Summer quarter	Summer session

Credit Load - For the above corresponding terms, Colorado State students must be registered for 12 credits 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. 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, 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 or quarter the course is to be taken.
6. The request is presented any term except graduation quarter or 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 or the Office of the Dean of the Graduate School.

All-University Core Curriculum

Office of Vice Provost for Undergraduate Studies
Administration Building, Room 108

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. First Year Seminar	2-3
2. Core Competencies	
A. Written Communication ¹	3
B. Additional Communication	3
C. Mathematics ¹	3
D. Logical/Critical Thinking	3
3. Foundations and Perspectives	
A. Biological/Physical Sciences (At least one course will have an associated lab)	7
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 a group of courses used to satisfy 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. First Year Seminar

The objective of the First Year Seminar requirement is to engage students intellectually through rigorous academic study in small-class or group settings and to connect them to faculty, other students, and Colorado State University.

The following courses are offered in a first year seminar format:¹

A CC	192A-B	Orientation to Agricultural Systems	3
APCC	192A	Cultures of the World ²	3
APCC	192B	Humans in Prehistory ³	3
BCC	192	Biochemistry Freshman Seminar	2
BGCC	192	First Year Seminar in Business	3
BSCC	192	First Year Seminar in Biomedical Sciences	2
BZCC	192	First-Year Seminar in Life Sciences	2
C CC	192	Introductory Seminar in Chemistry	2
CECC	192	Civil Engineering Principles II	3
CHCC	192	Strategies of Engineering Design	3
CSCC	192	First Year Seminar in Computer Science	2
EDCC	192	Learning and Community	3
ECC	192	Electrical Engineering Fundamentals	3
F CC	192	Forestry Inquiries	2
FWCC	192	Wildlife Inquiries	2
G CC	192	First Year Seminar in Geosciences	2
HPCC	192	First Year Seminar	4
HSCC	192	Applied Human Sciences First Year Seminar	2
IUCC	192	The Individual, University, and Society	3
JTCC	192	Journalistic Writing	3
KACC	192	Key Academic Community Seminar	3
L CC	192	Modern Languages/Cultures: Italian and Japanese ⁴	3
LBCC	192	College of Liberal Arts First Year Seminar	3
M CC	192	First Year Seminar in Mathematical Sciences ⁵	1
MBCC	192	Microbiology First Year Seminar	2
MECC	192	Introduction to Mechanical Engineering	2
MUCC	192	Introduction to Music History and Literature ⁶	3
NRCC	192	First Year Seminar in Environmental Studies	2
NSCC	192	Introductory Seminar	2
PHCC	192	The Flying Circus of Physics	2

PLCC 192	Conceptions of the Good Life	3
POCC 192A	Seminar-U.S. National Government and Politics ⁷	3
POCC 192B	Seminar-State and Local Government and Politics ⁷	3
POCC 192C	Seminar-International Relations ⁸	3
POCC 192D	Seminar-Comparative Government and Politics ⁹	3
PYCC 192	Introductory Seminar	3
S CC 192	Civic Culture and Social Responsibility	3
SCCC 192	Water in the West	3
SPCC 192	Introduction to Intercultural Communication ⁴	3
STCC 192	First-Year Seminar in Mathematical Sciences ⁵	1
THCC 192	From Page to Stage: Freshman Theatre Seminar	3

¹ Other courses have been approved as first year seminars, but are currently not being taught in that format (identified by the __CC 192 designation).

² Also listed in category 3C. Course can count for both categories.

³ Also listed in category 3D. Course can count for both categories.

⁴ Also listed in category 3E. Course can count for both categories.

⁵ Both M CC 192 and STCC 192 must be taken to fulfill the first-year seminar requirement.

⁶ Also listed in category 3B. Course can count for both categories.

⁷ Must be counted in category 1. May also count for category 3C or category 3F, but not both.

⁸ Must be counted in category 1. May also count for category 3C or category 3D, but not both.

⁹ Must be counted in category 1. May also count for category 3C or category 3E, but not both.

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. 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. 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 2D. 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.

Between Fall Semester 2000 and Fall Semester 2005, students may satisfy this option if they take and complete 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 procedure.

C. 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.

D. 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 2B2. 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 130	Earth System Science ^{2,3}	3
G CC 140	Physical Geology ²	4
H CC 100	Horticultural Science	4
LSCC 102	Attributes of Living Systems	4
LSCC 201A-B	Introductory Genetics	3

NRCC 130	Global Environmental Systems ³	3
NSCC 101	Phenomena of Matter and Energy	4
NSCC 102	Phenomena of Life	4
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.

² Credit not allowed for both G CC 130 and G CC 140.

³ 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 ¹	3
E CC 232	Introduction to Humanities	3
E CC 238	20th Century Fiction ²	3
E CC 242	Reading Shakespeare	3
E CC 245	World Drama ²	3
E CC 270	Introduction to American Literature ³	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 ²	3
ETCC 240	Native American Cultural Expressions	3
ETCC 256	Americans in a Changing World ²	3
HPCC 392	Seminar ⁴	3
L CC 250	Language, Literature, Culture in Translation ²	3
MUCC 100	Music Appreciation	3
MUCC 111	Music Theory Fundamentals	3
MUCC 192	Introduction to Music History and Literature ⁵	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 Course is also approved in category 1 and can count for both categories if it is taught as a first-year seminar (CC 192 designation). This course is currently not being offered as a first-year seminar.

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

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

⁴ Also listed in category 3F. Course may count in both categories.

⁵ Also listed in category 1. 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
APCC 192A	Cultures of the World ¹	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 ²	3
POCC 101	American Government and Politics ²	3
POCC 103	State and Local Government and Politics ²	3
POCC 192A	Seminar-U.S. National Government and Politics ³	3
POCC 192B	Seminar-State and Local Government and Politics ³	3
POCC 192C	Seminar-International Relations ⁴	3
POCC 192D	Seminar-Comparative Government and Politics ⁵	3
POCC 232	International Relations ⁶	3
POCC 241	Comparative Government and Politics ⁷	3
PYCC 100	General Psychology	3
S CC 100	General Sociology ²	3
S CC 105	Social Problems ²	3
SWCC 110	Contemporary Social Welfare	3

¹ Course is also approved in category 1 and can count for both categories.

² Also listed in category 3F. Course may count for both categories.

³ Also listed in category 1 and category 3F. Must count for category 1, may count for 3C or 3F, but not both.

⁴ Also listed in category 1 and category 3D. Must count for category 1, may count for 3C or 3D, but not both.

⁵ Also listed in category 1 and category 3E. Must count for category 1, may count for 3C or 3E, but not both.

⁶ Also listed in category 3D. Course may count in one category or the other, but not both.

⁷ 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
APCC 192B	Humans in Prehistory ¹	3
AUCC 100	Self/Community in American Culture, 1600-1877	3
AUCC 101	Self/Community in American Culture Since 1877 ²	3
E CC 270	Introduction to American Literature ³	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 ⁴	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 ⁴	3
HYCC 120	Asian Civilizations I ⁴	3
HYCC 150	U.S. History to 1876 ²	3
HYCC 151	U.S. History Since 1876 ²	3
HYCC 170	World History, Ancient-1500	3
HYCC 171	World History, 1500-Present	3
HYCC 215	Islamic World Since 1500 ⁴	3
HYCC 220	Asian Civilizations II ⁴	3
HYCC 230	Medieval Europe ⁴	3
HYCC 235	Slavic and East Central European Civilizations ⁴	3
HYCC 238	Latin America Since 1500 ⁴	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 ²	3
PLCC 120	History and Philosophy of Scientific Thought	3
POCC 131	Current World Problems ⁴	3
POCC 192C	Seminar-International Relations ⁵	3
POCC 232	International Relations ⁶	3

¹ Course is also approved in category 1 and can count for both categories.

² Also listed in category 3F. Course may count for both categories.

³ Also listed in category 3B. 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.

⁵ Also listed in category 1 and category 3C. Must count for category 1. May also count for 3D or 3C, but not both.

⁶ 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.

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 270A	World Interdependence-Population and Food	3
L CC 192	Modern Languages/Cultures: Italian and Japanese ³	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	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 192D	Seminar-Comparative Government and Politics ⁴	3
POCC 241	Comparative Government and Politics ⁵	3
S CC 205	Contemporary Race-Ethnic Relations	3
SACC 482V	Study Abroad	3
SPCC 192	Introduction to Intercultural Communication ³	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 Course is also listed in category 1 and may count for both categories.

⁴ Also listed in category 1 and category 3C. Must count in category 1, may count for 3E or 3C, but not both.

⁵ Also listed in category 3C. Course may count in one category or the other, but not both.

F. U.S. Public Values and Institutions.¹ 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 ²	3
BGCC 205	Fundamentals of Business Law	3
BGCC 260	Legal Environment of 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 200	Ethnicity in America	3
ETCC 204	Ethnicity in Colorado	3
HPCC 392	Seminar ³	3
HYCC 150	U.S. History to 1876 ²	3
HYCC 151	U.S. History Since 1876 ²	3
JTCC 100	Introduction to Mass Media ⁴	3
NRCC 320	Natural Resources History and Policy ²	3
PLCC 103	Moral and Social Problems	3
POCC 101	American Government and Politics ⁴	3
POCC 103	State and Local Government and Politics ⁴	3
POCC 192A	Seminar-American Government and Politics ⁵	3
POCC 192B	Seminar-State and Local Government and Politics ⁵	3
S CC 100	General Sociology ⁴	3
S CC 105	Social Problems ⁴	3

¹ With the exception of POCC 192A and POCC 192B, if a course taken to satisfy the U.S. Public Values and Institutions requirement will also fulfill another Core requirement, the one course can be used to satisfy both requirements; that is, the course can be “double counted.”

² Also listed in category 3D.

³ Also listed in category 3B.

⁴ Also listed in category 3C.

⁵ Also listed in category 1 and category 3C. Must count for category 1, may count for 3F or 3C, but not both.

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).

Students (except first semester transfer and readmitted students) who have earned 60 or more Colorado State and transfer semester credits and who have not met this requirement may enroll only in the course necessary to fulfill this requirement. Transfer and readmitted students 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 cosigned by the student’s academic adviser. The

appeal must be presented to the Director of the Composition program (or designee) for final approval.

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 2C 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-algebra and algebra, logarithmic and exponential functions, and trigonometry. All entering freshmen are required to take the MPE, unless they can satisfy point 2) 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 120A-B, M CC 121, M CC 124, M CC 125, and M CC 126. A student who displays higher proficiency may earn credit in one or more of those courses. Only earned credits count toward the three-credit University mathematics requirement.

Students (except first semester transfer and readmitted students) who have earned 60 or more Colorado State and transfer semester credits and who have not completed the requirements of category 2C of the All University Core Curriculum may enroll only in the course(s) necessary to fulfill this requirement. Transfer and readmitted students will be allowed the initial term of full-time enrollment before this restriction is imposed.

Graduation Requirements

*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 House Bill 01-1263) 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 University's academic support services area (northeast wing of 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 in programs of study based on the [All-University Core Curriculum](#).

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 section.)

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.

Major Requirements

The student wishing to graduate must complete the requirements for a major and the [All-University Core Curriculum](#) (see that section). 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 a student's diploma and academic record. Students may also elect to complete concurrently the requirements for a second major.

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 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 is issued which displays both majors, and both are recorded on the student's academic record.

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

Concentration Requirements

Some majors have concentrations (or specialization areas). A concentration is a sequence of at least 12 semester credits of designated courses within a major designed to accommodate specific interests of students. Completion of a concentration is shown on a student's academic record.

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.

Minor Requirements

Students may elect to pursue a minor program of study in addition to the requirements for a major. Minor programs of study are optional and are offered only at the undergraduate level. A minor program of study consists of a minimum of 21 semester credits of required course work outside the academic discipline which constitutes the student's program of study (major). Students may take minors in their department which are outside their 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.

A list of currently available minors can be found in the [Degree Programs](#) section of this publication.

At least one full term before the graduation term, students declaring minors must contact the Office of Records and Registration to make official declarations and obtain required departmental approvals. Once approval has been obtained, students deciding not to complete minors must drop them officially through the Office of Records and Registration.

Students must file an intent-to-graduate and a contract for graduation in the Degree and Transfer Evaluation Office for each minor program of study. Minors must be completed the term of graduation. Completion of a minor is shown on the student's academic record, but not on the diploma.

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).

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

Changes in Undergraduate Curriculum Requirements

Students who enter 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 of 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 substitutions of equivalent courses or waivers are for good and sufficient academic reasons rests with the Provost/Academic Vice President.

Course Restrictions

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](#) above.) Courses at the 600 level are automatically excluded from use for an undergraduate degree.

A written request must be filed with 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.

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 scholastic 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.

NONTRADITIONAL CREDIT POLICIES

The evaluation of nontraditional credit is done only after a student has been accepted for admission to Colorado State.

College-Level Courses Completed by High School Students

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

1. The college or university must be fully accredited by one of the six regional associations of schools and colleges. 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, 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, C 81 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 composition 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). Beginning July 1, 2001, students scoring 50 or higher on a computer-based

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-level prerequisite. 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.

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 and higher. The website, www.registrar.colostate.edu and the “Transfer Office” link, lists the courses for which credit will be granted.

Challenging Colorado State Courses for Credit

Whenever feasible, the opportunity to challenge the content of a course on the basis of an examination is 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 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 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.

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.

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.

Time Limitation on Credit Earned Toward a Bachelor’s Degree

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.

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.

These requirements do not alter the University graduation credit requirement and the senior year credit requirement.

Transfer Credit from Noncollegiate Institutions

Colorado State will award transfer credit for academic work done under the sponsorship of noncollegiate 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.

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 in Undergraduate Curriculum Requirements](#) in this section).

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.

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.

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.

Financial Indebtedness

See [Payment of Student Accounts](#) under Tuition, Fees, Expenses, and Adjustments section of this catalog.

Commencement

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 a few 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. Distinction designations are determined according to the following criteria:

1. “Summa Cum Laude” - Top one percent of graduates in each college;
“Magna Cum Laude” - Next three percent of graduates in each college;
“Cum Laude” - Next six percent of graduates in each college.
2. The grade point average minimums used to determine each category are established after graduation, based on the cumulative grade point average at the time of graduation. At the end of the spring and fall semester, the minimums for each category in each college are established, using the actual number of students graduating in this term. The grade point averages, as established for the spring semester, will also apply to students who graduate at the end of the summer session. Graduation with distinction is indicated on the diploma and the transcript of the student.
3. Candidates for graduation with distinction are recognized at the time of commencement. The grade point average minimums used to determine candidacy status for each category are established each spring semester based on the cumulative grade point average through the preceding

fall semester of the spring graduating class for each college. The same grade point averages are also used to determine candidacy for the following summer. Candidacy for graduation with distinction does not guarantee graduation with distinction, which is based on the percentage as established at the time of graduation.

4. To qualify for candidacy for graduation with distinction, a minimum of 45 semester credits completed at Colorado State is required prior to the graduation term. To qualify for graduation with distinction, a minimum of 60 credits completed at Colorado State is required. Students who have been granted Fresh Start must have 45 credits to qualify for candidacy and 60 credits to qualify for graduation with distinction completed *after* the Fresh Start designation.
5. Transfer credits are not considered when determining candidacy for graduation with distinction or graduation with distinction.
6. Students seeking a second bachelor’s degree are eligible for distinction designation. To qualify for candidacy for graduation with distinction, a minimum of 45 semester credits completed at Colorado State is required after completion of the first degree and prior to the graduation term for the second degree. 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, and the Honors Scholar designation appears on their diplomas and transcripts.

For information about admission to the [University Honors Program](#), visit or contact the Honors Program Office, E203 Newsom Hall, Fort Collins, Colorado 80523-1025 (970)491-5679 or visit online at www.honors.colostate.edu.

COLORADO STATE UNIVERSITY HONOR SOCIETIES

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 departments or see www.provost.colostate.edu/index.asp?url=honorcsu.

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*
Omicron Delta Epsilon – *Economics*
Phi Alpha Theta – *History*
Pi Sigma Alpha – *Political Science*

Natural Resources

Xi Sigma Pi

Natural Resources

Psi Chi – *Psychology*
Sigma Pi Sigma – *Physics*

Veterinary Medicine and Biomedical Sciences

Phi Zeta – *Veterinary Medicine*

Degree Programs

UNIVERSITY OPEN OPTION

University Open Option is a recognized category of registration at Colorado State University for students who are exploring which major they want to pursue. Students choosing to be University Open Option frequently have a rich and diverse set of interests. Through the University Open Option program, students are able to learn about various academic opportunities while keeping their academic major options open as they begin their college experience.

Full-time, professional academic advisers in University Academic Support Services (northeast wing of Aylesworth Hall) assist students in the major selection process. Students are advised to choose courses that meet general requirements as well as provide more information about potential majors. Students should declare a major by the time they earn 45 credits.

UNDERGRADUATE DEGREES

The following is a list of majors offered by Colorado State University. Many of the majors include concentrations and many departments also have minor programs of study. For information on requirements for undergraduate degrees, see [Undergraduate Degree Requirements](#), [Graduation Requirements](#), and college and department sections of this catalog.

Bachelor of Arts (B.A.)

Anthropology
Art
Economics
English
History
*Languages, Literatures,
and Cultures*
Liberal Arts

Music
Performing Arts
Philosophy
Political Science
Social Work
Sociology
Speech Communication
Technical Journalism

Bachelor of Fine Arts (B.F.A.)

Art

Bachelor of Music (B.M.)

Music

Bachelor of Science (B.S.)

Agricultural Business
Agricultural Economics
Agricultural Education
Animal Science
Apparel and Merchandising
Biochemistry
Biological Science
*Bioresource and
Agricultural Engineering*
Botany
Business Administration
Chemical Engineering
Chemistry
Civil Engineering
Computer Engineering
Computer Science
Construction Management
*Consumer and Family
Studies*
Electrical Engineering
Engineering Science
Environmental Engineering
Environmental Health
Equine Science
Fishery Biology
Forestry
Geology

Health and Exercise Science
Horticulture
*Human Development and
Family Studies*
Interior Design
Landscape Architecture
Landscape Horticulture
Mathematics
Mechanical Engineering
Microbiology
*Natural Resource Recreation
and Tourism*
*Natural Resources
Management*
Natural Sciences
Nutrition and Food Science
Physics
Psychology
Rangeland Ecology
*Restaurant and Resort
Management*
Soil and Crop Sciences
*Technology Education and
Training*
Watershed Science
Wildlife Biology
Zoology

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.

Academic Degrees

Master of Arts (M.A.)

Anthropology
Economics
English
History
*Languages, Literatures
and Cultures*

Philosophy
Political Science
Sociology
Speech Communication

Master of Science (M.S.)

*Agricultural and Resource
Economics*
Animal Sciences

Horticulture
*Human Development and
Family Studies*

<i>Atmospheric Science</i>	<i>Manufacturing Technology and Construction Management</i>
<i>Biochemistry</i>	<i>Mathematics</i>
<i>Biomedical Science</i>	<i>Mechanical Engineering</i>
<i>Bioresource and Agricultural Engineering</i>	<i>Microbiology</i>
<i>Botany</i>	<i>Occupational Therapy</i>
<i>Business Administration</i>	<i>Physics</i>
<i>Cell and Molecular Biology</i>	<i>Plant Pathology and Weed Science</i>
<i>Chemical Engineering</i>	<i>Psychology</i>
<i>Chemistry</i>	<i>Radiological Health Sciences</i>
<i>Civil Engineering</i>	<i>Rangeland Ecosystem Science</i>
<i>Clinical Sciences</i>	<i>Recreation Resources</i>
<i>Computer Science</i>	<i>Soil and Crop Sciences</i>
<i>Design and Merchandising</i>	<i>Statistics</i>
<i>Ecology</i>	<i>Student Affairs in Higher Education</i>
<i>Electrical Engineering</i>	<i>Technical Communication</i>
<i>Entomology</i>	<i>Watershed Science</i>
<i>Environmental Health</i>	<i>Zoology</i>
<i>Fishery and Wildlife Biology</i>	
<i>Food Science and Nutrition</i>	
<i>Forest Sciences</i>	
<i>Geosciences</i>	
<i>Health and Exercise Science</i>	

Doctor of Philosophy (Ph.D.)

<i>Agricultural and Resource Economics</i>	<i>Fishery and Wildlife Biology</i>
<i>Animal Sciences</i>	<i>Food Science and Nutrition</i>
<i>Atmospheric Science</i>	<i>Forest Sciences</i>
<i>Biochemistry</i>	<i>Horticulture</i>
<i>Biomedical Sciences</i>	<i>Mathematics</i>
<i>Bioresource and Agricultural Engineering</i>	<i>Mechanical Engineering</i>
<i>Botany</i>	<i>Microbiology</i>
<i>Cell and Molecular Biology</i>	<i>Pathology</i>
<i>Chemical Engineering</i>	<i>Physics</i>
<i>Chemistry</i>	<i>Plant Pathology and Weed Science</i>
<i>Civil Engineering</i>	<i>Political Science</i>
<i>Clinical Sciences</i>	<i>Psychology</i>
<i>Computer Science</i>	<i>Radiological Health Sciences</i>
<i>Earth Resources</i>	<i>Rangeland Ecosystem Science</i>
<i>Ecology</i>	<i>Recreation Resources</i>
<i>Economics</i>	<i>Sociology</i>
<i>Education and Human Resource Studies</i>	<i>Soil and Crop Sciences</i>
<i>Electrical Engineering</i>	<i>Statistics</i>
<i>Entomology</i>	<i>Zoology</i>
<i>Environmental Health</i>	

Professional Degrees

Doctor of Veterinary Medicine (D.V.M.) ¹
Master of Agriculture (M.Agr.)
<i>Agricultural Sciences</i>
Master of Business Administration (M.B.A.)
<i>Business Administration</i>
Master of Computer Science (M.C.S.)
<i>Computer Science</i>
Master of Education (M.Ed.)
<i>Education and Human Resource Studies</i>
Master of Engineering (M.E.)
<i>Engineering</i>
Master of Fine Arts (M.F.A.)
<i>Art</i>
<i>Creative Writing</i>
Master of Forestry (M.F.)
<i>Forest Sciences</i>
Master of Music (M.M.)
<i>Music</i>
Master of Social Work (M.S.W.)
<i>Social Work</i>

¹Requirements for the D.V.M. degree are listed in the *Graduate and Professional Bulletin*.

UNDERGRADUATE MINORS

The minors in aerospace studies and military science are described in the University-Wide Instructional Programs section of this catalog. Descriptions of the other minor programs are found in the respective college sections.

All-University

Aerospace Studies
Military Science

College of Agricultural Sciences

Agricultural and Resource Economics
Entomology
Horticulture
Landscape Horticulture
Plant Health
Soil Resources and Conservation

College of Applied Human Sciences

Coaching
Construction Management
Merchandising
Nutrition

College of Business

None

College of Engineering

Environmental Engineering

College of Liberal Arts

Anthropology
Art History
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

College of Natural Resources

Fishery Biology
Forestry
Geology
Range Ecology
Spatial Information Management
Watershed Science
Wilderness Management

College of Natural Sciences

Biochemistry
Botany
Chemistry
Computer Science
Mathematics
Physics
Statistics
Zoology

College of Veterinary Medicine and Biomedical Sciences

Biomedical Sciences
Microbiology

College of Agricultural Sciences

*Office in Shepardson Building, Room 121
Professor Marc A. Johnson, Dean
Professor S. Lee Gray, Acting Associate Dean*

UNDERGRADUATE MAJORS

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

UNDERGRADUATE MINORS

*Agricultural and Resource Economics
Entomology
Horticulture
Landscape Horticulture
Plant Health
Soil Resources and Conservation*

Agriculture was the first science . . . the progenitor of sciences . . . and it remains the science that makes human life possible. 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, and reinforce these with courses in the arts and humanities, to prepare students for a variety of careers. 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 positions.

The college, recognizing the computer's ever-increasing importance in agriculture, provides instruction in computer-oriented agriculture through a variety of offerings.

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 should consider simultaneously completing the requirements for a second major. See **Second Major Requirements** in the Graduation Requirements section of this catalog for a complete description of the program.

Open Option Students

Freshman students planning on an agriculturally related career but uncertain about a specific major should indicate that they wish to be classified as Agricultural Sciences Open Option on their application form. Open Option students will be given special attention and provided with an opportunity to explore many areas during their first semester. They will be assigned special advisers with particular expertise in assisting students in career exploration. Once a major is decided upon, the student can conveniently transfer out of the Open Option program into their new major.

Extension Emphasis

Although some careers with Cooperative Extension require specialized preparation in a particular agricultural specialty, some extension agent positions require a broad base in production agriculture. The majority of the Cooperative Extension positions require an advanced degree. Questions on academic programs that address Cooperative Extension should be directed to the Dean's Office, College of Agricultural Sciences.

International Agriculture Emphasis

Because the United States is the world's leading food producing and exporting nation, many countries look to us for agricultural expertise. The increasing importance of international trade, world population growth, shifts in living standards, and transfer of agricultural technology add to the dimensions of a career in international agriculture. Students interested in preparing for careers abroad in governmental agencies, including the Peace Corps, or with private firms may do so under most majors in the college. Students should ask their advisers about courses needed for such preparation. Also, general information about preparation for international careers may be obtained by contacting the Associate Dean, College of Agricultural Sciences, 121 Shepardson Building.

Career Internships

Students in certain majors may select a career internship with permission of their department heads and approval of a cooperator. The number of allowable credits is determined by the student's department. Some internships are available each term with a larger number available during the summer term. Internships normally require a minimum of 10 weeks, and a stipend may be provided. Application must 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 strongly encouraged to take a semester or longer to study outside the United States as part of their overall program at Colorado State University. Students interested in study abroad should plan, far in advance, by discussing opportunities with their academic adviser and by visiting the [Office of International Education](http://www.international.colostate.edu/us/studyabroad) in Laurel Hall (<http://www.international.colostate.edu/us/studyabroad>).

Transfer of Credits from Other Institutions

The college makes every effort to accept properly prepared transfer students from other institutions without credit loss. Agricultural courses from land-grant colleges and universities may be transferred at full credit. Credit from out-of-state institutions, other than land-grant, is normally accepted as it would be by the land-grant institution in that state.

Students planning to continue in two-year colleges beyond the freshman year should work closely with their college advisers for curriculum guidance. Attention should be given to the requirements of the student's proposed major. For additional information, contact the Associate Dean of Agricultural Sciences.

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

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. There are two concentrations in the

major—**agricultural education** and **agricultural extension education**.

Characteristics and Skills

- Passion for working in the field of agriculture
- Enjoy working with youth and adults
- Capability to inspire trust and confidence
- Ability to motivate others for peak performance
- Enjoy guiding activities of others
- Work effectively with individuals and groups
- Enjoy planning and organizing courses of study
- Desire to understand emotional and educational needs of students
- Strong ability to communicate clearly
- Ability to maintain order, resolve differences, anticipate and prevent problems
- Aptitude for gathering information, organizing and presenting it in a manner that holds attention
- Ability to adapt and present information to different learning styles
- Ability to accurately assess progress of individuals and programs

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. Within Cooperative Extension, there are opportunities in local, state, and federal agencies for 4-H youth specialists, resource managers, and extension agents. Participation in internships and cooperative education opportunities 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 representative; agriservice representative; Cooperative Extension agent; education specialist; 4-H association youth specialist; youth development specialist; science teacher.

Agricultural Education Concentration

*College of Agricultural Sciences
Interim Dean Jim Heird, Coordinator
Office in Shepardson Building, Room 121*

The agricultural education concentration 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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A CC 192A-B	Orientation to Agricultural Systems	2	1
AN 100	Animal Sciences	3	
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.)	1	3A
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
<i>Select three credits from the following</i>			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
OR			
M CC 130	Math in the Social Sciences (Math Placement Exam)	3	2C
OR			
M CC 133	Financial Mathematics (Math Placement Exam)	3	2C
PLCC 110	Logic and Critical Thinking	3	2D
SC 100	General Crops	4	
	Historical perspectives ¹	3	3D
	TOTAL	<u>29</u>	
SOPHOMORE			
A 244E	Topics in Agricultural Mechanics-Small Gas Engines	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/C CC 107 or C/C CC 111)	4	
SPCC 200	Public Speaking	3	2B1
	Agriculture electives	6	
	Arts/humanities ²	3	3B
	Global and cultural awareness ³	3	3E
	TOTAL	<u>32</u>	

JUNIOR			
AN 250	Live Animal and Carcass Evaluation	3	
EA 205	Farm and Ranch Management (EA/EACC 202 or EC/ECCC 202)	3	
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
ED 340	Literacy and the Learner (completion of 30 credits of course work; consent of Teacher Licensure Office)	3	
ED 350	Instruction I- Individualization/Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (ED 310/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	
	Agriculture electives	8	
	TOTAL	<u>31</u>	

SENIOR			
EA 308	Agricultural Finance (EA/EACC 202 or EC/ECCC 202)	3	
OR			
EA 310	Agricultural Marketing (EA/EACC 202 or EC/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 450, VE 426, concurrent reg. in ED 485A or B or C or VE 485)	1	4B
OR			
A 330/ PL 330 PL 305E	Agricultural Ethics	3	
OR			
VE 425	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 = 122 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.

Agricultural Extension Education Concentration

*Associate Professor Glen Rask, Coordinator
Office in Shepardson Building, Room 124A*

Agricultural extension education emphasizes preparation for careers in the Cooperative Extension System, which includes working with 4-H youth, agricultural production and economic efficiency, and adult volunteer and leadership development. The curriculum in this concentration is broad based, balancing course work in technical agriculture, professional, general and adult education, journalism, and human development. This program provides students with excellent preparation for graduate studies as well.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A CC	192A-B Orientation to Agricultural Systems	2	1
AN	100 Animal Sciences	3	
<i>Select one pair from the following:</i>			
BZCC	104 Basic Concepts of Plant Life	3	3A
BZCC	105 Basic Concepts of Plant Life Laboratory (BZ/BZCC 104 or concurrent reg.)	1	3A
OR			
BZCC	110 Principles of Animal Biology	3	3A
BZCC	111 Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.)	1	3A
COCC	150 College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
JTCC	100 Introduction to Mass Media	3	3C, 3F
<i>Select three credits from the following courses:</i>			
M CC	120A-B College Algebra I (Math Placement Exam)	1	2C
M CC	121 College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC	124 Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
OR			
M CC	133 Financial Mathematics (Math Placement Exam)	3	2C
PYCC	100 General Psychology	3	3C
SC	100 General Crops	4	
	Electives	7	
TOTAL			32

SOPHOMORE

A	140	Technology in Agriculture	3	
C CC	107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC	108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
EACC	202	Agricultural and Resource Economics	3	3C
H CC	100	Horticultural Science (high school biology)	4	3A
JTCC	300	Professional and Technical Communication (CO/COCC 150)	3	2B2
OR				
SPCC	200	Public Speaking	3	2B1
PLCC	110	Logic and Critical Thinking	3	2D
OR				
STCC	201	General Statistics (M/M CC 120A-B)	3	2D
SC	240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
		Arts/humanities ¹	3	3B
		Health and wellness ²	2	3G
TOTAL			30	

JUNIOR

A CC	270/IECC 270A	World Interdependence-Population and Food	3	3E
A	300	Issues in Agriculture	2	
A	320F	Computer Applications in Agriculture-Presentation Technology (A 140 or BD 150 or CS 110)	1	
A	346	Principles of Cooperative Extension	3	
AN	286	Livestock Practicum (AN 100 or concurrent reg.)	2	
AN	300T	Topics in Animal Sciences-Event, Fair, and Show Management (AN 100)	1	
HDCC	101	Individual and Family Development	3	3C
		Historical perspectives ³	3	3D
		Electives	12	
TOTAL			30	

SENIOR

A	487	Internship (A 346)	12	4A, 4B
A	492A	Seminar-Agricultural Extension Education (A 346, concurrent reg. in A 487)	1-3	4C
HD	310	Infant and Child Development in Context (HD/HDCC 101, PY/PYCC 100)	3	
OR				
HD	311	Adolescent/Early Adult Development in Context (HD/HDCC 101)	3	
		Electives	12	
TOTAL			28-30	

PROGRAM TOTAL = 120-122 credits

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

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

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

DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS

Office in Clark Building, Room B 320
Professor Paul C. Huszar, Acting Chair

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.

Characteristics and Skills

- A strong interest in agriculture
- An aptitude for business
- Enjoy working with people
- Good organizational skills
- Analytical
- Problem solving skills
- Strong oral and written communication skills
- Well organized and can manage multiple tasks
- Can work in a group or alone
- Work well with people

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. 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: agricultural loan officer; commodity merchandiser; commodity broker; feedlot manager; elevator manager; farm supply manager; flour mill territory manager; landscape contractor; mortgage broker; farm real estate appraiser; grain merchandiser; agricultural chemical representative; and farm machinery company representative.

Course		Title (Prerequisite)	Cr	AUCC
FRESHMAN				
A	140	Technology in Agriculture	3	
A CC	192A-B	Orientation to Agricultural Systems	2	1
<i>Select one course from the following:</i>				
AN	100	Animal Sciences	3	
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 (BZ/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 to 6 or COCC 192/CO 130)	3	2A
EACC	202	Agricultural and Resource Economics	3	
ECCC	204	Principles of Macroeconomics (EC/ECCC 202 or EA/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	2C
M CC	118	College Algebra in Context II (M/M CC 117)	1	2C
OR				
M CC	120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC	121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC	124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
		Health and wellness ¹	2	3G
		TOTAL	29-30	
SOPHOMORE				
BA	205	Fundamentals of Accounting	3	
COCC	300	Writing Arguments (CO/COCC 150)	3	2B2 or 2D
OR				
JT	301	Business Communication (CO/COCC 150)	3	

M CC	141	Calculus in Management Sciences (M/M CC 118 or M/M CC 121)	3	2C
SPCC	200	Public Speaking	3	2B1
		Agricultural science electives ²	6	
		Foundations and perspectives ³	12	3B-3F
		TOTAL	30	
JUNIOR				
BF	305	Fundamentals of Finance (BA 205, EC/ECCC 204)	3	
BK	305	Fundamentals of Marketing (EC/ECCC 101 or EC/ECCC 202 or EA/EACC 202)	3	
EA	305	Agricultural and Resource Enterprise Analysis (EA/EACC 202 or EC/ECCC 202)	3	
EA	310	Agricultural Marketing (EA/EACC 202 or EC/ECCC 202)	3	
EA EC	335/ 335	Introduction to Econometrics (EC/ECCC 204 or ST/STCC 201 or ST/STCC 204 or ST/STCC 301)	3	
EC	306	Intermediate Microeconomics (EC/ECCC 204, M/M CC 141)	3	
STCC	301	Introduction to Statistical Methods (M/M CC 121)	3	2D
		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 (EA/EACC 202 or EC/ECCC 202)	3	
EA	375	Agricultural Law	3	
EA	405	Agricultural Production Management (EA/EACC 202 or EC/ECCC 202)	3	
EA	412	Agricultural Commodities Marketing (EA 310)	3	
EA	415	International Agricultural Trade (EC/ECCC 204)	3	
EA	428	Agricultural Business Management	3	4A, 4C
EA	460	Economics of World Agriculture (EA/EACC 202 or EC/ECCC 202)	3	4B
OR				
EA	478	Agricultural Policy (EA/EACC 202 or EC/ECCC 202 or EA/EACC 240 or EC/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, NR 260, or NRCC 320. A maximum of 6 EA credits may be used as agricultural science electives.

³ Select four courses to meet the core requirements in arts/humanities (3B), social/behavioral sciences [excluding EACC and ECCC courses] (3C), 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 3C 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 environmental problems. Most decisions by governments, businesses, or individuals must weigh tradeoffs or balance costs and benefits. Most human endeavors involve the production, distribution, or consumption of goods and services.

Characteristics and Skills

- Good written and oral communication skills
- Desire to understand how political and social contexts affect behavior
- A strong interest in agriculture or natural resources
- A strong interest in economic and social issues
- Aptitude for mathematics and logic
- Analytical and critical thinking ability
- Creative problem solving ability
- Ability to identify key issues
- Ability to integrate a variety of concepts

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 CC 192A-B	Orientation to Agricultural Systems	2	1
<i>Select one of the following courses:</i>			
AN 100	Animal Sciences	3	
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 courses:</i>			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZ/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 to 6 or COCC 192/CO 130)	3	2A
EACC 202	Agricultural and Resource Economics	3	
ECCC 204	Principles of Macroeconomics (EC/ECCC 202 or EA/EACC 202)	3	
<i>Select one pair of the following:</i>			
M CC 117	College Algebra in Context I (Math Placement Exam)	1	2C
M CC 118	College Algebra in Context II (M/M CC 117)	1	2C
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
	Health and wellness ²	2	3G
	TOTAL	29-30	
SOPHOMORE			
BA 205	Fundamentals of Accounting	3	

COCC 300	Writing Arguments (CO/COCC 150)	3	2B2
OR			
JT 301	Business Communication (CO/COCC 150)	3	
M CC 141	Calculus in Management Sciences (M/M CC 118 or M/M CC 121)	3	2C
SPCC 200	Public Speaking	3	2B1
	Foundations and perspectives ³	12	3B-3F
	Agricultural electives ⁴	3	
	Electives	3	
	TOTAL	30	
JUNIOR			
BF 305	Fundamentals of Finance (BA 205, EC/ECCC 204)	3	
EA 305	Agricultural and Resource Enterprise Analysis (EA/EACC 202 or EC/ECCC 202)	3	
<i>Select two courses from the following:</i>			
EA 308	Agricultural Finance (EA/EACC 202 or EC/ECCC 202)	3	
EA 310	Agricultural Marketing (EA/EACC 202 or EC/ECCC 202)	3	
EA 412	Agricultural Commodities Marketing (EA 310)	3	
EA 428	Agricultural Business Management	3	
EA 335/ EC 335	Introduction to Econometrics (EC/ECCC 204 or ST/STCC 201 or ST/STCC 204 or ST/STCC 301)	3	
EA 340/ EC 340	Introduction to Economics of Natural Resources (EA/EACC 202 or EC/ECCC 202)	3	
OR			
EA 342	Economic Analysis-Water Resource Development (EA/EACC 202 or EC/ECCC 202)	3	
EC 306	Intermediate Microeconomics (EC/ECCC 204, M/M CC 141)	3	
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
	Agricultural sciences electives ⁴	3	
	Electives	3	
	TOTAL	30	
SENIOR			
EA 405	Agricultural Production Management (EA/EACC 202 or EC/ECCC 202)	3	4A, 4C
EA 415	International Agricultural Trade (EC/ECCC 204)	3	
EA 478	Agricultural Policy (EA/EACC 202 or EC/ECCC 202 or EA/EACC 240 or EC/ECCC 240)	3	4A, 4B, 4C
EC 304	Intermediate Macroeconomics (EC/ECCC 204, M/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/C CC 107 and C/C CC 108.

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

³ Select four courses to meet the core requirements in arts/humanities (3B), social/behavioral sciences [excluding EACC and ECCC] (3C), 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 3C or category 3D.

⁴ Select three credits from courses in A, AN, BI EA, FT, H, LA, SC, FNCC 150, NR 120A-B, NR 260, 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 CC 192A-B	Orientation to Agricultural Systems	2	1
<i>Select one of the following courses:</i>			
AN 100	Animal Sciences	3	
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 courses:</i>			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZ/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 to 6 or COCC 192/CO 130)	3	2A
EACC 202	Agricultural and Resource Economics	3	
ECCC 204	Principles of Macroeconomics (EC/ECCC 202 or EA/EACC 202)	3	
<i>Select one pair of the following:</i>			
M CC 117	College Algebra in Context I (Math Placement Exam)	1	2C
M CC 118	College Algebra in Context II (M/M CC 117)	1	2C
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
	Health and wellness ¹	2	3G
	TOTAL	29-30	
SOPHOMORE			
BA 205	Fundamentals of Accounting	3	

COCC 300	Writing Arguments (CO/COCC 150)	3	2B2
OR			
JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2
EA 305	Agricultural and Resource Enterprise Analysis (EA/EACC 202 or EC/ECCC 202)	3	
M CC 141	Calculus in Management Sciences (M/M CC 118 or M/M CC 121)	3	2C
SPCC 200	Public Speaking	3	2B1
	Foundations and perspectives ²	12	3B-3F
	Agricultural science electives ³	3	
	TOTAL	30	

JUNIOR

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

SENIOR

<i>Select two courses from the following:</i>			
EA 310	Agricultural Marketing (EA/EACC 202 or EC/ECCC 202)	3	
EA 412	Agricultural Commodities Marketing (EA 310)	3	
EA 415	International Agricultural Trade (EC/ECCC 204)	3	
EA 428	Agricultural Business Management (EA 305, EA 310, and senior standing)	3	
EA 375	Agricultural Law	3	
EA 460	Economics of World Agriculture (EA/EACC 202 or EC/ECCC 202)	3	4B
OR			
EA 478	Agricultural Policy (EA/EACC 202 or EC/ECCC 202 or EA/EACC 240 or EC/ECCC 240)	3	4A, 4B, 4C
EA 405	Agricultural Production Management (EA/EACC 202 or EC/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 four courses to meet the AUCC requirements in arts/humanities (3B), social/behavioral sciences [excluding EACC and ECCC] (3C), 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 3C 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, NR 260, 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 CC 192A-B	Orientation to Agricultural Systems	2	1
<i>Select four credits from the following:</i>			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZ/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 to 6 or COCC 192/CO 130)	3	2A
EACC 202	Agricultural and Resource Economics	3	
ECCC 204	Principles of Macroeconomics (EC/ECCC 202 or EA/EACC 202)	3	
<i>Select one pair from the following:</i>			
M CC 117	College Algebra in Context I (Math Placement Exam)	1	2C
M CC 118	College Algebra in Context II (M/M CC 117)	1	2C
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
	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 (CO/COCC 150)	3	2B2 or 2D
OR			
JT 301	Business Communication (CO/COCC 150)	3	

M CC 141	Calculus in Management Sciences (M/M CC 118 or M/M CC 121)	3	2C
SPCC 200	Public Speaking	3	2B1
	Foundations and perspectives ⁴	12	3B-3F
	Agriculture, forestry, or natural science elective ³	3	
	Electives	4	
	TOTAL	31	

JUNIOR

BF 305	Fundamentals of Finance (BA 205, EC/ECCC 204)	3	
CB 462	Environmental Law (CO/COCC 150)	3	
OR			
EA 375	Agricultural Law	3	
EACC 240/ ECCC 240	Issues in Environmental Economics	3	
EA 335/ EC 335	Introduction to Econometrics (EC/ECCC 204 or ST/STCC 201 or ST/STCC 204 or ST/STCC 301)	3	
EA 340/ EC 340	Introduction to Economics of Natural Resources (EA/EACC 202 or EC/ECCC 202)	3	
EC 306	Intermediate Microeconomics (EC/ECCC 204, M/M CC 141)	3	
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
	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 (EA/EACC 202 or EC/ECCC 202)	3	
EA 346/ EC 346	Economics of Outdoor Recreation (EA/EACC 202 or EC/ECCC 202)	3	
EC 344	Economics of Energy Resources (EA/EACC 202 or EC/ECCC 202)	3	
EA 460	Economics of World Agriculture (EA/EACC 202 or EC/ECCC 202)	3	4B
EA 478	Agricultural Policy (EA/EACC 202 or EC/ECCC 202 or EA/EACC 240 or EC/ECCC 240)	3	4A, 4B, 4C
EC 304	Intermediate Macroeconomics (EC/ECCC 204, M/M CC 141)	3	
	Agriculture, forestry, natural science elective ³	3	
	EA and 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 four courses, to meet the core requirements in arts/humanities (3B), social/behavioral sciences [excluding EACC and ECCC courses] (3C), 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 3C 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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

¹Additional course work may be required because of prerequisites.

²To 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
Professor J. Daryl Tatum, Head

Major in Animal Science

Students majoring in Animal Science are provided with an industry-oriented, science-based education to prepare 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 biological, chemical, and agricultural sciences, balanced with courses comprising the broad-based [All University Core Curriculum](#). Students also choose from specialized courses to enhance their technical, practical, and business skills in topics related to various aspects of

production, marketing, handling, and processing of livestock and their products. Two concentrations of study, [industry and science](#), are available.

Characteristics & Skills

- Interest in farm/livestock animals
- Interest in business
- Excellent communication skills
- Problem-solving skills
- Enjoy working independently or as a team
- Organizational skills
- Attention to detail
- Critical thinking skills
- Analytical skills
- Problem solving skills
- Self-motivation
- Interest in a variety of work environments

Potential Occupations

An animal science degree prepares students for a variety of career opportunities including positions with animal health, feed and nutrition companies, livestock breed associations, food processing and distribution firms, ranches or livestock feeding operations, agricultural policy organizations, livestock marketing firms, livestock publications, companies specializing in animal facilities design, and for graduate or professional school. Participation in internships is highly recommended to enhance practical training and development. Graduates who pursue advanced studies are qualified for positions with greater opportunity for professional advancement.

Some examples include: animal nutritionist; geneticist; cell biologist; animal health care specialist; feed lot consultant; market analyst; international trade specialist; animal reproduction/embryo transfer technician; animal behavior specialist; veterinary supplies sales representative; research scientist.

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 industry or related industries.

Animal science majors in the industry concentration have an opportunity to complete a second major in agricultural business by taking a few additional classes. Elective credits in one major are used to meet the required courses in the other major.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A CC 192A-B	Orientation to Agricultural Systems	2	1
AN 100	Animal Sciences	3	
BZCC 110	Select four credits from the following: Principles of Animal Biology	3	3A
BZCC 111	Animal Biology AND Laboratory(BZ/BZCC 110 or concurrent reg.)	1	3A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
EACC 202	Agricultural and Resource Economics OR	3	3C
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 120A-B)	3	3C
	Health and wellness ¹	2	3G
	Historical perspectives ²	3	3D
	Mathematics ³	3	2C
	TOTAL	28	
SOPHOMORE			
AN 250	Live Animal and Carcass Evaluation	3	
AN 286	Livestock Practicum (AN 100 or concurrent reg.)	2	
BS 230	Animal Anatomy and Physiology (C/C CC 107, BY/LSCC 102)	3	
	Additional communication ⁴	3	2B
	Arts/humanities ⁵	3	3B
	Global and cultural awareness ⁶	3	3E
	Logical/critical thinking ⁷	3	2D
	U.S. public values and institutions ⁸	3	3F
	Applied courses ⁹	5	
	TOTAL	28	
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			
Select one of the following courses:			
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
AN 478	Beef Production and Management (AN 250, AN 310, AN 320, AN 330)	3	4C
Electives		30-31	
TOTAL		33-34	

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 3D in the AUCC.
- ³ Select from the list of courses in category 2C 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 3B in the AUCC.
- ⁶ Select from the list of courses in category 3E in the AUCC.
- ⁷ Select statistics course from the list in category 2D in the AUCC.
- ⁸ Select from the list of courses in category 3F in the AUCC.
- ⁹ Select 5 credits from at least 3 courses from the department approved list.
- ¹⁰ Select two courses from the department approved list for animal science industry majors.
- ¹¹ Select nine credits of agricultural economics, economics, or business from the departmental approved list.

Science Concentration

The science concentration emphasizes biological sciences, physics, and chemistry along with animal science courses. This concentration prepares students to enter graduate programs and provides students with most of the preprofessional requirements for veterinary medicine. After graduate school, students are prepared for opportunities in research, university teaching, extension, and industry.

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

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A CC 192A-B	Orientation to Agricultural Systems	2	1
AN 100	Animal Sciences	3	

<i>Select one of the following sets of courses:</i>			
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
OR			
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192 or CO 130)	3	2A
EACC 202	Agricultural and Resource Economics	3	3C
OR			
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 120A-B)	3	3C
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
M CC 125	Numerical Trigonometry (M/M CC 118 or M/M CC 121 or placement)	1	2C
	Arts/humanities ¹	3	3B
	Health and wellness ²	2	3G
	Historical perspectives ³	3	3D
	TOTAL	30-34	
SOPHOMORE			
AN 250	Live Animal and Carcass Evaluation	3	
AN 286	Livestock Practicums (AN 100 or concurrent reg.)	2	
BS 230	Animal Anatomy and Physiology (C/C CC 107, BY/LSCC 102)	3	
BS 231	Gross Anatomy-Domestic Animals (BS 230 or concurrent reg.)	2	
<i>Select one of the following sets of courses:</i>			
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/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/M CC 124, M/M CC 125)	4	2C
	Additional communications ⁴	3	2B
	Global and cultural awareness ⁵	3	3E

		U.S. public values and institutions ⁶	3	3F
		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
PHCC 121	General Physics I (concurrent reg. in M/M CC 125)		5	3A
OR				
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)		5	3A
<i>Select one of the following:</i>				
STCC 301	Introduction to Statistical Methods (M/M CC 121)		3	2D
STCC 307/ EHCC 307	Introduction to Biostatistics (M/M CC 121)		3	2D
STCC 309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)		3	2D
<i>Advanced courses⁷</i>				
			5-7	
<i>Applied courses⁸</i>				
			5	
		TOTAL	27-29	
SENIOR				
<i>Select one of the following:</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
AN 478	Beef Production and Management (AN 250, AN 310, AN 320, AN 330)		3	4C
MB 300	General Microbiology (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 345 or concurrent reg.)		3	
MB 302	General Microbiology Laboratory (MB 300 or concurrent reg.)		2	
<i>Advanced science⁹</i>				
			6-8	
<i>Electives</i>				
			9-20	
		TOTAL	25-34	

PROGRAM TOTAL = 120 credits

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. It also offers practical experience that will allow you to develop proficiency in working with horses; and a broad understanding of the horse industry and its relationship to the 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. The curriculum offers an

appropriate balance of mathematics, biological, chemical and agricultural sciences, as well as social sciences and humanities. Students have a choice of two concentrations that focus on different career objectives—the **industry** concentration and the **science** concentration.

Characteristics and Skills

- Love for working with horses
- Successful academic background in science and/or business
- Excellent communication skills
- Problem-solving skills
- Enjoy working independently or as a team
- Organizational skills
- Analytical skills
- Attention to detail
- Critical thinking skills
- Self-motivation

Potential Occupations

Career opportunities in the equine industry not only involve horses but business, scientific, and service-related positions. Approximately 20% of equine science graduates go on for advanced degrees. Another 20% work directly with horses at breeding and training farms. Others are employed in education, by breed associations, and in journalism and related industries. Participation in internships, volunteer activities, and cooperative education opportunities is highly recommended to enhance practical training and development.

Some examples include: public relations specialist; computerized management system manager; insurance agent; editors, writers, advertisers, photographers, or artists for publications; finance specialist; farm/ranch real estate agent; import/export broker; guest ranch manager; extension agent; trainer; judge; show steward; course designer; equitation instructor; professional rider; brand inspector; marketing analyst or appraiser; racetrack personnel. Some examples for students with graduate and professional degrees include: veterinarian; university research, teaching, and extension positions; reproduction specialist; geneticist; medical degree; pharmacy degree/nutritionist.

Industry Concentration

The industry concentration emphasizes economics, business, and management associated with equine and food animal industries. Students are provided the background for employment in a multitude of equine-related industries, management, production, marketing, and extension work.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A CC 192A-B	Orientation to Agricultural Systems	2	1
AN 100	Animal Sciences	3	
BZCC 110	Select 4 credits from the following: Principles of Animal Biology	3	3A
BZCC 111	AND Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.)	1	3A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
EACC 202	Agricultural and Resource Economics	3	3C
ECCC 202	OR Principles of Microeconomics (M/M CC 117 or M/M CC 120A-B)	3	3C
	Health and wellness ¹	3	3G
	Historical perspectives ²	3	3D
	Mathematics ³	3	2C
	TOTAL	29	
SOPHOMORE			
AN 240	Equine Management	3	
AN 245	Equine Evaluation	3	
AN 286	Livestock Practicum (AN 100 or concurrent reg.)	2	
BS 230	Animal Anatomy and Physiology (C/C CC 107, BY/LSCC 102)	3	
	Additional communication ⁴	3	2B
	Applied courses ⁵	5	
	Arts/humanities ⁶	3	3B
	Global and cultural awareness ⁷	3	3E
	Statistics ⁸	3	2D
	U.S. public values and institutions ⁹	3	3F
	TOTAL	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 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 240, 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 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 2C in the AUCC.

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

⁵ Select five credits from three different courses; see approved department list.

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 statistics course from category 2D in the AUCC.

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

¹⁰ Select nine credits from the department approved list.

Science Concentration

The science concentration emphasizes basic sciences and provides background for students to enter graduate programs to pursue advanced degrees. Students in this concentration can complete the preprofessional requirements for veterinary medicine. With this concentration and graduate school, students are prepared for opportunities in university teaching, research, extension, or industry.

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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
A CC 192A-B	Orientation to Agricultural Systems	2	1
AN 100	Animal Sciences	3	

<i>Select one the following sets of courses:</i>			
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
OR			
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192 or CO 130)	3	2A
EACC 202	Agricultural and Resource Economics	3	3C
OR			
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 120A-B)	3	3C
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
M CC 125	Numerical Trigonometry (M/M CC 118 or M/M CC 121 or placement)	1	2C
	Health and wellness ¹	2	3G
	Historical perspectives ²	3	3D
	TOTAL	27-31	

SOPHOMORE

AN 240	Equine Management	3	
AN 245	Equine Evaluation	3	
AN 286	Livestock Practicums (AN 100 or concurrent reg.)	2	
BS 230	Animal Anatomy and Physiology (C/C CC 107, BY/LSCC 102)	3	
BS 231	Gross Anatomy of Domestic Animals (BS 230 or concurrent reg.)	2	
<i>Select one of the following sets of courses:</i>			
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/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/M CC 124, M/M CC 125)	4	2C
	Additional communications ³	3	2B
	Arts/humanities ⁴	3	3B
	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 (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 343 or concurrent reg. in C 343)	4	
PHCC	121	General Physics I (concurrent reg. in M/M CC 125)	5	3A
OR				
PHCC	141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
<i>Select one of the following:</i>				
STCC	301	Introduction to Statistical Methods (M/M CC 121)	3	2D
STCC 307/ EHCC 307		Introduction to Biostatistics (M/M CC 121)	3	2D
STCC	309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
Applied course ⁵			5	
Global and cultural awareness ⁶			3	3E
U.S. public values and institutions ⁷			3	3F
TOTAL			34-35	
SENIOR				
AN	440	Equine Production and Industry (AN 240, 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 (BZ/BZCC 110 or BZ/BZCC 120 or BY/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			2-12	
TOTAL			23-31	

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 list of courses in category 3D of the AUCC.

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

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

⁵ Select from approved departmental list.

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

⁷ Select from the list of courses 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.

Preveterinary Medicine

Preveterinary medical students interested in animal or equine science are encouraged to follow the science concentration listed under the animal science and equine science majors in this section of the catalog. Maximum flexibility in career direction can 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. Students accepted into the professional veterinary medical program after receiving this degree will benefit from the background in nutrition, breeding, marketing, and management of livestock or nutrition, genetics, and marketing. Students not entering the veterinary medical program use this background in pursuing career suggestions mentioned in the science concentration of the animal science or equine science majors.

Graduate Programs in Animal Sciences

The department offers graduate programs leading to the master of science and the doctor of philosophy degrees. Students interested in graduate work should refer to the [Graduate and Professional Bulletin](#).

DEPARTMENT OF BIOAGRICULTURAL SCIENCES AND PEST MANAGEMENT

Office in Plant Sciences Building, Room C 129
Professor Thomas O. Holtzer, Head

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

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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 (BY/LSCC 102)	4	
OR			
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.)	1	3A
TOTAL		4-8	
UPPER DIVISION			
BI 302	Applied and General Entomology	2	
BI 303A-C	Entomology Laboratory (EN 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 (BZ/BZCC 111 or BY/LS 103)	4	
BI 451	Insect Pest Management (BI 302 or BI 361 or BI 308 or 10 credits of biology)	4	
BI 462/ MB 462/ BZ 462*	Parasitology and Vector Biology (BZ/BZCC 110 or BY/LS 103; MB 301 or MB 302 or BZ 212)	5	
TOTAL		17-18	

PROGRAM TOTAL = 21-26 credits

*Additional course work may be required because of prerequisites.

Minor in Plant Health

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
BI 302	Applied and General Entomology	2	
BI 303A	General Entomology Laboratory (BI 302 or concurrent reg.)	2	
BI 303B	Horticultural Entomology Laboratory (BI 302 or concurrent reg.)	1	
OR			
BI 303C	Agricultural Entomology Laboratory (BI 302 or concurrent reg.)	1	
BI 308*	Biology and Control of Weeds (BZ/BZCC 120 or BY/LS 103; C/C CC 107 or C/C CC 111)	4	
BI 310	Fundamentals of Pesticides (introductory biological science or introductory chemistry)	2	
BI 361*	Elements of Plant Pathology (BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100 or BY/LSCC 102)	3	

<i>Select a minimum of 8 credits from the following:</i>			
BI 365*	Integrated Tree Health Management (BZ/BZCC 120 or BY/LSCC 102)	4	
BI 495	Independent Study	3	
BZCC 110	Principles of Animal Biology ¹	3	3A
BZCC 111	Animal Biology Laboratory ¹ (BZ/BZCC 110 or concurrent reg.)	1	3A
BZCC 120	Principles of Plant Biology ¹	4	3A
OR			
LSCC 102	Attributes of Living Systems ¹ (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants ¹ (BY/LSCC 102)	4	
BI 423	Evolution and Classification of Insects (BI 303A or B or C)	4	
BI 445	Aquatic Insects (BZ/BZCC 111 or BY/LS 103)	4	
BI 451	Integrated Pest Management (BI 302, BI 361 or BI 308 or 10 credits of biology)	4	
BI 462/ MB 462/ BZ 462*	Parasitology and Vector Biology (BZ/BZCC 110 or BY/LS 103; MB 301 or MB 302 or BZ 212)	5	
PROGRAM TOTAL = 22 credits without prerequisites			

*Additional course work may be required because of prerequisites.

¹May 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 Professional Bulletin*.

**DEPARTMENT OF
HORTICULTURE AND
LANDSCAPE ARCHITECTURE**

Office in Shepardson Building, Room 111
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**.

Characteristics and Skills

- Strong interest in growing and propagating plants
- Strong interest in the natural sciences
- Problem solving skills
- Enjoy working outdoors
- Oral communication skills
- Organizational skills
- Analytical skills
- Written communication skills

Potential Occupations

A major challenge facing the horticulture industry today is keeping up with the 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 field and greenhouse-grown flower crops and foliage plants. 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 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			
A CC 192A-B	Orientation to Agricultural Systems	2	1
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/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
OR			
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
H CC 100	Horticultural Science (high school biology)	4	3A
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 124	Logarithmic and Exponential Functions (M/M CC 118 or M/M CC 121 or placement)	1	2C
	Arts/humanities ¹	3	3B
	Global and cultural awareness ²	3	3E
	Electives	0-2	
	TOTAL	29-31	
SOPHOMORE			
<i>Select one of the following courses:</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 223	Plant Identification (BZ/BZCC 120 or BY/LS 103)	3	
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
EACC 202	Agricultural and Resource Economics	3	3C
H 260	Plant Propagation (H/H CC 100)	4	
<i>Select one of the following courses:</i>			
L CC 105	First-Year Language I (no previous study of the language)	5	2B3 ³
L CC 107	First-Year Language II (L/L CC 105 or L 106)	5	2B3 ³
SPCC 200	Public Speaking	3	2B1

SC	240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
		Logical/critical thinking ⁴	3	2D
		Electives	0-3	
		TOTAL	29-30	
JUNIOR				
A	320B	Computer Applications in Agriculture-Data Base ⁵ (A 140 or BD 150 or CS 110)	1	
A	320D	Computer Applications in Agriculture-Project Management ⁵ (A 140 or BD 150 or CS 110)	1	
A	320E	Computer Applications in Agriculture-Spreadsheets ⁵ (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 (BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100 or BY/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 ⁶	2	
H	487	Internship ⁷	3	
SC	330	Principles of Genetics (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102)	3	
<i>Select 3-4 credits from the following:</i>				
H	321	Nursery Production and Management (H/H CC 100)	4	
H	331	Landscape Design	2	
H	341	Turfgrass Management (H/H CC 100)	3	
H	441	Turfgrass Science (BZ/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/	Plant Breeding (SC 330)	3	
SC	460	Arboriculture and Urban Plant Management (H/H CC 100, SC 240)	3	
H	464	Environmental Requirements of Horticultural Plants (BZ 440)	3	
H	475		3	
		Electives	2-3	
		TOTAL	30	
SENIOR				
BN	305	Fundamentals of Management	3	
BZ	440	Plant Physiology (BZ/BZCC 120 or BY/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	4C
H	486	Practicum ⁸	2	
JTCC	300	Professional and Technical Communication (CO/COCC 150)	3	4A
OR				
JT	301	Business Communication (CO/COCC 150)	3	4A
		Agricultural economics ⁹	3	
		Health and wellness ¹⁰	2	3G
		Horticulture electives ¹¹	3-4	
		Electives ¹²	3-7	
		TOTAL	29-32	

PROGRAM TOTAL = 120 credits

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

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

³ See the All-University Core Curriculum section of the catalog for an explanation of which language courses will satisfy category 2B requirements (if so allowed by the student's major).

⁴ SP/SPCC 207 if SP/SPCC 200 is not taken for 2B; otherwise select from the list of courses in category 2D in the AUCC.

⁵ 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.

⁶ All junior-level floriculture majors are required to register for at least one credit of H 486 during each term.

⁷ For internship requirements, refer to departmental policy.

⁸ All senior level floriculture students are required to register for at least two credits of H 486 during each term unless enrolled in H 454.

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 any 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 degree with one additional year.

	<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN				
A CC	192A-B	Orientation to Agricultural Systems	2	1
BZCC	120	Principles of Plant Biology	4	3A
C CC	107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A

C CC	108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A	
COCC	150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A	
EACC	202	Agricultural and Resource Economics	3	3C	
ECCC	204	Principles of Macroeconomics (EC/ECCC 202 or EA/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	2C	
M CC	121	College Algebra II (M/M CC 120A-B or placement)	1	2C	
M CC	124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C	
		Health and wellness ¹	2	3G	
TOTAL			29		

SOPHOMORE

A	140	Technology in Agriculture	3		
OR					
BD	150	Business Computing Concepts and Applications	3		
BA	205	Fundamentals of Accounting	3		
C	245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4		
EA	375	Agricultural Law	3		
H	260	Plant Propagation (H/H CC 100)	4		
SC	240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4		
SPCC	200	Public Speaking	3	2B1	
		Electives	6		
TOTAL			30		

JUNIOR

BF	305	Fundamentals of Finance (BA 205, EC/ECCC 204)	3		
OR					
EA	308	Agricultural Finance (EA/EACC 202 or EC/ECCC 202)	3		
BI	302	Applied and General Entomology	2		
BI	361	Elements of Plant Pathology (BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100 or BY/LSCC 102)	3		
BK	305	Fundamentals of Marketing (EC/ECCC 101 or EC/ECCC 202 or EA/EACC 202)	3		
BN	305	Fundamentals of Management	3		
BZ	440	Plant Physiology (BZ/BZCC 120 or BY/LS 103; C 245 or concurrent reg.)	3		
SC	330	Principles of Genetics (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102)	3		
STCC	204	Statistics for Business Students (M/M CC 120A-B)	3	2D	

		Horticulture, upper division	6		
TOTAL			29		
SENIOR					
EC	300	Managerial Economics (EA/EACC 202 or EC/ECCC 202)	3		
H	454	Horticulture Crop Production and Management (H 310 or H 450A-B)	2	4A, 4C	
H	460/460	Plant Breeding (SC 330)	3	4B	
H	475	Environmental Requirements of Horticultural Plants (BZ 440)	3		
		Arts/humanities ²	3	3B	
		Global and cultural awareness ³	3	3E	
		Historical perspectives ⁴	3	3D	
		Horticulture, upper division	5		
		Electives	7		
TOTAL			32		

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 3D in the AUCC.

Horticultural Food Crops Concentration

Horticultural food crops focuses on systems related to production of fruits and vegetables. Specific courses include fruit and vegetable production, irrigation practices, soil fertility, propagation, breeding, and related plant pest management courses. Students must choose either the production or seed science option. A number of opportunities exist in horticultural food crops-related professions including: greenhouse production, all phases of the retail and wholesale businesses, greenhouse supply sales, greenhouse construction, seed production and sales, plant breeding and plant research.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A CC 192A-B	Orientation to Agricultural Systems	2	1
BZCC 120	Principles of Plant Biology	4	3A

Select one of the following sets of courses:				
C CC	107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC	108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
OR				
C CC	111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC	112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C	113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C	114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
SOPHOMORE				
COCC	150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
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	2C
M CC	121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC	124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
		Health and wellness ¹	2	3G
		TOTAL	26-30	
JUNIOR				
C	245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
H	260	Plant Propagation (H/H CC 100)	4	
SC	240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
SPCC	200	Public Speaking	3	2B1
STCC	201	General Statistics (M/M CC 120A-B)	3	2D
OR				
STCC	301	Introduction to Statistical Methods (M/M CC 121)	3	2D
		Arts/humanities ²	3	3B
		Historical perspectives ³	3	3D
		Global and cultural awareness ⁴	3	3E
		U.S. public values and institutions ⁵	3	3F
		TOTAL	30	
SENIOR				
A	140	Technology in Agriculture	3	
OR				
CS	110	Personal Computing	4	
BI	302	Applied and General Entomology	2	

BI	303B	Horticultural Entomology Laboratory (BI 302 or concurrent reg.)	1	
BI	361	Elements of Plant Pathology (BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100 or BY/LSCC 102)	3	
BZ	440	Plant Physiology (BZ/BZCC 120 or BY/LS 103; C 245 or concurrent reg.)	3	
OR				
H	486	Practicum	3	
H	487	Internship	3	
SC	330	Principles of Genetics (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102)	3	
		TOTAL	18-19	
SENIOR				
BI	308	Biology and Control of Weeds (BZ/BZCC 120 or BY/LS 103; C/C CC 107 or C/C CC 111)	4	
H	450A	Cool Season Vegetable Production (one plant science course)	1	
H	450B	Warm Season Vegetable Production (one plant science course)	1	
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	

CORE 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/H CC 100 or SC 100; SC 240)	3
		Electives ¹	11
		TOTAL	16

PROGRAM TOTAL = 120 credits

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

Seed Science Option

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

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
BZ 223	Plant Identification (BZ/BZCC 120 or BY/LS 103)	3	
JUNIOR			
<i>Select 5 credits from the following:</i>			
H 310	Greenhouse Management	4	
H 321	Nursery Production and Management (H/H CC 100)	4	
H 341	Turfgrass Management (H/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			
H 461/ SC 461	Plant Breeding Laboratory (H 460/SC 460 or concurrent reg.)	1	
	Electives ¹	11-15	
	TOTAL	12-16	

PROGRAM TOTAL = 120 credits

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

Horticultural Science Concentration

Horticultural science graduates conduct research to discover new information about plant growth, development, and environmental response. This research can lead to new plant varieties and production methods. The curriculum consists of a solid foundation in the basic natural and agricultural sciences and prepares students for technical and scientific careers in laboratory, greenhouse, or field research. Exceptional students participate in individual research projects coordinated by professors. Graduates in this area often continue their education.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A CC 192A-B	Orientation to Agricultural Systems	2	1
BZCC 120	Principles of Plant Biology	4	3A
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/ C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
H CC 100	Horticultural Science (high school biology)	4	3A
M CC 126	Analytic Trigonometry ¹ (M/M CC 125 or placement)	1	2C
	Arts/humanities ²	3	3B
	Historical perspectives ³	3	3D
	Social/behavioral sciences ⁴	3	3C
	TOTAL	32	
SOPHOMORE			
A 140	Technology in Agriculture	3	
OR			
CS 110	Personal Computing	4	
H 260	Plant Propagation (H/H CC 100)	4	
PHCC 121	General Physics I (Corequisite: M/M CC 125)	5	3A
PHCC 122	General Physics II (PH/PHCC 121)	5	3A
SPCC 200	Public Speaking	3	2B1
	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/C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/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/M CC 124, M/M CC 125)	4	2C
SC 240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	

SC	330	Principles of Genetics (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102)	3	
STCC	301	Introduction to Statistical Methods (M/M CC 121)	3	2D
		Horticulture electives	8	
		Electives	0-3	
		TOTAL	30	
SENIOR				
BC	351	Principles of Biochemistry (BZ/BZCC 110 or BZ/BZCC 120 or BY/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.)	2	
BZ	440	Plant Physiology (BZ/BZCC 120 or BY/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 (BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100 or BY/LSCC 102.)	3	
H	454	Horticulture Crop Production and Management (H 310 or H 450 A-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/M CC 120A-B, M/M CC 121, and M/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. The course 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. The course 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.

Characteristics and Skills

- Strong interest in computers and drawing as tools for creative and artistic thinking
- Strong interest in spatial and environmental issues applied to landscape
- Strong oral communication skills
- Good presentation skills
- Problem solving skills
- Ability to work well with other professionals
- Strong writing skills
- Analytical skills

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 are: design consultant; landscape designer and contractor; private practice business; construction supervisor; land or environmental planner; urban designer; historic preservationist; golf course architect; resort planner.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
<i>Select one of the following courses:</i>			
A CC 192A-B	Orientation to Agricultural Systems	2	1
BZCC 192	First-Year Seminar in Life Sciences	2	1
EDCC 192	Learning and Community	3	1
G CC 192	First-Year Seminar in Geosciences	2	1
NRCC 192	First Year Seminar in Environmental Studies	2	1
S CC 192	Civic Culture and Social Responsibility	3	1
BZCC 120	Principles of Plant Biology	4	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
ERCC 140	Physical Geology	4	3A
LA 110	Introduction to Landscape Architecture	3	
LA 120	History of the Designed Landscape	3	
M CC 141	Calculus in Management Sciences (M/M CC 118 or M/M CC 121)	3	2C
PHCC 110	Descriptive Physics	3	3A
PYCC 100	General Psychology	3	3C
	Health and wellness ¹	2	3G
	TOTAL	30-31	
SOPHOMORE			
BY 220	Fundamentals of Ecology (one course in biology, M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160)	3	

C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/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	2D
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ²	3	3B
	Global and cultural awareness ³	3	3E
	TOTAL	30	
JUNIOR			
EACC 202	Agricultural and Resource Economics	3	3C
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
LA 360	Basic Landscape Design and Construction (LA 240)	3	4A
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	
LA 454	<i>Select one of the following courses:</i> 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 (BZ/BZCC 120 or BY/LS 103, M/M CC 121)	5	
SC 240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
	TOTAL	28	
SENIOR			
H 367	Landscape Irrigation	3	
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 (BZ/BZCC 120 or BY/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	3	
		Electives	6	
		TOTAL	23-24	
PROGRAM TOTAL = 135 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 care for indoor gardens and plantings in public facilities, such as malls, hotels, and botanical gardens. Three concentrations are offered in the landscape horticulture major—**landscape design and contracting**, **nursery and landscape management**, and **turf management**.

Characteristics and Skills

- Strong interest in plants and plant propagation
- Creativity and interest in designing landscapes
- Enjoy working outdoors
- Enjoy working with people
- Problem solving skills
- Strong oral communication skills
- Interest in business issues

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 and botanic garden-arboreta 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; athletic field manager; botanic garden or arboretum specialist; community forester; custom lawn care specialist; golf course turf manager; landscape designer and contractor; landscape estimator; interior plant maintenance; irrigation designer; landscape maintenance manager; plant diagnostician; retail garden center manager; seed producer; 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.

Course		Title (Prerequisite)	Cr	AUCC
FRESHMAN				
A	140	Technology in Agriculture	3	
OR				
BD	150	Business Computing Concepts and Applications	3	
A CC	192A-B	Orientation to Agricultural Systems	2	1
C CC	107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
COCC	150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
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	

Select one of the following pairs of courses:

M CC	117	College Algebra in Context I (Math Placement Exam)	1	2C
M CC	118	College Algebra in Context II (M/M CC 117)	1	2C
OR				
M CC	120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC	121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC	125	Numerical Trigonometry (M/M CC 118 or M/M CC 121 or placement)	1	2C
		Health and wellness ¹	2	3G
		Electives	2	
		TOTAL	31	

SOPHOMORE

BA	205	Fundamentals of Accounting	3	
H	221	Landscape Plants	4	
H	235	Landscape Grading and Drainage Studio (H 140; M/M CC 118 or M/M CC 121)	4	
H	487	Internship	3-6	
L CC	105	First-Year Language I (no previous study of the language)	5	2B3 ²
OR				
SPCC	200	Public Speaking	3	2B1
LA	120	History of the Designed Landscape	3	
MC	131	Graphic Communications/CAD	3	
MC	261	Construction Surveying (M/M CC 125)	3	
SC	240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
		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/H CC 100)	3	
H	367	Landscape Irrigation	3	
H	465	Landscape Estimating (3 credits of mathematics)	3	
SPCC	207	Rhetoric and Argumentation	3	2D
OR				
		Logical/critical thinking ³	3	2D
		Advanced writing ⁴	3	2B2
		Arts/humanities ⁵	3	3B
		Social/behavioral sciences ⁶	3	3C
		Electives	3	
		TOTAL	33	

SENIOR

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/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
		Electives		
		TOTAL	28	

PROGRAM TOTAL = 125-130 credits

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

² See the All-University Core Curriculum section of the catalog for an explanation of which language courses will satisfy category 2B requirements (if so allowed by the student's major).

³ Select either SPCC 207 or another course from the list of courses in category 2D in the AUCC.

⁴ Select from the list of courses in category 2B2 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 systems, culture, and use; and also develops skills needed to start and manage a personally owned nursery, garden center, arboriculture or landscape management firms. Nursery specialists propagate and produce trees, shrubs, groundcovers, and herbaceous perennials for the landscape industry. Nursery and landscape managers oversee general operations, manage all aspects of the landscape, choose the type and quantity of horticultural plants to be grown; select and purchase seed, fertilizers, and disease 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
A CC 192A-B	Orientation to Agricultural Systems	2	1
BZCC 120	Principles of Plant Biology	4	3A
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A

C CC	108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A	A	320D	Computer Applications in Agriculture-Project Management (A 140 or BD 150 or CS 110)	1	
COCC	150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A	A	320E	Computer Applications in Agriculture-Spreadsheets (A 140 or BD 150 or CS 110)	1	
EACC	202	Agricultural and Resource Economics	3	3C	A	320F	Computer Applications in Agriculture-Presentation Technology (A 140 or BD 150 or CS 110)	1	
H CC	100	Horticultural Science (high school biology)	4	3A	BI	302	Applied and General Entomology	2	
M CC	120A-B	College Algebra I (Math Placement Exam)	1	2C	BI	303B	Horticultural Entomology Laboratory (BI 302 or concurrent reg.)	1	
M CC	121	College Algebra II (M/M CC 120A-B or placement)	1	2C	C	245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
M CC	124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C	H	310	Greenhouse Management	4	4B
		Health and wellness ¹	2	3G	H	321	Nursery Production and Management (H/H CC 100)	4	4A
		Electives	3		H	322	Herbaceous Plants (one course in botany, biological science, or horticulture)	3	
		TOTAL	29		H	331	Landscape Design	2	
SOPHOMORE					H	341	Turfgrass Management (H/H CC 100)	3	
AUCC	101	<i>Select one of the following courses:</i> Self/Community in American Culture Since 1877	3	3D, 3F	H	487	Internship ⁶	3	
HYCC	150	U.S. History to 1876	3	3D, 3F			TOTAL	29	
HYCC	151	U.S. History Since 1876	3	3D, 3F					
NRCC	320	Natural Resources History and Policy	3	3D, 3F					
BZ	223	Plant Identification (BZ/BZCC 120 or BY/LS 103)	3						
H	221	Landscape Plants	4						
H	260	Plant Propagation (H/H CC 100)	4						
L CC	105	<i>Select one of the following courses:</i> First-Year Language I	5	2B3 ²	BI	308	Biology and Control of Weeds (BZ/BZCC 120 or BY/LS 103; C/C CC 107 or C/C CC 111)	4	
L CC	107	First-Year Language II (L/L CC 105 or L 106)	5	2B3 ²	BI	361	Elements of Plant Pathology (BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100 or BY/LS 102)	3	
SPCC	200	Public Speaking	3	2B1	BZ	440	Plant Physiology (BZ/BZCC 120 or BY/LS 103; C 245 or concurrent reg.)	3	
SC	240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4		EA	328	Small Agribusiness Management (EA/EACC 202 or EC/ECCC 202)	3	
		Arts/humanities ³	3	3B	H	464	Arboriculture and Urban Plant Management (H/H CC 100, SC 240)	3	4C
		Global and cultural awareness ⁴	3	3E	H	465	Landscape Estimating (3 credits of mathematics)	3	
		Logic/critical thinking ⁵	3	2D			Electives	11-13	
		TOTAL	30-32				TOTAL	30-32	
JUNIOR							PROGRAM TOTAL = 120 credits		
A	140	<i>Select three credits from the following:</i> 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						

(Continued in the next column)

¹ Select from the list of courses in category 3G in the All-University Core Curriculum (AUCC).² See the All-University Core Curriculum section of the catalog for an explanation of which language courses will satisfy category 2B requirements (if so allowed by the student's major).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 2D in the AUCC.⁶ 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			
A CC 192A-B	Orientation to Agricultural Systems	2	1
BZCC 120	Principles of Plant Biology	4	3A
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
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	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 125	Numerical Trigonometry (M/M CC 118 or M/M CC 121 or placement)	1	2C
	Global and cultural awareness ¹	3	3E
	Health and wellness ²	2	3G
	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/C CC 107 or C 113)	4	
H 221	Landscape Plants	4	
H 487	Internship	3	
MC 261	Construction Surveying (M/M CC 125)	3	
SC 240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	

<i>Select one of the following courses:</i>			
L CC 105	First-Year Language I (no previous study in the language)	5	2B3 ³
L CC 107	First-Year Language II (L CC 105 or L 106)	5	2B3 ³
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ⁴	3	3B
	Logical/critical thinking ⁵	3	2D
	TOTAL	30-33	

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 (BZ/BZCC 120 or BY/LS 103; C 245 or concurrent reg.)	3	
H 321	Nursery Production and Management (H/H CC 100)	4	4A
H 341	Turfgrass Management (H/H CC 100)	3	
H 464	Arboriculture and Urban Plant Management (H/H CC 100, SC 240)	3	
BI 361	Elements of Plant Pathology (BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100 or BY/LSCC 102)	3	
SC 350	Soil Fertility Management (SC 240)	3	
	Electives	8	
	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	
H 367	Landscape Irrigation	3	
H 441	Turfgrass Science (BZ/BZCC 120, H 341, SC 240)	3	4C
H 465	Landscape Estimating (3 credits of math)	3	
BI 308	Biology and Control of Weeds (BZ/BZCC 120 or BY/LS 103; C/C CC 107 or C/C CC 111)	4	4B
	Electives ⁶	9-12	
	TOTAL	28-31	

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 See the All-University Core Curriculum section of the catalog for an explanation of which language courses will satisfy category 2B requirements (if so allowed by the student's major).

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

⁵ Select from list of courses in category 2D in the AUCC.

⁶ 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/H CC 100)	4	
TOTAL		8	
UPPER DIVISION			
H 310	Greenhouse Management	4	
H 412	Floriculture Crops (H 310)	4	
OR			
H 450A-D	Horticulture Food Crops (one plant science course)	3-4	
<i>Select two courses from the following for a minimum of six credits:</i>			
H 412	Floriculture Crops (H 310) ¹	4	
H 450A-D	Horticulture Food Crops (one plant science course) ¹	1-4	
H 454	Horticulture Crop Production and Management (H 310 or H 450A-B)	2	
H 460/ SC 460*	Plant Breeding (SC 330)	3	
H 475*	Environmental Requirements of Horticultural Plants (BZ 440)	3	
TOTAL		13-14	

PROGRAM TOTAL = 21-22 credits without prerequisites

*Additional course work may be required because of prerequisites.

¹ Course can only count once for minor. If taken for upper division, then cannot be used for selection of two courses.

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	
UPPER DIVISION			
H 341	Turfgrass Management (H/H CC 100)	3	
H 464*	Arboriculture and Urban Plant Management (H/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/H CC 100)	4	
H 321	Nursery Production and Management (H/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 (BZ/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, Room C 117
Professor James S. Quick, 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. The work these scientists do is of great importance worldwide due to the rapidly increasing population, 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. However, students do not have to choose a concentration but are given the flexibility to tailor the curriculum to their individual interests.

Characteristics and Skills

- Interest in and aptitude for the natural sciences
- Enjoy working outdoors
- Enjoy doing research
- Problem solving abilities
- Analytical skills

- Ability to work as part of a team or independently
- Strong oral and written communication skills

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 scientist; 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; 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 CC 192A-B	Orientation to Agricultural Systems	2	1
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCCC 192 or CO 130)	3	2A
EACC 202	Agricultural and Resource Economics	3	3C
	OR EACC or ECCC elective ¹	3	3C
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
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/C CC 107 or C 113)	4	
C	246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/C CC 112 or C 114; C 245 or concurrent reg.)	1	
SC	240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
SPCC	200	Public Speaking	3	2B1
		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 (CO/COCC 150)	3	2B2
SC	330	Principles of Genetics (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102)	3	
		Historical perspectives ⁷	3	3D
		Soil and crop science electives ⁸	6	
		Statistics ⁹	3	2D
		Technical electives ¹⁰	6	
		Electives	6	
		TOTAL	30	
SENIOR				
BZ	440	<i>Select from the following courses:</i> Plant Physiology (BZ/BZCC 120 or BY/LS 103; C 245 or concurrent reg.)	3	
BZ	441	AND Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
G CC	140	OR Physical Geology	4	3A
SC	421	Crop and Soil Management Systems II (H/H CC 100 or SC 100, SC 240)	4	4A, 4B, 4C
SC	492	Seminar	1	4A
		Soil and crop science electives ⁸	5	
		Technical electives ¹⁰	12	
		Electives	3-8	
		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 2D 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 or 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 available for those who wish to focus on the dynamic science of seeds.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A CC 192A-B	Orientation to Agricultural Systems ¹	2	1
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/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
OR			
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
EACC 202	Agricultural and Resource Economics	3	3C
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
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 (EA/EACC 202 or EC/ECCC 202)	3	
BY 220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
PHCC 110	Descriptive Physics	3	3A
SC 240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
SPCC 200	Public Speaking	3	2B1
	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	

JUNIOR

BZ 440	Plant Physiology (BZ/BZCC 120 or BY/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/C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/C CC 112 or C 114; C 245 or concurrent reg.)	1	
JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2
SC 330	Principles of Genetics (BZ/BZCC 110 or BZ/BZCC 120 or BY/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/H CC 100 or SC 100, SC 240)	3	
SC 420	Crop and Soil Management Systems I (H/H CC 100 or SC 100, SC 240)	3	
<i>Select one course from the following:</i>			
STCC 201	General Statistics (M/M CC 120A-B)	3	2D
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
STCC 307/ EHCC 307	Introduction to Biostatistics (M/M CC 121)	3	2D
Electives			
		1	
TOTAL		30	

SENIOR				
<i>Select three 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	308	Biology and Control of Weeds (BZ/BZCC 120 or BY/LS 103; C/C CC 107 or C/C CC 111)	4	
BI	361	Elements of Plant Pathology (BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100 or BY/LSCC 102)	3	
BZ	223	Plant Identification (BZ/BZCC 120 or BY/LS 103)	3	
<hr/>				
<i>Select three credits from the following:</i>				
SC	200	Seed Development and Metabolism (one course in biology or SC 100 or H/H CC 100 or written consent of instructor)	1	
SC	201	Agronomic Plant and Seed Identification (SC 100, H/H CC 100 or one course in biology)	1	
SC	310	Physiology of Seeds (BZ 440)	2	
SC	446	Seed Anatomy and Identification (one course in biology or SC 100 or H/H CC 100 or written consent of instructor)	2	
<hr/>				
<i>Select three courses from the following:</i>				
SC	304	Seed Production, Conditioning and Marketing (SC 100)	3	
SC	320/RS	Forage and Range Management (one course in biological sciences)	3	
SC	322	Principles of Microclimatology (BY 220 or NR 220; PH/PHCC 141)	3	
SC	377/CE	Geographic Information Systems in Agriculture (CS 110)	3	
SC	414	Agricultural Experimental Design (ST/STCC 201 or ST/STCC 301)	3	
SC	440	Pedology (SC 240)	4	
SC	460/H	Plant Breeding (SC 330)	3	
SC	421	Crop and Soil Management Systems II (H/H CC 100 or SC 100, SC 240)	4	4A, 4B, 4C
SC	492	Seminar	1	4A
		Electives	2-4	
		TOTAL	30	

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 CC 192A-B	Orientation to Agricultural Systems	2	1
AN 100	Animal Sciences	3	
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
SC 100	General Crops	4	
STCC 201	General Statistics (M/M CC 120A-B)	3	2D
	Health and wellness ¹	2	3G
	TOTAL	33	
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 (EA/EACC 202 or EC/ECCC 202)	3	
JTCC 100	Introduction to Mass Media	3	3C, 3F
PYCC 100	General Psychology	3	3C
SC 240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ²	3	3B
	TOTAL	29	

JUNIOR

A	320A-F	Computer Applications in Agriculture (A 140 or BD 150 or CS 110)	2	
AT	150	Science of Weather and Climate (high school algebra; high school chemistry or physics)	2	
AT	151	Weather and Climate Laboratory (AT 150 or concurrent reg.)	1	
EA	305	Agricultural and Resource Enterprise Analysis (EA/EACC 202 or EC/ECCC 202)	3	
EA	310	Agricultural Marketing (EA/EACC 202 or EC/ECCC 202)	3	
NR	220	Natural Resources Ecology and Measurements (BZ/BZCC 120 or BY/LS 103; M/M CC 121)	5	
PHCC	110	Descriptive Physics	3	3A
SC	322	Principles of Microclimatology (BY 220 or NR 220; PH/PHCC 141)	3	
		Historical perspectives ³	3	3D
		Electives	6	
		TOTAL	31	

SENIOR

A	346	Principles of Cooperative Extension	3	
A	487	Internship (A 346)	4	4A, 4B
A	492A	Seminar-Agricultural Extension Education (A 346; concurrent reg. in A 487)	1	4C
CE	204/	Agricultural and Environmental Measurements (PH/PHCC 110 or PH/PHCC 141)	3	
EV	204			
CE	425	Soil and Water Engineering (CE 300 or CH 331 or SC 240)	4	
EA	328	Small Agribusiness Management (EA/EACC 202 or EC/ECCC 202)	3	
EA	478	Agricultural Policy (EA/EACC 202 or EC/ECCC 202 or EA/EACC 240 or EC/ECCC 240)	3	
SC	377/	Geographic Information Systems in Agriculture (CS 110)	3	
CE	377			
		Global and cultural awareness ⁴	3	3E
		TOTAL	27	

PROGRAM TOTAL = 120 credits¹ 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. 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 environmental soil science concentration in the major in soil and crop sciences.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
A CC 192A-B	Orientation to Agricultural Systems	2	1
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
EACC 240/ ECCC 240	Issues in Environmental Economics	3	3F
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
M CC 141	Calculus in Management Sciences (M/M CC 118 or M/M CC 121)	3	2C
SC 240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
	Arts/humanities ¹	3	3B
	Health and wellness ²	2	3G
	TOTAL	33	
SOPHOMORE			
BY 220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
G CC 140	Physical Geology	4	3A
M CC 125	Numerical Trigonometry (M/M CC 118 or M/M CC 121 or placement)	1	2C
PHCC 121	General Physics I (concurrent reg. in M/M CC 125)	5	3A
PHCC 122	General Physics II (PH/PHCC 121)	5	3A
SC 350	Soil Fertility Management (SC 240)	3	
SC 351	Soil Fertility Laboratory (SC 350 or concurrent reg.)	1	
SPCC 200	Public Speaking	3	2B1
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
OR			
STCC 307/ EHCC 307	Introduction to Biostatistics (M/M CC 121)	3	2D

Global and cultural awareness ³	3	3E
TOTAL	31	

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.

JUNIOR

<i>Select one of the following sets of courses:</i>				
C	245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
C	246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/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 (CO/COCC 150)	3	2B2
MB	300	General Microbiology (BZ/BZCC 110 or BZ/BZCC 120 or BY/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 (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 343 or concurrent reg. in C 343)	4	
BZ	440	Plant Physiology (BZ/BZCC 120 or BY/LS 103; C 245 or concurrent reg.)	3	
SC	455	Soil Microbiology (MB 300 or SC 240)	3	
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 AUCC.

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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
A CC 192A-B	Orientation to Agricultural Systems	2	1
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/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
OR			
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent registration)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
EACC 202	Agricultural and Resource Economics	3	3C
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
SC 100	General Crops	4	
	Health and wellness ¹	2	3G
	Electives	1-4	
TOTAL		30-31	

SOPHOMORE

A CC IECC	270/ 270A	World Interdependence-Population and Food	3	3E
BY	220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
C	245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
C	246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/C CC 112 or C 114; C 245 or concurrent reg.)	1	
ECCC	204	Principles of Macroeconomics (EC/ECCC 202 or EA/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/C CC 107 or C/C CC 111)	4	
SPCC	200	Public Speaking	3	2B1
		Arts/humanities ²	3	3B
		TOTAL	30	
JUNIOR				
BZ	440	Plant Physiology (BZ/BZCC 120 or BY/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 (CO/COCC 150)	3	2B2
PO EC	332/ 332	International Political Economy (EA/EACC 202 or EC/ECCC 202 and PO/POCC 232 or POCC 192C)	3	
<i>Select one of the following courses:</i>				
S	341	Sociology of Rural Life (S/S CC 100 or S/S CC 105)	3	
S	364	Agricultural and Global Society (S/S CC 100 or S/S CC 105)	3	
S	366	Peoples and Institutions of Latin America (S/S CC 100 or S/S CC 105)	3	
SC	330	Principles of Genetics (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 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/H CC 100 or SC 100, SC 240)	3	
<i>Select one course from the following:</i>				
STCC	201	General Statistics (M/M CC 120A-B)	3	2D
STCC	301	Introduction to Statistical Methods (M/M CC 121)	3	2D
STCC EHCC	307/ 307	Introduction to Biostatistics (M/M CC 121)	3	2D
		Electives	3	
		TOTAL	30	

SENIOR

EA	460	Economics of World Agriculture (EA/EACC 202 or EC/ECCC 202)	3	
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 (BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100 or BY/LSCC 102)	3	
BI	308	Biology and Control of Weeds (BZ/BZCC 120 or BY/LS 103; C/C CC 107 or C/C CC 111)	4	
<i>Select two course from the following:</i>				
SC	304	Seed Production, Conditioning and Marketing (SC 100)	3	
SC RS	320/ 320	Forage and Range Management (one course in biological sciences)	3	
SC	322	Principles of Microclimatology (BY 220 or NR 220; PH/PHCC 141)	3	
SC CE	377/ 377	Geographic Information Systems in Agriculture (CS 110)	3	
SC	440	Pedology (SC 240)	4	
SC H	460/ 460	Plant Breeding (SC 330)	3	
SC	370	Irrigation Principles and Management (H/H CC 100 or SC 100, SC 240)	3	
SC	421	Crop and Soil Management Systems II (H/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.

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	

Course	Title (Prerequisite)	Cr	AUCC				
FRESHMAN				JUNIOR			
A CC 192A-B	Orientation to Agricultural Systems	2	1	BC 351	Principles of Biochemistry (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 343 or concurrent reg. in C 343)	4	
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A	<i>Select nine credits from the following courses:</i>			
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A	BC 352	Principles of Biochemistry Laboratory (BC 351 or BC 401 or concurrent reg., two credits of college chemistry laboratory)	1	
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3		BC 463	Molecular Genetics (BC 401 or concurrent reg. or BC 351; LSCC 201B)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1		BZ 331	Developmental Plant Anatomy (BZ/BZCC 120 or BY/LS 103; C 245 or C 343; BZ 350 or concurrent reg.)	4	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A	BZ 346	Population and Evolutionary Genetics (BZ 220, M/M CC 155, ST/STCC 301 or ST/STCC 307 or EH/EHCC 307)	3	
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A	BZ 402	Chromosomes of Eukaryotes (BY 310)	4	
LS 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4		BZ 476	Topics in Advanced Genetics (BZ 350 or SC 330)	3	
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C	H 450A	Horticulture Food Crops-Cool Season Vegetable Production (one plant science course)	1	
M CC 125	Numerical Trigonometry (M/M CC 118 or M/M CC 121 or placement)	1	2C	H 450B	Horticulture Food Crops-Warm Season Vegetable Production (one plant science course)	1	
M CC 126	Analytic Trigonometry (M/M CC 125 or placement)	1	2C	H 450C	Horticulture Food Crops-Small Fruit Production (one plant science course)	1	
M CC 155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	2C	H 450D	Horticulture Food Crops-Tree Fruit Production (one plant science course)	1	
SC 100	General Crops	4		H 454	Horticulture Crop Production and Management (H 310 or H 450A-B)	2	
	TOTAL	33		MB 300	General Microbiology (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 341 or concurrent reg.)	3	
SOPHOMORE				MB 450	Microbial Genetics (MB 300; BC 351 or BC 401 or concurrent reg.)	3	
A CC 116/IECC 116	Plants and Civilization	3	3E	SC 414	Agricultural Experimental Design (ST/STCC 201 or ST/STCC 301)	3	
OR				BZ 440	Plant Physiology (BZ/BZCC 120 or BY/LS 103; C 245 or concurrent reg.)	3	
A CC 270/IECC 270A	World Interdependence-Population and Food	3	3E	BZ 441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
BY 310	Cell Biology (one semester of organic chemistry or concurrent reg.; two semester of introductory biology)	4		<i>Select two courses from the following:</i>			
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4		BI 302	Applied and General Entomology	2	
C 246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/C CC 112 or C 114; C 245 or concurrent reg.)	1		AND			
EACC 202	Agricultural and Resource Economics	3	3C	BI 303C	Agricultural Entomology Laboratory (BI 302 or concurrent reg.)	1	
PHCC 110	Descriptive Physics	3	3A	BI 308	Biology and Control of Weeds (BZ/BZCC 120 or BY/LS 103; C/C CC 107 or C/C CC 111)	4	
SC 240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4		BI 361	Elements of Plant Pathology (BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100 or BY/LSCC 102)	3	
SPCC 200	Public Speaking	3	2B1	JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2
				SC 330	Principles of Genetics (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102)	3	
				SC 331	Genetics Laboratory (SC 330 or concurrent reg.)	1	

STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
OR			
STCC 307/ EHCC 307	Introduction to Biostatistics (M/M CC 121)	3	2D
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 graduates provide technical assistance to farmers, ranchers, state and local governments, and others concerned with the conservation of soil, water, and related natural resources. Emphasis is on interpretations of land suitability 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 CC 192A-B	Orientation to Agricultural Systems	2	1
BZCC 120	Principles of Plant Biology	4	3A
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	

C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
EACC 202	Agricultural and Resource Economics	3	3C
ECCC 204	Principles of Macroeconomics (EC/ECCC 202 or EA/EACC 202)	3	3F
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
MBCC 149	The Microbial World	3	2G
OR			
MB 300	General Microbiology (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 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/C CC 107 or C 113)	4	
G CC 140	Physical Geology	4	3A
PHCC 110	Descriptive Physics	3	3A
SC 240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
SPCC 200	Public Speaking	3	2B1
	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 (BZ/BZCC 110 or BZ/BZCC 120 or BY/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/H CC 100 or SC 100, SC 240)	3	
SC 420	Crop and Soil Management Systems I (H/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/M CC 120A-B)	3	2D
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
STCC 307/ EHCC 307	Introduction to Biostatistics (M/M CC 121)	3	2D

		Health and wellness ⁴	2	3G
		Historical perspectives ⁵	(3)	3D
		TOTAL	25	
SENIOR				
BZ	440	Plant Physiology (BZ/BZCC 120 or BY/LS 103; C 245 or concurrent reg.)	3	
BZ	441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
G	454	Geomorphology (G CC 140 or G 150 or GR 210; M/M CC 155 or M/M CC 160)	4	
JTCC	300	Professional and Technical Communication (CO/COCC 150)	3	2B2
SC	421	Crop and Soil Management Systems II (H/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/C CC 107 or C/C CC 111)	4	
UPPER DIVISION					
BZ	440*		Plant Physiology (BZ/BZCC 120 or BY/LS 103; C 245 or concurrent reg.)	3	
G	454*		Geomorphology G CC 140 or G 150 or GR 210; M/M CC 155 or M/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/H CC 100 or SC 100, SC 240)	3	
SC	420*		Crop and Soil Management Systems I (H/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	
SC	351		Soil Fertility Laboratory (SC 350 or concurrent reg.)	1	
SC	421*		Crop and Soil Management Systems II (H/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	

			TOTAL	28-29	

PROGRAM TOTAL = 32-33 credits without prerequisites

*Additional course work may be required because of prerequisites.

Graduate Programs in Soil and Crop Sciences

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](#).

College of Applied Human Sciences

Office in Gibbons Building, Room 204
Professor Nancy Hartley, Dean
Professor Antigone Kotsiopulos, Associate Dean
Professor Brad Sheafor, 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
Technology Education and Training

UNDERGRADUATE MINORS

Coaching
Construction Management
Merchandising
Nutrition

UNDERGRADUATE PROGRAMS

The College of Applied Human Sciences comprises six academic departments and two schools. It is a human-centered place, with a focus on educating students for people-oriented professions and on applying creative, interdisciplinary research to solving 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 **Design and Merchandising**; **Food Science and Human Nutrition**; **Health and Exercise Science**; **Human Development and Family Studies**; **Manufacturing Technology and Construction Management**; 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 16 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 catalog.

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 while 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 website 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 in **dietetics**, **human development and family studies**, **nutritional sciences**, **nutrition and fitness**, **occupational therapy**, **social work**, and **sports medicine**.

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 CSU 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 advisors far in advance (the junior year is usually the best time to study elsewhere) and 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 227

Consumer and family studies is an exciting field with many career opportunities. The mission of this interdepartmental major in the College of Applied Human Sciences is to prepare individuals who are dedicated to enhancing the well-being and relationships among individuals and families and the community and environments in which they function.

Because this major is interdepartmental, students graduate with an interdisciplinary perspective about problems encountered by families. They have the expertise to critically examine

decisions and problems and suggest solutions based on a holistic approach. Consumer and family studies students graduate with skills to assist families and consumers with quality of life decisions and challenges in the areas of interpersonal/human relationships, consumer and financial skills, personal development, nutrition and wellness, and balancing family and work. Students study the roles of individuals within families and as consumers. 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 graduate with 120 credits.

Placement Rate

The placement rate for graduates is very high, especially for the student in the education track. Consumer and family studies students are often recruited to fill positions before they complete student teaching or internships. The demand for consumer and family studies teachers exceeds the supply in Colorado and nationally.

Consumer and Family Studies Concentration

The consumer and family studies concentration provides students 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.

Graduates' career opportunities include cooperative extension/agent; consumer program development; consultant; product designer; product representative; consumer information specialist; customer assurance specialist; writer/developer of informational or education materials; entrepreneur; governmental, community, and non-profit agency worker, and Peace Corps volunteer.

It is highly recommended that students participate in internships, volunteer activities, or cooperative extension opportunities to enhance their practical training and development. Graduate who go on for advanced studies can attain higher level professional positions.

Consumer and family studies is a quality undergraduate programs consistent with the contemporary land-grant mission and its heritage as it integrates teaching, research, and service to impact student learning. The program integrates on-campus and off-campus student experiences to meet evolving needs of families and communities.

Colorado State University's consumer and family studies program includes general education courses; subject matter courses; and elective courses to enhance personal and professional development.

Students completing the program meet the requirements for a Bachelor's of Science degree in consumer and family studies. Our undergraduate program 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).

Characteristics and Skills

- Ability to communicate effectively
- Understand clients' emotional and educational needs
- Strong desire to help people and display compassion and empathy
- Capability to be dependable and patient
- Creativity and self-motivation
- Interested in issues affecting individuals, families, and consumers

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
AM 130	Design Appreciation-Apparel and Merchandising	3	
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/C CC 103 or concurrent reg.)	1	3A
OR			
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
CF 179	Introduction to Consumer and Family Studies	2	
COCC 150	College Composition (Composition Placement Exam exam of 3 to 6 or COCC 192/CO 130)	3	2A
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	2C
M CC 133	Financial Mathematics (math placement exam)	3	2C
M CC 135	Patterns of Phenomena I (math placement exam)	3	2C
PYCC 100	General Psychology	3	3C
	First year seminar ¹	2	1
TOTAL		29-30	

SOPHOMORE			
BD 150	Business Computing Concepts and Applications	3	
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/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/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	2B1
	Arts/humanities ²	3	3B
	Consumer and family studies ³	3	
	Elective	3	
TOTAL		30-32	

JUNIOR			
DM 320	Finance-Personal and Family	3	
FN 300	Food Principles and Applications (C/C CC 107, FN/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 (HD/HDCC 101 or PY/PYCC 100)	3	
HD 311	Adolescent/Early Adult Development in Context (HD/HDCC 101)	3	
HD 312	Adult Development-Middle Age and Aging (HD/HDCC 101 or PY/PYCC 100 or S/S CC 100)	3	
HSCC 300	Research in Applied Professions	3	2D
	AM/DM elective	3	
	FN, FT, RM elective	3	
	Consumer and family studies elective ³	3	
	Historical perspectives ⁴	3	3D
	Support career objective-elective ⁵	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 (PY/PYCC 100 or S/S CC 100)	3	
HD 334	Parenting Across the Lifespan (HD/HDCC 101 or HD 310)	3	4B
HD 402	Family Studies (HD/HDCC 101)	3	
HD 403	Families in the Legal Environment	3	
	Global and cultural awareness ⁶	3	3E

Consumer and family studies ³	12
Support career objective-electives ⁵	2-3
TOTAL	31-32

PROGRAM TOTAL = 120-122 credits

¹ Select from list of courses in category 1 in the All-University Core Curriculum (AUCC). HSCC 192 is recommended.

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

³ 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.

⁴ Select from the list of courses in category 3D in the AUCC. AUCC 200 and POCC 131 are recommended.

⁵ Select courses to enhance knowledge and skill in chosen career area.

⁶ 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

This licensing program is for students who plan to teach consumer and family studies at the middle school, junior high, high school, or postsecondary levels. Consumer and family studies education directly addresses the needs of individuals, families, and consumers. Teachers of consumer and family studies can directly impact the lives of individuals, the health of families, and the welfare of society and help to shape the future in a very direct way.

Consumer and family studies education programs focus on relationships, personal development, life management skills, teen challenges and choices, understanding parenting, teen parenting, food science and dietetics, catering, culinary arts, infant and childhood development, interior design, textile and fashion design, nutrition and food decisions, balancing work and family, and general employability skills.

The consumer and family studies education program has as its mission *to teach and model best educational practices to prepare emerging teachers as learners, collaborators, and leaders*. Colorado State University's consumer and family studies licensing program includes general education courses; subject matter courses; and teacher preparation courses.

Licensure students apply for the program in their junior year. Students participate in multi-level practicum experiences which allow them to work closely with master classroom teachers at various levels. Students are assigned for 15 weeks to a middle, junior, or senior high school where they apply professional knowledge and refine their instructional skills. Students work closely with a consumer and family studies mentor teacher(s) and university professor(s) while student teaching.

Students completing the program meet the requirements for a Bachelor's of Science in consumer and family studies with an emphasis in education, a Colorado Teaching License in Consumer and Family Studies, and a Consumer and Family Studies Vocational Credential.

Our undergraduate program 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).

The program 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).

Characteristics and Skills

- Desire to educate and inform
- Ability to communicate and teach effectively
- Understand students' emotional and educational needs
- Strong desire to help people and display compassion and empathy
- Capability to be dependable and patient
- Creativity and self-motivation
- Interested in issues affective individuals, families, and consumers
- Enjoy being a role model

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one of the following pairs of courses:</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/M CC 117 or M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/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 to 6 or COCC 192/CO 130)	3	2A
<i>Select one of the following courses:</i>			
EDCC 192	Learning and Community	3	1
HSCC 192	Applied Human Sciences First Year Seminar	2	1
PLCC 192	Conceptions of the Good Life	3	1
S CC 192	Civic Culture and Social Responsibility	3	1
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 130	Math in the Social Sciences (Math Placement Exam)	3	2C
M 133	Financial Mathematics (Math Placement Exam)	3	2C
M 135	Patterns of Phenomena I (Math Placement Exam)	3	2C

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 (HD/HDCC 101 and PY/PYCC 100)	3	
AM	130	Design Appreciation-Apparel and Merchandising	3	
OR				
ID	129	Introduction to Interior Design	3	
SPCC	200	Public Speaking	3	2B1
		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 (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
ED	340	Literacy and the Learner (completion of 30 credits of course work; consent of Teacher Licensure Office)	3	
ED	350	Instruction I-Individualization/Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED	386	Practicum-Instruction I (ED 310/EDCC 275, ED 340; concurrent reg. in ED 350; admission to Teacher Licensure Program)	1	
FN	300	Food Principles and Applications (C/C CC 107, FN/FNCC 150)	3	
FN	301	Food Principles and Applications Laboratory (FN 300 or concurrent reg.)	2	
HD	302	Marriage and Family Relationships (PY/PYCC 100, S/S CC 100)	3	
HD	311	Adolescent/Early Adult Development in Context (HD/HDCC 101)	3	
HSCC	300	Research in Applied Professions	3	
		Consumer and family studies electives ³	3-4	
		TOTAL	31-32	

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 450 or ED 426; , VE 451; concurrent reg. in ED 485A or B or C or VE 485)	1	4B
HD	334	Parenting Across the Lifespan (HD/HDCC 101 or HD 310)	3	
HD	403	Families in the Legal Environment	3	
VE	451	Methods-Consumer and Family Studies Education (ED 320; 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 = 121-122 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 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.

SCHOOL OF EDUCATION

*Office in Education Building, Room 209
Professor Rick Ginsberg, Director*

Professional Licensing Program

*Educator Licensing Office, Education Building, Room 111
Professor David Whaley, Associate Director*

All candidates for teacher licensure must complete a degree program in an approved area of study (English, mathematics, natural sciences, etc.) plus the professional education requirements for teacher licensure. Licensure coursework is a balance of the specific content area and education courses designed to provide students with in-depth knowledge of a specific discipline and the skills to effectively manage a classroom. Early advising from the School of Education is highly recommended.

Candidates may pursue an endorsement in art or music to teach kindergarten through twelfth grade or an endorsement in early childhood education to teach grades pre-school through third grade. All other endorsements lead to secondary teacher licensure (and vocational credentialing for specific endorsements). Interdepartmental endorsements include: English as a Second Language in Liberal Arts; the Department

of Occupational Therapy graduate program; and the School of Social Work graduate program. Graduate programs in the School of Education include principal and school counselor. The Colorado State Educator Licensing program is nationally accredited by the National Council for Accreditation of Teacher Education (NCATE). Candidates may complete licensure while enrolled in an undergraduate program or after completing a bachelor's degree at Colorado State or any other accredited university.

Section 207 of Title II of the Higher Education Act mandates that the Department of Education collect data on state assessments, other requirements, and standards 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 website of the Educator Licensing Program in the School of Education (www.colostate.edu/Depts/EdLicense).

Characteristics and Skills

- Capability to inspire trust and confidence
- Ability to motivate others for peak performance
- Ability to guide activities of others
- Ability to deal effectively with individuals and groups
- Ability to plan and organize courses of study
- An understanding of emotional and educational needs of students
- Strong ability to communicate clearly
- Ability to maintain order, resolve differences, anticipate and prevent problems
- Ability to gather information, organize and present in a manner that holds attention
- Capability to adapt and present information to people with different learning styles
- Ability to accurately assess progress of individuals and programs

Potential Occupations

The National Center for Educational Statistics reports that by the year 2008, the total K-12 enrollment in private and public schools is expected to increase from 51.4 million to 54.5 million students. Fueled by the increased numbers of students, teacher retirements, career changes, and mandates for class size reduction, the need for teachers will increase from 3.03 million to 3.4 million, a 14% growth rate (Nat. Center for Ed. Statistics, 1998). The 2000-01 median salary for teachers was \$39,184.

Participation in internships, volunteer activities, or cooperative education opportunities is highly recommended to licensure students to enhance practical training and development. Graduates who go on for advanced studies can attain higher positions with the possibility of rising to top professional levels.

Licensure Endorsements

<u>PreK-3</u>	
Endorsement Area	Required College Undergraduate Major
Early childhood education	*Human Development & Family Studies
<u>K-12</u>	
Endorsement Area	Appropriate College Undergraduate Major
Art	*Art
Music	*Music
<u>Secondary</u>	
Endorsement Area	Appropriate College Undergraduate Major
English	*English
Foreign Languages French, German, or Spanish	*Languages, Literatures, and Cultures French, German, or Spanish Concentrations
Mathematics	*Mathematics
Science	*Natural Sciences Biology; Biology/Natural Resources; Chemistry; General; Geology; Physics
Social Studies	*History, *Liberal Arts
Speech General Speech Theatre	*Speech Communication
<u>Vocational Education**</u>	
Endorsement Area	Required College Undergraduate Major
Agricultural Education	*Agricultural Education
Business Education	Business Administration- *Accounting or *Entrepreneurship Concentration
Consumer and Family Studies	*Consumer and Family Studies Education
Distributive (Marketing) Education	Business Administration- *Marketing Concentration
Technology Education	*Technology Education and Training
Trade and Industrial Education	*Technology Education and Training

Other Endorsement Areas (Graduate Programs)

Principal
Counselor
Occupational therapist
English as a Second Language
School Social Worker

*Endorsement requirements for these programs are outlined in the department where the major is offered.

**Vocational credentialing is required for secondary teachers in agriculture, consumer and family studies, business, marketing, and trade and industry education. Candidates in these areas receive a teaching certificate and a vocational credential. It may also be required for teachers in community colleges and vocational/technical colleges.

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.

Requirements for admission to teacher licensure are available in the Education Building, Room 111. Students may not enroll in education courses beyond Phase I courses until they have been admitted to the Teacher Licensure Program.

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 website at <http://soe.cahs.colostate.edu/licensure.html>.

Foundations Requirement

Candidates will complete approximately one third of their overall preparation program in foundations, including course work in communication and reasoning, natural sciences, arts and humanities, behavioral and social sciences, physical

education/ wellness, and additional major course work. Aligned closely with the **All-University Core Curriculum**, course work in foundations also complements the major requirements of each teaching endorsement area.

Student Teaching

Teacher licensure candidates apply to the School of Education for student teaching placement one semester before student teaching. Candidates must pass the PLACE® content exam 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.

The University reserves the right to not place a candidate for student teaching on the basis of unacceptable academic and personal fitness/performance.

An opportunity is available to interested candidates to teach abroad. Further information is available in the Education Building, Room 111.

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 imposed by the Colorado Department of Education include the successful completion of the PLACE® content exam. The PLACE® is the only assessment program that satisfies the licensing requirement for Colorado educators. Successful completion of the approved teacher licensure program at Colorado State does not guarantee successful completion of the PLACE® assessment. The School of Education does not assume responsibility in the successful completion of the PLACE® assessment.

Colorado State University's approved program requirements include completion of a baccalaureate degree, prescribed general education requirements, teaching endorsement requirements, the professional education sequence, and fulfillment of all other established program requirements that includes 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 is 2.75 computed for all course work.

The University reserves the right to not recommend a student for teacher licensure on the basis of unacceptable personal and fitness/performance.

Professional Licensure Requirements

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 addition to (ED 400) or in place of (ED 425, 426), ED 350/386 and ED 450/486J. Additional courses may be required by specific endorsements areas. Refer to individual checksheets for clarification; checksheets may be obtained in Room 111, Education Building.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
ED 340	Literacy and the Learner (completion of 30 credits of course work; consent of Teacher Licensure Office)	3	
ED 350	Instruction I-Individualization/Management (ED/EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (ED/EDCC 310/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 485A-B	Student Teaching ¹ (ED 450 and appropriate special methods courses)	Var.	
OR			
VE 485	Student Teaching ¹ (ED 450 and appropriate special methods courses)	Var.	
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
ED 493A-B	Seminar (ED 450 and appropriate special methods course(s); concurrent reg. in ED 485A or B or VE 485)	1	
OR			
VE 492	Seminar-Professional Relations (ED 450 and appropriate special 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 Students must take the appropriate special methods courses based upon their endorsement areas from the following list:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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 (ED/EDCC 310/EDCC 275, admission to Teacher Licensure Program)	4	
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 reg. 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 (ED 320; VE 431 or concurrent reg.; admission to Teacher Licensure Program or written consent of instructor)	1	
VE 451	Methods-Consumer and Family Studies Education (ED 320, concurrent reg. 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. Student teachers complete a semester-long student teaching experience, a professional relations seminar, and an assessment seminar.

Candidates planning to be licensed in art or music must complete both an elementary and secondary student teaching experience and enroll in a professional relations seminar.

Candidates planning to be licensed in early childhood education must complete both a pre-school and K-3rd grade student teaching experience and enroll in a professional relations seminar and an assessment seminar.

Career and Technical (Vocational) Teaching Endorsement (CTE) Area Requirements

Career and Technical (Vocational) Credentialing

Individuals desiring to teach in or administer career and technical programs in the state of Colorado must qualify for a CTE credential in addition to a teaching or administrative license. Those who plan to qualify as career and technical teachers or administrators 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 Blvd., Building 965, Denver, CO 80230; phone (303) 365-7646.

Credit for Merchandising, Selling, Managerial, Technical, Trade, or Industrial Work Experience

Evidence of a minimum of two to five years of approved full-time work experience is required before a credential can be granted in vocational education. A year is defined as 48 weeks of full-time (or part-time equated to full-time) work experience; work experience of less than three months cannot be used to meet this requirement.

Students may receive academic credit for work experience and for successfully passing an appropriate competency examination administered by the School of Education. The amount of credit to be awarded is determined by the University Committee on Undergraduate Work in Vocational Education; up to a maximum of 42 credits may be granted for this experience. Students may apply for the competency examination credit after they have completed 16 credits at Colorado State and have a total of 32 credits which are applicable in meeting degree requirements.

Nontransfer credits in technical/vocational courses from postsecondary institutions approved by a recognized accrediting agency may be used to meet the technical specialty requirement.

Students who have successfully completed a minimum of three or more years of teaching at an approved institution may qualify for eight credits in teaching and have the student teaching requirement waived.

Professional Core Requirements

The professional core requirements listed under Professional Licensure Requirements apply to all teaching endorsement areas in vocational education.

Adult Technical Education

Assistant Professor James Folkestad, Program Chair

Work Experience Requirement

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 four-year curriculum, refer to the Department of Manufacturing Technology and Construction Management, major in [technology education and training](#) in this section of the catalog.

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 vocational 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 Yohon, Program Chair

Individuals majoring in business administration with a concentration in entrepreneurship/management, accounting, or a 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.

Work Experience Requirement

Candidates having 2,000 hours of successful, office-related work experience can qualify for a career and technical credential issued by the Community Colleges of Colorado. Work experience may be acquired while attending Colorado State through part-time, office-related work experience during the school year and/or summers.

For the detailed curriculum requirements in business administration with a concentration in **accounting**, **entrepreneurship**, 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 vocational 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 teach marketing education at the secondary or community and junior college levels need to qualify for vocational marketing education licensure and credentialing. In addition to majoring in business administration, students must meet the licensure and credentialing requirements in **marketing education**.

Work Experience Requirement

It is recommended that individuals complete a minimum of two years of work experience in merchandising, sales, or other marketing occupations prior to completion of the degree program in order to meet Colorado vocational credentialing requirements.

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 vocational program. Applicants without vocational credentials must complete three years of occupational experience before completing the degree requirements.

For the detailed four-year curriculum, refer to the Department of Manufacturing Technology and Construction Management, major in **technology education and training**, in this section of the catalog.

Graduate Programs

*Graduate Programs Office, Education Building, Room 100
Professor Jean Lehmann, Associate Director*

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 specializations are available in adult education and training, counseling and career development (CACREP approved), educational leadership, and organizational performance and change (OPC).

Doctoral degree specializations 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, school counselor, vocational guidance specialist, and local vocational director.

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
Professor Linda Carlson, Interim Head*

Major in Apparel and Merchandising

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

Students interested in *teaching* apparel and merchandising 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 apparel, merchandising, and/or interior design with teaching. Consumer and family studies students take course work in the departments of Design and Merchandising, Food Science and Human Nutrition, 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.

Characteristics And Skills

- Interested in fibers and textile products
- Creative
- Good eye-hand coordination
- Ability to perform repetitive tasks
- Ability to operate machinery
- Interest in design
- Knowledge of fashion and textile industry trends
- Strong communication skills
- Customer oriented
- Entrepreneurial interest

Potential Occupations

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.

Apparel design and production graduates design clothing, accessories, and other soft goods. Some high fashion designers are self-employed and design for individual clients often making fashion news by establishing their own clothing line including colors and fabrics that will be worn each season. Other high fashion designers cater to specialty stores or department stores. Most fashion designers however, work for apparel manufacturers creating and adapting fashions for the mass market.

Some examples of careers in this area 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.

Merchandising professionals operate at the wholesale or retail level in the textile industry. Career placement is very high and is complemented by the strong, paid industry internship

program. Knowledge of sales techniques and merchandise, as well as knowledge of trends in the market place and customer service are essential.

Careers in this area 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.

Apparel Design and Production Concentration

In the apparel design and production concentration, students learn about all facets of the apparel and textile industries from the raw materials to the consumer. This encompasses knowledge of textile science and apparel design and production from product development through promotion and distribution.

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

The curriculum focuses on apparel design, production, and marketing strategies to enable students to develop the skills to work within the apparel industry. Courses instruct students in all aspects of the industry including: development, organization, and trends of national and foreign fashion; fibers, fabrics, and finishes basic to the selection, use, and care of textiles; basic apparel production; current technology in computer-aided design; fashion design and visual analysis; apparel sketching, pattern drafting, and grading; pattern making techniques; apparel production management; and historic development of costume and textiles.

In addition to knowledge of the fashion industry, students may obtain background and skills in art, history, journalism, theater, marketing, business management, production management, finance, accounting, and customer service. A variety of opportunities are available to assess student learning in apparel design, production, and textiles, including judges' comments on garments selected for the annual senior fashion show, senior portfolio review, and evaluation of interns from their on-site supervisors.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
AM 101	Fashion Industries	3	
AM 130	Design Appreciation-Apparel and Merchandising	3	
AM 143	Introduction to Apparel Design	4	
C CC 103	Chemistry in Context	3	3A
C CC 104	Chemistry in Context Laboratory (C/C CC 103 or concurrent reg.)	1	3A

COCC	150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
DM	120	Textiles	3	
HSCC	192	Applied Human Sciences First Year Seminar	2	1
M CC	130	Math in the Social Sciences (Math Placement Exam)	3	2C
PYCC	100	General Psychology	3	3C
OR				
S CC	100	General Sociology	3	3C
		Elective	3	
		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	2D
OR				
STCC	201	General Statistics (M/M CC 120A-B)	3	2D
SPCC	200	Public Speaking	3	2B1
		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	

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.

⁵ 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 in-depth study of the process of planning, negotiating, acquiring, selling, and evaluating merchandise throughout the distribution channel. It is designed for students interested in merchandising at the wholesale or retail level. Students acquire knowledge of merchandise, sales techniques, trends in the market place, and customer service. This concentration assumes a global perspective, is complemented by business courses, and allows for career flexibility. The merchandising program of study has received the first Award for Excellence given by the American Textile Manufacturers Institute.

Courses instruct students in all aspects of apparel merchandising including the use of computer software to simulate management strategies, as well as design and display of promotional campaigns. Students can also become involved in special projects with the Denver Merchandise Mart. Educational travel opportunities also exist. Traditionally, the merchandising internship may involve participation in an executive development training program, which may include: seminars; training manual assignments; experience in a buying office; department management; and, rotation in the control, promotion, operations, and personnel divisions.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
AM 101	Fashion Industries	3	
AM 130	Design Appreciation-Apparel and Merchandising	3	
BD 150	Business Computing Concepts and Applications	3	
C CC 103	Chemistry in Context	3	3A
C CC 104	Chemistry in Context Laboratory (C/C CC 103 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
DM 120	Textiles	3	
HSCC 192	Applied Human Sciences First-Year Seminar	2	1
<i>Select one pair of the following courses:</i>			
M CC 117	College Algebra in Context I (Math Placement Exam)	1	2C
M CC 118	College Algebra in Context II (M/M CC 117)	1	2C
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C

PYCC	100	General Psychology	3	3C
OR				
S CC	100	General Sociology	3	3C

		Arts/humanities ¹	3	3B
		Health and wellness ²	2	3G
		Mathematics ³	1	2C
		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/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
SPCC	200	Public Speaking	3	2B1
STCC	201	General Statistics (M/M CC 120A-B)	3	2D
OR				
STCC	204	Statistics for Business Students (M/M CC 120A-B)	3	2D

		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; EC/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 (EC/ECCC 101 or EC/ECCC 202 or EA/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/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 students selecting a merchandising minor both enhance understanding in the student's major program of study and expand career opportunities available to the student.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
AM 101	Fashion Industries	3	
AM 270*	Merchandising Processes (M/M CC 117 and M/M CC 118 or M/M CC 120A-B and M/M CC 121; M/M CC 124 or three credits of higher level math)	3	
DM 120	Textiles	3	
	TOTAL	9	
UPPER DIVISION			
AM 330*	Textile and Apparel Economics (DM 120 and EC/ECCC 202)	3	
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 embraces the definition of the professional interior designer as qualified by education, experience, and examination to enhance the function and quality of life, increasing productivity, and protecting the health, safety, and welfare of the public.

Faculty in the interior design program place value in *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 with strong communication skills, active as team players, creative problem solvers, and prepared to make a positive impact in the practice of interior design through multi-dimensional practice opportunities in interior design. Students are engaged in research-based problem solving, providing a solid transition from education to practice in a global community.

Four goals maximize the program's location and resources and embrace change as a constant variable. A description of each goal can be found on the department website, <http://www.caahs.colostate.edu/dm>.

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 space types including, for example, residential, corporate, retail, health care, institutional, financial services, educational, and hospitality. Students will understand conceptual aspects of the design process and develop the necessary technical, theoretical, and psychological skills required of an entry-level interior designer. Assessment of student progress includes a second semester portfolio evaluation, with a senior year portfolio review and show of work.

Students are provided with opportunities to work with actual clients in the classroom setting through selected service learning projects that have included facilities for a wide variety of clients. The Colorado State interior design program is accredited by the Foundation for Interior Design Education and Research (FIDER).

The interior design core curriculum encompasses the entirety of the design process, beginning with assessment of client needs through architectural programming, development of planning alternatives and schematic design solutions, development of design intent including detailing, lighting, selection of furniture and finish materials as well as interior architectural materials, construction documentation including working drawings and specifications, 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, and multimedia; graphic visualization; interior design history; and sustainable practices.

The program has teaching facilities, including interior design studios, student work display space, a resource room, critique spaces, and computer labs for software evaluation, data analysis, word processing, and document production.

Students interested in *teaching* interior design 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 apparel, merchandising, and/or interior design with teaching. Consumer and family studies students take course work in the departments of Design and Merchandising, Food Science and Human Nutrition, 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.

Characteristics And Skills

- Creative
- Like to visualize through drawings and imagery
- Analytical
- Investigative and inquisitive
- Ability to visualize in three dimensions
- Strong sense of space, light, and color
- Like to work with people and in team tasks
- Client/user oriented
- Strong communications skills (oral, written, and graphic)

Potential Occupations

The entry-level interior designer graduating from the Colorado State University program in interior design may qualify to take the professional certification exam after two years of practice experience. Graduates seek employment in interior design and architecture firms, as lighting designers and as designers to allied professions including industrial design and graphic design. Each student is required to complete a professional internship prior to the senior year. Participation in service learning projects and volunteer activities sponsored by design organizations is highly recommended to enhance entry into the profession. Graduate may also seek graduate studies in interior design to prepare them for practice, design research, or teaching careers.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
AR 101	Visual Form	3	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
HSCC 192	Applied Human Sciences First Year Seminar	2	1
ID 129	Introduction to Interior Design	3	
ID 166	Visual Communication/Sketching	3	
MC 131	Graphic Communications/CAD	3	

MC	151	Construction Material and Methods	3	
PYCC	100	General Psychology	3	3C
		Biological/physical science ¹	4	3A
		Mathematics ²	3	2C
		TOTAL	30	
SOPHOMORE				
ARCC	100	Introduction to the Visual Arts	3	3B
DM	120	Textiles	3	
ID	210	Interior Design Anatomy (portfolio review; advancement to Interior Design second year)	3	
ID	230	Color in Interior Design (concurrent registration in ID 256; portfolio review; advancement to Interior Design second year or written consent of instructor)	2	
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 (MC 131; advancement to Interior Design second year)	2	
ID	266	Visual Communication-Multi-Media (ID 129, ID 166 advancement to Interior Design second year)	3	
ID	276	Interior Design I (ID 210, ID 230)	3	
MC	235	Construction Graphics (MC 131)	3	
		Additional communication ³	3	2B
		Historical perspectives ⁴	3	3D
		Electives	2	
		TOTAL	32	
JUNIOR				
HSCC	300	Research in Applied Professions	3	2D
ID	330	Lighting Design (ID 256, ID 276)	3	
ID	340	Interior Materials and Finishes (DM 120, ID 276)	3	
ID	350	Codes: Health and Safety (ID 276 and advancement to Interior Design second year or written consent of instructor)	3	
ID	356	Professional Communications-Interior Design (CO/COCC 150; advancement to Interior Design second year)	3	4A
ID	357	History of International Interiors (AR/ARCC 100)	3	
ID	360	Interior Project Management (ID 256, ID 276)	3	
ID	376	Interior Design II (ID 276, ID 330, ID 340)	3	
MC	361	Mechanical and Electrical Systems (MC 241)	3	
MC	496A-B	Group Study	1	
PY	316	Environmental Psychology (PY/PYCC 100)	3	
		TOTAL	31	

SENIOR				
ID	358	History of American and 20th Century Interiors (AR/ARCC 100)	3	
ID	400	Interior Design Research Proposal (ID 376; HS/HSCC 300 or concurrent registration)	2	4B
ID	476	Interior Design Project (ID 400)	4	4C
ID	487	Internship-Interior Design (ID 376)	3	
		Biological/physical science ¹	3	3A
		Global and cultural awareness ⁵	3	3E
		Health and wellness ⁶	2	3G
		U.S. public values and institutions ⁷	3	3F
		Electives	4	
		TOTAL	27	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 3A in the All-University Core Curriculum (AUCC). One courses must have a laboratory component.

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

Graduate Program in Design and Merchandising

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

DEPARTMENT OF FOOD SCIENCE AND HUMAN NUTRITION

Office in Gifford Building, Room 234
Professor Christopher Melby, Head

Major in Nutrition and Food Science

Public interest in the 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.

Three options are currently available in this major: **dietetics; nutrition and fitness**; and **nutritional sciences** (pre-med). The department is developing a fourth option in **food safety and nutrition**.

Characteristics And Skills

- Interest in promotion of good nutrition and health
- Ability and desire to work with people
- Strong planning, instructing and record keeping skills
- Interest in education and research
- Ability to communicate clearly with people
- Organizational and management skills

Potential Occupations

Participation in community outreach, internships, volunteer activities, or cooperative education opportunities is highly recommended to enhance career planning, skills, and development. Graduates who go on for advanced studies can attain more responsible leadership positions with the possibility of rising to top professional levels.

Some examples of career opportunities include, but are not limited to: dietitian or nutritionist in health care, hospitals, nursing homes, schools, state or county health agencies, health clubs, corporate wellness programs, or private practice; community nutritionist; biomedical scientist; restaurant manager; caterer; quality assurance specialist; food scientist; food inspector; food technologist; food plant manager; food service manager.

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 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			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
HSCC 192	Applied Human Sciences First-Year Seminar	2	1

<i>Select one pair of the following courses:</i>			
M CC 117	College Algebra in Context I (Math Placement Exam)	1	2C
M CC 118	College Algebra in Context II (M/M CC 117)	1	2C
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C

M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
S CC 100	General Sociology	3	3C, 3F
	Option courses ¹	17-25	
	TOTAL	28-36	
SOPHOMORE			
BS 300	Principles of Human Anatomy and Physiology (BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 102; C/C CC 103 or C/C CC 107 or C/C CC 111)	4	
OR			
BS 310/ BZ 310	Fundamentals of Physiology (BZ/BZCC 101 or BZ/BZCC 110 or BY/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 or BS 310/BZ 310; 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	27-33	
PROGRAM TOTAL = 120-125 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 coursework 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
BD 150	Business Computing Concepts and Applications	3	
	OR		
CS 110	Personal Computing	4	
	<i>Select four credits from the following courses:</i>		
BZCC 110	Principles of Animal Biology	3	3A
	AND		
BZCC 111	Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.)	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/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
	OR		
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/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 or BS 310/BZ 310 or concurrent reg.)	2	
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/C CC 112 or C 114; C 245 or concurrent reg.)	1	
FN 300	Food Principles and Applications (C/C CC 107, FN/FNCC 150)	3	
FN 301	Food Principles and Applications Laboratory (FN 300 or concurrent reg.)	2	

FN 310	Food Service Systems-Operations	3	
LS 205	Survey of Microbial Biology (C/C CC 107 or C 113 and BY/LSCC 102)	3	
LS 206	Microbial Biology Laboratory (LS 205 or concurrent registration)	2	
OT 215	Medical Terminology	1	
	Foundations and perspectives ¹	3	3B, 3D, 3E
	TOTAL	24	

JUNIOR

BC 351	Principles of Biochemistry (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 346 or concurrent reg. in C 346)	4	
BN 305	Fundamentals of Management	3	
	<i>Select one of the following courses:</i>		
COCC 300	Writing Arguments (CO/COCC 150)	3	2B2
JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2
SPCC 200	Public Speaking	3	2B1
FN 311	Food Service Systems-Production and Purchasing (FN 310)	3	
FN 360	Nutrition Assessment (C 246 or C 344, 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/M CC 120A-B)	3	2D
	OR		
STCC 204	Statistics for Business Students (M/M CC 120A-B)	3	2D
	Electives	4	
	TOTAL	25	

SENIOR

FN 414	Food Service Systems-Operations Analysis (FN 310)	3	
FN 428	Nutrition Teaching and Counseling Techniques (FN 350; nine credits in food science and nutrition)	3	
FN 450	Diet and Disease (FN 350; BC 351)	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 reg.)	2	
	Electives	1	
	TOTAL	24	

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).

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 throughout 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 (BZ/BZCC 110 or concurrent reg.)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
OR			
<i>Select one set of courses from the following:</i>			
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
OR			
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/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)	3	
	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	
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	

C 246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/C CC 112 or C 114; C 245 or concurrent registration)	1	
ECCC 101	Economics of Social Issues	3	3C
FN 300	Food Principles and Applications (C/C CC 107, FN/FNCC 150)	3	
FN 301	Food Principles and Applications Laboratory (FN 300 or concurrent registration)	2	
<i>Select one of the following courses:</i>			
COCC 300	Writing Arguments (CO/COCC 150)	3	2B2
JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2
SPCC 200	Public Speaking	3	2B1
TOTAL		19-20	
JUNIOR			
FT 447	Food Chemistry (C 245; BC 351 or concurrent reg.)	2	
MB 300	General Microbiology (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 345 or concurrent registration)	3	
MB 302	General Microbiology Laboratory (MB 300 or concurrent registration)	2	
		Upper division FN courses	6
		Advanced courses ²	8
		Electives	6
TOTAL		27	
SENIOR			
FT 400	Food Safety (6 credits in biology and/or chemistry)	3	
FT 420	Quality Assessment of Food Products (FT 110, MB 300)	3	
MB 334	Food Microbiology (MB 300)	3	
MB 335	Food Microbiology Laboratory (MB 301 or MB 302)	2	
STCC 201	General Statistics (M/M CC 120A-B)	3	2D
OR			
STCC 204	Statistics for Business Students (M/M CC 120A-B)	3	2D
		Upper division FN courses	6
		Advanced courses ²	4
		Electives	2-6
TOTAL		26-30	

OPTION TOTAL = 93-94 credits

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

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.

Nutrition and Fitness Option

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 coursework 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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BD 150	Business Computing Concepts and Applications	3	
	OR		
CS 110	Personal Computing	4	
	<i>Select four credits from the following courses:</i>		
BZCC 110	Principles of Animal Biology	3	3A
	AND		
BZCC 111	Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.)	1	3A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
	<i>Select one set of courses from the following:</i>		
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
	OR		
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
FNCC 150	Survey of Human Nutrition	3	3G
PYCC 100	General Psychology	3	3C
	TOTAL	18-22	
SOPHOMORE			
BS 302	Laboratory in Principles of Physiology (BS 300 or BS 310/BZ 310 or concurrent reg.)	2	
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/C CC 112 or C 114; C 245 or concurrent reg.)	1	
	<i>Select one of the following courses:</i>		
COCC 300	Writing Arguments (CO/COCC 150)	3	2B2
JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2
SPCC 200	Public Speaking	3	2B1
EX 332F	Techniques of Teaching Weight Training (corresponding laboratory or competency in area)	1	
FN 300	Food Principles and Applications (C/C CC 107, FN/FNCC 150)	3	
FN 301	Food Principles and Applications Laboratory (FN 300 or concurrent reg.)	2	
FN 310	Food Service Systems-Operations	3	

OT 215	Medical Terminology	1	
	Foundations and perspectives ¹	3	3B, 3D, 3E
	TOTAL	23	

JUNIOR			
BC 351	Principles of Biochemistry (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 346 or concurrent reg. in C 346)	4	
BS 420	Cardiopulmonary Physiology (BS 300)	3	
EX 240	First Aid and Emergency Care	2	
EX 332H	Techniques of Teaching Aerobics (corresponding laboratory or competency in area)	1	
EX 403	Physiology of Exercise (BS 300)	4	
FN 496A-I	Group Study in Dietetics and Nutrition (FN 350)	1	
LS 205	Survey of Microbial Biology (C/C CC 107 or C 113 and BY/ LSCC 103)	3	
LS 206	Microbial Biology Laboratory (LS 205 or concurrent registration)	2	
STCC 201	General Statistics (M/M CC 120A-B)	3	2D
	OR		
STCC 204	Statistics for Business Students (M/M CC 120A-B)	3	2D
	Electives	5	
	TOTAL	28	

SENIOR			
EX 405	Exercise Testing Instrumentation (EX 403)	2	
FN 360	Nutrition Assessment (C 246 or C 344; FN 350)	2	
FN 428	Nutrition Teaching and Counseling Techniques (FN 350; nine credits in food science and nutrition)	3	
FN 450	Diet and Disease (FN 350; BC 351)	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 reg.)	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 preparation for graduate study and a career in nutritional research, biomedical research, or college teaching. The curriculum provides a background in biomedical sciences and nutrition. 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 (BZ/BZCC 110 or concurrent reg.)	1	3A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
OR			
BZCC 120	Principles of Plant Biology	4	3A
LS 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
M CC 125	Numerical Trigonometry (M/M CC 118 or M/M CC 121 or placement)	1	2C
PYCC 100	General Psychology	3	3C
TOTAL		21	
SOPHOMORE			
BS 302	Laboratory in Principles of Physiology (BS 300 or BS 310/BZ 310 or concurrent reg.)	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/M CC 124, M/M CC 125)	4	2C
MB 300	General Microbiology (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 345 or concurrent reg.)	3	
MB 302	General Microbiology Laboratory (MB 300 or concurrent reg.)	2	
OT 215	Medical Terminology	1	
TOTAL		23	

JUNIOR

BC 351	Principles of Biochemistry (BZ/BZCC 110 or BZ/BZCC 120 or BY/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.; 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 reg.; two semesters of introductory biology)	4	
<i>Select one of the following courses:</i>			
COCC 300	Writing Arguments (CO/COCC 150)	3	2B2
JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2
SPCC 200	Public Speaking	3	2B1
PHCC 121	General Physics I (concurrent reg in M/M CC 125)	5	3A
PHCC 122	General Physics II (PH/PHCC 121)	5	3A
	Foundations and perspectives ¹	3	3B, 3D, 3E
TOTAL		28-29	

SENIOR

FN 360	Nutrition Assessment (C 246 or C 344; FN 350)	2	
FN 428	Nutrition Teaching and Counseling Techniques (FN 350; nine credits in food science and nutrition)	3	
FN 450	Diet and Disease (FN 350; BC 351)	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/M CC 120A-B)	3	2D
TOTAL		24	

OPTION TOTAL = 96-97 credits

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

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 in the curriculum that is combined with coursework 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.

Characteristics & Skills

- Proficiency for organization
- Aptitude for leadership and leading teams
- Self discipline
- Problem solver
- Decision maker
- Good communication skills
- Works well under stressful conditions
- Ability to interact with people of differing backgrounds and personalities
- Desire to serve and please others
- Hospitable
- Business minded
- Good health and stamina

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 (BZ/BZCC 110 or concurrent reg.)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A

ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
FNCC 150	Survey of Human Nutrition	3	3G
HSCC 192	Applied Human Sciences First-Year Seminar	2	1
<i>Select one pair of courses from the following:</i>			
M CC 117	College Algebra in Context I (Math Placement Exam)	1	2C
M CC 118	College Algebra in Context II (M/M CC 117)	1	2C
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
RM 101	Hospitality Industry	3	
RR 270	Principles of Natural Resource Tourism	3	
TOTAL		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 (EC/ECCC 202 or EA/EACC 202)	3	3F
FN 310	Food Service Systems-Operations	3	
JT 301	Business Communication (CO/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	2B1
STCC 204	Statistics for Business Students (M/M CC 120A-B)	3	2D
Electives		3	
TOTAL		34	

JUNIOR

BF 305	Fundamentals of Finance (BA 205, EC/ECCC 204)	3	
FN 300	Food Principles and Applications (C/C CC 107; FN/FNCC 150)	3	
FN 301	Food Principles and Applications Laboratory (FN 300 or concurrent reg.)	2	4A
FN 311	Food Service Systems-Production and Purchasing (FN 310)	3	
FN 414	Food Service Systems-Operations Analysis (FN 310)	3	
RM 330	Alcoholic Beverage Technology and Control (C/C CC 103 or C/C CC 107)	2	
RM 400	Food and Society (S/S CC 100, completion of AUCC categories 3D and 3E)	3	4B

S CC	100	General Sociology	3	3C, 3F
		Electives	6	
		TOTAL	28	

SENIOR

BN	305	Fundamentals of Management	3	
BN	310	Human Resource Management	3	
FT	400	Food Safety (six 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
		Foundations and perspectives ¹	9	3B, 3D, 3E
		Electives, upper division	3	
		TOTAL	30	

PROGRAM TOTAL = 120 credits

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

Minor in Nutrition

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. This minor provides an opportunity for a nonmajor to gain a significant orientation to a food, nutrition, and health-related field.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
UPPER DIVISION			
BC 351*	Principles of Biochemistry (BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120; C 245 or C 343 or concurrent reg. in C 343)	4	
BS 300*	Principles of Human Anatomy and Physiology (C/C CC 103 or C/C CC 107 or C/C CC 111; BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110)	4	
FN 350*	Human Nutrition (BS 300 or BS 310/BZ 310, C 245 or C 345)	3	
FN 450	Diet and Disease (FN 350, BC 351)	5	
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 = 25 credits without prerequisites

*Additional course work may be required because of prerequisites.

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 program, refer to the *Graduate and Professional Bulletin*.

DEPARTMENT OF HEALTH AND EXERCISE SCIENCE

*Office in Health and Exercise Science Complex
Professor Richard G. Israel, Head*

Major in Health and Exercise Science

Students may choose from two concentrations offered in the health and exercise science major—**health promotion** or **sports medicine**.

Characteristics and Skills

- Good decision making skills
- Strong leadership skills
- Ability to motivate others
- Sensitive to others needs
- Ability to effectively convey information to others
- Diplomacy
- Reliability
- Analytical skills
- Detail oriented
- Interest in human health and fitness
- Creativity and resourcefulness
- Ability to work with a diverse population
- Ability to exercise good judgement
- Willingness to accept responsibility

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
<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/C CC 103 or concurrent reg.)	1	3A
OR			
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
OR			
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
EXCC 145	Health and Wellness	3	3G
HSCC 192	Applied Human Sciences First Year Seminar	2	1
PYCC 100	General Psychology	3	3C
	Historical perspectives and U.S. public values and institutions ¹	3	3D, 3F
	Mathematics ²	3	2C
	TOTAL	25-26	
SOPHOMORE			
BS 300	Principles of Human Anatomy and Physiology (BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 102; C/C CC 103 or C/C CC 107 or C/C CC 111)	4	
EX 240	First Aid and Emergency Care	2	
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ³	3	3B
	TOTAL	12	
JUNIOR			
EX 303	Anatomical Kinesiology (BS 300)	3	
EX 403	Physiology of Exercise (BS 300)	4	4B
	Global and cultural awareness ⁴	3	3E
	TOTAL	10	
SENIOR			
<i>Select one of the following:</i>			
STCC 201	General Statistics (M/M CC 120A-B)	3	2D
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
STCC 307/ EHCC 307	Introduction to Biostatistics (M/M CC 121)	3	2D

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 2C 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 coursework includes chemistry, anatomy, physiology of exercise, marketing, advertising, accounting, and more. Students also have opportunities for several practical field experiences before graduating. In fact, the Colorado State health promotion program was ranked #1 in the country by the Association for Worksite Health Promotion for the business coursework 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
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	

ECCC	202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-Bor M/M CC 121 or M/M CC 141 or M/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 (EX/EXCC 145)	3	
JT	200	Professional Writing (CO/COCC 150)	3	
OR				
JT	301	Business Communication (CO/COCC 150)	3	
Electives			4-5	
TOTAL			17-19	

JUNIOR

BA	205	Fundamentals of Accounting	3
BK	305	Fundamentals of Marketing (EC/ECCC 101 or EC/ECCC 202 or EA/EACC 202)	3
BK	320	Integrated Marketing Communications (BK 300 or BK 305)	3
EX	340	Exercise Prescription (concurrent reg. in EX 386A)	1
EX	356	Wellness Programming (EX/EXCC 145, EX 386A)	3
EX	386A	Practicum in Adult Fitness (EX/EXCC 145, EX 240, EX 332F, EX 332H, FN/FNCC 150, concurrent reg. 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 reg)	3
EX	486B	Practicum in Wellness Program Management (EX 386B)	3
EX	487	Internship (EX 486B and all coursework)	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 science core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
EX 203	Motor Learning (PY/PYCC 100)	3	
	EX 100 or EX 101 ¹	1	
TOTAL		4	
SOPHOMORE			
BS 301	Human Gross Anatomy (BZ/BZCC 110 or BY/LSCC 102)	5	
BS 302	Laboratory in Principles of Physiology (BS 300 or BS 310/BZ 310 or concurrent reg.)	2	
EX 332F	Techniques of Teaching Weight Training (corresponding lab or competency in area)	1	
PHCC 121	General Physics I (Corequisite: M/M CC 125)	5	
PHCC 122	General Physics II (PH/PHCC 121)	5	
TOTAL		18	
JUNIOR			
BC 301	Survey of Biochemistry (C 245)	3	
OR			
BC 351	Principles of Biochemistry (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 346 or concurrent reg. in C 346)	4	
<i>Select 4 credits from the following:²</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
LS 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/C CC 112 or C 114; C 245 or concurrent reg.)	1	
EX 307	Biomechanical Principles of Human Movement (PH/PHCC 121 or PH/PHCC 141)	3	
Electives			6-7
TOTAL			22
SENIOR			
EX 405	Exercise Testing Instrumentation (EX 403)	2	
EX 476	Rehabilitation Exercise (EX 240, EX 303)	3	

EX	479	Psychology and Sport (PY/PYCC 100)	3
FN	350	Human Nutrition (BS 300 or BS 310/BZ 310; C 245 or C 345)	3
HDCC	101	Individual and Family Development	3
OR			
PY	320	Abnormal Psychology (PY/PYCC 100)	3
			EX, upper division ³
			3
			Electives
			6-8
TOTAL			23-25

PROGRAM TOTAL = 120 credits

¹ Select any EX 100 or 101 courses.

² Select 3-4 credits different from course(s) selected in the first year of the major in health and exercise science.

³ Select any upper division EX course.

Minor in Coaching

There is a need for competent coaches at the junior and senior high school levels. The minor may be taken by students majoring in disciplines other than health and exercise science. However, coaches in junior and senior high schools should be certified in a teaching area.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
EXCC 123	Fitness and Wellness	2	3G
OR			
EXCC 143	Survey of Health and Wellness	2	3G
EX 203*	Motor Learning (PY/PYCC 100)	3	
EX 240	First Aid and Emergency Care	2	
TOTAL		7	
UPPER DIVISION			
EX 303*	Anatomical Kinesiology (BS 300)	3	
EX 309	Methods of Coaching	2	
EX 346*	Training Room Methods (EX 303)	3	
EX 479*	Psychology and Sport (PY/PYCC 100)	3	
EX 486C	Practicum-Coaching	3	
TOTAL		14	

PROGRAM TOTAL = 21 credits without prerequisites

*Additional course work may be required because of prerequisites.

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

Professor Clifton E. Barber, Head

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. Students learn to identify factors that influence cognitive, emotional, social, and physical development through infancy, childhood, adolescence, adulthood, and later adulthood in the contexts of culture and family. Students complete the human development and family studies foundational requirements and a prescribed series of courses related to their career interests. Each student chooses a career interest area (option)—**childhood education, programming for youth and families, child life specialist, allied health, or adult development and aging**—in order to gain additional knowledge specific to future career aspirations. Additionally, students choose support courses and electives that reflect their future career aspirations. The 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 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.

Characteristics And Skills

- Capacity to understand emotional and physical needs of others
- Interest in the empirical research related to human development and family studies
- Ability to inspire respect, trust and confidence
- Ability to identify factors that influence personal development

- Ability to help persons through stressful situations
- Dependable and patient
- Strong written and oral communication skills
- Organized and creative

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 long-term care facilities. Graduates are also well prepared to pursue an advanced degree 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; services coordinator for low-income families; family assistance programs; program developer and evaluator; fundraiser; public relations specialist; program coordinator; probation officer; youth services worker; community corrections officer; case manager; law enforcement officer; non-profit agency administrator; shelter program worker; residential center manager; retirement transition programmer; early childhood teacher; adult recreation programmer; career development specialist; family services specialist; human development specialist; adult education teacher; gerontological programmer; 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 to 6 or COCC 192/CO 130)	3	2A
HDCC 101	Individual and Family Development	3	3C
HSCC 192	Applied Human Sciences First Year Seminar	2	1
PYCC 100	General Psychology	3	3C
S CC 100	General Sociology	3	3C
	Arts/humanities ¹	3	3B
	Historical perspectives ²	3	3D
	Mathematics ³	3	2C
	Elective	3	
	TOTAL	29	

SOPHOMORE

FNCC 150	Survey of Human Nutrition	3	3G
HD 277	Professional Skills Development I (CO/COCC 150, HD/HDCC 101)	2	
HD 286	Practicum-Observational Skills ⁴ (CO/COCC 150 and HD/HDCC 101 or concurrent reg.)	3	
SPCC 200	Public Speaking	3	2B1
	Advanced writing or second language ⁵	3	2B2 or 2B3
	Biological/physical sciences ⁶	4	3A
	Global and cultural awareness ⁷	3	3E
	Logical/critical thinking ⁸	3	2D
	U.S. public values and institutions ⁹	3	3F
	Elective	3	
	TOTAL	30	

JUNIOR

HD 310	Infant and Child Development in Context (HD/HDCC 101, PY/PYCC 100)	3	
HD 311	Adolescent/Early Adult Development in Context (HD/HDCC 101)	3	
HD 312	Adult Development-Middle Age and Aging (HD/HDCC 101 or PY/PYCC 100 or S/S CC 100)	3	
HD 334	Parenting Across the Lifespan (HD/HDCC 101 or HD 310)	3	4A, 4B
	Career option ¹⁰	6-9	
	Electives	9	
	TOTAL	27-30	

SENIOR

<i>Select two of the following courses:</i>			
HD 302	Marriage and Family Relationships (PY/PYCC 100, S/S CC 100)	3	
HD 402	Family Studies (HD/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 reg. or written consent of instructor)	3	4C
	Career option ¹⁰	5-10	
	Experiential learning ¹¹	9	
	Electives	8	
	TOTAL	31-36	

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 3D in the AUCC. Students in the childhood education career option are encouraged to select either HYCC 150 or HYCC 151.
³ Select from list of courses in category 2C in the AUCC.
⁴ Students must register for lecture and laboratory.
⁵ Select from list of courses in category 2B2 or 2B3 in the AUCC. See the All-University Core Curriculum section of the catalog for an explanation of which language courses will satisfy category 2B requirements (if so allowed by the student’s major).
⁶ Select from list of courses in category 3A in the AUCC.
⁷ Select from list of courses in category 3E in the AUCC.
⁸ Select an STCC course from category 2D in the AUCC.
⁹ Select from list of courses in category 3F in the AUCC.
¹⁰ Select one of the following career options: childhood education, child life/allied health, programming-adult/late life families, or programming-youth and families.

¹¹ HD 477, Professional Skills Development II (1 credit), and HD 488AV-EV, Field Placement (7-14 credits), or a three course upper-division cognate defined with and approved by the adviser.

Adult Development and Aging Option

Students who are interested in adult development and aging complete a series of courses that will prepare them to work with the older adult population. This option works well for students who are interested in a gerontology interdisciplinary studies program certificate.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
HD 332	Death, Dying, and Grief (HD/HDCC 101)	3	
HS 201	Perspectives in Gerontology (HD/HDCC 101 or PY/PYCC 100 or S/S CC 100 or written consent of instructor)	3	
SENIOR			
HD 354	Biological Aspects of Aging (BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 102)	3	
OT 355	Handicapped Individual in Society (PY/PYCC 100 or S/S CC 100)	2	
SW 371F	Social Work-Social Gerontology	3	

OPTION = 14 credits

Childhood Education Option

The childhood education option is designed for students who intend to work in programs that enhance the normal development of young children, such as preschool/infant care settings. This option is also beneficial for students preparing for elementary education licensure programs after they complete their baccalaureate degree.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
BS 254/ HD 254	Biological Aspects of Human Development (BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 102)	3	
HD 375	Programming for Children and Families (HD 286, HD 310)	3	
SENIOR			
HD 400	Speech, Language and Communication Development (HD 310 or PY 260)	3	
HD 401	Childhood Socialization (HD 310, HD 334)	3	
PY 460	Child Exceptionality and Psychopathology (PY/PYCC 100)	3	

OPTION = 15 credits

Child Life/Allied Health Option

Students can also select coursework designed to help meet professional requirements for certification as a child life specialist. A child life specialist is a member of a pediatric health care team that helps hospitalized children and their families deal with the stress of the health care experience.

This option also prepares students for further education in the allied health field. These students are interested in pursuing advanced degrees or additional studies for careers as occupational therapists, physician's assistants, or certified nurse-midwives.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
HD 375	Programming for Children and Families (HD 211, HD 286)	3	
	Global and cultural awareness ¹	3	3E
SENIOR			
BS 300	Principles of Human Anatomy and Physiology (C/C CC 103 or C/C CC 107 or C/C CC 111; BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 102)	4	
HD 401	Childhood Socialization (HD 310, HD 334)	3	
<i>Select one of the following:</i>			
OT 355	Handicapped Individual in Society (PY/PYCC 100 or S/S CC 100)	2	
PY 320	Abnormal Psychology (PY/PYCC 100)	3	
PY 460	Child Exceptionality and Psychopathology (PY/PYCC 100)	3	

OPTION = 15-16 credits

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

Programming for Youth and Families Option

The programming for youth and families option is beneficial for students who are interested in working in programs that address the unique developmental issues of adolescents and their families.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
BS 254/ HD 254	Biological Aspects of Human Development (BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 102)	3	
HD 375	Programming for Children and Families (HD 286, HD 310)	3	
SENIOR			
HD 401	Childhood Socialization (HD 310, HD 334)	3	

<i>Select one of the following:</i>				
PY	320	Abnormal Psychology (PY/PYCC 100)	3	
PY	460	Child Exceptionality and Psychopathology (PY/PYCC 100)	3	
OT	355	Handicapped Individual in Society (PY/PYCC 100 or S/S CC 100)	2	
Global and cultural awareness ¹			3	3E

OPTION = 14-15 credits

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

Preparation for Teacher Licensure in Early Childhood and Elementary Education

Human development and family studies is a strong foundation for students desiring a license to teach young children between the ages of 0 and 8. Knowledge of developmental processes and family systems prepares future teachers to work in partnership with parents 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 coursework 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 to 6 or COCC 192/CO 130)	3	2A
HDCC 101	Individual and Family Development	3	3C
HD 217	Creative Experiences for Children (HD/HDCC 101 or concurrent reg. in HD 286)	3	
HSCC 192	Applied Human Sciences First Year Seminar	2	1
PYCC 100	General Psychology	3	3C
S CC 100	General Sociology	3	3C
	Arts/humanities ¹	3	3B
	Historical perspectives ²	3	3D
	Mathematics ³	3	2C
	TOTAL	29	
SOPHOMORE			
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F

ED	331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
EDCC	430	Diversity and Communication (ED 310/EDCC 275; admission to Teacher Licensure Program)	3	3E
FNCC	150	Survey of Human Nutrition	3	3G
HD/BS	254/254	Biological Aspects of Human Development (BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 102)	3	
HD	277	Professional Skills Development I (HD/HDCC 101 and CO/COCC 150)	2	
HD	286	Practicum-Observational Skills (CO/COCC 150, HD/HDCC 101 or concurrent reg.)	3	
SPCC	200	Public Speaking	3	2B1
		Advanced writing or second language ⁴	3	2B
		Biological/physical sciences ⁵	4	3A
		Logical/critical thinking ⁶	3	2D
		TOTAL	31	

JUNIOR

ED	400	Diagnostic Teaching of Reading (EDCC 310/EDCC 275, ED 340, HD 217, HD 310, HD 400)	3	
ED	425	Early Childhood Education I (EDCC 310/EDCC 275; admission to Teacher Licensure Program)	4	
HD	302	Marriage and Family Relationships (PY/PYCC 100, S/S CC 100)	3	
HD	310	Infant and Child Development in Context (HD/HDCC 101 and PY/PYCC 100)	3	
HD	311	Adolescent /Early Adult Development in Context (HD/HDCC 101)	3	
HD	312	Adult Development-Middle Age and Aging (HD/HDCC 101 or PY/PYCC 100 or S/S CC 100)	3	
HD	334	Parenting Across the Lifespan (HD/HDCC 101 or HD 310)	3	4A, 4B
HD	375	Programming for Children and Families (HD 286, HD 310)	3	
HD	400	Speech, Language, and Communication Development (HD 310 or PY 260)	3	
HD	402	Family Studies (HD/HDCC 101)	3	
		TOTAL	31	

SENIOR

ED	426	Early Childhood Education II (ED 425)	4	
ED	493B	Seminar-Assessment of Learning (ED 450 or ED 426 and appropriate special methods course(s), concurrent reg. in ED 485A or B or VE 485)	1	
HD	401	Childhood Socialization (HD 310, HD 334)	3	
HD	403	Families in the Legal Environment	3	
HD	488	Field Placement (HD 277, HD 286, concurrent reg. with HD 477)	12	

HD	492	Seminar-Program Proposal Development (HD 477 and HD 488A or B or C or D or E or concurrent reg. or written consent of instructor)	3	4C
HD	493	Specialized Seminar (written consent of instructor)	3	
PY	460	Childhood Exceptionality and Psychopathology (PY/PYCC 100)	3	
TOTAL			32	

PROGRAM TOTAL = 123 credits

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

² Select from HYCC courses in category 3D in the AUCC.

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

⁴ Select from list of courses in category 2B2 or 2B3 in the AUCC. See the All-University Core Curriculum section of the catalog for an explanation of which language courses will satisfy category 2B requirements (if so allowed by the student's major).

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

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

Graduate Programs in Human Development and Family Studies

The Department of Human Development and Family Studies offers a course of study leading to the Master of Science. Specializations include family and developmental studies and marriage and family therapy. A description of this program may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF MANUFACTURING TECHNOLOGY AND CONSTRUCTION MANAGEMENT

Office in Guggenheim Hall, Room 102
Professor Larry Grosse, Head

The department offers two academic programs leading to a bachelor of science degree: **construction management** and **technology education and training**. The technology education and training program is being phased out and students can no longer be admitted to this program.

Pre-Manufacturing Technology and Construction Management (MTCM) Program

Students seeking the construction management program are admitted to the Pre-MTCM program where they acquire a foundation in leadership, computer skills, design, and materials and methods in addition to the **All University Core Curriculum**. When the student approaches completion of the Pre-MTCM program, application must be made to the

construction management major. Students seeking the technology education and training program are directly admitted to that major.

Entering students may complete their pre-major requirements at any accredited institution; however, courses must be substantially equivalent in content and level to those required by Colorado State and the department. Students intending to transfer from two-year programs or other colleges or universities should work closely with a department academic adviser.

M CC 120A-B and M CC 121 are considered review courses; these courses may be taken as electives.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
M CC 125	Numerical Trigonometry (M/M CC 118 or M/M CC 121 or placement)	1	2C
MC 110	Team Problem Solving and Leadership	2	
MC 131	Graphic Communications/CAD	3	
MC 151	Construction Materials and Methods	3	
PHCC 110	Descriptive Physics	3	3A
PHCC 111	Descriptive Physics Laboratory (PH/PHCC 110 or concurrent reg.)	1	3A
	Arts/humanities ¹	3	3B
	First-year seminar ²	2	1
	Global and cultural awareness ³	3	3E
	Health and wellness ⁴	2	3G
	Historical perspectives ⁵	3	3D
TOTAL		29	
SOPHOMORE			
C CC 103	Chemistry in Context	3	3A
C CC 104	Chemistry in Context Laboratory (C/C CC 103 or concurrent reg.)	1	3A
MC 241	Energy Controls for Industry	3	
MC 251	Materials Testing and Processing (MC 151, PH/PHCC 111)	3	
MC 317	Safety Management	2	
SPCC 200	Public Speaking	3	2B1
TOTAL		15	
CORE TOTAL = 44 credits⁶			

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 1 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 To complete a major in the department, students must select one of the following majors: construction management or technology education and training.

Major in Construction Management

The construction management program at Colorado State University is one of the highest ranked in the nation. Since its inception in 1946, more than 4,000 students have graduated, many of them going on to become leaders in their field as presidents and CEOs of major construction companies. The program is accredited by the American Council for Construction Education.

A major in construction management provides a strong foundation for professional careers in the construction industry. The curriculum combines the technology and management of construction with the basics of civil engineering, business and management, and the communication skills required to be successful in today's industry. The focus is on the integration of computers, innovative management systems and other technologies into the construction process. Course work includes construction materials and methods, estimating, scheduling, computer applications, architectural principles, fundamentals of management and law, steel and concrete structures, and soils. The academic program is interdisciplinary, with course requirements in business, engineering and the humanities as well as the applied courses in construction management. These requirements provide a wider scope of educational experience and create a much broader range of career options for graduates.

The major addresses issues related to the management of multiple project sites and the applications of resource management, schedule control, cost control, design and other requirements of the construction process. Design elements concentrate on the relationship between the built environment and the comfort of its inhabitants while safety education emphasizes the health of the individual worker.

Recently added is the Certified Professional Constructor exam provided through the American Institute of Constructors. Students who pass the exam are awarded the designation of Associate Constructor. After six (6) years of professional experience, graduates can sit for the level two exam to earn the designation of certified professional constructor (CPC). Many opportunities exist for internships and work experience in the construction industry to satisfy the six-month internship requirement. Participation in internships, volunteer activities, and cooperative education opportunities are highly recommended to enhance practical training and development. Additionally, many departmental scholarships are available.

Potential Occupations

The construction industry has become a \$500 billion dollar 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 is growing. 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 \$43,000 to \$46,000.

Entry-level occupations include, but are not limited to: field engineer; estimator; project scheduler; cost control engineer; safety engineer; project supervisor; quality assurance specialist; assistant project engineer; project engineer; assistant superintendent.

In addition to the Pre-MTCM core courses, the following must be completed:

Construction management is a controlled major which requires attaining a specified GPA and completion of the Pre-MTCM program.

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
M CC 141	Calculus in Management Sciences (M/M CC 118 or M/M CC 121)	3	2C
MC 261	Construction Surveying (M/M CC 125)	3	
MC 267	Construction Management Pre-internship	1	
MC 363	Plan Reading for Estimating (MC 131, MC 151)	3	
MC 364	Advanced Construction Systems (MC 151, MC 271 or MC 363 or concurrent reg.)	3	
STCC 204	Statistics for Business Students (M/M CC 120A-B)	3	2D
	TOTAL	16	
JUNIOR			
BA 205	Fundamentals of Accounting	3	
BN 305	Fundamentals of Management	3	
CE 359	Basics of Statics and Strength of Materials (M/M CC 125, M/M CC 141; PH/PHCC 110 or PH/PHCC 121 or PH/PHCC 141)	3	
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
F 432	Design of Wood Structures (CE 360)	3	
MC 362	Construction Contracts (MC 363 or concurrent reg.)	2	4B
MC 365	Construction Estimating (MC 363, MC 364, MC 366 or concurrent reg.)	3	4A
MC 366	Construction Equipment and Methods (MC 261)	3	
MC 461	Construction Project Scheduling and Cost Control (MC 365)	3	
	Technical elective ¹	3	
	TOTAL	29	
SENIOR			
BGCC 205	Fundamentals of Business Law	3	3F

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)	3	
MC	462	Financial Management for Construction (BA 205, BN 305)	3	
MC	464	Construction Project Administration (MC 362, MC 461 or concurrent reg.)	2	
MC	465	Construction Management Professional Practice (MC 461, MC 464; MC 487A or MC 487D and MC 487E, MC 462 or concurrent reg.)	2	4C
MC	487A	Internship-Construction Management	6	
		Technical elective ¹	3	
		TOTAL	31	

PROGRAM TOTAL = 120 credits

¹Select from department list of approved courses.

Minor in Construction Management

This program is designed to provide students an opportunity to study the basic concepts of construction materials, 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	
	TOTAL	6	
UPPER DIVISION			
MC 362*	Construction Contracts (MC 363 or concurrent reg.)	2	
MC 363*	Plan Reading for Estimating (MC131, MC 151)	3	
MC 364*	Advanced Construction Systems (MC 151, MC 271 or MC 363 or concurrent reg.)	3	
MC 365*	Construction Estimating (MC 363, MC 364, MC 366 or concurrent reg.)	3	
MC 461	Construction Project Scheduling and Cost Control (MC 365)	3	
MC 464	Construction Project Administration (MC 362, MC 461 or concurrent reg.)	2	
	TOTAL	16	

PROGRAM TOTAL = 22 credits without prerequisites

Major in Technology Education and Training

The technology education and training major provides graduates with the education necessary for employment in educational settings related to applied technology in secondary and post-secondary schools, and in industry. Through courses in educational techniques, manufacturing processes and methods, and materials in technology education, the major focuses on issues related to the development of efficient teaching strategies in educational and industrial settings. Students also study the impact of individual learning styles upon teaching methods.

The major is accredited by the National Council on Accreditation of Technology Education.

Characteristics and Skills

- Good communications skills
- Leadership ability
- Technical skills
- Ability to motivate others
- Good decision making ability
- Organizational skills
- Effective use of time

Potential Occupations

Participation in internships, volunteer activities, or cooperative education opportunities is 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. Approximately two thirds of the graduates are employed by secondary schools where they teach theoretical and abstract knowledge along with opportunities for practical experience using technology. One third are employed in a variety of industrial positions.

Some example occupations include, but are not limited to: middle school, junior high, or high school technology teacher; community college instructor; technical institute instructor; government agency technology trainer/specialist; manufacturing technology trainer.

Technology Education (Licensure) Concentration

Technology Education Option

In addition to the pre-MTCM core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
SOPHOMORE			
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F

MC	271	Design and Technology (MC 131, MC 251)	3	
MC	273	Principles of Technological Systems	2	
S CC	100	General Sociology	3	3C
STCC	110	Statistical Thinking: Concepts and Applications (math placement exam)	3	2D
		Mathematics ¹	2	2C
TOTAL			16	

JUNIOR

ED	331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
ED	340	Literacy and the Learner (completion of 30 credits of course work; consent of Teacher Licensure Office)	3	
ED	350	Instruction I- Individualization/Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED	386	Practicum-Instruction I (EDCC 310/EDCC 275, ED 340, concurrent reg. in ED 350; admission to Teacher Licensure Program)	1	
MC	364	Advanced Construction Systems (MC 151, MC 271 or MC 363 or concurrent reg.)	3	
MC	375	Information and Communication for Technology (MC 241)	3	
MC	379	Power, Energy, and Transportation Technology (M/M CC 125; PH/PHCC 110, PH/PHCC 111)	3	
MC	471	Production and Processes of Material Conversion (MC 251, MC 271)	3	4A
MC	472	Appropriate Technology for Sustainable Living (C/C CC 103 and C/C CC 104; MC 251)	2	
S	460	Technology, Society, and Environment (S/S CC 100 or S/S CC 105)	3	
		Technical electives	6	
TOTAL			31	

SENIOR

ED	450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. in ED 486J)	4	
ED	485B	Student Teaching-Secondary (ED 450, VE 465)	11	
OR				
VE	485	Student Teaching (ED 450, VE 465)	11	
ED	486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
VE	492	Seminar-Professional Relations (ED 450, VE 465; concurrent reg. in ED 485 A or B or VE 485)	1	
ED	493B	Seminar-Assessment of Learning (ED 450 or ED 426, VE 465, concurrent reg. in ED 485A or B or C or VE 485)	1	

MC	473	Technology Applications (MC 241, MC 251)	3	4C
MC	477	Rapid Technologies (MC 471 or written consent of instructor)	2	
VE	465	Methods and Materials in Technology Education	3	4B
		Technical elective	3	
TOTAL			29	

PROGRAM TOTAL = 120 credits

¹Select from the list of courses in category 2C in the All-University Core Curriculum (AUCC).

Trade and Industry Education Option

In addition to the pre-MTCM core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
PYCC 100	General Psychology	3	3C
OR			
S CC 100	General Sociology	3	3C
	Logic/critical thinking ¹	3	2D
	Mathematics ²	2	2C
TOTAL		11	

JUNIOR

ED	331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
ED	340	Literacy and the Learner (completion of 30 credits of course work; consent of Teacher Licensure Office)	3	
MC	261	Construction Surveying (M/M CC 125)	3	
MC	271	Design and Technology (MC 131, MC 251)	3	
MC	273	Principles of Technological Systems	2	
MC	334	Career Portfolio Development (admission to fire service emphasis of technology education and training)	1	
MC	471	Production and Process of Material Conversion (MC 251, MC 271)	3	4A
		Work experience credit, upper-division ³	15-30	
TOTAL			31-46	

SENIOR

ED	350	Instruction I-Individualization/ Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED	386	Practicum-Instruction I (EDCC 310/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		MC	375	Information and Communication for Technology (MC 241)	3	
ED	486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1		MC	379	Power, Energy and Transportation Technology (M/M CC 125; PH/PHCC 110, PH/PHCC 111)	3	
ED	493B	Seminar-Assessment of Learning (ED 450 or ED 426 and VE 465; concurrent reg. in ED 485A or B or C or VE 485)	1		MC	471	Production and Process of Material Conversion (MC 251, MC 271)	3	4A
MC	473	Technology Applications (MC 241, MC 251)	3	4C	MC	472	Appropriate Technology for Sustainable Living (C/C CC 103, C/C CC 104; MC 251)	2	
VE	465	Methods and Materials in Technology Education	3	4B			Technical electives	6	
VE	485	Student Teaching (ED 450, VE 465)	11				TOTAL	30	
VE	492	Seminar-Professional Relations (ED 450, VE 465; concurrent reg. in ED 485A or B or VE 485)	1						
		Technical electives, upper-division	0-6						
		TOTAL	28-34						

PROGRAM TOTAL = 120-129 credits

¹ Select from list of courses in category 2D in the All-University Core Curriculum (AUCC).

² Select from list of courses in category 2C in the AUCC.

³ Credits for work experience and competency examination may be used to meet this requirement. A maximum of 30 credits may be applied to the technical course requirement.

Technology Education (Non-Licensure) Concentration

Industrial and Corporate Training Option

In addition to the pre-MTCM core courses the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
BGCC 205	Fundamentals of Business Law	3	3F
MC 271	Design and Technology (MC 131, MC 251)	3	
MC 273	Principles of Technological Systems	2	
PYCC 100	General Psychology	3	3C
STCC 204	Statistics for Business Students (M/M CC 120A-B)	3	2D
	Mathematics ¹	2	2C
	TOTAL	16	
JUNIOR			
BA 205	Fundamentals of Accounting	3	
BN 301	Production Fundamentals (ST/STCC 204 or ST/STCC 301)	3	
BN 305	Fundamentals of Management	3	
ED 331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2 or 2D

MC	375	Information and Communication for Technology (MC 241)	3	
MC	379	Power, Energy and Transportation Technology (M/M CC 125; PH/PHCC 110, PH/PHCC 111)	3	
MC	471	Production and Process of Material Conversion (MC 251, MC 271)	3	4A
MC	472	Appropriate Technology for Sustainable Living (C/C CC 103, C/C CC 104; MC 251)	2	
		Technical electives	6	
		TOTAL	30	
SENIOR				
BN	310	Human Resource Management	3	
BN	410	Organizational Behavior (BN 305 or BN 320)	3	
BN	473	Labor Relations and Collective Bargaining	3	
MC	473	Technology Applications (MC 241, MC 251)	3	4C
MC	477	Rapid Technologies (MC 471 or written consent of instructor)	2	
MC	487C	Internship-Technology Education and Training	3	
VE	465	Methods and Materials in Technology Education	3	4B
		Technical electives	3	
		Electives	7	
		TOTAL	30	

PROGRAM TOTAL = 120 credits

¹ Select from list of courses in category 2C in the All-University Core Curriculum (AUCC).

Graduate Programs in Manufacturing Technology and Construction Management

The Department of Manufacturing Technology and Construction Management offers a graduate program leading to a Master of Science. The program is designed for students with specialized studies in construction management and technology education and training. Students are no longer being admitted to the technology education and training program through the Department of Manufacturing Technology and Construction Management. 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 program may be found in the [Graduate and Professional Bulletin](#).

DEPARTMENT OF OCCUPATIONAL THERAPY

Office in Occupational Therapy Building, Room 219
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. To learn more about the department, please visit www.caahs.colostate.edu/OT.

Students interested in earning a masters degree in occupational therapy must first earn an undergraduate degree. Contact the Pre-OT adviser (Kim Urata, 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, 970 491-6255; otinfo@caahs.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, 970 491-6255; otinfo@caahs.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
Professor Deborah Valentine, Director

Major in Social Work

Social work is distinguished by a tradition of concern for people and their interactions with society. Social work professionals are community problem solvers who intervene in organizational settings—communities, 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 practice 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 effect 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.

Characteristics and Skills

- Strong desire to help people
- Commitment to social and economic justice
- Empathy and compassion
- Emotional maturity
- Strong listening and communication skills
- Ability to deal with diverse populations
- Ability to accept people's values and differences
- A positive attitude
- Understanding of human behavior
- Ability to cope with stressful situations
- Crisis intervention skills
- Knowledge of social welfare system
- Knowledge of problem solving techniques
- Understanding social issues relevant to special populations
- Ability to work in a variety of social organizations
- Ability to work with large and small groups
- Effective interviewing skills

Potential Occupations

Social work graduates are employed in a variety of settings including welfare agencies, schools, hospitals, clinics, institutions, community centers, public health, corrections, and

group homes. Entry level job opportunities are plentiful. Graduates should be willing to work with people of all ages and in a multitude of circumstances. Opportunities to work with older adults are especially prevalent. Internships are required. Graduates who achieve a Masters of Social Work (MSW) 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; family welfare; child protection; adult protection; women's health advocate; clinical social worker; psychiatric social worker; geriatric social worker; crisis counselor; 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; agency director; client advocate; victim-witness program counselor; program manager; school social services; substance abuse counselor.

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 the end of the second semester for sophomores in the practicum, SW 286. 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 question, 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 Department 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 a variety of 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 and geriatric centers, and correction programs. Under supervision, students have the opportunity to evaluate their practice interventions and those of other relevant systems.

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 department office.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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 (AP/APCC 120 or concurrent reg.)	1	3A
OR			
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or CO 130)	3	2A
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 (PY/PYCC 100 or concurrent reg.; S/S CC 100 or S/S CC 105 or concurrent reg.)	3	
	First-year seminar ¹	2-3	1
	Mathematics ²	3	2C
	Social/behavioral sciences ³	3	3C
	Elective	2-3	
	TOTAL	30	
SOPHOMORE			
SW 233	Systems Perspective for Social Work (HD/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 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
		Logical/critical thinking ⁹	3	2D
		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 ¹⁰	3	2B
		Arts/humanities ¹¹	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 HS/HSCC 300 or concurrent registration in S 311 or HS/HSCC 300; SW 341, SW 342)	10	
SW	492	Seminar (concurrent reg. in SW 488)	3	4C
		Social/behavioral sciences ¹²	6	

Electives	5
TOTAL	30

PROGRAM TOTAL = 120 credits

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

² Select from the list of courses in category 2C in the AUCC. M/M CC 130 or M/M CC 133 are recommended.

³ Select from economics (ECCC) or political science (POCC) courses in category 3C 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 any three credit statistics course from the list of courses in category 2D in the AUCC. STCC 101 or STCC 110 are recommended.

¹⁰ Select from the list of courses in category 2B1, 2B2, or 2B3 in the AUCC. See the All-University Core Curriculum section of the catalog for an explanation of which language courses will satisfy category 2B requirements (if so allowed by the student's major).

¹¹ Select from the list of courses in category 3B in the AUCC, or with approval of adviser, from the following prefixes: APCC, ARCC, DCC, ECC, ETCC (see department list), HPCC, LCC, MUCC, PLCC, SPCC, and THCC.

¹² 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

Professor Ajay Menon, Dean

Professor Tom Ingram, Interim Associate Dean

Professor Willie Hopkins, Interim 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).

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 website, 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 nonbusiness 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 enterprises, technology, and corporate citizenship. 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 60 credits of nonbusiness courses 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-real estate, computer information systems, marketing, or organization 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. Conditions for admission include:

Students with an index of 107 or above will be admitted directly to the College of Business. Students not meeting the 107 index will be admitted to University Open Option-Seeking Business.

To be eligible for admission to the college, 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.

External transfer students who have completed either 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 one of the above criteria will be admitted to University Open Option-Seeking Business and must complete a minimum of 15 graded credits at Colorado State. Students who establish a 2.85 cumulative GPA and complete M CC 141 and ECCC 202 with grades of B- or above will be eligible for admission to the college.

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. 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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BD 111	Software Productivity Tool Proficiency	1	
	OR		
BD 150	Business Computing Concepts and Applications	3	
BGCC 192	First Year Seminar in Business	3	1
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
ECCC 204	Principles of Macroeconomics (EC/ECCC 202 or EA/EACC 202)	3	3F

M CC 120A-B	College Algebra I ¹ (Math Placement Exam)	1	2C
M CC 121	College Algebra II ¹ (M/M CC 120A-B or placement)	1	2C
M CC 141	Calculus in Management Sciences (M/M CC 118 or M/M CC 121)	3	2C
	Biological/physical sciences ²	4	3A
	Global and cultural awareness ³	3	3E
	Health and wellness ⁴	2	3G
	TOTAL	27-29	

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	Legal Environment of Business	3	3F
SPCC 200	Public Speaking	3	2B1
STCC 204	Statistics for Business Students (M/M CC 120A-B)	3	2D
	Arts/humanities ⁵	3	3B
	Biological/physical sciences ²	3	3A
	Historical perspectives ⁶	3	3D
	TOTAL	27	

JUNIOR⁷

BF 300	Principles of Finance (BA 205 or BA 210, EC/ECCC 204)	3	4A, 4B
BK 300	Marketing (EA/EACC 202 or EC/ECCC 202)	3	4B
BN 301	Production Fundamentals (ST/STCC 204 or ST/STCC 301)	3	
BN 320	Organization Management (BG 200)	3	
	TOTAL	12	

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
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CORE TOTAL = 69-71 credits^{8,9}

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 3B in the AUCC.

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

⁷ All freshman and sophomore required courses must be completed prior to or concurrent with first enrollment in required junior and senior courses. By the beginning of the junior year, students must select one of the concentrations described on the following pages.

⁸ 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 courses or non-business core courses.

⁹ 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. American Ethnicity, Asian Studies, Biotechnology, Environmental Affairs, International Development, Latin American Studies, Russian, Eastern and Central European Studies, etc.).

DEPARTMENT OF ACCOUNTING

Office in Rockwell Hall, Room 205

Associate Professor Donald Samelson, Interim Chair

Accounting Concentration

Accountants provide financial information and documentation about businesses to managers, investors, creditors and other interested parties. Accounting can be categorized into management accounting, which provides information for internal decision-makers (e.g. managers); and financial accounting, which provides information for external decision makers (e.g. investors and creditors).

Accounting is an ever-evolving field with constantly changing objectives. Today, accountants are business leaders and participate in corporate decisions and strategies. While accountants still have traditional duties of gathering necessary information, they must also be able to explain and analyze the information and assist in the interpretation of data. Accountants also consult with corporate decision-makers and excel in areas of communication, teamwork, leadership, and technical expertise. The “new” accountant is an information specialist and a business adviser, and is well prepared for today’s complex business environment

The accounting curriculum at Colorado State satisfies current educational requirements to become a Certified Management Accountant (CMA), a Certified Internal Auditor (CIA), or a Certified Public Accountant (CPA) in Colorado and many other states. Students who wish to become a Certified Public Accountant are prepared to take the state CPA exam which is required to practice accounting in any state

The accounting curriculum is designed to meet the needs of those who seek professional training to practice as public, private or governmental accountants, or expect to work in business managerial positions requiring an understanding of accounting. The curriculum also offers considerable flexibility in designing a program of study that will meet the various career interests of students. In addition to the All-University Core Curriculum, coursework for a major in business administration-accounting includes calculus, economics, statistics, and business principles.

Characteristics and Skills

- Enjoy dealing with data
- Strong strategic thinking and planning skills
- Strong written and oral communication skills

- Ability to interact and communicate with people
- Strong quantitative abilities

Potential Occupations

Accounting provides a strong technical background for a career in business or government. Accounting graduates may apply their education to the following non-inclusive list of occupations. Internships and related work experiences enhance skills and marketability.

Some examples of career opportunities include, but are not limited to: auditor of publicly or privately held companies, governmental agencies, or not-for-profit institutions; consultant in assurance services; management information systems; taxation; financial and estate planning; leadership roles in industry and commerce such as senior executive or chief financial officer; owner, partner, or manager of a CPA firm; financial analyst; wage & hour administrator; bank officer.

In addition to the business administration core courses, the following must be completed:

No accounting course (BA prefix) with a grade less than C- (1.67) may count toward the accounting concentration.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
	Electives	1-3	
SOPHOMORE			
	Electives	3	
JUNIOR			
BA 311	Intermediate Accounting I (BA 2205 with grade of B- or better or BA 210 with grade of B- or better; BA 220 with grade of B- or better)	3	
BA 312	Intermediate Accounting II (BA 311 with grade of C- or better)	3	
BA 321	Cost Management (BA 220)	3	
BA 350	Applications of Accounting Technology (BA 220)	3	
BA 421	Management Control Systems (BA 220)	3	
	Electives	3	
	TOTAL	18	
SENIOR			
BA 330	Introduction to Taxation (BA 205 or BA 210)	3	
BA 411	Advanced Accounting (BA 312 with grade of C- or better; BA 421 with grade of C- or better)	3	
BA 441	Auditing Practices (BA 312, BA 421)	3	
	Electives ¹	18	
	TOTAL	27	

PROGRAM TOTAL = 120 credits

¹ Students must take 24-26 credits of electives to make up 120 credits. Twelve of these credits must be at the 300- or 400- level.

Business Education Option

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BD 111	Software Productivity Tool Proficiency	1	
BGCC 192	First Year Seminar in Business	3	1
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	7	3A
	Health and wellness ³	2	3G
	Historical perspectives ⁴	3	3D
	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	Legal Environment of 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 (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
ED 340	Literacy and the Learner (completion of 30 credits of course work; consent of Teacher Licensure Office)	3	
M CC 141	Calculus in Management Sciences (M/M CC 118 or M/M CC 121)	3	2C
STCC 204	Statistics for Business Students (M/M CC 120A-B)	3	2D
	Global and cultural awareness ⁵	3	3E
	TOTAL	31	

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	
BA 312	Intermediate Accounting II (BA 311 with grade of C- or better)	3	
BF 300	Principles of Finance (BA 205 or BA 210, EC/ECCC 204)	3	4A, 4B
BK 300	Marketing (EA/EACC 202 or EC/ECCC 202)	3	4B
BN 301	Production Fundamentals (ST/STCC 204 or ST/STCC 301)	3	
BN 320	Organization Management (BG 200)	3	
ED 350	Instruction I-Individualization/Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	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	
	Elective	4	
	TOTAL	30	

SENIOR

BA 321	Cost Management (BA 220)	3	
BA 350	Applications of Accounting Technology (BA 220)	3	
BA 421	Management Control Systems (BA220)	3	
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
ED 493B	Seminar-Assessment of Learning (ED 450 or ED 426 and appropriate special methods courses; concurrent reg. in ED 485A or B or C or VE 485)	1	
VE 431	Methods/Materials in Business Education (successful completion of Phase II of Teacher Licensure Program or written consent of instructor)	4	
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	
	TOTAL	29	

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
Associate Professor John Plotnicki, Chair

Information Systems Concentration

The information systems curriculum provides students with a broad understanding of business and a sound foundation in computer programming, systems analysis and design, networking, web applications, project management, and systems integration. Graduates acquire an ability to apply computer technologies to business solutions, providing a variety of lucrative career opportunities, including the design and implementation of computer systems for business applications.

Characteristics and Skills

- Enjoy utilizing computers to make systems and processes more efficient
- Logical, accurate, detail-oriented, and persistent
- Enjoy thinking, analyzing, and problem solving
- Enjoy exploring and fixing things
- Tendency to get thoroughly absorbed in work or hobbies
- Ability to interact and communicate with people
- Ability to educate others about computers

Potential Occupations

All computing related careers are characterized by a very high 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; microcomputer specialist; network manager; system consultant; programmer analyst; marketing specialist; systems analyst; data base administrator; marketing information systems manager; network administrator; 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	
<hr/>			
BD 462	Systems Development Project (BD 320, BD 360)	3	
<hr/>			
OR			
BD 487	Internship (BD 355, BD 360)	3	
Electives ¹		16-18	
TOTAL		22-24	

PROGRAM TOTAL = 120 credits

¹ Students must take 22-24 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
Professor Timothy J. Gallagher, Chair

Finance-Real Estate Concentration

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.

Characteristics and Skills

- Capable of analyzing complex problems
- Persuasive and enjoy being in charge
- Action-oriented
- Analytical skills
- Ability to cope with challenges involving risk
- Ability to interact and communicate with others
- Work well in structured situations
- Ability to adapt to changing conditions

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>
FRESHMAN			
	Electives	1-3	
SOPHOMORE			
	Electives	3	

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 (EC/ECCC 204)	3
		Accounting, upper division	3
		Option ¹	6
		TOTAL	18
SENIOR			
		Option ¹	27
PROGRAM TOTAL = 120 credits			

¹ Choose either the finance option or the real estate option.

Finance Option

<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 (EC/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

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
BF	360	Real Estate Principles (EC/ECCC 204)	3
		Electives	3
		TOTAL	6
SENIOR			
BF	367	Real Estate Law (BG/BGCC 205 or BG/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

Professor Willie E. Hopkins, Chair

Organizational Management Concentration

Organizational management is about obtaining results primarily through and with people. Managers use interpersonal, administrative, and technical skills to accomplish assigned tasks, large and small, in business and government. The five managerial functions are planning, leading, organizing, controlling (e.g. product quality and production costs) and staffing. In addition to the All-University Core Curriculum, coursework for a major in business administration-organizational management includes calculus, economics, statistics, and business principles along with courses that specifically examine management issues and practices.

Characteristics and Skills

- Possess strong verbal and leadership skills
- Like to explore ideas through objective analysis
- Persuasive and action-oriented
- Enjoy being in charge and making things happen
- Possess high level of interpersonal skills

Potential Occupations

Students are prepared to apply their management skills within the private and public sectors, while internships and volunteer experiences enhance skills and marketability.

Examples of possible careers include, but are not limited to: management trainee; human resource manager; scheduling/routing; coordinator/recruiter; facilities manager; buyer/purchasing agent; personnel selection/employment manager; distribution manager; hotel/motel manager; compensation/benefits specialist; marketing manager; public administrator; production and quality control specialist; bank officer; inventory control specialist; warehouse manager.

In addition to the business administration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
	Electives	1-3	
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 (BG 200)	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

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BD 111	Software Productivity Tool Proficiency	1	
BGCC 192	First Year Seminar in Business	3	1
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ¹	3	3B

		Biological/physical sciences ²	7	3A		Group I, II, or III courses ⁶	6
		Health and wellness ³	2	3G		TOTAL	34
		Historical perspectives ⁴	3	3D	SENIOR		
		TOTAL	30		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
SOPHOMORE							
BA	210	Introduction to Financial Accounting	3		BN 301	Production Fundamentals (ST/STCC 204 or ST/STCC 301)	3
BA	220	Introduction to Managerial Accounting (BA 205 or BA 210)	3		BN 320	Organization Management (BG 200)	3
BG	200	Business Communications and Report Writing (CO/COCC 150)	3		BN 440	New Venture Management (BN 420)	3
BGCC	260	Legal Environment of Business	3	3F	ED 493B	Seminar-Assessment of Learning (ED 450 or ED 426, VE 431; concurrent reg. in ED 485A or B or C or VE 485)	1
BK	300	Marketing (EA/EACC 202 or EC/ECCC 202)	3	4B	VE 485	Student Teaching (ED 450, VE 431)	11
BN	340	Entrepreneurship in the Contemporary World (BG 200)	3		VE 492	Seminar-Professional Relations (ED 450, VE 431; concurrent reg. in ED 485A or B or VE 485)	1
ECCC	204	Principles of Macroeconomics (EC/ECCC 202 or EA/EACC 202)	3	3F		Group I, II, or III course ⁶	3
EDCC	275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F		TOTAL	28
ED	331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1			PROGRAM TOTAL = 123 credits	
M CC	141	Calculus in Management Sciences (M/M CC 118 or M/M CC 121)	3	2C		¹ Select from list of courses in category 3B of the All-University Core Curriculum (AUCC).	
STCC	204	Statistics for Business Students (M/M CC 120A-B)	3	2D		² Select from list of courses in category 3A of the AUCC. One course must have a laboratory component.	
		TOTAL	31			³ Select from list of courses in category 3G of the AUCC.	
						⁴ Select from list of courses in category 3D of the AUCC.	
JUNIOR							
BA	431	Corporate Taxation (BA 220, BA 330)	3	4A, 4B	BD 240	Program Design and Construction [use this course for an information system focus]	3
BF	300	Principles of Finance (BA 205 or BA 210, EC/ECCC 204)	3		BF 360	Real Estate Principles (EC/ECCC 204)	3
BN	420	New Venture Creation (BN 340)	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
ED	340	Literacy and the Learner (completion of 30 credits of course work; consent of Teacher Licensure Office)	3			Group II: Select one of the following	
ED	350	Instruction I-Individualization/Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3		BD 360	Systems Analysis and Design (BD 220 or BD 240) [use this course for an information system focus]	3
ED	386	Practicum-Instruction I (EDCC 310/EDCC 275, ED 340, concurrent reg. in ED 350; admission to Teacher Licensure Program)	1		BF 460	Real Estate Finance and Investment (BF 300 or BF 305, BF 360 or written consent of instructor)	3
ED	450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. in ED 486J)	4		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
ED	486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1			Group III: Select one of the following:	
VE	431	Methods/Materials in Business Education (successful completion of Phase II of Teacher Licensure Program or written consent of instructor)	4		BD 355	Business Database Systems (BD 220 and BD 240) [use this course for an information system focus]	3
		Global and cultural awareness ⁵	3	3E	BF 367	Real Estate Law (BG/BGCC 205 or BG/BGCC 260 or HD 403)	3

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 AUCC

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 Principles (EC/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
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

Group III: Select one of the following:

BD	355	Business Database Systems (BD 220 and BD 240) [use this course for an information system focus]	3
BF	367	Real Estate Law (BG/BGCC 205 or BG/BGCC 260 or HD 403)	3

BK	360/	Retailing (BK 300 or BK 305) [use	3
DM	360	this course if there is a possibility	
		that you may wish to add Marketing	
		as an endorsement]	

DEPARTMENT OF MARKETING

Office in Rockwell Hall, Room 111
 Professor O. C. Ferrell, Chair

Marketing Concentration

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, coursework 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.

Characteristics and Skills

- Persuasive and action-oriented
- Like working with diverse groups
- Ability to communicate effectively in writing and verbally
- Prefer working with abstract rather than concrete problems
- Like to use imagination and creativity to solve problems and accomplish tasks
- Prefer unstructured settings that allow for flexibility and creativity
- Competencies in quantitative and analytical work (important for certain marketing positions, e.g. market research analyst)
- Value social issues and interpersonal interactions

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 less than C- (C minus) may count toward graduation requirements for the marketing concentration in the major in business administration.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
	Electives	1-3	
SOPHOMORE			
	Electives	3	
JUNIOR			
BK 361	Buyer Behavior (BK 300 or BK 305)	3	
BK 410	Marketing Research (BK 300 or BK 305; ST/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

¹ Students must take 30-32 credits of electives to make up 120 credits. Nine of these credits must be at the 300- or 400- level.

Education Option

Course	Title (Prerequisite)	Cr	AUCC				
				BK	440	Pricing and Financial Analysis in Marketing (BK 300 or BK 305)	3
				BN	301	Production Fundamentals (ST/STCC 204 or ST/STCC 301)	3
				BN	320	Organization Management (BG 200)	3
				ED	331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1
				ED	340	Literacy and the Learner (completion of 30 credits of course work; consent of Teacher Licensure Office)	3
				ED	350	Instruction I-Individualization/Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3
				ED	386	Practicum-Instruction I (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 350; admission to Teacher Licensure Program)	1
						TOTAL	32
				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
				ED	493B	Seminar-Assessment of Learning (ED 450 or ED 426 and VE 431, VE 441; concurrent reg. in ED 485A or B or C or VE 485)	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 (ED 320; 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	494	Independent Study	1
						TOTAL	31
				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.			

Education Option

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BD 111	Software Productivity Tool Proficiency	1	
BGCC 192	First Year Seminar in Business	3	1
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	7	3A
	Health and wellness ³	2	3G
	Historical perspectives ⁴	3	3D
	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	Legal Environment of Business	3	3F
BK 300	Marketing (EA/EACC 202 or EC/ECCC 202)	3	4B
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
M CC 141	Calculus in Management Sciences (M/M CC 118 or M/M CC 121)	3	2C
STCC 204	Statistics for Business Students (M/M CC 120A-B)	3	2D
	Global and cultural awareness ⁵	3	3E
	TOTAL	30	
JUNIOR			
BF 300	Principles of Finance (BA 205 or BA 210, EC/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, ST/STCC 204)	3	

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*.

College of Engineering

Office in Engineering Building, Room A 202

Professor Neal Gallagher, Dean

Professor Steven Abt, Executive Associate Dean

Professor Thomas Siller, Associate Dean

UNDERGRADUATE MAJORS

Bioresource and Agricultural Engineering

Chemical Engineering

Civil Engineering

Computer Engineering

Electrical Engineering

Engineering Science

Environmental Engineering

Mechanical Engineering

UNDERGRADUATE MINOR

Environmental Engineering

COLLEGE PROGRAMS

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.

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 the world.

Undergraduate Majors

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 also coordinated by the Associate Dean for Academic Affairs in the College of Engineering. This program offers three well-defined concentrations: [engineering physics](#), [space engineering](#), and a [dual degree \(five-year\) program](#) leading to a B.A. 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 Graduation Requirements section 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.

Students interested in a combined program in engineering and business may consider obtaining a B.S. degree in engineering and the M.B.A. degree. This program is jointly administered by the Colleges of Business and Engineering; direct inquiries to the associate dean of one of these colleges.

All engineering programs are accredited at the basic level by the Accreditation Board for Engineering and Technology.

Registration as a Professional Engineer

Registration and licensing are required under certain legally defined circumstances in order to practice as an engineer. The College of Engineering actively encourages all of its students to fulfill the necessary requirements as soon as they are eligible. The Fundamentals of Engineering Examination administered by the State Board of Registration for Professional Engineers and Professional Land Surveyors may be taken by seniors during the two semesters prior to graduation. After the required practical experience, the Principles and Practice of Engineering Examination 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.

Study Abroad

Study abroad programs are available to students in the College of Engineering. 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 website, www.international.colostate.edu/us/studyabroad.

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 Admissions Policy 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 will be advised to take

up to five credits of review courses (M CC 120A-B, M CC 121, M CC 124, M CC 125, and M CC 126) before enrolling in calculus (M CC 160). Credits for review courses may not be used toward a degree in engineering.

Faculty advisers recommend programs suited to the student's background and interests. Superior preparation is recognized, and appropriate placement and/or credit is given.

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 completed at least one semester of calculus (M CC 160) and one semester of physics (PHCC 141) or chemistry (C CC 111) with at least one B and nothing less than a C 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 HELP/ Success Center.

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 student's perspectives in nontechnical 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 Arcade, Room AR 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 in the College of Engineering at Colorado State University. Three concentrations are available—**engineering physics**, **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 and are strongly encouraged to take the Fundamentals of Engineering examination, which constitutes the first step toward registration as a Professional Engineer.

The Engineering Science program has established the following objectives:

Individuals graduating from the Engineering Science major shall display competence

- in the fundamentals of mathematics, science, and the engineering sciences;
- through the use of the fundamental, experiential, experimental, and technical aspects of engineering;
- through demonstration of strong problem solving skills, related to both, closed-form and open-ended problems;
- by recognition of the professional nature of engineering, through ethics, contact with practicing professionals and professional societies;
- by study and experience of multidisciplinary group dynamics and communication;
- by appreciation for subject areas beyond the traditional engineering science, mathematics, and sciences required in engineering majors; and
- by appreciation of the need for life-long learning.

Characteristics and Skills

- Interest in developing solutions for real problems and needs
- Curiosity about how things work
- Aptitude in math and physical sciences
- Ability to work within large organizations
- Perseverance
- Attention to detail
- Leadership ability and interpersonal skills
- Strong verbal and writing ability
- Inventive
- Able to draw information and ideas from a variety of sources
- Good team player
- Versatility
- Aptitude for and interest in computer applications and design

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, volunteer activities, or cooperative education opportunities 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.

To qualify for graduation, engineering science majors must achieve a minimum 2.00 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.

Engineering Science Core

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
TOTAL		14	
SOPHOMORE			
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
CE 260	Engineering Mechanics-Statics (M/M CC 160, PH/PHCC 141)	3	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	2C
M 261	Calculus for Physical Scientists III (M/M CC 161)	4	
ME 237	Introduction to Thermal Sciences (PH/PHCC 142)	3	
PHCC 142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
	Additional communication ¹	3	2B
	Arts/humanities ²	3	3B
	Health and wellness ³	2	3G

Social/behavioral sciences ⁴	3	3C
TOTAL	37	

JUNIOR

CE 261	Engineering Mechanics-Dynamics (CE 260; CE 108 or CBCC/CHCC 192 or ME 101/MECC 192)	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/M CC 255 or M 261)	4	4A, ⁵ 4B
TOTAL		10-11	

SENIOR

STCC 309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
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CORE TOTAL = 64-65 credits⁶

¹ Select from the list of courses in category 2B 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 Computer Science, Electrical and Computer Engineering, Mathematics, Mechanical Engineering, and Physics.

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	
EECC 192	Electrical Engineering Fundamentals (high school algebra and geometry)	3	1
TOTAL		7	
SOPHOMORE			
EE 201	Circuit Theory (EECC 192; concurrent reg. in M/M CC 161 and PH/PHCC 142)	3	
EE 202	Circuit Theory Applications (EE 201)	4	
	Global and cultural awareness ¹	3	3E

		Historical perspectives ²	3	3D			Historical perspectives ²	3	3D
		U.S. public values and institutions ³	3	3F			U.S. public values and institutions ³	(3)	3F
		TOTAL	16				TOTAL	11	
JUNIOR					JUNIOR				
EE	341	Electromagnetic Fields and Devices I (M 340 or M 345)	3		CE	360	Mechanics of Solids (CE 260 or CE 262)	3	
EE	342	Electromagnetic Fields and Devices II (EE 341)	3		CE	367	Structural Analysis (CE 360)	3	
PH	314	Introduction to Modern Physics (PH/PHCC 142, concurrent reg. in M 261)	4		ME	304	Engineering Design (ME 120, ME 250, ME 307, ME 324, ME 325, ME 331, ME 338, ME 344, CE 363 or concurrent reg. in ME 250, ME 307, ME 324, ME 325, ME 331, ME 338, ME 344, CE 363)	3	4A
PH	315	Modern Physics Laboratory (concurrent reg. in PH 314)	2		ME	307	Mechatronics and Measurement Systems (CE 261, EE 204, M 340)	4	
		TOTAL	12		ME	337	Thermodynamics (M 261, ME 237)	3	
SENIOR					SENIOR				
EE	401	Senior Design Project I (EE 312, EE 332, and EE 342 or EE 343)	3	4A			TOTAL	16	
EE	402	Senior Design Project II (EE 401)	3	4C					
PH	353	Optics and Waves (M 261, PH/PHCC 142)	4		CE	408	Civil Engineering Design I (CE 309)	3	
		Mathematics ⁴	3		CE	409	Civil Engineering Design II (CE 408)	3	4C
		Technical electives ⁵	18-19		ME	344	Heat and Mass Transfer (ME 342)	3	
		Electives	5		ME	417	Control Systems (M 340, ME 304)	3	
		TOTAL	36-37		ME	460	Aeronautics (ME 342)	3	
PROGRAM TOTAL = 136 credits					PROGRAM TOTAL = 136 credits				
					PO	371	U.S. Space Policy	3	
							Mathematics, upper division	6	
							Technical electives ⁴	11-12	
							Electives	3	
							TOTAL	38-39	

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, applied mathematics, and computer science.

In addition to the engineering science core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
CE 108	Civil Engineering Principles I	3	
CECC 192	Civil Engineering Principles II (CE 108)	3	1
	TOTAL	6	
SOPHOMORE			
EE 204	Introduction to Electrical Engineering (M/M CC 161, PH/PHCC 142)	3	
ME 250	Computer Applications in Mechanical Engineering (M 340 or concurrent reg.)	2	
	Global and cultural awareness ¹	3	3E

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: AU/AUCC 101 (3D), HY/HYCC 150 (3D), HY/HYCC 151 (3D), NR/NRCC 320 (3D), PO/POCC 101 (3C), PO/POCC 103 (3C), S/S CC 100 (3C), S/S CC 105 (3C).

⁴ Select courses with adviser's approval.

Liberal Arts Concentration

The liberal arts concentration is a five-year joint program with dual degrees in liberal arts (BA) and engineering science (BS). The 152-credit 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 concentration in engineering science.)

Major in Environmental Engineering

*Administered by the Department of Civil Engineering
Office in Engineering Building, Room AR 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 bioresource and agricultural engineering, chemical engineering, civil engineering, and mechanical engineering as they relate to environmental engineering. They also pursue a broad background in the liberal arts.

Graduates of the program will be academically well prepared with technical knowledge and creative skills to enter careers in environmental engineering in industry, the consulting engineering practice, regulatory agencies, or to enter graduate school.

Individuals graduating from the environmental engineering major shall display competence

- in the fundamentals of mathematics, science, and the engineering sciences;
- through the use of the fundamental, experiential, experimental, and technical aspects of engineering;

- through demonstration of strong problem solving skills, related to both closed-form and open-ended problems;
- by recognition of the professional nature of engineering, through ethics, contact with practicing professionals and professional societies;
- by study and experience of multidisciplinary group dynamics and communication;
- by appreciation for subject areas related to environmental engineering but taught outside of the traditional engineering science, mathematics, and sciences required in engineering majors;
- by appreciation of the need for life-long learning

Characteristics and Skills

- Interest in preserving environmental quality and preventing environmental damages
- Interest in developing solutions for environmental pollution problems
- Aptitude in math, and biological and physical sciences
- Interest in designing large and small systems and structures
- Perseverance
- Attention to detail
- Leadership ability and interpersonal skills
- Strong verbal and writing ability
- Able to draw information and ideas from a variety of sources
- Good team player
- Creative/Innovative
- Versatility
- Aptitude for and interest in computer applications and design

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 specialist.

Course	Title (Prerequisite)	Cr	AUCC	Health and wellness ¹	2	3G
FRESHMAN				TOTAL	34	
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A	JUNIOR		
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A	BY 220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160)	3
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3		C 471	Physical Chemistry for Biological Sciences (C 113; M/M CC 161 or M/M CC 255; PH/PHCC 122 or PH/PHCC 142)	4
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1		CE 204/ EV 204	Agricultural and Environmental Measurements (PH/PHCC 110 or PH/PHCC 141)	3
CHCC 104	Strategies of Engineering Problem Solving (CBCC/CHCC 192)	3	2D	CE 300	Fluid Mechanics (CE 261 or CE 262, ME 237)	4
CHCC 192	Strategies of Engineering Design	3	1	CH 331	OR Momentum Transfer and Mechanical Separations (CH 201, M 340; CB 202 or ME 237)	3
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C	CE 322/ EV 322	Basic Hydrology (CE 300 or CH 331 or ER 416, ST/STCC 301 or ST/STCC 309 or CE 308 or written consent of instructor)	3
M CC 161	Calculus for Physical Scientists II (M/M CC 124 and M/M CC 160)	4	2C	CE 471	Engineering Design I (CE 204/EV 204 or CH 201)	1 4C
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A	MB 300	General Microbiology (C 245 or C 345 or concurrent reg.; BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	3
PHCC 142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A	MB 301	Fundamental Microbiology Laboratory Techniques (MB 300 or concurrent reg.)	1
TOTAL		33			Additional communication ²	3 2B
SOPHOMORE					Arts/humanities ³	3 3B
<i>Select four credits from the following courses:</i>					Engineering electives ⁴	7
BZCC 110	Principles of Animal Biology	3	3A		TOTAL	34-35
BZCC 111	Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.)	1	3A	SENIOR		
BZCC 120	Principles of Plant Biology	4	3A	CE 438/ EV 438	Pollution Control Engineering (C 113, CE 300 or CH 331 or ME 342)	4
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A	CE 472	Engineering Design II (CE 471)	3 4A, 4C
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4		CH 442/ EV 442	Rate-Controlled Separations (CE 300 or CH 331; M 340; one course in physical chemistry)	3
CH 201	Material and Energy Balances (C/C CC 111, M/M CC 160, PH/PHCC 141, one course in computer programming)	3		CH 443/ EV 443	Mass Transfer and Separation Laboratory (CH 341 or CH 442/EV 442 or concurrent reg.)	2
CH 202	Thermodynamic Process Analysis (CH 201)	3		EH 446	Environmental Toxicology (C 245 or C 346)	3
ME 237	Introduction to Thermal Sciences (PH/PHCC 142)	3		ME 448/ EV 448	Pollution Prevention (CE 300 or CH 331 or ME 342)	3
CE 262	Engineering Mechanics (M/M CC 161, PH/PHCC 141)	4			Engineering electives ⁴	4
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A		Global and cultural awareness ⁵	3 3E
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160.)	3	3C		Historical perspectives ⁶	3 3D
M 261	Calculus for Physical Scientists III (M/M CC 161)	4			Humanities/social sciences	3
M 340	Introduction to Ordinary Differential Equations (M/M CC 255 or M 261)	4	4A, 4B		U.S. public values and institutions ⁷	(3) 3F
TOTAL					TOTAL	31
PROGRAM TOTAL = 132-133 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 2B in the AUCC.

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

⁴ Select courses with adviser's approval.

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

⁶ Select from the list of courses in category 3D in the AUCC. The course selected for 3D should also be listed in 3F so the two requirements may be fulfilled with one course.

⁷ Select from the list of courses in category 3F in the AUCC. The course selected for 3F should also be listed in 3D so the two requirements may be fulfilled with one course.

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
LOWER DIVISION			
C 245*	Fundamentals of Organic Chemistry ^{1,2} (C/C CC 107 or C 113)	4	
C 246*	Fundamentals of Organic Chemistry Laboratory ^{1,2} (C/C CC 108 or C/C CC 112 or C 114; C 245 or concurrent reg.)	1	
TOTAL		5	
UPPER DIVISION			
C 471*	Physical Chemistry for Biological Sciences (C 113; M/M CC 161 or M/M CC 255; PH/PHCC 122 or PH/PHCC 142)	4	
CE 438/ EV 438*	Pollution Control Engineering ^{3,4} (C 113, CE 300 or CH 331 or ME 342)	4	
OR			
ME 448/ EV 448*	Pollution Prevention (CE 300 or CH 331 or ME 342) ⁴	3	
MB 300*	General Microbiology (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 345 or concurrent reg.)	3	
MB 301	Fundamental Microbiology Laboratory Techniques (MB 300 or concurrent reg.)	1	
<i>Select four to five credits from the following:⁴</i>			
BC 351	Principles of Biochemistry (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 346 or concurrent reg. in C 346)	4	
CE 440	Nonpoint Source Pollution (one course in soil science, hydrology, or fluid mechanics)	3	
CH 439/ CE 439*	Environmental Engineering Chemical Concepts (C 113, M 340)	3	
CH 443/ EV 443*	Mass Transfer and Separation Laboratory (CH 341 or CH 442/EV 442 or concurrent reg.)	2	
EH 446	Environmental Toxicology (C 245 or C 346)	3	

(Continued in the next column)

MB 432	Aquatic Microbiology (MB 301 or MB 302)	4
ME 463*	Building Energy Systems (ME 344)	3
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/C CC 111, C/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
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 the 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
Professor A. Ted Watson, Head

Major in Chemical Engineering

Chemical engineers design equipment and develop processes to transform raw materials into usable products in a socially and environmentally acceptable manner. Examples include the production of methane from natural gas, fine chemicals and plastics from crude oil, materials and devices for therapeutic drug delivery, and electronic devices from silicon substrates. The program is structured to prepare students for the practice of chemical engineering and the integration of appropriate technology into modern society. Demonstrating a greater than 90% pass rate on the Fundamentals of Engineering professional exam, Colorado State University engineering graduates are well prepared for careers in the field.

The chemical engineering curriculum is a blend of chemistry, biological science, physics, mathematics, humanities, social sciences, engineering sciences, and engineering design methods. Through the use of technical electives, students can specialize in biochemical engineering, biomedical engineering, advanced materials processing, and hazardous waste management. The required two-semester unit operations laboratory provides students with an in-depth understanding of the concepts learned in the classroom. Concepts of heat transfer, fluid dynamics, mass transfer, and explicit equipment use and optimization are covered in the lab.

Final integration of all aspects of the curriculum is accomplished in the senior year through a two-semester capstone design sequence. In these courses, students work in teams, utilizing engineering principles, economic analysis, and sophisticated simulation software to design a major chemical engineering process or product. Development of oral and written communication skills is stressed throughout the laboratory and design course sequences.

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 the program are well prepared to enter the industrial world or to pursue higher degrees. Their educational experience is designed to enable them to:

- utilize theoretical and practical concepts of chemical engineering in the formulation and solution of closed-form and open-ended problems;
- design experiments and interpret experimental data;
- utilize modern computational tools;
- communicate effectively in oral and written forms; and
- work effectively in teams.

Characteristics and Skills

- Interest and ability in math, chemistry, and physical sciences
- Logical thinking
- Inventiveness
- Ability to draw information and ideas from a variety of sources
- Perseverance
- Curiosity
- Versatility
- Leadership ability
- Strong verbal and writing skills
- Ability to work effectively with a team and independently
- Strong aptitude for computer applications

Potential Occupations

Chemical engineering graduates find employment with the petroleum, chemical, food, biotechnology, microelectronics, environmental consulting, and other private sector industries and with government agencies. Participation in internships, volunteer activities, or cooperative education opportunities is highly recommended to enhance practical training and development. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels. Some examples include: research engineer, process development engineer, equipment design engineer, production engineer, pollution control engineer, sales engineer, consulting engineer, materials engineer, biochemical engineer, biomedical engineer, and food engineer.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
CHCC 104	Strategies of Engineering Problem Solving (CBCC/CHCC 192)	3	2D
CHCC 192	Strategies of Engineering Design	3	1
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124 and M/M CC 160)	4	2C
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A

PHCC	142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/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/C CC 111, M/M CC 160, PH/PHCC 141, one course in computer programming)	3	
CH	202	Thermodynamic Process Analysis (CH 201)	3	
CE	262	Engineering Mechanics (M/M CC 161, PH/PHCC 141)	4	
COCC	150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
EE	204	Introduction to Electrical Engineering (M/M CC 161, PH/PHCC 142)	3	
M	261	Calculus for Physical Scientists III (M/M CC 161)	4	
M	340	Introduction to Ordinary Differential Equations (M/M CC 255 or M 261)	4	4A, 4B
		Health and wellness ¹	2	3G
TOTAL			34	
JUNIOR				
C	472	Physical Chemistry for Engineers (C 113, M 261, PH/PHCC 142)	4	
CH	330	Process Simulation (CH 202; concurrent reg. 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 reg.)	3	
CH	333	Momentum and Heat Transfer Laboratory (CH 332)	2	
CH	341	Equilibrium-Staged 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	2B
		Advanced science ³	4	
		Social/behavioral sciences ⁴	3	3C
		Elective	3	
TOTAL			35	
SENIOR				
CH	430	Process Control and Instrumentation (CH 332, CH 341, CH 420)	4	
CH	442/	Rate-Controlled Separations (CE 300 or CH 331; M 340; one course in physical chemistry)	3	
EV	442			
CH	443/	Mass Transfer and Separation Laboratory (CH 341 or CH 442/EV 442 or concurrent reg.)	2	
EV	443			

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	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

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 2B in the AUCC.

³ Select from departmental list of approved courses.

⁴ Select from the list of courses in category 3C 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 3E 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 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

Programs leading to the Master of Science and Doctor of Philosophy degrees are offered in many areas of specialization. A description of these programs may be found in the *Graduate and Professional Bulletin*. The department publishes a descriptive brochure, which may be obtained by writing to the department chair.

DEPARTMENT OF CIVIL ENGINEERING

Office in Engineering Building, Room A203
Professor Sandra L. Woods, Head

The Department of Civil Engineering administers undergraduate and graduate degrees in civil engineering, **bioresource and agricultural engineering**, and an interdisciplinary undergraduate degree program in **environmental engineering**.

Major in Civil Engineering

Civil engineers are involved in the planning, design, construction, operation, and maintenance of complex, large-scale, one-of-a-kind public/private projects such as bridges, buildings, canals, highways, transit systems, airports, irrigation projects, water treatment and distribution systems, solid waste treatment and recycling facilities. Increasingly, the need to provide for both society's infrastructure requirements and the preservation of environmental quality is being

addressed by civil engineers. Due to their uniqueness and scale, civil engineering projects cannot be proof tested and revised; they are expected to work the first time. Consequently, civil engineers use computers extensively in the design, visualization, and management of these large systems and structures. Additionally, the need to satisfy environmental concerns and the demand for remediation of past practices has made the field of environmental engineering one of the fastest growing fields in 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. Engineering courses cover such topics as design practices, computer tools, technical communications, project management, and engineering ethics. This curriculum provides the basic scientific and professional education necessary to enter the engineering profession in any branch of civil engineering. 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, CECC 192, CECC 208, CE 209, CE 308, CE 309, CE 408, and CE 409, include an integrated coverage of design practices, computer tools, technical communications, project management, engineering heritage and ethics, and other technical topics for with the coverage extends beyond a single semester. This series connects and includes the first year classes on computer skills, graphics, introduction to design and civil engineering, and first year seminar with the year-long team-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 and increased ability to learn, inquisitiveness and critical assessment skills, and appreciation for the need to continue development of their professional skills, and a desire to continue their education through life-long learning.
- To provide its 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.

Characteristics and Skills

- Interest in developing solution for real problems and needs
- Interest in designing large systems and structures
- Curiosity about how things work
- Aptitude in math and physical sciences
- Ability to work within large organizations
- Perseverance
- Attention to detail
- Leadership ability and interpersonal skills
- Strong verbal and writing ability
- Creative/Innovative
- Able to draw information and ideas from a variety of sources
- Good team player
- Versatility
- Aptitude for and interest in computer applications and design

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, hydraulics 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
CE 108	Civil Engineering Principles I	3	
CECC 192	Civil Engineering Principles II (CE 108)	3	1
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124 and M/M CC 160)	4	2C
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/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/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
CECC 208	Civil Engineering Analysis I (CE 109/CECC 192)	3	2D
CE 209	Civil Engineering Analysis II (C/C CC 111, CE 208, CE 260)	3	
CE 260	Engineering Mechanics-Statics (M/M CC 160, PH/PHCC 141)	3	
CE 261	Engineering Mechanics-Dynamics (CE 260; CBCC/CHCC 192 or CE 108 or ME 101/MECC 192)	3	
CE 360	Mechanics of Solids (CE 260 or CE 262)	3	

M	261	Calculus for Physical Scientists III (M/M CC 161)	4	
M	340	Introduction to Ordinary Differential Equations (M/M CC 255 or M 261)	4	
ME	237	Introduction to Thermal Sciences (PH/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 ER 416; ST/STCC 301 or ST/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/M CC 161, PH/PHCC 142)	3	
		Additional communications ³	3	2B
		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	34	

PROGRAM TOTAL = 132 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 2B 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 C.E. departmental list of courses from those in category 3F in the AUCC.

⁸ Select from C.E. departmental list of permissible technical elective courses.

Major in Bioresource and Agricultural Engineering

The bioresource and agricultural engineering major prepares students for careers in the application of engineering principles to the management of natural resources and the production of food and agricultural commodities. Colorado State's unique tradition in natural resources, its land grant and agricultural heritage, and its faculty expertise provide an ideal learning environment for students in this major. Required course work includes biological and physical sciences, natural resources, introduction to soil science, and fundamental engineering sciences in thermodynamics, mechanics, hydraulic and geotechnical engineering, heat and mass transfer, and flow processes. Senior projects are year-long and mentored by professional engineers. Examples include water quality monitoring systems, determination of instream flow requirements, wetland design for nonpoint pollution control, determination of agricultural consumptive use, salinity reduction in lake systems, irrigation and drainage design, variable-rate chemical application systems, and design of equipment safety structures.

Two concentrations are offered in the major—**agricultural engineering** and **bioresource engineering**. Regardless of the concentration chosen, Colorado State University engineering graduates are well prepared for a professional career with a greater than 90% pass rate on the Fundamentals of Engineering exam, the first step towards registration as a Professional Engineer.

The educational objectives of the undergraduate program in bioresource and agricultural engineering are to:

- educate students to formulate and solve engineering problems in which agricultural and natural resource systems are involved;
- foster a learning environment in which the students will be exposed to the technical tolls of modern engineering practice;
- enable students to develop effective written and oral communication skills;
- develop students' ability to work both individually and in teams;
- develop an appreciation for the interdisciplinary character of modern business and society; and
- prepare students for employment in engineering careers, for study in graduate and professional schools, and for life-long learning.

Characteristics and Skills

- Interest in natural resources or agriculture
- Curiosity about how things work
- Aptitude and interest in math and physical sciences
- Interest in developing solutions for real problems and needs

- Perseverance
- Attention to detail
- Leadership ability and interpersonal skills
- Strong verbal and writing ability
- Creative/Innovative
- Able to draw information and ideas from a variety of sources
- Good team player
- Versatility
- Aptitude for computer applications

Potential Occupations

Bioresource engineers find employment with environmental and natural resource consulting firms; government agencies at the local, state and federal levels; and industries facing increasing environmental regulation. Agricultural engineers are employed by a wide variety of farm, construction, and related equipment manufacturers, consulting firms, and by government agencies at all levels.

Participation in internships, volunteer activities, professional organizations and associated student branch activities, or cooperative education opportunities is highly recommended to enhance practical training and development. Graduates who go on for advanced studies are prepared to practice in more technically-demanding areas 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: bioresource engineer, environmental engineer, irrigation engineer, water resource engineer, quality control manager, sales engineer, occupational health and safety specialist, agronomist, packaging engineer, cooperative extension agent, agricultural equipment design engineer, ecological engineer, soil conservationist, agricultural research engineer, environmental health specialist, hydrogeologist, and hydrologist.

Core Program

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	

					<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
CHCC	104	Strategies of Engineering Problem Solving (CBCC/CHCC 192)	3	2D				
CHCC	192	Strategies of Engineering Design	3	1				
M CC	160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C	CE 360	Mechanics of Solids (CE 260 or CE 262)	3	
M CC	161	Calculus for Physical Scientists II (M/M CC 124 and M/M CC 160)	4	2C	CE 377/ SC 377	Geographic Information Systems in Agriculture (CS 110)	3	
PHCC	141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A	CE 425	Soil and Water Engineering (CE 300 or CH 331 or SC 240)	4	
PHCC	142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A	CE 440	Nonpoint Source Pollution (one course in soil science, hydrology, or fluid mechanics)	3	
		TOTAL	33		CE 471	Engineering Design I (CE 204/EV 204 or CH 201)	1	4C
SOPHOMORE					CE 473/ ME 440	Design of Off-Highway Vehicles (CE 261 or CE 262; ME 237)	4	
BZCC	120	Principles of Plant Biology	4	3A	ME 337	Thermodynamics (M 261, ME 237)	3	
CE	204/ EV 204	Agricultural and Environmental Measurements (PH/PHCC 110 or PH/PHCC 141)	3		ME 342	Mechanics and Thermodynamics of Flow Processes (M 340; ME 237)	3	
CE	262	Engineering Mechanics (M/M CC 161, PH/PHCC 141)	4			Additional communication ¹	3	2B
COCC	150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A		Social/behavioral sciences ²	3	3C
						Natural resources elective ³	3	
						TOTAL	33	
SENIOR					CE 472	Engineering Design II (CE 471)	3	4A, 4C
EE	204	Introduction to Electrical Engineering (M/M CC 161, PH/PHCC 142)	3		EG 410	Systems Engineering and Optimization (M/M CC 255 or M 261)	3	
M	261	Calculus for Physical Scientists III (M/M CC 161)	4		ME 338	Thermosciences Laboratory (ME 337 or concurrent reg. in ME 344)	1	
M	340	Introduction to Ordinary Differential Equations (M/M CC 255 or M 261)	4	4A, 4B	ME 344	Heat and Mass Transfer (ME 342)	3	
ME	237	Introduction to Thermal Sciences (PH/PHCC 142)	3		ME 410	Engineering Economy for Engineers (M 261)	2	
SC	240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4			Arts/humanities ⁴	3	3B
		Health and wellness ¹	2	3G		Global and cultural awareness ⁵	3	3E
		TOTAL	34			Historical perspectives ⁶	3	3D
CORE TOTAL = 67 credits²						U.S. public values and institutions ⁷	3	3F
						Agricultural engineering electives	6	
						TOTAL	30	
					PROGRAM TOTAL = 130 credits			

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

² To complete the degree in bioresource and agricultural engineering, students must select one of the following concentrations: agricultural engineering or bioresource engineering.

Agricultural Engineering Concentration

Agricultural engineering emphasizes the design and testing of machinery and equipment used in the production of food and fiber or in off-highway transport. Required course work includes a sequence of core courses in mechanical engineering covering fluid mechanics and thermal sciences. Additional courses are taken in field measurements, fluid and machine dynamics, thermal sciences, and global positioning systems. Students may specialize in biomachine design, testing, controls, or human/machine interaction.

In addition to the bioresource and agricultural engineering core courses, the following must be completed:

¹ Select from the list of courses in category 2B in the All-University Core Curriculum (AUCC).

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

³ Select from departmental list of approved courses.

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. Certain courses taken to satisfy a requirement in other areas of foundations and perspectives may simultaneously satisfy this requirement.

Bioresource Engineering Concentration

The bioresource engineering concentration emphasizes natural resource management, soil/water/plant/atmosphere interactions, advanced engineering principles, and computer technology, including geographic information systems.

Through the choice of electives students may specialize in water quality, air quality, water resources irrigation and drainage design, or ecological engineering.

In addition to the bioresource and agricultural engineering core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
CE 300	Fluid Mechanics (CE 261 or CE 262; ME 237)	4	
CE 360	Mechanics of Solids (CE 260 or CE 262)	3	
CE 377/ SC 377	Geographic Information Systems in Agriculture (CS 110)	3	
CE 425	Soil and Water Engineering (CE 300 or CH 331 or SC 240)	4	
CE 440	Nonpoint Source Pollution (one course in soil science, hydrology, or fluid mechanics)	3	
CE 471	Engineering Design I (CE 204/EV 204 or CH 201)	1	4C
CE 473/ ME 440	Design of Off-Highway Vehicles (CE 261 or CE 262; ME 237)	4	
	Additional communication ¹	3	2B
	Natural resources elective ²	3	
	Social/behavioral sciences ³	3	3C
	TOTAL	31	
SENIOR			
CE 401	Hydraulic Engineering (CE 300)	3	
	OR		
CE 450	Introduction to Geotechnical Engineering (CE 360)	4	
CE 472	Engineering Design II (CE 471)	3	4A, 4C
EG 410	Systems Engineering and Optimization (M/M CC 255 or M 261)	3	
ME 410	Engineering Economy for Engineers (M 261)	2	
	Arts/humanities ⁴	3	3B
	Bioresource engineering electives ⁵	8	
	Global and cultural awareness ⁵	3	3E
	Historical perspectives ⁶	3	3D
	U.S. public values and institutions ⁷	3	3F
	TOTAL	31-32	

PROGRAM TOTAL = 129-130 credits

¹ Select from list of courses approved for category 2B of the All University Core Curriculum (AUCC).

² Select from departmental list of approved courses.

³ Select from list of courses approved for category 3C of the AUCC.

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

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

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

⁷ Select from list of courses approved for category 3F of the AUCC. Certain courses taken to satisfy a requirement in other areas of foundations and perspectives may simultaneously satisfy this requirement.

Graduate Programs in Civil Engineering and Bioresource and Agricultural 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; hydrologic science and engineering; engineering mechanics; structural engineering; and water resources planning and management.

In bioresource and agricultural engineering, programs leading to the Master of Science and Doctor of Philosophy degrees are offered in many areas of specialization.

Addition of a practice-oriented, course work only, Master of Engineering program has recently (January 2001) been approved and program requirements specific for civil engineering and bioresource and agricultural engineering are in the process of being implemented.

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 Arcade, Room AR 104
Professor Anthony Maciejewski, Head

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 a 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.

Characteristics and Skills

- Strong interest and aptitude for math and the physical sciences
- Strong interest in designing electrical or computer systems and devices
- Logical thinker
- Creative
- Able to draw information from multiple sources
- Good team player
- Self motivated
- Strong problem solving ability
- Values accuracy and precision
- Cooperative team working skills
- Good written and verbal communication skills
- Enjoys experimentation and data analysis

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 largest engineering profession, and computer engineering being the fastest growing, graduates readily find 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, electric power superintendent, numerical control programmer, geophysicist, aerospace engineer, communications specialist, transportation engineer.

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.

Major in Computer Engineering

Computer engineering emphasizes computer electronics, digital system design, digital computing and networking, and computer programming.

Computer engineering students are required to take three computer science courses and choose senior elective courses in computer-related areas.

<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 COCC 192/CO 130)	3	2A
CSCC 153	Java Programming (M/M CC 118 with a C or better or M/M CC 121 with a C or better)	4	2D
EE 102	Digital Circuit Logic	4	
EECC 192	Electrical Engineering Fundamentals (high school algebra and geometry)	3	1
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	2C
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A

SPCC	200	Public Speaking	3	2B1	Historical perspectives ⁴	3	3D
		Health and wellness ¹	2	3G	TOTAL	35	
		TOTAL	32				
SOPHOMORE					SENIOR		
CS	200	Algorithms and Data Structures (CS/CSCC 153 with a C or better, CS 166/M 166 with a C or better)	4		EE 303/ST 303	Introduction to Communications Principles (M 261)	3
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)	4		EE 401	Senior Design Project I (EE 312, EE 332, and EE 342 or EE 343)	3 4A, 4B
EE	201	Circuit Theory (EECC 192; concurrent reg. in M/M CC 161 and PH/PHCC 142)	3		EE 402	Senior Design Project II (EE 401)	3 4C
EE	202	Circuit Theory Applications (EE 201)	4		EE 456	Computer Networks (CS/CSCC 153, EE 451)	4
EE	251	Introduction to Microprocessors (EE 102)	4			Arts and humanities ⁵	3 3B
M	261	Calculus for Physical Scientists III (M/M CC 161)	4			Global and cultural awareness ⁶	3 3E
						U.S. public values and institutions ⁷	3 3F
						Technical electives ⁸	10
						TOTAL	32
M	340	Introduction to Ordinary Differential Equations (M/M CC 255 or M 261)	4		PROGRAM TOTAL = 131-133 credits		
		OR			¹ Select from list of courses in category 3G of the All-University Core Curriculum (AUCC).		
M	229	Matrices and Linear Equations (M/M CC 141 or M/M CC 155 or M/M CC 160)	2		² CS 301 (followed by CS 453 in the senior year) is recommended for students interested in specializing in computer system design.		
		AND			³ EE 332 is recommended for students interested in specializing in VLSI.		
M	345	Differential Equations (M 229; M/M CC 161 or M/M CC 255)	4		⁴ Select from list of courses in category 3D of the AUCC.		
					⁵ Select from list of courses in category 3B of the AUCC.		
PHCC	142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A	⁶ Select from list of courses in category 3E of the AUCC.		
		TOTAL	32-34		⁷ Select from list of courses in category 3F of 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.		
JUNIOR							
CS	301	Foundations of Computer Science ² (CS 166/M 166 with C or better, CS 200 with C or better, M/M CC 161 with C or better, M 229 with C or better)	4		Major in Electrical Engineering		
		OR			Students choose between the electrical engineering or optoelectronic engineering concentrations, each one of which leads to the bachelor of science degree. The number of credits within each concentration ranges between 129 to 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 team senior design project under the direction of a faculty member.		
EE	332	Electronics Principles II ³ (EE 331)	4		A maximum of six credits in 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.		
CS	370	System Architecture and Software (CS 200 with a C or better, CS 270 with a C or better; ST/STCC 301 with a C or better or ST/STCC 309 with a C or better)	4				
ECCC	202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C			
EE	311	Linear System Analysis I (EE 202 and M 340 or M 345)	3				
EE	312	Linear System Analysis II (EE 311)	3				
EE	331	Electronics Principles I (EE 202 and M 340 or M 345)	4				
EE	343	Electrodynamics for Computer Engineers (EE 202 and M 340 or M 345)	4				
EE	450	Digital System Design Laboratory (concurrent reg. in EE 451)	1				
EE	451	Digital System Design (EE 251; concurrent reg. in EE 450)	3				
EE	452	Principles of Digital Computing and Networking (EE 251)	3				

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 and computer 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 and computer 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 COCC 192/CO 130)	3	2A
CSCC 153	Java Programming (M/M CC 118 with a C or better or M/M CC 121 with a C or better)	4	2D
EE 102	Digital Circuit Logic	4	
EECC 192	Electrical Engineering Fundamentals (high school algebra and geometry)	3	1
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	2C
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
SPCC 200	Public Speaking	3	2B1
	TOTAL	30	
SOPHOMORE			
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
EE 201	Circuit Theory (EECC 192; concurrent reg. in M/M CC 161 and PH/PHCC 142)	3	
EE 202	Circuit Theory Applications (EE 201)	4	
EE 251	Introduction to Microprocessors (EE 102)	4	
M 261	Calculus for Physical Scientists III (M/M CC 161)	4	
M 340	Introduction to Ordinary Differential Equations (M/M CC 255 or M 261)	4	
	OR		
M 345	Differential Equations (M 229; M/M CC 161 or M/M CC 255)	4	
PHCC 142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/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 and M 340 or M 345)	3	
EE 312	Linear System Analysis II (EE 311)	3	
EE 331	Electronics Principles I (EE 202 and M 340 or M 345)	4	
EE 332	Electronics Principles II (EE 331)	4	4A
EE 341	Electromagnetic Fields and Devices I (M 340 or M 345)	3	
EE 342	Electromagnetic Fields and Devices II (EE 341)	3	
EE 362	Electromechanical Devices (EE 311, EE 331, EE 341)	3	
	OR		
EE 372	Physical Electronics (EE 341, PH/PHCC 142)	3	
	Global and cultural awareness ²	3	3E
	Historical perspectives ³	3	3D
	TOTAL	32	

SENIOR

ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B, M/M CC 121 or M/M CC 140 or M/M CC 160)	3	3C
EE 362	Electromechanical Devices ⁴ (EE 311, EE 331, EE 341)	3	
	OR		
EE 372	Physical Electronics ⁵ (EE 341, PH/PHCC 142)	3	
EE 401	Senior Design Project I (EE 312, EE 332 and EE 342 or EE 343)	3	4A, 4B
EE 402	Senior Design Project II (EE 401)	3	4C
	Arts/humanities ⁵	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 COCC 192/CO 130)	3	2A
CSCC 153	Java Programming (M/M CC 118 with a C [2.0] or better or M/M CC 121 with a C or better)	4	2D
EE 102	Digital Circuit Logic	4	
EECC 192	Electrical Engineering Fundamentals (high school algebra and geometry)	3	1
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	2C
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
SPPC 200	Public Speaking	3	2B1
	TOTAL	30	
SOPHOMORE			
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
EE 201	Circuit Theory (EECC 192; concurrent reg. in M/M CC 161 and PH/PHCC 142)	3	
EE 202	Circuit Theory Applications (EE 201)	4	
EE 251	Introduction to Microprocessors (EE 102)	4	
M 261	Calculus for Physical Scientists III (M/M CC 161)	4	
M 340	Introduction to Ordinary Differential Equations (M/M CC 255 or M 261)	4	
	OR		
M 345	Differential Equations (M 229; M/M CC 161 or M/M CC 255)	4	
PHCC 142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/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 and M 340 or M 345)	3	
EE 312	Linear System Analysis II (EE 311)	3	

EE 331	Electronics Principles I (EE 202 and M 340 or M 345)	4	
EE 332	Electronics Principles II (EE 331)	4	4A
EE 341	Electromagnetic Fields and Devices I (M 340 or M 345)	3	
EE 342	Electromagnetic Fields and Devices II (EE 341)	3	
EE 372	Physical Electronics (EE 341, PH/PHCC 142)	3	
PH 353	Optics and Waves (M 261, PH/PHCC 142)	4	
	Global and cultural awareness ³	3	3E
	Historical perspectives ⁴	3	3D
	TOTAL	33	
SENIOR			
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/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, EE 332 and EE 342 or EE 343)	3	4A, 4B
EE 402	Senior Design Project II (EE 401)	3	4C
EE 404	Experiments in Optical Electronics (concurrent reg. in EE 441)	2	
EE 441	Optical Electronics (EE 342)	3	
EE 457	Optical Information Processing (EE 312, EE 342 or EE 343)	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
Professor Allan T. Kirkpatrick, Head

Major in Mechanical Engineering

Mechanical engineers design, develop, and manufacture the machinery and instrumentation that runs factories, transportation systems, mining operations, and utilities. 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. 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.

Following are the objectives of the Mechanical Engineering department.

Graduating mechanical engineers shall display:

Competence

- through introduction to the fundamentals of mathematics, sciences, and the engineering sciences;
- through use of the fundamental, experiential, experimental, and technical aspects of mechanical engineering; and
- through demonstration of strong closed-form and open-ended problem solving skills.

Professionalism

- by recognition of the professional nature of engineering, through ethics, contact with practicing professionals, and study of the role of engineering in industry and society;
- by study and experience of group dynamics and communications (oral, written, and electronic); and
- by appreciation of the need for life-long learning and an awareness of contemporary issues.

Characteristics and Skills

- Aptitude in math and physical sciences
- Strong analytical skills
- Aptitude for and interest in computer applications and design
- Strong mechanical skills
- Inventive
- Able to draw information and ideas from a variety of sources
- Good team player
- Good oral and written & communication skills
- Organizational and leadership ability
- Curiosity and creativity
- Interest in developing solution for real problems and needs
- Perseverance
- Attention to detail
- Leadership ability and interpersonal skills
- Versatility

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 exam. Participation in internships, volunteer activities, or cooperative education opportunities is highly recommended to enhance your 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 COCC 192/CO 130)	3	2A
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124 and M/M CC 160)	4	2C
ME 120	Introduction to Computer-Aided Design (ME 121 or concurrent reg.)	3	

ME	121	Mechanical Engineering Shop Practicum	1		ME	304	Engineering Design (ME 120, ME 250; ME 307, ME 324, ME 325, ME 331, ME 338, ME 344, CE 363 or concurrent reg in ME 250; ME 307, ME 324, ME 325, ME 331, ME 338, ME 344, CE 363)	3	4A
MECC	192	Introduction to Mechanical Engineering	2	1					
PHCC	141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A		ME	307	Mechatronics and Measurement Systems (CE 261, EE 204, M 340)	4
PHCC	142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A		ME	324	Dynamics of Machines (CE 261, M 340 or concurrent reg.)	4
		Arts/humanities ¹	3	3B		ME	325	Machine Design (CE 360)	3
		Health and wellness ²	2	3G		ME	331	Introduction to Engineering Materials (C/C CC 112, C 113, PH/PHCC 142)	4
		TOTAL	32			ME	337	Thermodynamics (M 261, ME 237)	3
SOPHOMORE						ME	338	Thermosciences Laboratory (ME 337, concurrent reg. in ME 344)	1
C CC	111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A		ME	342	Mechanics and Thermodynamics of Flow Processes (M 340, ME 237)	3
C CC	112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A		ME	344	Heat and Mass Transfer (ME 342)	3
C	113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3				TOTAL	32	4B
CE	260	Engineering Mechanics-Statics (M/M CC 160, PH/PHCC 141)	3		SENIOR				
CE	261	Engineering Mechanics-Dynamics (CE 260; CE 108 or CBCC/CHCC 192 or ME 101/MECC 192)	3		ME	486A	Engineering Design Practicum I (ME 304)	3	4C
EE	204	Introduction to Electrical Engineering (M/M CC 161, PH/PHCC 142)	3		ME	486B	Engineering Design Practicum II (ME 486A)	3	4C
M	261	Calculus for Physical Scientists III (M/M CC 161)	4				Global and cultural awareness ⁴	3	3E
M	340	Introduction to Ordinary Differential Equations (M/M CC 255 or M 261)	4				Historical perspectives ⁵	3	3D
ME	237	Introduction to Thermal Sciences (PH/PHCC 142)	3				Social/behavioral sciences ⁶	3	3C
ME	250	Computer Applications in Mechanical Engineering (M 340 or concurrent reg.)	2				U.S. public values and institutions ⁷	3	3F
STCC	309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D			Technical electives ⁸	12	
		Additional communications ³	3	2B			TOTAL	30	
		TOTAL	36		PROGRAM TOTAL = 130 credits				
JUNIOR					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 2B in the AUCC. ⁴ Select from the list of courses in category 3E in the AUCC. ⁵ Select from the list of courses in category 3D in the AUCC. ⁶ Select from the list of courses in category 3C in the AUCC. ⁷ Select from the list of courses in category 3F in the AUCC. ⁸ Select from department list of approved courses.				
CE	360	Mechanics of Solids (CE 260 or CE 262)	3		Graduate Programs in Mechanical Engineering				
CE	363	Material Properties (CE 360)	1		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 <i>Graduate and Professional Bulletin</i> .				

College of Liberal Arts

*Office in Clark Building, Room C 138
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
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 educates citizens for life through studies and experiences which lead to an understanding of people, their history, literature, and art; their social, political, and economic systems; and their relationship to a social and physical environment. Specific college functions are:

1. To provide through courses in the arts, humanities, and social sciences a broad, liberal education for all students, both in its own majors and those of other Colorado State colleges.
2. To provide concentrated study in the arts, humanities, and social sciences, preparing students for a wide selection of careers e.g., in teaching, research, music therapy, journalism, the creative arts, business, industry, and government.
3. To provide graduate study in disciplines of the arts, humanities, and social sciences.
4. To offer preprofessional training for advanced study of law and foreign service and professional training in technical journalism.

COLLEGE PROGRAMS

Undergraduate Majors

Undergraduate majors lead to one of three degrees: bachelor of arts, bachelor of fine arts, and bachelor of music. These degrees require a minimum of 120 credits with a minimum of 42 in upper-division courses. Some programs of study require more than the 120-credit minimum. Descriptions of departmental and interdepartmental majors and concentrations are given 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. Numerous combinations, all of which enhance the value of the University experience, are available with careful planning. Some of these may be completed within, or close to, the normal four years of study—for example, English/computer science, or liberal arts/history. See [Second Major Requirements](#) in the Graduation Requirements section of this catalog for a complete description of the program.

Graduation Average Requirement

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. Some departments have a more rigorous requirement, e.g., a minimum grade of C in each course taken in the major. Consult the requirements for the major.

Prelaw

Offices in Clark Building, Rooms C 346 and B 349

Students preparing for law school usually major in business administration, economics, English, history, philosophy, political science, or a planned program in liberal arts. Law schools seek above-average students with a broad background. Prelaw students, regardless of major, should design a course of study which develops their basic skills with language and symbolic logic, accounting skills, insight into social, cultural, economic, and political forms, and analytical capabilities.

Law schools generally require an undergraduate degree for admission.

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, foreign languages, history, liberal arts, political science, sociology, or technical journalism.

Study Abroad

Study abroad programs are available to students in the College of Liberal Arts. 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 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 website www.international.colostate.edu/us/studyabroad.

Graduate Programs

A variety of programs lead to advanced degrees. 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 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. The program, interdepartmentally administered, consist of 32 semester credits with at least one course from each of the three departments other than the department of admission. 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

Office in Clark Building, Room C 138

This program is for freshmen and sophomores with undeclared 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 C 138

Liberal arts majors can select from six concentrations: [arts and humanities](#); [social sciences](#); [social sciences with social studies licensure](#); [American studies](#); [international studies](#); and a five-year joint program with [dual degrees in liberal arts \(BA\) and engineering science \(BS\)](#).

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.

Liberal arts majors have a desire for an interdisciplinary approach to education and wide-ranging interests in human expression, culture, history, and institutions of the past and present. Completing a liberal arts major gives students a well-rounded education and develops a number of skills including the ability to integrate knowledge from several perspectives into a coherent whole, the ability to write and speak well, and the ability to think critically and logically. Liberal arts majors also tend to have leadership skills and a desire for responsible and creative participation in their communities and broader society.

Graduates 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. Others enter graduate and professional schools for more specialized study. To enhance their career opportunities, majors are encouraged to participate in paid or voluntary work, internships, and cooperative education 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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	4	3A
	First-year seminar ³	2-3	1
	Health and wellness ⁴	2	3G
	Mathematics ⁵	3	2C
	Electives	12-13	
	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 ⁶	3	2B
	Biological/physical sciences ²	3	3A
	Global and cultural awareness ⁷	3	3E
	Logical/critical thinking ⁸	3	2D
	Social/behavioral sciences ⁹	3	3C
	Electives	9	
	TOTAL	30	
JUNIOR			
AU 300/ E 300	American Lives-Methods in American Studies (AU/AUCC 100, AU/AUCC 101)	3	4A, 4B
	American identities ¹⁰	6	
	American studies option ¹¹	10	
	Foreign language ¹²	6-10	
	Electives	1-5	
	TOTAL	30	

SENIOR

AU 492	Seminar in American Studies (AU 300/E 300; senior status or written consent of instructor))	3	4C
AU 499	Thesis in American Studies (AU 492)	3	
	American identities ¹⁰	3	
	American studies option ¹¹	11	
	Electives	10	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

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

²Select from list of courses in category 3A of the AUCC. One course must have a laboratory component.

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

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

⁵Select from list of courses in category 2C of the AUCC.

⁶Select from list of courses in category 2B of the AUCC.

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

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

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

¹⁰Students 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.

¹¹Students 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.

¹²Placement 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 CC 105/L CC 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 courses (minimum of 3 prefixes):</i>			
AP 412	Indians of North America (AP/APCC 100 or AP/APCC 200 or AP 413 or AP 414/ET 414, or written consent of instructor)	3	
AP 413	Indigenous Peoples Today (AP/APCC 200 or AP 412 or AP 414/ET 414)	3	
AR 314	Women in Art History (AR/ARCC 100 or AR 110)	3	
AR 318	Native American Art (AR 110; AR/ARCC 100 or AR 111 or AR 113)	3	
E 330	Images of Women in Literature	3	
E 332	Modern Women Writers	3	
ETCC 200	Ethnicity in America	3	3F
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	Federal Indian Law and Policy	3	
HYCC	250/ ETCC	African-American History 1619-1865	3	3D
HYCC	251/ ETCC	African-American History Since 1865	3	3D
HY	468	Women In America	3	
PO	413	U.S. Civil Rights and Liberties (PO/POCC 101 or POCC 192A)	3	
PO	423	American Political Theories (PO/POCC 101 or POCC 192A)	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/S CC 100 or S/S CC 105)		
S	333	Gender Roles in Society (S/S CC 100 or S/S CC 105)	3	
S	341	Sociology of Rural Life (S/S CC 100 or S/S CC 105)	3	
S	342	Leisure and Society (S/S CC 100 or S/S CC 105)	3	
S	343	Sport and Society		
S	372	Sociology of Deviance (S/S CC 100 or S/S CC 105)	3	
S	375	Sociology of Religion and Medicine (S/S CC 100 or S/S CC 105)	3	
Other options ¹			9	
TOTAL			30	

¹Students 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 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 CO/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/ ET	Contemporary Native American Literature	3
E	439	Novel in the American West (E 179 or E/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 or POCC 192A)	3
S	342	Leisure and Society (S/S CC 100 or S/S CC 105)	3
S	343	Sport and Society	3
S	375	Sociology of Religion and Medicine (S/S CC 100 or S/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

¹Students 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 (EC/ECCC 101 or EC/ECCC 202 or EA/EACC 202)	3	
EC	379/ HY	Economic History of the United States (EC/ECCC 101 or EC/ECCC 202 or EA/EACC 202; or any two courses in American history)	3
HY	360	Colonial and Provincial America to 1740	3
HY	362	Era of the American Revolution	3
HY	364	Early U.S. Republic (HY/HYCC 150)	3
HY	368	Age of Jackson (HY/HYCC 150)	3
HY	370	Civil War Era (HY/HYCC 150)	3
HY	372	Reconstruction and the New South (HY/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
POCC	103	State and Local Government and Politics	3
PO	301	Political Parties and Interest Groups (PO/POCC 101 or POCC 192A)	3
PO	304	Legislative Politics (PO/POCC 101 or POCC 192A)	3
PO	305	Judicial Politics (PO/POCC 101 or POCC 192A)	3

PO	306	Executive Politics (PO/POCC 101 or POCC 192A)	3
PO	309	Urban Politics (PO/POCC 101 or PO/POCC 103 or POCC 192A or POCC 192B)	3
PO	351	Public Administration (PO/POCC 101 or POCC 192A)	3
PO	361	U.S. Environmental Politics and Policy (PO/POCC 101 or POCC 192A)	3
PO	413	U.S. Civil Rights and Liberties (PO/POCC 101 or POCC 192A)	3
PO	423	American Political Theories (PO/POCC 101 or POCC 192A)	3
S	330	Social Stratification (S/S CC 100 or S/S CC 105)	3
S	360	Political Sociology (S/SCC 100 or S/S CC 105)	3
Identities ¹			9
TOTAL			30

¹Students 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 (AP/APCC 140)	3	
AP	412 Indians of North America (AP/APCC 100 or AP/APCC 200 or AP 413 or AP 414/ET 414, or written consent of instructor)	3	
AP	413 Indigenous Peoples Today (AP/APCC 200 or AP 412 or AP 414/ET 414)	3	
AP	455 Great Plains Archaeology (AP/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 CO/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	3	
ET	438 Literature		
E	439 Novel in the American West (E 179 or E/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	
S	341 Sociology of Rural Life (S/S CC 100 or S/S CC 105)	3	
Identities ¹			9
TOTAL			30

¹Students 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 coursework 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 to 6 or COCC 192/CO 130)	3	2A
	Arts and humanities ¹	6	3B
	Biological/physical sciences ²	3	3A
	First-year seminar ³	2-3	1
	Historical perspectives ⁴	6	3D
	Mathematics ⁵	3	2C
	Social/behavioral sciences ⁶	3	3C
	U.S. public values and institutions ⁷	3	3F
TOTAL		29-30	

SOPHOMORE

Additional communication ⁸	3	2B
Biological/physical sciences ²	4	3A
Global and cultural awareness ⁹	3	3E
Health and wellness ¹⁰	2	3G
Logical/critical thinking ¹¹	3	2D
Minor/certificate courses ¹²	6	
Arts and humanities electives ¹³	3	
Electives ¹⁴	6	
TOTAL	30	

JUNIOR

Minor/certificate courses ¹²	9	
Arts and humanities electives ¹³	15	
Electives ¹⁴	6	
TOTAL	30	

SENIOR

<i>Select one of the following:</i>				
LB	455/	Narrative Film as a Liberal Art ¹⁵	3	4B
SP	455	(senior standing)		
LB	456/	Documentary Film as a Liberal Art ¹⁵	3	4B
JT	456	(senior standing)		
		Other CLA 4B course ¹⁵	3	4B
LB	492	Liberal Arts Capstone Seminar	2	4A, 4C
		Minor/certificate courses ¹²	6	
		Arts and humanities electives ¹³	6	
		Electives ¹⁴	13-14	
TOTAL			30-31	

PROGRAM TOTAL = 120 credits¹⁶

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, 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 from the list of courses in category 1 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 250/HYCC 251 or ETCC 250/ETCC 251, HYCC 270/HYCC 271. 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 2C in the AUCC.

⁶ Select from the list of courses in category 3C in the AUCC 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: ARCC, APCC, AUCC, D CC, E CC, ECCC, ETCC, HYCC, JTCC, L CC, LBCC, MUCC, PFCC, PLCC, POCC, S CC, SPCC, or THCC.

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

⁹ Select from the list of courses in category 3E in the AUCC with any of the following prefixes: ARCC, APCC, AUCC, D CC, E CC, ECCC, ETCC, HYCC, JTCC, L CC, LBCC, MUCC, PFCC, PLCC, POCC S CC, SACC, SPCC, or THCC.

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

¹¹ Select from the following subset of courses in category 2D 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.

¹² Students must complete a minor in the arts and humanities 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 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.

¹³ 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, PL, 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.

¹⁴ 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.

¹⁵ 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.

¹⁶ Students must complete 120 credits, and a minimum total of 42 upper-division credits.

Arts and Humanities and Engineering Science Concentration

Students interested in a broad education and training for the engineering profession may take a five-year program awarding a B.A. with a major in liberal arts, arts and humanities concentration, and a B.S. in engineering science. The program, which requires 152 credits, is administered jointly by the Colleges of Liberal Arts and Engineering. Direct inquiries to the Dean's Office of one of these colleges. Students in this concentration must fulfill the requirements for both degrees in order to graduate.

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/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A

CE	108	Civil Engineering Principles I	3	
CECC	192	Civil Engineering Principles II (CE 108)	3	1
EG	192	Seminar	1	
M CC	160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M	229	Matrices and Linear Equations (M/M CC 141 or M/M CC 155 or M/M CC 160)	2	
PHCC	141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/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/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
COCC	150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
M CC	161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	2C
M	261	Calculus for Physical Scientists III (M/M CC 161)	4	
PHCC	142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
SPCC	200	Public Speaking	3	2B1
		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/M CC 160, PH/PHCC 141)	3	
CE	261	Engineering Mechanics-Dynamics (CE 260; CBCC/CHCC 192 or CE 108 or ME 101/MECC 192)	3	
M	340	Introduction to Ordinary Differential Equations (M/M CC 255 or M 261)	4	4A, 4B
ME	237	Introduction to Thermal Sciences (PH/PHCC 142)	3	
STCC	309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
		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/M CC 161, PH/PHCC 142)	3	

Health and wellness ⁸	2	3G
Minor or certificate ⁶	12	
Arts and humanities electives ⁷	6	
TOTAL	27	

FIFTH YEAR

CE 471	Engineering Design I (CH 201 or CE 204/EV 204)	1	4C
CE 472	Engineering Design II (CE 471)	3	4A, 4C
	Technical electives in engineering ⁹	27	
TOTAL		31	

PROGRAM TOTAL = 152 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.

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/ETCC 251. 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 201, 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: American Ethnicity; Asian Studies; Criminal Justice; Environmental Affairs; 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, 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 Courses

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 275	Introduction to British Literature	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
THCC 141	Introduction to Theatre	3	3B
<i>Select one of the following courses:</i>			
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)	3	2A
	First year seminar ²	2-3	1
	Health and wellness ³	2	3G
	Mathematics ⁴	3	2C
TOTAL		19-20	

SOPHOMORE				
<i>Select one of the following courses:</i>				
COCC	300	Writing Arguments (CO/COCC 150) Logic and Critical Thinking	3	2D
PLCC	110	Rhetoric and Argumentation	3	2D
SPCC	207	Activity Based Statistics (math placement exam)	3	2D
STCC	101	Statistical Thinking: Concepts and Applications (math placement exam)&	3	2D
STCC	110	General Statistics (M/M CC 120A-B)	3	2D
STCC	204	Statistics for Business Students (M/M CC 120A-B)	3	2D
STCC	301	Introduction to Statistical Methods (M/M CC 121)	3	2D
STCC	307/	Introduction to Biostatistics (M/M CC 121)	3	2D
EHCC	307	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
STCC	309		3	2D
<i>Select one of the following courses:</i>				
ECCC	204	Principles of Macroeconomics (EC/ECCC 202 or EA/EACC 202)	3	3F
ECCC	212	Racial Inequality and Discrimination	3	3F
ECCC	240/	Issues in Environmental Economics	3	3F
EACC	240			
ETCC	200	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 Problems	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/L CC 107 or L 108 or placement exam)	3-5	2B3
		Biological/physical sciences ⁵	7	3A
		Social/behavioral sciences ⁶	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 ⁷ (A) HY/HYCC 273/ HYCC 120, HY/HYCC 274/HYCC 220, IN 300. B) HY/HYCC 270/HY 354, IN 300. C) two courses in European history, IN 300)	3	4A, 4C
CORE TOTAL = 44-47 credits⁸				

¹ Study Abroad; recommended in junior year.² Select from the list of courses in category 1 in the All-University Core Curriculum (AUCC).³ Select from the list of courses in category 3G in the AUCC.⁴ Select from the list of courses in category 2C in the AUCC.⁵ Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.⁶ Select from the list of courses in category 3C in the AUCC with one of the following prefixes: APCC, ECCC, JTCC, POCC, PYCC, or S CC.⁷ Select subtopic according to option.⁸ 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 CC 105	First-Year Language I (no previous experience in language)	5	2B3 ²
L CC 107	First-Year Language II (L/L CC 105 or L 106)	5	2B3 ²
	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/L CC 200 or placement exam)	5	2B3
	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 requirements (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 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 369, PL 371, PL 379.⁴ 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 CC 105	First-Year Language I (no previous experience in language)	5	2B3 ²
L CC 107	First-Year Language II (L/L CC 105 or L 106)	5	2B3 ²
	TOTAL	10	
SOPHOMORE			
L CC 201	Second-Year Language II (L/L CC 200 or placement exam)	3-4	2B3

	Electives ³	6
	TOTAL	9-10
JUNIOR		
<i>Select 6 credits from the following courses:</i>		
HYCC 100	Western Civilization, Pre Modern ⁴	3
	AND	
HYCC 101	Western Civilization, Modern ⁴	3
	OR	
	Two HY courses at the 200 and/or 300 level related to Europe ⁵	6
<hr/>		
	Track courses ⁶	18
	Electives ³	3
	TOTAL	27
SENIOR		
	Track courses ⁶	3
	Electives ³	23-27
	TOTAL	26-30
PROGRAM TOTAL = 120 credits		

¹ French, German, Italian, Russian, or Spanish.

² See the All-University Core Curriculum section of the catalog for an explanation of which language courses will satisfy category 2B requirements (if so allowed by the student's major).

³ 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.

⁴ 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.

⁵ With approval of adviser.

⁶ 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 305, HY 306, HY 309, HY 310, HY 318, HY 326, HY 346, HY 410, HY 415, HY 416, HY 417, HY 418, HY 421, HY 422, HY 423, HY 435, HY 438, HY 440, HY 442, HY 451, HY 452, 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 275, E 337, E 342, E 343, E 353, E 426, E 430, E 431, E 432, E 443, E 444, E 445, E 452, E 455, E 460, E 463, E 476, 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 443, 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 CC 105S	First-Year Language I-Spanish (no previous study in language)	5	
L CC 107S	First-Year Language II-Spanish (L/L CC 105S or L 106S)	5	
	TOTAL	10	
SOPHOMORE			
HYCC 271	Latin America Since Independence	3	
HYCC 354	Colonial Latin America (HY/HYCC 101 or HY/HYCC 171 or HYCC 238)	3	
L CC 201S	Second-Year Language II-Spanish (L/L CC 200S or placement exam)	3	
	Electives	3	
	TOTAL	12	

JUNIOR

Track courses ¹	18
Electives ²	9
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 331, 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 436, L 441S, L 435, L 442, L 445, L 449, L 452S, L 453S, L 454S.

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.

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)	3	2A
	Arts and humanities ¹	3	3B
	Biological/physical sciences ²	4	3A
	First year seminar ³	2-3	1
	Health and wellness ⁴	2	3G
	Historical perspectives ⁵	6	3D
	Mathematics ⁶	3	2C
	Social/behavioral sciences ⁷	3	3C
	U.S. public values and institutions ⁸	3	3F
	TOTAL	29-30	

SOPHOMORE

Minor/certificate courses ⁹	6
Additional communication ¹⁰	3
Arts and humanities ¹	3
Biological/physical sciences ²	3
Global and cultural awareness ¹¹	3
Logical/critical thinking ¹²	3
Social science electives ¹³	3
Electives ¹⁴	6
TOTAL	30

JUNIOR

Minor/certificate courses ⁹	9
Social science electives ¹³	12
Electives ¹⁴	9
TOTAL	30

SENIOR

		<i>Select one of the following:</i>	
LB	455/	Narrative Film as a Liberal Art ¹⁵	3 4B
SP	455	(senior standing)	
LB	456/	Documentary Film as a Liberal Art ¹⁵	3 4B
JT	456	(senior standing)	
		Other CLA 4B course ¹⁵	3 4B
LB	492	Liberal Arts Capstone Seminar	2 4A, 4C
		Minor/certificate courses ⁹	6
		Social science electives ¹³	6
		Electives ¹⁴	13-14
		TOTAL	30-31

PROGRAM TOTAL = 120 credits¹⁶

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 1 in the AUCC.

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

⁵ Select one pair of courses from the following subset of courses in category 3D in the AUCC: AUCC 200/AUCC 201 (AUCC 201 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 ETCC 250/ETCC 251, HYCC 270/HYCC 271. Students may also select a pair of courses designed to achieve programmatic objectives, if approved by the adviser.

⁶ Select from the list of courses in category 2C in the AUCC.

⁷ Select from the list of courses in category 3C with the following prefixes: APCC, ECCC, JTCC, POCC, PYCC, or S CC.

⁸ Select from the list of courses in category 3F in the AUCC with any of the following prefixes: ARCC, APCC, AUCC, D CC, E CC, ECCC, ETCC, HYCC, JTCC, L CC, LBCC, MUCC, PFCC, PLCC, POCC, S CC, SPCC, THCC.

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 2B in the AUCC.

¹¹ Select from the list of courses in category 3E in the AUCC with any of the following prefixes: ARCC, APCC, AUCC, D CC, E CC, ECCC, ETCC, HYCC, JTCC, L CC, LBCC, MUCC, PFCC, PLCC, POCC, S CC, SACC, SPCC, THCC.

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 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.

¹⁵ 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.

¹⁶ 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 student for teaching work in public school education.

<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 COCC 192/CO 130)	3	2A
<i>Select one of the following courses:</i>			
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	Logic and Critical Thinking	3	2D
POCC 101	American Government and Politics	3	3C, 3F
	Biological/physical sciences ¹	4	3A
	First year seminar ²	3	1
	Mathematics ³	3	2C
	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
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	
ECCC 204	Principles of Macroeconomics (EC/ECCC 202 or EA/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	2B
	Biological/physical sciences ¹	3	3A
	Health and wellness ⁴	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 (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
ED	340	Literacy and the Learner (completion of 30 credits of course work; consent of Teacher Licensure Office)	3	
ED	350	Instruction I-Individualization/ Management (ED 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED	386	Practicum-Instruction I (ED 310/EDCC 275, ED 340, concurrent reg. in ED 350; admission to Teacher Licensure Program)	1	
		Non-U.S. history, upper-division ⁵	6	
		Upper-division U.S. history pre-1865 ⁶	3	
		Upper-division U.S. history post- 1865 ⁷	3	
		Electives	6	
		TOTAL	32	

SENIOR

ED	450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. 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 450 or ED 426, ED 465, concurrent reg. in ED 485A or B or C or VE 485)	1	
ED	493B	Seminar-Assessment of Learning (ED 450 or ED 426, ED 465, concurrent reg. 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 ⁸	3	
		Elective	1	
		TOTAL	28	

PROGRAM TOTAL = 120 credits¹ 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 Any approved first year seminar (category 1 in the AUCC) in the social sciences.³ Select from the list of courses in category 2C in the AUCC.⁴ Select from the list of courses in category 3G in the AUCC.⁵ Students must complete six upper-division credits in non-U.S. history.⁶ Any upper-division U.S. history pre-1876.⁷ Any upper-division U.S. history post-1876.⁸ 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 152 credits, is administered jointly by the Colleges of Liberal Arts and Engineering. Direct inquiries to the Dean's Office of one of these colleges. Students in this concentration must fulfill the requirements for both degrees in order to graduate.

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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
C CC 111	General Chemistry I (M/M CC 118, M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
CE 108	Civil Engineering Principles I	3	
CECC 192	Civil Engineering Principles II (CE 108)	3	1
EG 192	Seminar	1	
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M 229	Matrices and Linear Equations (M/M CC 141 or M/M CC 155 or M/M CC 160)	2	
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/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/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
COCC 150	College Composition (Composition Placement Exam)	3	2A
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	2C
M 261	Calculus for Physical Scientists III (M/M CC 161)	4	
PHCC 142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
SPCC 200	Public Speaking	3	2B1

		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/M CC 160, PH/PHCC 141)	3	
CE	261	Engineering Mechanics-Dynamics (CE 260; CB 103/CBCC/CHCC 192 or CE 108 or ME 101/MECC 192)	3	
M	340	Introduction to Ordinary Differential Equations (M/M CC 255 or M 261)	4	4A, 4B
ME	237	Introduction to Thermal Sciences (PH/PHCC 142)	3	
STCC	309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
		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/M CC 161, PH/PHCC 142)	3	
		Minor or certificate ⁷	9	
		Social science electives ⁸	6	
		Technical electives in engineering ⁹	6	
		TOTAL	28	
FIFTH YEAR				
CE	471	Engineering Design I (CH 201 or CE 204/EV 204)	1	4C
CB	471	Engineering Design II (CB 470)	3	4A, 4C
		Technical electives in engineering ⁹	21	
		TOTAL	25	
PROGRAM TOTAL = 152 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 200/AUCC 201 (AUCC 201 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/ETCC 251, HYCC 270/HYCC 271, HYCC 273/HYCC 274. 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 216, HYCC 219, HYCC 230, HYCC 270, HYCC 271, HYCC 273, HYCC 274, 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 201, 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: American Ethnicity; Asian Studies; Criminal Justice; Environmental Affairs; 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 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 departmental 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
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/ ET 316	Multiculturalism and the Media	3	
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 C 207
Associate 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.

Characteristics and Skills

Human Relations

- Appreciation of different ways of life
- Enjoy leading and participating in groups
- Investigative
- Ability to observe people, data and things
- Ability to analyze and evaluate relationships between factors

Scientific

- Laboratory skills
- Enjoy researching origins and uses of artifacts
- Qualitative and quantitative analytical skills
- Computational skills
- Ability to investigate the nature of the past

Cultural

- Information gathering skills
- Ability to conduct field studies
- Sampling and surveying skills
- Enjoy data collection and comparison
- Enjoy examination of archaeological remains, settlements, tools, pottery

Project Development

- Project planning and design skills
- Maintenance of records and data tabulation skills
- Excellent writing and speaking skills

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; heritage conservationist; historic preservationist; librarian; urban planner; archivist or artifact conservator; resource specialist; classical or historical anthropologist; cultural affairs officer; diplomatic service representative; immigration or foreign service officer; linguist; educational television researcher; biographical writer; scientific/technical writer; reporter; ethnographic photographer; anthropological linguist; rural development worker; ethnic groups special concerns advocate; intercultural educator; medical anthropologist; grant writer; psychological anthropologist; international development administrator; public relations representative; public opinion pollster; sales/marketing representative; consultant for cross-cultural relations; personnel worker.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one of the following:</i>			
APCC 100	Introductory Cultural Anthropology	3	3C
APCC 192A	Cultures of the World	3	1, 3C
APCC 200	Cultures and the Global System	3	3E
APCC 120	Human Origins and Variation	3	3A
APCC 121	Human Origins and Variation Laboratory (AP/APCC 120 or concurrent reg.)	1	3A
APCC 140	Introduction to Prehistory	3	3D
OR			
APCC 192B	Humans in Prehistory	3	1, 3D
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
	Additional communication ¹	3	2B
	First year seminar ²	3	1

		Health and wellness ³	2	3G
		Logic/critical thinking ⁴	3	2D
		Mathematics ⁵	3	2C
		U.S. public values and institutions ⁶	3	3F
		TOTAL	30	
SOPHOMORE				
		Arts and humanities ⁷	9	3B
		Biological and physical sciences ⁸	10-11	3A
		Global and cultural awareness ⁹	3	3E
		Social and behavioral science ¹⁰	6	
		Anthropology elective ¹⁰	3	
		TOTAL	31 - 32	
JUNIOR				
AP	400	History of Anthropological Theory (AP/APCC 100 or AP 101/APCC 192A or AP/APCC 200; AP/APCC 140 and AP 141/APCC 192B or AP 150/APCC 120 and AP 151/APCC 121)	3	4B
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S	310	<i>Select one of the following:</i> Quantitative Sociological Analysis (M/M CC 120A-B or M/M CC 117)	3	
STCC	301	Introduction to Statistical Methods (M/M CC 121)	3	
STCC	307/ EHCC 307	Introduction to Biostatistics (M/M CC 121)	3	
STCC	311	Statistics for Behavioral Sciences I (M/M CC 121)	3	
<hr/>				
		Social and behavioral sciences ¹⁰	3	
		Upper-division archaeology ¹⁰	3	
		Upper-division biological anthropology ¹⁰	3	
		Upper-division cultural anthropology ¹⁰	3	
		Anthropology electives ⁸	3	
		Electives	9	
		TOTAL	30	
<hr/>				
SENIOR				
<i>Select one of the following:</i>				
AP	329	Cultural Change (AP/APCC 100)	3	4A
AP	330	Human Ecology (AP/APCC 100; AP 150/APCC 120 or BY 220 or BZ/BZCC 101)	3	4A
AP	332	Peoples of the Caribbean (AP/APCC 100 or AP/APCC 200)	3	4A
AP	334	Narrative Traditions and Social Experience (AP/APCC 100 or AP/APCC 200 or E/E CC 140 or S/S CC 100, or written consent of instructor)	3	4A
AP	374	Human Biological Variation (AP 150/APCC 120 or BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110)	3	4A
AP	376	Evolution of Human Adaptation (AP 150/APCC 120 or BZ/BZCC 110 or BY/LSCC 102)	3	4A
AP	412	Indians of North America (AP/APCC 100 or AP/APCC 200 or AP 413 or AP 414/ET 414, or written consent of instructor)	3	4A

(Continued in the next column)

AP	450	Hunter-Gatherer Ecology (AP/APCC 100 or APCC 101/APCC 192A; AP 150/APCC 120 and AP 151/APCC 121; AP/PCC 140 or APCC 141/APCC 192B)	3	4A
AP	451	Andean Archaeology and Ethnohistory (AP/APCC 100, AP/APCC 140)	3	4A
AP	455	Great Plains Archaeology (AP/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 ¹⁰	3	
		Social/behavioral sciences ¹⁰	3	
		Anthropology elective ¹⁰	3	
		Electives	15-16	
		TOTAL	28-29	

PROGRAM TOTAL = 120 credits

- ¹ Select from the list of courses in category 2B in the All-University Core Curriculum (AUCC).
- ² Select from the list of courses in category 1 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 2D in the AUCC.
- ⁵ Select three credits, except M/M CC 133, from the courses in category 2C in the AUCC.
- ⁶ Select from the list of courses in category 3F in the AUCC.
- ⁷ 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.
- ⁸ 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).
- ⁹ Select from the list of courses in category 3E in the AUCC.
- ¹⁰ 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
LOWER DIVISION			
<i>Select one of the following:</i>			
APCC 100	Introductory Cultural Anthropology	3	3C
APCC 192A	Cultures of the World	3	1, 3C
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 reg.)	1	3A

APCC 140	Introduction to Prehistory	3	3D
	OR		
APCC 192B	Humans in Prehistory	3	1, 3D
TOTAL		10	

UPPER DIVISION

*Any combination of upper-division anthropology courses 12

PROGRAM TOTAL = 22 credits without prerequisites

*Additional course work may be required because of prerequisites.

Graduate Program in Anthropology

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*. Applications and inquiries should be directed to the department.

DEPARTMENT OF ART

Office in Visual Arts Building, Room G 100
Associate Professor Patrick Fahey, Chair

Major in Art

Visual arts comprise the study of the variety of means of visually expressing human thoughts, interests, attitudes, emotions, and ideas. Artists use many different media such as oils, watercolors, acrylics, pastels, clay, plaster 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.

Characteristics and Skills

- Creativity and artistic ability
- Good powers of observation
- Imagination
- Ability to concentrate for long periods of time
- Ability to communicate thoughts and feelings through visual aides
- Ability to communicate ideas
- Aptitude for spatial relationships
- Ability to recognize differences in shapes shading, and color

Potential Occupations

Employment of visual artists is expected to grow faster than average throughout the next several years. Demand for the work of graphic artists, for example, will be strong as producers of information, goods, and services put increasing emphasis on visual appeal in product design, advertising,

marketing and television. Because art graduates possess a number of transferable communication, analytical, and critical thinking skills, they find positions in government, industry, and academia, in addition to roles as freelance artists and studio fine artists. Many employers appreciate liberal arts majors for their multiple skills and their ability to adapt to a variety of tasks and work environments. Participation in internships and cooperative education opportunities is 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.

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; 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.

The Art Department has established minimum admission requirements for the major. Please contact the department for more information.

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.

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 area each semester. Exhibitions and lecture series present nationally known artists and critics to complement departmental course work. Established study abroad programs are offered in Castiglione Fiorentino, Italy, for students in the major.

Bachelor of Fine Arts Core Courses

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 COCC 192/CO 130)	3	2A
		Additional communication ¹	3	2B
		First year seminar ²	2-3	1
		Health and wellness ³	2	3G
		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)	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 (AR 111, AR 136, AR 160, AR 170)	3	
AR	235	Drawing Workshop I (AR 136)	3	
		Arts/humanities ⁴	3	3B
		Historical perspectives ⁵	3	3D
		Logical/critical thinking ⁶	3	2D
		Mathematics ⁷	3	2C
		Social/behavioral sciences ⁸	3	3C
		U.S. public values and institutions ⁹	3	3F
		TOTAL	33	
JUNIOR				
		Global and cultural awareness ¹⁰	3	3E
		Upper-division art history ¹¹	6	4A, 4B
		TOTAL	9	
SENIOR				
		Biological/physical sciences ¹²	7	3A
		Non-art electives	14-15	
		TOTAL	21-22	
PROGRAM TOTAL = 92 credits¹³				

¹ Select from the list of courses in category 2B in the All-University Core Curriculum (AUCC).

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

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

⁴ Select from the list of courses (other than ARCC 100) in category 3B in the AUCC.

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

⁶ Select from the list of courses in category 2D in the AUCC.

⁷ Select from the list of courses in category 2C in the AUCC.

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 Select from the list of courses in category 3E 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 Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

¹³ 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			

¹ At 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	
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:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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			

¹ At least eight upper-division credits.

Pottery Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

<u>Course</u>	<u>Title (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:

Course	Title (Prerequisite)	Cr	AUCC
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:

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
AR 370	Sculpture II (AR 270)	4	
AR 371	Sculpture III (AR 270)	4	
	Art electives ¹	12	
	TOTAL	20	
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 coursework 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.

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 COCC 192/CO 130)	3	2A
	Biological/physical sciences ¹	7	3A
	First year seminar ²	2-3	1
	TOTAL	30-31	
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	2B1
	Global and cultural awareness ³	3	3E
	Logical/critical thinking ⁴	3	2D
	Mathematics ⁵	3	2C
	Social/behavioral sciences ⁶	3	3C
	TOTAL	33	
JUNIOR			
AR 325	Concepts in Art Education (EDCC 310/EDCC 275; admission to Teacher Licensure Program)	3	
ED 331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
ED 340	Literacy and the Learner (completion of 30 credits of course work; consent of Teacher Licensure Office)	3	
ED 350	Instruction I-Individualization/Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	

ED	386	Practicum-Instruction I (EDCC 310/EDCC 275, ED 340, concurrent reg. in ED 350; admission to Teacher Licensure Program)	1	
		Arts/humanities ⁷	3	3B
		Health and wellness ⁸	2	3G
		Historical perspectives ⁹	3	3D
		Studio teaching emphasis ¹⁰	8	
		Upper-division art history ¹¹	6	4B
		TOTAL	33	

SENIOR

AR	326	Art Education Studio (EDCC 310/EDCC 275, admission to Teacher Licensure Program)	4	
ED	450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. in ED 486J)	4	
ED	466	Methods and Assessment in K-12 Art Education (EDCC 310/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 450 or ED 426, ED 466, concurrent reg. in ED 485A or B or C)	1	4C
		TOTAL	26	

PROGRAM TOTAL = 122-123 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 1 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 2D in the AUCC.
⁵ Select from the list of courses in category 2C 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 3B in the AUCC, except ARCC 100.
⁸ Select from the list of courses in category 3G in the AUCC.
⁹ Select from the list of courses in category 3D in the AUCC.
¹⁰ Select eight credits from one upper-division concentration area other than graphic design.
¹¹ 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.

Course	Title (Prerequisite)	Cr	AUCC
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 COCC 192/CO 130)	3	2A
		Arts/humanities ²	3	3B
		First year seminar ³	2-3	1
		Global and cultural awareness ⁴	3	3E
		Health and wellness ⁵	2	3G
		Logical/critical thinking ⁶	3	2D
		TOTAL	31-32	

SOPHOMORE

Select two courses from the following:

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 ⁷	3	3D
		Mathematics ⁸	3	2C
		Second field ⁹	9	
		Social/behavioral sciences ¹⁰	3	3C
		U.S. public values and institutions ¹¹	3	3F
		TOTAL	30	

JUNIOR

L	120	Reading for Proficiency	3	
L CC	200	Second-Year Language I (L CC 107 or L 108 or placement exam)	3-5	2B3
PL	318	Aesthetics-Visual Arts	3	
		Second field ⁹	12	
		Art history upper-division electives ¹²	9	4A, 4B
		TOTAL	30-32	

SENIOR

AR	419	Historiography and Methodology of Art History (written consent of instructor)	3	4C
		Biological/physical sciences ¹³	7	3A
		Art electives, upper-division	4	
		Art history electives, upper-division ¹²	12	4A, 4B

Non-art electives	2-3
TOTAL	28-29

PROGRAM TOTAL = 120 credits

¹ Transfer students who have taken or transferred in credit for AR/ARCC 100 may use it in lieu of AR 110.

² Select three credits (other than AR/ARCC 100) from category 3B in the All-University Core Curriculum (AUCC).

³ Select from the list of courses in category 1 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 2D 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 2C in the AUCC.

⁹ Select 21 credits from the same non-art prefix. Satisfy remaining upper-division non-art credits to total 14.

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

¹¹ Select from the list of courses in category 3F in the AUCC.

¹² 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.

¹³ 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.

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 COCC 192/CO 130)	3	2A
	First year seminar ¹	2-3	1
	Health and wellness ²	2	3G
	Logical/critical thinking ³	3	2D
	Mathematics ⁴	3	2C
	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 111, AR 136, AR 160, AR 170)	3	
AR 270	Sculpture I (AR 111, AR 136, AR 160, AR 170)	3	
	Arts/humanities ⁵	3	3B
	Global and cultural awareness ⁶	3	3E
	Historical perspectives ⁷	3	3D
	Social/behavioral sciences ⁸	3	3C
	U.S. public values and institutions ⁹	3	3F
	Non-art electives	6	
	TOTAL	30	

JUNIOR

	Biological/physical sciences ¹⁰	7	3A
	Foreign language ¹¹	10	2B3
	Upper division art history ¹²	6	4A, 4B
	Upper division concentration ¹³	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	4C
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 ¹⁴	9	
	Non-art electives	14-15	
	TOTAL	27-28	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 1 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 2D in the AUCC.
- ⁴ Select from the list of courses in category 2C in the AUCC.
- ⁵ Select three credits (other than ARCC 100) from 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 3D in the AUCC.
- 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 Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.
- ¹¹ Select from the list of courses in category 2B3 in the AUCC. Between Fall Semester 2000 and Fall Semester 2002, students may use language courses to satisfy category 2B of the AUCC if they take and complete L CC 200 or if they reach an equivalent level of competence as measured in an examination procedure.
- ¹² 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.
- ¹³ Choose eight upper-division credits in one area of concentration in addition to the four credit capstone course.
- ¹⁴ 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: fibers, metalsmithing and jewelry, painting, photo image making, pottery, printmaking, or sculpture.

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	
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

¹ After 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

Office in Clark Building, Room C 306
 Professor Ronnie J. Phillips, Chair

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.

Characteristics and Skills

- Strong interest in economic and social issues
- Aptitude for mathematics and logic
- Analytical and critical thinking ability
- Creativity
- Ability to identify key issues
- Ability to integrate a variety of concepts
- Good written and oral communication skills
- Desire to understand how political and social contexts affect behavior

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; bank examiner; securities analyst; internal auditor; 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 COCC 192/CO 130)	3	2A
COCC 300	<i>Select one of the following:</i> Writing Arguments (CO/COCC 150) Writing in the Disciplines (CO/COCC 150)	3	2B
COCC 301A-D	Writing Online (CO/COCC 150)	3	2B
COCC 302	Professional and Technical	3	2B
JTCC 300	Communication (CO/COCC 150)	3	2B
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
ECCC 204	Principles of Macroeconomics (EC/ECCC 202 or EA/EACC 202)	3	3F
<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 Context I (Math Placement Exam)	1	2C
M CC 118	College Algebra in Context II (M/M CC 117)	1	2C
OR			
M CC 120A	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
		3	3B
		2-3	1
		2	3G
		5	
TOTAL		29-30	
SOPHOMORE			
EC 304	Intermediate Macroeconomics (EC/ECCC 204, M/M CC 141)	3	
EC 306	Intermediate Microeconomics (EC/ECCC 204, M/M CC 141)	3	4A, 4B
<i>Select one course from the following:</i>			
EC 370	Comparative Economic Systems (EC/ECCC 101 or EC/ECCC 202 or EA/EACC 202)	3	
EC 372	History of Economic Institutions and Thought (EC/ECCC 101 or EC/ECCC 202 or EA/EACC 202)	3	
EC 376	Marxist Economic Thought (EC/ECCC 101 or EC/ECCC 202 or EA/EACC 202)	3	

(Continued in the next column)

EC HY	379/ 379	Economic History of the United States (EC/ECCC 101 or EC/ECCC 202 or EA/EACC 202; or any 2 courses in American history)	3	
EC	474	Recent Economic Thought (EC 304, EC 306)	3	
M CC	141	Calculus in Management Sciences (M/M CC 118 or M/M CC 121)	3	2C
STCC	201	<i>Select one of the following courses:</i> General Statistics (M/M CC 120A-B)	3	2D
STCC	204	Statistics for Business Students (M/M CC 120A-B)	3	2D
STCC	301	Introduction to Statistical Methods (M/M CC 121)	3	2D
		Biological/physical sciences ⁴	7	3A
		Electives	8	
		TOTAL	30	
JUNIOR				
EC EA	335/ 335	Introduction to Econometrics (EC/ECCC 204 or ST/STCC 201 or ST/STCC 204 or ST/STCC 301)	3	
		Additional social sciences ⁵	15	
		Economics ⁶	6	
		Electives	6	
		TOTAL	30	
SENIOR				
EC	492	Seminar	3	4A, 4B, 4C
		Additional arts/humanities ⁷	9	
		Economics ⁸	6	
		Electives ⁹	12-13	
		TOTAL	30-31	

PROGRAM TOTAL = 120 credits

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

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

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

⁴Select two courses (including one with a lab) from the list of courses in category 3A in the AUCC.

⁵Select 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.

⁶Select any 2 EC courses (excluding EC 300).

⁷Select 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.

⁸Select any 2 upper-division EC courses (excluding EC 300).

⁹One 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/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
ECCC 204	Principles of Macroeconomics (EA/EACC 202 or EC/ECCC 202)	3	3F
	TOTAL	6	
UPPER DIVISION			
EC 304*	Intermediate Macroeconomics (EC/ECCC 204, M/M CC 141)	3	
EC 306*	Intermediate Microeconomics (EC/ECCC 204, M/M CC 141)	3	
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 Program 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

*Office in Eddy Hall, Room 359
Professor Bruce Ronda, Chair*

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**.

Characteristics and Skills

- Enjoy reading
- Enjoy writing
- Ability to generate creative ideas
- Ability to see connections among ideas
- Ability to influence and persuade
- Logical argumentation skills
- Independence in thought and work
- Critical listening and reading skills
- Problem solving skills
- Enjoy working in groups

Potential Occupations

A major in English prepares students for business, government, or education careers which require broadly educated people who can think critically, communicate effectively, analyze texts, and write well. Many employers appreciate liberal arts majors for their multiple skills and their ability to adapt to a variety of tasks and work environments.

The department encourages experiential education by offering a variety of internship opportunities. Students are also invited to generate their own positions in fields of interests, as well as pursue established local, regional or national internships. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

Depending on a student's interests, the electives taken, or the concentration selected, available career choices include, but are not limited to: copy editor; project editor; manuscript reader or story analyst; sales representative; publicity and promotion specialist; advertising coordinator; production specialist; assistant book publicist; contracts and permission specialist; agency or arts administrator; human resource manager; human services program developer; public relations; English teacher; teacher of English as a second language; curriculum developer; education administrator; grant writer; technical writer for business, industry, or science; magazine, newspaper, television, education, or government writer; biographer or writer of prose, fiction, 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.

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 COCC 192/CO 130)	3	2A
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ¹	3	3B
	First year seminar ²	3	1
	Health and wellness ³	2	3G
	Mathematics ⁴	3	2C
	English elective	3	
	Elective	3	
	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 ⁵	7	3A
	Global and cultural awareness ⁶	3	3E
	Logical/critical thinking ⁷	3	2D
	Philosophy ⁸	3	
	Social/behavioral sciences ⁹	3	3C
	TOTAL	31	
JUNIOR			
COCC 300	Writing Arguments (CO/COCC 150)	3	4A
OR			
COCC 301A-D	Writing in the Disciplines (COCC 150)	3	4A

E	311A	<i>Select one of the following:</i> Intermediate Creative Writing-Fiction (E 210 with grade of B or better)	3	
E	311B	Intermediate Creative Writing-Poetry (E 210 with grade B or better)	3	
E	311C	Intermediate Creative Writing-Nonfiction (CO/COCC 150; E 210 with grade B or better or JT 210)	3	
E	341	Principles of Literary Criticism (one course in literature)	3	4B
		U.S. public values and institutions ¹⁰	3	3F
		Second field ¹¹	3	
		English elective ¹²	3	
		Upper division English/composition ¹³	6	
		Electives	6	
		TOTAL	30	

SENIOR

E	412A	<i>Select one of the following:</i> ¹⁴ 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 of B or better in E 311A or E 311C)	3	
E	460	<i>Select one of the following:</i> Chaucer (E 160, E 341, and one other upper-division E prefix course)	3	4C
E	463	Milton (E 160, 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 ¹¹	9	
		Upper division English/composition ¹³	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 a three credit course from the list of courses in category 1 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 2C in the AUCC.

⁵ Select two courses, one with lab, from 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 2D 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 Select from the list of courses in category 3F in the AUCC.

¹¹ 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.

¹² Select any lower or upper level E prefix course.

¹³ Fifteen credits of upper division E or CO courses; 3 credits must be in British literature before 1800 or American literature before 1870; 3 credits must be in British literature after 1800 or American literature after 1870; and 3 credits must be in literature in translation.

¹⁴ 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.

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 COCC 192/CO 130)	3	2A
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	2B1
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	4	3A
	First year seminar ³	3	1
	Historical perspectives ⁴	3	3D
	Mathematics ⁵	3	2C
	Electives	3	
	TOTAL	31	
SOPHOMORE			
COCC 301D	Writing in the Disciplines-Education (CO/COCC 150)	3	4A
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
ED 331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
ED 340	Literacy and the Learner (completion of 30 credits of course work; consent of Teacher Licensure Office)	3	
	Biological/physical sciences ²	3	3A
	Health and wellness ⁶	2	3G
	Logical/critical thinking ⁷	3	2D

		Social/behavioral sciences ⁸	3	3C
		TOTAL	30	
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	4B
E	401	Teaching Reading (CO/COCC 301D)	3	
E	405	Adolescents Literature	3	
ED	350	Instruction I-Individualization/ Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED	386	Practicum-Instruction I (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 350, admission to Teacher Licensure Program)	1	
ED	463	Methods in Teaching Language Arts (admission to Teacher Licensure Program)	4	
		Upper-division English electives ⁹	9	
		TOTAL	32	
SENIOR				
E	402	Teaching Composition (CO/COCC 301A or B or C or D)	3	
ED	450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. 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 450 or ED 426, ED 463, concurrent reg. in ED 485A or B or C)	1	
ED	493B	Seminar-Assessment of Learning (ED 450 or ED 426, ED 463, concurrent reg. in ED 485A or B or C or VE 485)	1	
		English elective ¹⁰	3	
		Upper-division English elective ⁹	3	4C
		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 3A in the AUCC. One course must have a laboratory component.

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

⁴ Select one course from the following: AUCC 100, AUCC 101, HYCC 100, HYCC 101, HYCC 150, HYCC 151, HYCC 170, HYCC 171.

⁵ Select from the list of courses in category 2C in the AUCC.

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

⁷ Select from the list of courses on English Department green sheet.

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

⁹ The department requires Licensure majors to take 12 hours of upper-division E or CO prefix courses: 3 hours must be in British literature before 1800 or American literature before 1870; 3 hours must be in British literature after 1800 or American literature after 1870; and 3 hours must be in literature in translation. One of these courses must be a capstone course (E 460, E 463, E 465, E 470), preferably taken in the senior year.

¹⁰ 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 COCC 192/CO 130)	3	2A
E CC 270	Introduction to American Literature	3	3B or 3D
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ¹	3	3B
	First year seminar ²	2-3	1
	Foreign language ³	3-5	
	Health and wellness ⁴	2	3G
	Mathematics ⁵	3	2C
	Electives	0-2	
	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 ⁶	7	3A
	Foreign language ³	3-5	
	Global and cultural awareness ⁷	3	3E
	Logical/critical thinking ⁸	3	2D
	Philosophy ⁹	3	
	Social/behavioral science ¹⁰	3	3C
	Electives	0-2	
	TOTAL	30	

JUNIOR				
COCC	300	Writing Arguments (CO/COCC 150)	3	4A
OR				
COCC	301A-D	Writing in the Disciplines (CO/COCC 150)	3	4A
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	4B
E	342	Shakespeare I	3	
OR				
E	343	Shakespeare II	3	
Foreign language³				
			5	
		U.S. public values and institutions ¹¹	3	3F
		Electives	4	
		TOTAL	30	
SENIOR				
E	460	Chaucer (E 160, E 341, and one other upper-division E prefix course)	3	4C
OR				
E	465	Topics in Literature and Language (E 341 and one other upper-division E prefix course)	3	4C
Foreign language³				
			5	
		Upper division English/composition ¹²	15	
		Electives	6-7	
		TOTAL	29-30	

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 from the list of courses in category 1 in the AUCC.
³ This requirement must be met by completing the second year of one foreign language and the first year of another foreign language.
⁴ Select from the list of courses in category 3G in the AUCC.
⁵ Select from the list of courses in category 2C in the AUCC.
⁶ Select two courses, one with a lab, from the list of courses in category 3A 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 2D in the AUCC.
⁹ Select from the list of courses on English Department green sheet.
¹⁰ Select from the list of courses in category 3C in the AUCC.
¹¹ Select from the list of courses in category 3F in the AUCC.
¹² Fifteen credits of upper-division courses with E or CO prefixes, at least 9 credits of which must come from CO 401, E 311A-C, E 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 literatures 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 COCC 192/CO 130)	3	2A
E	240 Introduction to Poetry	3	
E CC	270 Introduction to American Literature	3	3B or 3D
SPCC	200 Public Speaking	3	2B1
	Arts/humanities ¹	3	3B
	First year seminar ²	3	1
	Health and wellness ³	2	3G
	Mathematics ⁴	3	2C
	TOTAL	29	
SOPHOMORE			
E CC	276 Survey of British Literature I	3	3B
E CC	277 Survey of British Literature II	3	3B
	Biological/physical sciences ⁵	7	3A
	Global and cultural awareness ⁶	3	3E
	Logical/critical thinking ⁷	3	2D
	Philosophy ⁸	3	
	Social/behavioral sciences ⁹	3	3C
	English elective ¹⁰	3	
	Electives	3	
	TOTAL	31	
JUNIOR			
COCC	300 Writing Arguments (CO/COCC 150)	3	4A
OR			
COCC	301A-D Writing in the Disciplines (CO/COCC 150)	3	4A

E	341	Principles of Literary Criticism (one course in literature)	3	4B
E	342	Shakespeare I	3	
OR				
E	343	Shakespeare II	3	

		Second field ¹¹	6	
		U.S. public values and institutions ¹²	3	3F
		Upper-division English/composition elective ¹³	6	
		Electives	6	
		TOTAL	30	

SENIOR

<i>Select one of the following:</i>				
E	460	Chaucer (E 160, E 341, and one other upper-division E prefix course)	3	4C
E	463	Milton (E 160, 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 ¹¹	6	
		Upper-division electives ¹³	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 from the list of courses in category 1 in the AUCC.

³ Select a three credit course from the list of courses in category 3G in the AUCC.

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

⁵ Select two courses, one having a lab, from the list of courses for 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 2D in the AUCC.

⁸ Select PL course from English Department green sheet list of courses.

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

¹⁰ Select any lower or upper division E prefix course.

¹¹ 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.

¹² Select from list of courses in category 3F in the AUCC.

¹³ The department requires majors to take 18 credits of upper division E and/or CO courses; 3 credits must be in British literature before 1800 or American literature before 1870; 3 credits must be in British literature after 1800 or American literature after 1870; and 3 credits must be in literature translation.

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 to 3 to 6 or COCC 192/CO 130)	3	2A
E 240	Introduction to Poetry	3	
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ¹	3	3B
	First year seminar ²	3	1
	Health and wellness ³	2	3G
	Mathematics ⁴	3	2C
	Electives	4	
	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 ⁵	7	3A
	English elective ⁶	3	
	Global and cultural awareness ⁷	3	3E
	Logical/critical thinking ⁸	3	2D
	Philosophy ⁹	3	
	Social/behavioral sciences ¹⁰	3	3C
	Electives	2	
	TOTAL	30	

JUNIOR

COCC 300	Writing Arguments (CO/COCC 150)	3	4A
OR			
COCC 301A-D	Writing in the Disciplines (CO/COCC 150)	3	4A
E 341	Principles-Literary Criticism (one course in literature)	3	4B
	Second field ¹¹	6	
	U.S. public values and institutions ¹²	3	3F
	Upper division English/composition ¹³	6	

		Electives	9	
		TOTAL	30	
SENIOR				
CO	401	Advanced Composition (CO/COCC 300 or CO/COCC 301A or B or C or D or CO/COCC 302)	3	

		<i>Select one of the following courses:</i>		
E	406A	Literacy and Cultural Difference	3	
E	406B	Literacy and Gender	3	
E	406C	Literacy and Technology	3	
E	406D	Literacy and Education	3	

		<i>Select one of the following courses:</i>		
E	460	Chaucer (E 160, E 341, and one other upper-division E prefix course)	3	4C
E	463	Milton (E 160, 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 ¹¹	6	
		Upper division electives ¹³	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 a three credit course from the list of courses in category 1 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 2C in the AUCC.

⁵ Select two courses, one with a lab, from the list of courses in category 3A in the AUCC.

⁶ Select any lower or upper-division E prefix course.

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

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

⁹ Select from the list of PL courses on English Department green sheet.

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

¹¹ 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.

¹² Select from the list of courses in category 3F in the AUCC.

¹³ A total of 15 credits of upper-division electives in E and CO prefix courses. Three credits must be in designated writing courses (CO/COCC 300, CO/COCC 301A-D, CO/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. CO/COCC 150 and E 487A-B may not count toward the minor. CO/COCC 300, CO/COCC 301A-D, CO/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 in 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 C 104

Professor Sara M. Saz, Chair

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 approaching that of a native speaker;
- comprehension in reading and listening;
- ability in speaking and writing in a manner acceptable to an educated native;
- a practical command of the culturally defined aspects of the language and related cultural patterns of behavior, including non-verbal communication
- comprehension in reading and listening;
- functional capability in speaking and writing in a manner that would be acceptable to an educated native;
- a practical command of most of its culturally defined semantic functions and related cultural patterns of behavior, including the use of 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 Chinese, Italian, and Latin.

Characteristics and Skills

- Motivation to learn
- Good listening, clarifying, and responding skills
- Ability to think logically and quickly
- Patience and perseverance
- Ability to adjust to new environments
- High proficiency in phonetics
- Good problem solving skills
- Attention to detail

Potential Occupations

Rapid technological, economic, and political changes have dramatically increased the demand for college graduates with proficiencies in one or more foreign languages and cultures. Because of the major role the United States plays in world politics, business, and industry, the demand for foreign language skills will remain high. International opportunities are also expanding as nations become more economically and technologically integrated. Positions are available in government, industry, and academia. 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. Numerous positions are available with a growing number of American firms doing business within foreign countries.

The following are some of the career opportunities available to foreign language graduates: journalist; bilingual administrative staff person; bilingual educator; translator; foreign correspondent; customs inspector; diplomat; tour guide/agent; import/export clerk; flight attendant; social worker; intelligence agent; librarian; textbook publisher; researcher; tutor; foreign language teacher; teacher for English as a second language; Vista/Peace Corps. volunteer.

The Department of Foreign Languages and Literatures has adopted proficiency guidelines, reflecting those set by the American Council on the Teaching of Foreign Languages, in oral and written uses of the language, knowledge of its culture,

and the analytical and critical reasoning skills necessary for successful communication. The department requires all undergraduate majors to submit a written portfolio and have oral interviews for outcome assessment in their language during their final academic semester.

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.

French Concentration

<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 COCC 192/CO 130)	3	2A
L CC 105F	First-Year French I (for students with no previous study in the language)	5	2B3 ¹
L CC 107F	First-Year French II (L/L CC 105F or L 106F)	5	2B3 ¹
	Arts/humanities ²	3	3B
	First year seminar ³	2-3	1
	Health and wellness ⁴	2	3G
	Historical perspectives ⁵	6	3D
	Social/behavioral sciences ⁶	3	3C
	TOTAL	29-30	
SOPHOMORE			
L CC 200F	Second-Year French I (L/L CC 107F or L 108F or placement exam)	3	
L CC 201F	Second-Year French II (L/L CC 200F or placement exam)	3	
	Additional communication ⁷	3	2B
	Global and cultural awareness ⁸	3	3E
	Logical/critical thinking ⁹	3	2D
	Mathematics ¹⁰	3	2C
	Biological/physical sciences ¹¹	7	3A
	U.S. public values and institutions ¹²	3	3F
	TOTAL	28	
JUNIOR			
L CC 300F	Reading and Writing for Communication (L/L CC 201F or L 208F)	3	2B3
L 310F	Approaches to Literature (L/L CC 300 or written consent of instructor)	3	
L 335F	Issues in Culture (L/L CC 201F or L 208F)	3	
L 301F	<i>Select three of the following courses:</i> Oral Communication-French (L/L CC 201F)	3	
L 313F	Introduction to Translation and Interpreting-French (L/L CC 300F or written consent of instructor)	3	
L 326F	French Phonetics (L/L CC 300F or concurrent reg.)	3	
L 345F	Business French (L/L CC 300F)	3	
	(Continued in the next column)		

L	335F	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) ¹³	3	
L	433B	Advanced French/Francophone Culture Center and Margins (L 335F) ¹³	3	
L	441F	Advanced Business French (L 345F or written consent of instructor)	3	
L	450F	Selected French Literary Movements and Periods (L/L CC 300F, L 310F)	3	
L	452F	Genre Studies in French (L/L CC 300F, L 310F)	3	
L	453F	Author Studies in French (L/L CC 300F, L 310F)	3	
L	454F	Topic Studies in French (L/L CC 300F, L 310F)	3	
L	460	French/Francophone Women Writers (L/L CC 300F, L 310F)	3	
Electives			12	
TOTAL			30	

SENIOR

L	400F	Advanced Communication Skills (L/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 ¹⁴			3	
Electives ¹⁵			20-21	
TOTAL			32-33	

PROGRAM TOTAL = 120 credits

¹ See the All-University Core Curriculum section of the catalog for an explanation of which language courses will satisfy category 2B requirements (if so allowed by the student's major. Primary majors may select from 2B1 or 2B2 only. Secondary majors may satisfy the 2B AUCC requirement by using L CC 105, L CC 107, L CC 200, or L CC 201 from 2B3.

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

³ Select from the list of courses in category 1 of the AUCC. The department strongly recommends one of the first year seminars offered in the College of Liberal Arts.

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

⁵ Select six credits of HYCC prefix courses from the list in category 3D of the AUCC.

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

⁷ Select from the list of approved courses in the department.

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

⁹ Select from the list of courses in category 2D in the AUCC.

¹⁰ Select from the list of courses in category 2C in the AUCC.

¹¹ Select from the list of courses in category 3A in the AUCC.

¹² Select from the list of courses in category 3F in the AUCC.

¹³ Choose the course not used to satisfy the 4A requirement during the senior year.

¹⁴ 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.

¹⁵ 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 14.

German Concentration

	<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 COCC 192/CO 130)	3	2A
L CC	105G	First-Year German I (for students with no previous study in the language)	5	2B3
L CC	107G	First-Year German II (L/L CC 105G or L 106G)	5	2B3 ¹
		Arts/humanities ²	3	3B
		First year seminar ³	2-3	1
		Health and wellness ⁴	2	3G
		Historical perspectives ⁵	6	3D
		Social/behavioral sciences ⁶	3	3C
TOTAL			29-30	
SOPHOMORE				
L CC	200G	Second-Year German I (L/L CC 107G or L 108G or placement exam)	3	2B3 ¹
L CC	201G	Second-Year German II (L/L CC 200G or placement exam)	3	2B3 ¹
		Additional communication ⁷	3	2B
		Global and cultural awareness ⁸	3	3E
		Logical/critical thinking ⁹	3	2D
		Mathematics ¹⁰	3	2C
		Biological/physical sciences ¹¹	7	3A
		U.S. public values and institutions ¹²	3	3F
TOTAL			28	
JUNIOR				
L CC	300G	Reading and Writing for Communication (L/L CC 201G or L 208G)	3	2B3
L	310G	Approaches to Literature (L/L CC 201G or L 208G)	3	
L	335G	Issues in Culture (L/L CC 201G or L 208G)	3	
<i>Select three of the following courses:</i>				
L	301G	Oral Communication-German (L/L CC 201G)	3	
L	313G	Introduction to Translation and Interpreting-German (L/L CC 300G or written consent of instructor)	3	
L	326G	German Phonetics (L/L CC 300G or concurrent reg.)	3	
L	345G	Business German (L/L CC 300G)	3	
L	355G	20th-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/L CC 300G, L 310G)	3	
L	452G	Genre Studies in German (L/L CC 300G, L 310G)	3	
L	453G	Author Studies in German (L/L CC 300G, L 310G)	3	
L	454G	Topic Studies in German (L/L CC 300G, L 310G)	3	

	Electives		12	
	TOTAL		30	
SENIOR				
L	400G	Advanced Communication Skills (L/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 ¹³	3	
		Electives ¹⁴	20-21	
	TOTAL		32-33	

PROGRAM TOTAL = 120 credits

¹ See the All-University Core Curriculum section of the catalog for an explanation of which language courses will satisfy category 2B requirements (if so allowed by the student's major). Primary majors may select from 2B1 and 2B2 only. Secondary majors may satisfy the 2B requirement by using L CC 105, L CC 107, L CC 200, or L CC 201.

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

³ Select from the list of courses in category 1 of the AUCC. The department strongly recommends one of the first year seminars offered in the College of Liberal Arts.

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

⁵ Select six credits of HYCC prefix courses from the list in category 3D of the AUCC.

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

⁷ Select from the list of approved courses in the department.

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

⁹ Select from the list of courses in category 2D in the AUCC.

¹⁰ Select from the list of courses in category 2C in the AUCC.

¹¹ Select from the list of courses in category 3A in the AUCC.

¹² Select from the list of courses in category 3F in the AUCC.

¹³ 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-prefix 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.

¹⁴ 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 13.

Spanish Concentration

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
L CC 105S	First-Year Spanish I (for students with no previous study in the language)	5	2B3 ¹
L CC 107S	First-Year Spanish II (L/L CC 105S or L 106S)	5	2B3 ¹
	Arts/humanities ²	3	3B
	First year seminar ³	2-3	1
	Health and wellness ⁴	2	3G
	Historical perspectives ⁵	6	3D
	Social/behavioral sciences ⁶	3	3C
	TOTAL	29-30	
SOPHOMORE			
L CC 200S	Second-Year Spanish I (L/L CC 107S or L 108S or placement exam)	3	2B3 ¹

L CC 201S	Second-Year Spanish II (L/L CC 200S or placement exam)	3	2B3 ¹
	Additional communication ⁷	3	2B
	Global and cultural awareness ⁸	3	3E
	Logical/critical thinking ⁹	3	2D
	Mathematics ¹⁰	3	2C
	Biological/physical sciences ¹¹	7	3A
	U.S. public values and institutions ¹²	3	3F
	TOTAL	28	

JUNIOR

L CC 300S	Reading and Writing for Communication (L/L CC 201S or L 208S)	3	2B3
L 310S	Approaches to Literature (L/L CC 300 or written consent of instructor)	3	
L 335S	Issues in Culture (L/L CC 201S or L 208S)	3	

L 301S	Select two of the following courses: Oral Communication-Spanish (L/L CC 201S)	3	
L 312	Introduction to Spanish Linguistics (L/L CC 300S or concurrent reg.)	3	
L 313S	Introduction to Translation and Interpreting-Spanish (L/L CC 300S or written consent of instructor)	3	
L 326S	Spanish Phonetics (L/L CC 300S or concurrent reg.)	3	
L 336	Introduction to Spanish-American Civilization (L/L CC 201S or L 208S)	3	
L 345S	Business Spanish (L/L CC 300S)	3	
L 346	Spanish for Health Care (L/L CC 300S)	3	
L 413S	Advanced Translation and Interpreting-Spanish (L 313S or written consent of instructor)	3	
L 435	Caribbean Culture in Hispanic Literature (L 335S)	3	
L 436	Advanced Latin American Culture (L 335S) ¹³	3	
L 437	Advanced Spanish Culture (L 335S) ¹³	3	
L 441S	Advanced Business Spanish (L 345S or written consent of instructor)	3	
L 442	Social Manifestations of Hispanic Poetry (L/L CC 300S or L 310S)	3	
L 443	Spanish Theatre (L/L CC 300S, L 310S)	3	
L 445	Women Writers in the Hispanic Worlds (L/L CC 300S, L 310S)	3	
L 449	Spanish-American Literary Movements and Periods (L/L CC 300S, L 310S)	3	
L 452S	Genre Studies in Spanish (L/L CC 300S, L 310S)	3	
L 453S	Author Studies in Spanish (L/L CC 300S, L 310S)	3	
L 454S	Topic Studies in Spanish (L/L CC 300S, L 310S)	3	
L 470	Spanish Syntax and Semantics-Teaching Methods (L 312)	3	

	Electives	15	
	TOTAL	30	

SENIOR

L 400S	Advanced Communication Skills (L/L CC 300S)	3	
L 436	Advanced Latin American Culture (L 335S)	3	4A
OR			
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 ¹⁴	6
			Electives ¹⁵	17-18
TOTAL				32-33

PROGRAM TOTAL = 120 credits

¹ See the All-University Core Curriculum section of the catalog for an explanation of which language courses will satisfy category 2B requirements (if so allowed by the student's major). Primary majors may select from 2B1 or 2B2 only. Secondary majors may satisfy the 2B requirement by using L CC 105, L CC 107, L CC 200, or L CC 201 (2B3).

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

³ Select from the list of courses in category 1 of the AUCC. The department strongly recommends one of the first year seminars offered in the College of Liberal Arts.

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

⁵ Select six credits of HYCC prefix courses from the list in category 3D of the AUCC.

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

⁷ Select from the list of approved courses in the department.

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

⁹ Select from the list of courses in category 2D in the AUCC.

¹⁰ Select from the list of courses in category 2C in the AUCC.

¹¹ Select from the list of courses in category 3A in the AUCC.

¹² Select from the list of courses in category 3F in the AUCC.

¹³ Choose the course not used to satisfy 4A during the senior year.

¹⁴ 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.

¹⁵ 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 14.

Teaching Endorsement

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
L CC 200	Second Year Language I (L/L CC 107 or L 108 or placement)	3	2B3
L CC 201	Second Year Language II (L/L CC 200 or placement)	3	2B3
LBCC 192	College of Liberal Arts First-Year Seminar	3	1
SPCC 200	Public Speaking	3	2B1
	Biological/physical sciences ¹	4	3A
	Health and wellness ²	2	3G
	Historical perspectives ³	6	3D
	Mathematics ⁴	3	2C
TOTAL		30	

SOPHOMORE

COCC 300	Writing Arguments (CO/COCC 150)	3	2B2
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F

ED 331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits or course work; consent of Teacher Licensure Office)	1	
L CC 300	Reading and Writing for Communication (L/L CC 201 or L 208)	3	
L 310	Approaches to Literature (F) and S) L/L CC 300 or written consent of instructor. G) L/L CC 201G or L 208G)	3	
L 326	Phonetics (L CC 300 or concurrent reg.)	3	
L 335	Issues in Culture (L/L CC 201 or L 208)	3	
OR			
L 336	Introduction to Spanish-American Civilization (L/L CC 201S or L 208S)	3	
PLCC 110	Logic and Critical Thinking	3	2D
PYCC 100	General Psychology	3	3C
	Biological/physical sciences ¹	3	3A
	Global and cultural awareness ⁵	3	3E
TOTAL		31	

JUNIOR

ED 350	Instruction I: Individualization/Management (EDCC 310/EDCC 275; ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 350; admission to Teacher Licensure Program)	1	
EDCC 430	Diversity and Communication (ED 310/EDCC 275, admission to Teacher Licensure Program)	3	3E
L 312	Introduction to Spanish Linguistics (L/L CC 300S or concurrent reg.)	3	
OR			
E 320A-D	Introduction to the Study of Language	3	
L 400	Advanced Communication Skills (L/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 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	
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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 450 or ED 426, ED 462, concurrent reg. in ED 485A or B or C)	1	
ED	493B	Seminar-Assessment of Learning (ED 450 or ED 426, ED 462, concurrent reg. in ED 485A or B or C or VE 485)	1	
L	470	Spanish Syntax and Semantics-Teaching Methods (L 312)	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			28	

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 2C 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 interests in language, literature, and culture. See the department for specific information on upper-division transfer work in the language of the minor.

All majors and minors in the department must earn a minimum grade of C (a grade of C- is not acceptable) in each upper-division course that carries the 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 specializations as 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 B 357
Professor Ruth M. Alexander, Chair

Major in History

History is an accounting of our human past and seeks to interpret the course of human affairs through evidence and reason. Historians rely on written records and materials, using them to understand and comprehend the present. History provides insights that help us understand how individuals and groups make decisions, exercise power, or respond to change. History provides a form of knowledge which cannot be rendered obsolete by a changing technological world.

The program is designed to enhance students' knowledge about the past, improve their ability to think logically and critically, and to express themselves in clear and precise language. Specialized programs are available in historic preservation and restoration, and in archival and records management.

Characteristics and Skills

Understanding Society

- Knowledge of how societies change
- A broadly developed world view
- Ability to analyze the impact of the past
- A clearer understanding of the present

Communications

- Excellent writing and speaking skills
- Mastery of summary and synthesis
- Expertise in interpreting events and ideas
- Capacity to compare and compile reports
- Ability to describe and evaluate issues, problems, and events

Research

- Analysis and comparison of contrasting ideas and information
- Interviewing and observation skills
- Capacity to work with details
- Organization and compiling skills

Project Development

- Ability to generate new ideas and projects
- Expertise in planning and organizing
- Decision making skills

Potential Occupations

History graduates apply their education in a large variety of occupations in the nonprofit, private and public sectors. History, like many liberal arts majors, provides students with a broad academic background suitable for a variety of jobs in the public and private sectors. History 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 your practical training and development. 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 History or attain advanced positions with the possibility of rising to top professional levels.

Depending on student interests, the electives chosen, or the minor selected, available career choices include, but are not limited to: historical association or project coordinator; archivist; catalog researcher; technical librarian; museum curator or conservator; educational materials consultant; publication and public relations specialist; public archivist; government planner; foreign service officer; historian; teacher/professor; heritage or cultural agency director; intelligence agent; legislative administrative assistant; librarian or museum curator; state historic preservation officer; consultant; free-lance writer; cultural resource manager; historical, legal, and policy researcher; preservationist;

restoration supervisor; film editor or video specialist; publisher, editor, journalist; banker; investment consultant; insurance agent; attorney; marketing researcher; public relations consultant; travel agent; staff trainer; archival record-keeping technician.

Liberal Arts Concentration

The liberal arts concentration is an excellent major for students planning further professional study in law, medicine, ministry, library science, archival and record management, or graduate work in history. The curriculum includes a foreign language option, or a quantitative option and requires approximately 120 credits to graduate.

<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 COCC 192/CO 130)	3	2A

<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
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

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
	First year seminar ³	2-3	1
	Health and wellness ⁴	2	3G
	Mathematics ⁵	3	2C
	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 (continued in the next column)	3	3D or 3E

HYCC 235	Slavic and East Central European Civilizations	3	3D or 3E
HYCC 270	Colonial Latin America	3	3D or 3E
HYCC 271	Latin America Since Independence	3	3D or 3E
Additional communication ⁶		3	2B
Logic/critical thinking ⁷		3	2D
Social/behavioral sciences ⁸		3	3C
Language and quantitative options ⁹		6-10	
History electives ¹⁰		6	
Electives		2-7	
TOTAL		30-31	

JUNIOR

HY 301	Historical Methods ^{11,12} (sophomore standing or written consent of instructor)	3	4A
	History, upper-division non-U.S. ^{12,13}	6	
	History, upper-division U.S. ¹²	3	
	Electives	18	
TOTAL		30	

SENIOR

HY 492	Capstone Seminar ^{11,12} (HY 301; senior status or written consent of instructor)	3	4B, 4C
	History electives, upper-division ¹²	9	
	Electives	18	
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 3A in the AUCC.
³ Select from list of courses in category 1 in the AUCC.
⁴ Select from list of courses in category 3G in the AUCC.
⁵ Select from list of courses in category 2C in the AUCC.
⁶ Select from list of courses in category 2B in the AUCC.
⁷ Select from list of courses in category 2D in the AUCC.
⁸ Select from list of courses in category 3C in the AUCC.
⁹ 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."
¹⁰ Select two history courses, any level.
¹¹ Restricted to history majors only.
¹² Any student seeking to register for 300- or 400-level history courses must have completed 45 credits or have received written consent from the instructor.
¹³ Select one upper-division course from two categories-Africa, East Asia, Europe, Latin America/Caribbean, Middle East, World.

Language Option

In addition to the liberal arts concentration courses, the following must be completed:

Course	Title (Prerequisite)	Cr	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 2B requirements (if so allowed by the student's major).

Quantitative Option

In addition to the liberal arts concentration 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 151	C++ for Scientists and Engineers (M/M CC 124, M/M CC 126)	4	2D
CSCC 153	Java Programming (M/M CC 118 with a C or better or M/M CC 121 with a C or better)	4	2D
CS 154	C++ to Java Programming Module (college-level C++ course)	2	
STCC 101	Activity Based Statistics (Math Placement Exam)	3	2D
STCC 110	Statistical Thinking: Concepts and Applications (Math Placement Exam)	3	2D
STCC 201	General Statistics (M/M CC 120A-B)	3	2D
STCC 204	Statistics for Business Students (M/M CC 120A-B)	3	2D
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
ST 302	Design of Experiments (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
ST 303/EE 303	Introduction to Communications Principles (M 261)	3	
ST 304	Multiple Regression Analysis (M 229, ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
ST 305	Sampling Techniques (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
STCC 307/EHCC 307	Introduction to Biostatistics (M/M CC 121)	3	2D
STCC 309	Statistics for Engineers or Scientists (M/M CC 161 or M/M CC 255)	3	2D
ST 310	Data Analysis and Database Management Tools (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
STCC 311	Statistics for Behavioral Sciences I (M/M CC 121)	3	2D
ST 312	Statistics for Behavioral Sciences II (ST/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 endorsement in the School of Education. This concentration requires 123 credits.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A

<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
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	2B
	Biological/physical sciences ²	7	3A
	First-year seminar ³	2-3	1
	Health and wellness ⁴	2	3G
	Logical/critical thinking ⁵	3	2D
	Mathematics ⁶	3	2C
	TOTAL	29-30	
SOPHOMORE			
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
ECCC 204	Principles of Macroeconomics (EA/EACC 202 or EC/ECCC 202)	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 270	Colonial Latin America	3	3D or 3E
HYCC 271	Latin America Since Independence	3	3D or 3E
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
	Arts/humanities ⁷	3	3B
	History elective ⁸	3	
	TOTAL	33	

JUNIOR

EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
ED 340	Literacy and the Learner (completion of 30 credits of course work; consent of Teacher Licensure Office)	3	
ED 350	Instruction I-Individualization/Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 310/EDCC 275, ED 340, concurrent reg. in ED 350; admission to Teacher Licensure Program)	1	
ED 465	Methods and Materials in Social Studies (admission to Teacher Licensure Program)	4	
HY 301	Historical Methods (sophomore standing or written consent of instructor)	3	4A

<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	
	Upper-division U.S. history ⁹		9
	TOTAL		30

SENIOR

ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. in ED 486J)	4	
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 450 or ED 426, ED 465, concurrent reg. in ED 485A or B or C)	1	
ED 493B	Seminar-Assessment of Learning (ED 450 or ED 426, ED 465, concurrent reg. in ED 485A or B or C or VE 485)	1	
HY 492	Capstone Seminar (HY 301; senior status or written consent of instructor, history majors only)	3	4B, 4C
	Upper-division non-U.S. history ¹⁰		9
	TOTAL		30

PROGRAM TOTAL = 122-123 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 3A in the All-University Core Curriculum (AUCC). One course must have a laboratory component.
³ Select from the list of courses in category 1 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 2D in the AUCC.
⁶ Select from the list of courses in category 2C in the AUCC.
⁷ Select from the list of courses in category 3B in the AUCC.
⁸ One history course, any level.

⁹ One course pre-1876; one course post-1876; one student's choice.

¹⁰ 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 total credits, enables students with an interest in history to satisfy their curiosity.

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 C 225
Professor Garrett J. O'Keefe, Chair

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 four 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 encourages development of a background in the humanities, social sciences, natural sciences, and in-depth study in an area of interest outside journalism. The addition of a minor or double major in a related discipline such as political science, economics, business, speech communication, psychology or a foreign language is possible. The Department of Journalism and

Technical Communication is one of a relatively small number of departments recognized nationally by the Accrediting Council for Education in Journalism and Mass Communications.

Students may enter the program as premajors and are given major status when they have 1) achieved a 2.9 cumulative Colorado State grade point average, and 2) received the combination of at least a B and a C in JTCC 100 and JT 210.

The four concentrations offered are: **news-editorial**, **public relations**, **specialized communication**, and **television news and video communication**.

Characteristics And Skills

- Strong interest in and aptitude for writing
- Strong interest in mass communications
- Interest in a broad liberal arts education
- Ability to meet deadlines
- Ability to work in a team or independently
- Desire to investigate and analyze a variety of topics
- Ability to glean and synthesize information from a variety of sources
- Interest and aptitude for working with sophisticated communications technology
- Ability to work within a large organization
- Ability to pay attention to detail

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 technologies. Participation in internships, volunteer activities, or cooperative education opportunities is 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.

Some career opportunities include, but are not limited to: news reporter/editor; publication editor; media consultant; public relations specialist; technical writer; photo journalist; investigative journalist; advertising specialist; television/radio broadcaster; television camera operator; documentary producer; special events coordinator; technical advertising specialist; video producer/editor; fund-raising specialist; public speaker; travel writer; columnist; advertising placement specialist; communications officer; program director.

Technical Journalism 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 COCC 192/CO 130)	3	2A
<i>Select one course from the following:</i>			
COCC 300	Writing Arguments (CO/COCC 150)	3	2B2
COCC 301A-D	Writing in the Disciplines (CO/COCC 150)	3	2B2
COCC 302	Writing Online (CO/COCC 150)	3	2B2
L CC 105	First-Year Language I (no previous study in the language)	5	2B3 ¹
L CC 107	First-Year Language II (L/L CC 105 or L 106)	5	2B3 ¹
L CC 200	Second-Year Language I (L/L CC 107 or L 108 or placement)	3-5	2B3
L CC 201	Second-Year Language II (L/L CC 200 or placement exam)	3-5	2B3
L CC 300	Reading and Writing for Communication (L/L CC 201 or L 208)	3	2B3
SPCC 200	Public Speaking	3	2B1
JTCC 100	Introduction to Mass Media	3	
	Biological/physical sciences ²	7	3A
	First year seminar ³	2-3	1
	Health and wellness ⁴	2	3G
	Mathematics ⁵	3	2C
	TOTAL	23-26	
SOPHOMORE			
JT 210	Newswriting ⁶ (satisfactory performance on typing and diagnostic tests)	3	
JT 211	Computer-Mediated Visual Communication (JT 210)	3	
	Arts/humanities ⁷	9-12	3B
	Global and cultural awareness ⁸	3	3E
	Historical perspectives ⁹	3	3D
	Logical/critical thinking ¹⁰	3	2D
	Social/behavioral sciences ¹¹	9	3C
	U.S. public values and institutions ¹²	3	3F
	TOTAL	36-39	
JUNIOR			
<i>Select one course from the following:</i>			
JT 311	History of Media	3	
JT 316/ ET 316	Multiculturalism and the Media	3	
JT 411	Media Ethics and Issues	3	
JT 412	International Mass Communication	3	
JT 413	New Communication Technologies and Society	3	
JT 414	Media Effects	3	
JT 471	Communication Research Methods (one statistics course)	3	
	Arts/humanities ⁷	0-3	3B
	Electives ¹³	(0-13)	
	TOTAL	3-6	

SENIOR

JT 415	Communications Law	3	4B
	Option area ¹⁴	21	
	TOTAL	24	

PROGRAM TOTAL = 89-92 credits¹⁵

¹ Between Fall Semester 2000 and Fall Semester 2005, students may use language courses to satisfy category 2B of the All-University Core Curriculum (AUCC) if they take and complete L CC 200 or if they reach an equivalent level of competency as measured in an examination procedure.

² Select a total of seven credits from category 3A in the AUCC, including one laboratory course.

³ Select from the list of courses in category 1 in the AUCC. Journalism students may take JTCC 192. This course will fulfill the requirement for JT 210.

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

⁵ Select any course or combination of courses in category 2C in the AUCC.

⁶ Students who have taken JT 110/JTCC 192 should not take this course, as JT 110/JTCC 192 fulfills the requirement for JT 210. Those students will be required to take an additional three credits of electives to replace this course.

⁷ 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.

⁸ 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.

⁹ Select from the list of courses in category 3D in the AUCC from courses with the following prefixes: APCC, AUCC, ETCC, HYCC, or PLCC.

¹⁰ Select any STCC course in category 2D in the AUCC.

¹¹ 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.

¹² 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.

¹³ 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.

¹⁴ See department advising manual for Option Area choices.

¹⁵ In order to complete a major in technical journalism, select a concentration from the following list: news-editorial, public relations, specialized communication, or television news and video production.

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:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
POCC 101	American Government and Politics	3	3C, 3F
POCC 103	State and Local Government and Politics	3	3C, 3F
	TOTAL	6	
JUNIOR			
<i>Select two of the following courses:</i>			
JT 326	Online Journalism (JTCC 192 or JT 210; JT 211)	3	
JT 335	Digital Photojournalism	3	
JT 361	Writing for Specialized Magazines (JTCC 192 or JT 210; JT 211)	3	
JT 372	Web Design and Management (JTCC 192 or JT 210; JT 211)	3	

(continued in the next column)

JT	460	Media Management	3	
JT	461	Writing about Science, Health, and Environment (JTCC 192 or JT 210; JT 211)	3	
JT	487	Internship	3	
JT	310	Copy Editing and Production (JTCC 192 or JT 210; JT 211)	4	
JT	320	Reporting (JTCC 192 or JT 210; JT 211)	3	
<i>Select one of the following:</i>				
POCC	232	International Relations	3	3C or 3D
POCC	241	Comparative Government and Politics	3	3C or 3E
PO	421	Modern Political Theories	3	
PO	423	American Political Theories (PO/POCC 101 or POCC 192A)	3	
Electives			1-3	
TOTAL			17-19	

SENIOR

JT	420	Advanced Reporting (JT 320)	3	4A, 4C
Journalism elective			2-3	
TOTAL			5-6	

PROGRAM TOTAL = 120 credits

Public Relations Concentration

The public relations concentration 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:

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/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
JUNIOR			
BK	305 Fundamentals of Marketing (EC/ECCC 101 or EC/ECCC 202 or EA/EACC 202)	3	
BN	305 Fundamentals of Management	3	
<i>Select one of the following:</i>			
JT	320 Reporting (JTCC 192 or JT 210; JT 211)	3	
JT	326 Online Journalism (JTCC 192 or JT 210; JT 211)	3	
JT	361 Writing for Specialized Magazines (JTCC 192 or JT 210; JT 211)	3	
JT	372 Web Design and Management (JTCC 192 or JT 210; JT 211)	3	
JT	461 Writing about Science, Health, and Environment (JTCC 192 or JT 210; JT 211)	3	
JT	310 Copy Editing and Production (JTCC 192 or JT 210; JT 211)	4	

JT	350	Public Relations	3
JT	351	Public Relations Practices (JTCC 192 or JT 210; JT 211 and JT 350)	3
Electives			1-3
TOTAL			20-22

SENIOR

JT	450	Public Relations Campaigns (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:

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
<i>Select three credits from the following:</i>			
JT	326 Online Journalism (JTCC 192 or JT 210; JT 211)	3	
JT	335 Digital Photojournalism	3	
JT	342 Writing for Specialized Electronic Media (JTCC 192 or JT 210; JT 211)	3	
JT	350 Public Relations	3	
JT	372 Web Design and Management (JTCC 192 or JT 210; JT 211)	3	
JT	460 Media Management	3	
JT	487 Internship	3	
JT	310 Copy Editing and Production (JTCC 192 or JT 210; JT 211)	4	
JT	361 Writing for Specialized Magazines (JTCC 192 or JT 210; JT 211)	3	
Electives			10-12
TOTAL			20-22
SENIOR			
JT	461 Writing about Science, Health, and Environment (JTCC 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:

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
<i>Select one of the following:</i>			
JT 326	Online Journalism (JTCC 192 or JT 210; JT 211)	3	
JT 341	Broadcast News (JTCC 192 or JT 210; JT 211)	3	
JT 342	Writing for Specialized Electronic Media (JTCC 192 or JT 210; JT 211)	3	
JT 340	Videotape Editing	3	
JT 345	Electronic Field Production (JT 340)	3	
	Electives	10-13	
	TOTAL	19-22	
SENIOR			
<i>Select one of the following:</i>			
JT 372	Web Design and Management (JTCC 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 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 Program 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
Professor Michael Thaut, Chair

Program in Music

Program goals encourage, develop, and offer high standards of teaching, scholarship, research, and performance in music; provide a stimulating musical environment for campus and community; and prepare and educate music teachers, music therapists, and performers.

Undergraduate curricula lead to the [bachelor of arts](#) degree in music, and the [bachelor of music](#) degree in music with concentrations in [music education](#), [music therapy](#), or [performance](#) (applied music).

Nonmusic majors with musical skills and aptitudes may participate in a chorus, band, or orchestra, and enroll in selected music classes. Individual lesson time, however, for nonmusic majors is limited. See applied music instruction courses in the Courses of Instruction section of this catalog.

Music majors are expected to pass comprehensive examinations in music history and theory upon completion of course sequences in those areas. Students are expected to recognize music literature of 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.

Program Requirements

Performance Auditions

An audition is required of all freshmen and transfer students before admission to the bachelor of music or bachelor of arts in music programs. In cases where a personal audition is not feasible, a tape demonstrating performance ability may allow provisional acceptance. Students who have been admitted to the University and have expressed an interest in one of the music programs but have yet to audition will be considered pre-music majors by the University. For further information contact the Department of Music, Theatre, and Dance or consult the current Music Student Handbook.

Applied Study, Ensembles, and Recitals

Every music major must declare a performing instrument/voice, with faculty determining the proficiency needed; they

must register for applied instruction each semester until program requirements (for applied study) are met. In addition, all music majors must register for a minimum of one ensemble every semester until program requirements (for applied study) are met.

A performance exam must be passed during the fourth semester of applied study to receive permission to register for upper-division applied study. All degree programs, except the B.A. degree in music, require at least one semester of upper-division applied study for graduation.

To perform any recital required for a degree, a student must be registered for applied study. Music majors concentrating in performance must present a junior and senior solo recital. Music majors concentrating in music education present a joint solo recital; recitals may not be given during the semester of student teaching.

Piano Proficiency

All music majors must fulfill a piano proficiency requirement. Most music majors develop the skills to meet this requirement with class piano courses. If development is not adequate, study continues until satisfactory. Music majors in the B.M.-music education concentration must pass the examination prior to the semester of student teaching. Students in the B.M.-music therapy concentration must pass the examination before being eligible to enroll in junior/senior music therapy practicum courses. Students in either the B.A. in music program or the B.M.-performance concentration must fulfill the requirement at least one semester prior to graduation. For specific requirements, consult the current Music Student Handbook.

Concert/Recital Attendance Requirement

All undergraduate music majors must attend 105 performances sponsored by the department in order to graduate. For further information, consult the current Music Student Handbook.

Review of Student Progress

During the freshman and sophomore years, the faculty annually examines each student's progress.

Scholastic Standards

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.

Second Major

While students may complete concurrently the requirements for a second major in any college, they may also wish to consider the combination of any two majors offered within the

music program. For example, the combination of both music education and music therapy will better prepare a student to teach disabled children in the public schools. For general information, see [Second Major Requirements](#) in the Graduation Requirements section of this catalog. For specific information, see program advisers in the Department of Music, Theatre, and Dance.

Major in Music (B.M.)

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. In addition, the student will take courses in music history, music theory, applied study, instrumental and vocal techniques, counterpoint, and orchestration. There are also many opportunities to perform in vocal and instrumental ensembles including orchestras, bands, and choirs as well as in numerous chamber music groups.

Characteristics and Skills

- Ability to develop a high degree of proficiency in music composition
- Ability to work independently
- Strong aptitude for music theory and history
- Talent to perform at a high level of proficiency on at least one instrument or voice
- Good keyboard ability

Potential Occupations

This degree is designed for those who plan a career as professional composers, arrangers, or college-level teachers of theory and composition. This concentration also prepares the student to further study in music composition at the graduate level.

<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 COCC 192/CO 130)	3	2A
MU 117	Music Theory I (MU/MUCC 111 or satisfactory completion of placement exam)	4	
MU 118	Music Theory II (MU 117)	4	
MUCC 192	Introduction to Music History and Literature	3	1
MU 272A-V	Applied Music Instruction ¹	2	
MU	Ensemble ²	2	
SPCC 200	Public Speaking	3	2B

Health and wellness ³	2	3G	Global and cultural awareness ¹¹	3	3E
Mathematics ⁴	3	2C	Music electives	3	
Electives	3		Electives	3	
TOTAL	29		TOTAL	28	

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 192)	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	2D
		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, MU/MUCC 100 or MUCC 192)	3	4A, 4B
MU	335	Music History II (MU 118, MU/MUCC 100 or MUCC 192)	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

PROGRAM TOTAL = 120 credits¹²¹ Two semesters; major instrument or voice.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 2C 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 2D 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**

Auditions are required for entry into the music education program. Scholarship opportunities exist. Majors take a variety of music courses including music theory, music history, and performance along with a specified sequence of applied music instruction and general education classes. In addition, core courses provide a broad background in communication, natural and social sciences, and arts and humanities.

Experiences include rehearsals, individual lessons and practice, attendance at concerts, recitals, and special events are required. There are also numerous opportunities to participate in ensembles, bands, orchestras, and choirs. At the end of the music education curriculum, a semester of student teaching in both elementary and secondary schools provides valuable classroom experience. The total requirement for the music degree and teaching certification is 127 credits.

Characteristics and Skills

- A good understanding of music theory and music history
- Broad background in communications, natural sciences, social sciences, and arts and humanities
- Good performance ability on two or more musical instruments
- Excellent applied music instruction skills
- Mastery of elementary and secondary school instrumental teaching methods and classroom techniques
- Qualification for teacher certification in music education

Potential Occupations

There are thousands of school music teachers in the United States. Many music educators work for public school districts and private schools. Others conduct private lessons and classes. Demand and placement of graduates is very good. Flexibility in location may increase your employment options. The work is challenging, satisfying, and rewarding. The Department of Music, Theatre, and Dance is the best source of career information. Contact a department adviser for help.

<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 COCC 192/CO 130)	3	2A
MU 117	Music Theory I (MU/MUCC 111 or satisfactory completion of placement exam)	4	
MU 118	Music Theory II (MU 117)	4	
MUCC 192	Introduction to Music History and Literature	3	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 (concurrent reg. in any music ensemble)	2	
MU	Ensembles ¹	2	
	Historical perspectives ²	3	3D
	Logical/critical thinking ³	3	2D
	Mathematics ⁴	3	2C
	TOTAL	31	
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 252B	Instrumental Techniques-High Brass	1	
MU 252C	Instrumental Techniques-Clarinet and Saxophone	1	
MU 252E	Instrumental Techniques-Low Strings	1	
MU 265A	Singers Diction-German/English	1	
	AND		
MU 265B	Singers Diction-French/Italian (MU 265A)	1	
	OR		
MU 420	Marching Band Techniques (MU 204, MU 356)	2	
MU 272A-V	Applied Music Instruction (concurrent reg. in any music ensemble)	2	
MU 286	Practicum-Music Education	1	

MU 496H	Group Study-Pedagogy	1	
MU	Ensembles ¹	2	
PYCC 100	General Psychology	3	3C
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ⁵	3	3B
	Biological/physical sciences ⁶	3	3A
	TOTAL	34	
JUNIOR			
ED 331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
ED 340	Literacy and the Learner (completion of 30 credits of course work; consent of Teacher Licensure Office)	3	
ED 350	Instruction I-Individualization/Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 310/EDCC 275, ED 340, concurrent reg. 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; MU/MUCC 100 or MUCC 192)	3	4A, 4B
MU 335	Music History II (MU 118; MU/MUCC 100 or MUCC 192)	3	4A, 4B
MU 355	Choral Conducting and Literature	2	
	OR		
MU 356	Instrumental Conducting and Literature	2	
MU 411	Orchestration (MU 218)	3	
MU 416	Stylistic Analysis (MU 218)	3	
MU 472A-V	Applied Music Instruction (MU 272A-V; concurrent reg. in any music ensemble; successful completion of upper-division qualifying exam)	2	
MU	Ensembles ¹	2	
	Health and wellness ⁷	2	3G
	TOTAL	32	
SENIOR			
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. in ED 486J)	4	
ED 476	Choral Methods for Secondary Schools (MU 217, admission to Teacher Licensure Program)	2	
	OR		
ED 477	Instrumental Methods for Secondary Schools (MU 217, admission to Teacher Licensure Program)	2	
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 450 or ED 426, ED 475 and ED 476 or ED 477, concurrent reg. 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 reg. 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 ⁸	3	3E
		TOTAL	30	

PROGRAM TOTAL = 127 credits

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 2C in the AUCC.

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

⁶ Select from list of courses in category 3A in the AUCC. One course must have a laboratory component.

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

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

Music Therapy Concentration

Music therapy is the therapeutic use of music in the restoration, maintenance, and improvement of mental and physical health. Music of all kinds is used as a tool to help people maintain or improve communication, academic performance, motor development, emotional growth, and social skills. Music is applied in a therapeutic environment to bring about desirable changes in behavior. Such changes enable individuals to understand themselves and the world differently. As a member of a therapeutic team, the professional music therapist participates in the analysis of individual problems, in the determination of general treatment aims, and in the evaluation of results.

Music therapy majors take a wide variety of courses in music theory, music history, performance, and conducting. In addition, the program requires courses in psychology, sociology, philosophy, arts, biology, anatomy, physiology plus a clinical core emphasizing the research aspects of music therapy. A total of 120 credits are required for the degree. Successful completion of all curricular requirements, plus a six-month clinical internship, qualifies a graduated to sit for the National Board Certification Examination and for eligibility for admission to the National Registry, maintained by the American Music Therapy Association (AMTA). Students are not qualified to work as professional music therapists until they have become registered by the AMTA.

Characteristics and Skills

- A desire to help improve people's quality of life
- A broad understanding of music theory and history
- Performance ability on two or more musical instruments
- A basic grasp of human anatomy, the human brain and its disorders
- Familiarity with abnormal, cognitive, and physiological psychology
- A desire to understand human development
- A desire to understand theories on death and dying
- Knowledge of research methods
- A desire to learn the therapeutic application of music to improve health

Potential Occupations

Employment opportunities are good and there is a high demand for Board Certified Music Therapists. Music therapists are employed in a variety of health care and educational settings, including hospitals, clinics, group homes, schools and centers for the developmentally delayed. Some music therapists maintain private practices or serve as consultants. Both jobs and salaries fluctuate with regional and institutional practices and some degree of flexibility in location can be helpful.

Paid or voluntary work, practicums, internships, and cooperative education opportunities will help to qualify you for AMTA certification and enhance your chances for employment. Contact an adviser in the department for more information about potential careers.

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 COCC 192/CO 130)	3	2A
MU 117	Music Theory I (MU/MUCC 111 or satisfactory completion of placement exam)	4	
MU 118	Music Theory II (MU 117)	4	
MUCC 192	Introduction to Music History and Literature	3	1
MU 155	Guitar Class I	2	
MU 241	Introduction to Music Therapy	3	
MU 272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2	
PYCC 100	General Psychology	3	3C
	Ensemble ²	2	
	Mathematics ³	3	2C
	TOTAL	32	
SOPHOMORE			
BZCC 110	Principles of Animal Biology	3	3A

BZCC	111	Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.)	1	3A	MU	445	Improvisation Techniques in Music Therapy (admission to professional curriculum)	2	
MU	153	Piano Class IV (MU 152)	2		MU	486A	Practicum-Music Therapy ² (piano proficiency)	5	4C
MU	217	Music Theory III (MU 118)	4		MU	487	Internship (completion of all course work in the music therapy curriculum)	1	
MU	218	Music Theory IV (MU 217)	4						
MU	250	Music Therapy Practice	2						
MU	252G	Instrumental Techniques-Percussion	1		PY	452	Cognitive Psychology (PY/PYCC 100 or written consent of instructor)	3	
MU	272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2				OR		
OT	215	Medical Terminology	1		PY	454A	Physiological Psychology (PY/PYCC 100 or written consent of instructor)	3	
PLCC	100	Appreciation of Philosophy	3	3B	STCC	201	General Statistics (M/M CC 120A-B)	3	2D
SPCC	200	Public Speaking	3	2B1			Global and cultural awareness ⁸	3	3E
		Ensemble ²	2				Music electives	2	
		Health and wellness ⁴	2	3G			TOTAL	27	
		Historical perspectives ⁵	3	3D, 3F					
		TOTAL	33						
JUNIOR									
BS	300	Principles of Human Anatomy and Physiology (BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 1102; C/C CC 103 or C/C CC 107 or C/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) ⁶	1						
MU	335	Music History II (MU 118; MU/MUCC 100 or MUCC 192)	3	4A, 4B					
MU	342	Psychology of Music (PY/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 reg. in any music ensemble; successful completion of upper-division qualifying exam)	1						
MU	486A	Practicum-Music Therapy (piano proficiency)	1						
PY	320	Abnormal Psychology (PY/PYCC 100)	3						
		Ensemble ⁷	1						
		TOTAL	28						
SENIOR									
MU	343	Research Methods in Music Therapy (ST/STCC 201)	3						
MU	355	Choral Conducting and Literature	2						
MU	444	Music Therapy Methods III (admission to professional curriculum)	3						

PROGRAM TOTAL = 120 credits

¹ Major instrument or voice (2 semesters).² Ensemble (2 semesters).³ Select from the list of courses in category 2C 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

Great personal satisfaction and fulfillment can be achieved through an arts career. Because work is often an expression of the artist's innermost feelings and ideas, an artist's personal identity may be more closely bound to that work than in other fields. It is particularly important to explore whether a music career is realistic given an individual's interest, talent, and temperament. Making an intelligent career choice involves weighing the realities of the music field against the desire to create.

Auditions are required for entry into the music program. Options include *voice*, *orchestral instrument* (brass, woodwind, strings, or percussion), *organ*, *piano*, *piano pedagogy*, and *string pedagogy*. Majors take a variety of music courses including music theory, music history, composition, and ensembles along with applied music instruction. In addition, students complete a core of course work to provide a broad background in communication, natural and social sciences, arts and humanities. Voice majors must learn a foreign language. Ensemble rehearsals, private lessons, master classes, and participation in and attendance at concerts, recitals, and special events as well as practice, practice, and more practice are a part of a music performance major's education. Students have numerous opportunities to participate in ensembles, bands, orchestras, and choir. Each

semester, students perform in jury exams before selected music faculty as well as participate in ensembles, concerts, and recitals.

Characteristics and Skills

- Strong talent and desire to develop proficiency in instrumental or voice performance or composition
- Commitment to excellence in performance
- Patience and self discipline in development of talents and abilities
- Ability to work with people and independently
- Strong aptitude for music theory and music history

Potential Occupations

Breaking into the field of music is not easy. Music is competitive and requires talent, contacts, luck, timing, persistence, hard work, and ability to get along with people to succeed. Most artists also depend upon other arts-related jobs or second careers to earn a living wage. Young musicians almost always start at the bottom and work up. Another way to get a foot in the door is to do an internship in the music business. For careers in the recording industry one must go to where the companies are: New York, Nashville, and Los Angeles. Many cities support professional orchestras, although funding in some locations has diminished. Contact the Department of Music, Theatre, and Dance for more career information.

Potential careers include, but are not limited to: accompanist; arranger/composer; recording artist or engineer; instrumentalist (orchestra, military band, or popular band); lyricist; choral or instrumental conductor; jazz band leader or member; ethnomusicologist; critic; music producer/retailer; organist; orchestrator; studio singer/vocalist; music advisor to professional organization; music consultant; copyist; studio teacher (private lessons); studio manager; sheet music clerk.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
MU 117	Music Theory I (MU/MUCC 111 or satisfactory completion of placement exam)	4	
MU 118	Music Theory II (MU 117)	4	
MUCC 192	Introduction to Music History and Literature	3	1
MU	Ensemble ¹	2	
SPCC 200	Public Speaking ²	3	2B1
	Health and wellness ³	2	3G
	Mathematics (Math Placement Exam) ⁴	3	2C
	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	2D
	TOTAL	19	

JUNIOR

MU 311	Counterpoint I ⁷ (MU 217)	2	
	OR		
MU 312	Counterpoint II ⁸ (MU 217)	2	
MU 334	Music History I (MU 118; MU/MUCC 100 or MU 131/MUCC 192)	3	4A, 4B
MU 335	Music History II (MU 118; MU/MUCC 100 or MU 131/MUCC 192)	3	4A, 4B
MU 355	Choral Conducting and Literature ⁹	2	
	OR		
MU 356	Instrumental Conducting and Literature ¹⁰	2	
MU 416	Stylistic Analysis (MU 218)	3	
MU 471	Recital ¹¹ (written consent of instructor)	1	
MU 472A-V	Applied Music Instruction ¹² (MU 272A-V; successful completion of upper-division qualifying exam; concurrent reg. in any music ensemble)	4	
MU	Ensemble ¹	2	
	Arts/humanities ¹³	3	3B
	Music electives	3	
	TOTAL	26	

SENIOR

MU 411	Orchestration ¹⁴ (MU 218)	3	
MU 471	Recital (written consent of instructor)	1	4C
MU 472A-V	Applied Music Instruction ¹² (MU 272A-V; successful completion of upper-division qualifying examination; concurrent reg. in any music ensemble)	4	
MU	Ensemble ¹⁵	2	
	OR		
MU 407	Accompanying ¹⁶ (MU 272I)	1	
	Biological/physical sciences ¹⁷	7	3A
	Global and cultural awareness ¹⁸	3	3E
	Music electives	3	
	TOTAL	22-23	

CORE TOTAL = 91-92 credits¹⁹

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 2C 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 2D in the AUCC.

⁷ Both MU 311 and MU 312 are required for the composition option in the third and fourth years.

⁸ MU 312 is required for the organ and string pedagogy options.

⁹ MU 355 is required for the organ and voice options. Neither MU 355 nor MU 356 is required for the piano pedagogy option.

¹⁰ MU 356 is required for the orchestral instrument and string pedagogy options.

¹¹ Junior recital not required for the piano pedagogy and string pedagogy options.

¹² Two semesters; major instrument, voice, or composition.

¹³ Select from the list of courses in category 3B in the AUCC.

¹⁴ Not required for the piano pedagogy or voice options.

¹⁵ Not required for the piano and piano pedagogy options.

¹⁶ For the piano and piano pedagogy options only.

¹⁷ Select two courses (one of which must have a laboratory component) from the list in category 3A of the AUCC.

¹⁸ Select from the list of courses in category 3E of the AUCC.

¹⁹ In order to complete the performance concentration, students must select from one of the following options: ~~composition~~, 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 music performance concentration core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
MU 272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2-4	
	Electives	2-4	
	TOTAL	6	
SOPHOMORE			
MU 272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	4	
	Electives	7	
	TOTAL	11	
JUNIOR			
	Electives	4	
SENIOR			
	Electives	7-8	
PROGRAM TOTAL = 120 credits			

¹Two semesters; major instrument.

Organ Option

In addition to the music performance concentration core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
MU 272H	Applied Music Instruction-Organ ¹ (concurrent reg. in any music ensemble)	2-4	
	Electives	2-4	
	TOTAL	6	

SOPHOMORE

MU 272H	Applied Music Instruction-Organ ¹ (concurrent reg. in any music ensemble)	4	
	Foreign language ¹	10	
	TOTAL	14	

JUNIOR

Electives 4-5

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

¹Two semesters.

Piano Option

In addition to the music performance concentration core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
MU 272I	Applied Music Instruction-Piano ¹ (concurrent reg. in any music ensemble)	2-4	
	Electives	2-4	
	TOTAL	6	
SOPHOMORE			
MU 272I	Applied Music Instruction-Piano ¹ (concurrent reg. in any music ensemble)	4	
	Foreign language ¹	10	
	TOTAL	14	
JUNIOR			
	Electives	3	
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 music performance concentration core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
MU 272I	Applied Music Instruction-Piano ¹ (concurrent reg. in any music ensemble)	2	

		Electives	4
		TOTAL	6
SOPHOMORE			
MU	272I	Applied Music Instruction-Piano ¹ (concurrent reg. in any music ensemble)	4
		Foreign language ¹	10
		TOTAL	14
JUNIOR			
MU	495G	Independent Study-Pedagogy	3
PY	260	Child Psychology (PY/PYCC 100)	3
		OR	
PY	465	Adolescent Psychology (PY/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 music performance concentration core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
MU	272K-P	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2
		Electives	4
		TOTAL	6
SOPHOMORE			
MU	272K-P	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2-4
		Electives	7-9
		TOTAL	11
JUNIOR			
MU	272K-P	Applied Music Instruction ² (concurrent reg. in any music ensemble)	1
MU	495G	Independent Study-Pedagogy	2
PY	260	Child Psychology (PY/PYCC 100)	3
		OR	
PY	465	Adolescent Psychology (PY/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 music performance core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
MU	272Q	Applied Music Instruction-Voice ¹ (concurrent reg. in any music ensemble)	2-4
		Foreign language (German) ¹	10
		TOTAL	12-14
SOPHOMORE			
MU	272Q	Applied Music Instruction-Voice ¹ (concurrent reg. in any music ensemble)	4
		Foreign language (French or Italian) ¹	10
		TOTAL	14
JUNIOR			
MU	265A	Singers Diction-German/English	1
SENIOR			
MU	265B	Singers Diction-French/Italian	1
MU	272I	Applied Music Instruction-Piano ¹ (concurrent reg. in any music ensemble)	2
MU	466	Song Literature	2
		Electives	0-2
		TOTAL	5-7
PROGRAM TOTAL = 124-125 credits			

¹Two semesters.

Major in Music (B.A.)

This major allows students to study music within the larger context of a liberal education. In comparison to majors leading to the bachelor of music degree, less emphasis is placed on studies specifically in music. An outside concentration or option area is required instead, and may be used to enhance opportunities for employment after graduation. The curriculum specific to music consists of courses in music theory, applied music instruction in voice or major instrument, music history, participation in ensemble, and your option area. Option programs and advisers are established in many fields, such as business, journalism, theatre, or dance, to mention a few. At least 21 credits are required in the option area, with at least 12 of those being upper- (300 or 400) level classes. In addition, students complete a core of course work to provide a broad background

in communication, natural and social sciences, arts, and humanities. A year of foreign language is also required. A major paper, a lecture/recital, or a full recital is required of seniors in the program.

Characteristics and Skills

- Strong interest in and aptitude for music theory and performance
- Strong motivation
- Patience and self discipline in development of talents and abilities
- Versatility
- Creative abilities
- Strong oral and written communication skills
- Interpersonal relations
- Ability to work independently and with others
- A desire for broad knowledge in communications, natural sciences, social sciences, and arts and humanities

Potential Occupations

Combining musical talent and desire to work in the music industry with other fields can open up many opportunities for graduates of this program. Incorporate business with music and start a music retail business. Couple journalism with music and write for a music magazine. Link communication with a musical background and be a disc jockey or radio announcer. Or, attend law school and use a music background to become a music copyright lawyer.

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.

Examples of potential careers for music graduates include, but are not limited to: accompanist; lyricist; radio and television announcer; music critic; instrumentalist (orchestra or popular band); sound and audio technician; music video producer; writer for a magazine; theater company member; disc jockey; music store owner or manager; instrument repair specialist; music publisher; concert manager/promoter; music agent; club manager; TV or radio program coordinator; fundraiser/institutional solicitor; music producer/retailer; music writer/journalist; music adviser to professional organization; music consultant; studio teacher (private lessons); studio manager; sheet music clerk.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A

MU	117	Music Theory I (MU/MUCC 111 or satisfactory completion of placement exam)	4	
MU	118	Music Theory II (MU 117)	4	
MUCC	192	Introduction to Music History and Literature	3	1
MU	272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2	
		Ensemble ²	2	
		Health and wellness ³	2	3G
		Logical/critical thinking ⁴	3	2D
		Mathematics ⁵	3	2C
		Electives	3	
		TOTAL	29	

SOPHOMORE

MU	217	Music Theory III (MU 118)	4	
MU	218	Music Theory IV (MU 217)	4	
MU	272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2	
SPCC	200	Public Speaking	3	2B1
		Ensemble ²	2	
		Foreign language ²	6	
		Option ⁶	6	
		Electives	3	
		TOTAL	30	

JUNIOR

MU	334	Music History I (MU 118; MU/MUCC 100 or MUCC 192)	3	4A, 4B
MU	335	Music History II (MU 118; MU/MUCC 100 or MUCC 192)	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
MU	499	OR 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 Major instrument or voice; 2 semesters.

² 2 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 2D in the AUCC.

⁵ Select from the list of courses in category 2C 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 in the AUCC. 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 courses 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 the student to broaden career opportunities or pursue avocational interests. If a student has a teaching major in another area and wishes to acquire licensure in music, he/she should consult with a music adviser for appropriate courses and requirements. The student must complete a minimum of 23 credits of which a minimum of 12 must be upper division. A maximum of four ensemble credits are allowed.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
MUCC 100	Music Appreciation	3	3B
OR			
MUCC 192	Introduction to Music History and Literature	3	1, 3B
MU 117*	Music Theory I (MU/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; MU/MUCC 100 or MUCC 192)	3	
MU 335	Music History II (MU 118; MU/MUCC 100 or MUCC 192)	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

Programs leading to the Master of Music are available in composition, conducting (choral or orchestral), music education, and performance. Applicants should 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*. For further information, contact the Department of Music, Theatre, and Dance.

Major in Performing Arts

Dance Concentration

Office in General Services Building, Room 347

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.

Characteristics and Skills

- A broad liberal arts education
- Competence in several dance techniques including: ballet, modern, and jazz
- Theoretical and practical experience in choreography
- Theoretical and practical experience in dance teaching methods including anatomy and kinesiology
- An understanding of the history of dance
- Experience in various aspects of dance production, designs and techniques of costuming, sound and lighting, publicity, and makeup

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 your 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 COCC 192/CO 130)	3	2A
LBCC 192	College of Liberal Arts First-Year Seminar	3	1
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	2D
	Mathematics ⁶	3	2C
	TOTAL	33	

SOPHOMORE

C CC 103	Chemistry in Context	3	3A
C CC 104	Chemistry in Context Laboratory (C/C CC 103 or concurrent reg.)	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	2B1
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	

JUNIOR

BS 300	Principles of Human Anatomy and Physiology (BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 102; C/C CC 103 or C/C CC 107 or C/C CC 111)	4	
D 324	Teaching Creative Movement for Children	2	
D 326	Choreography II (D 221A or B or C)	2	
D 427	Dance History I	3	4A
EX 303	Anatomical Kinesiology (BS 300)	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 221A 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 2D in the AUCC.

⁶ Select from the list of courses in category 2C 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

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 students 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.

Characteristics and Skills

- A broad liberal arts education
- An understanding of theater history
- Competence in the theatrical disciplines including production, directing, acting, costume, scenic, and lighting design
- Mastery of the theory and practice of scenic techniques
- Understanding of set design and construction
- Experience in all aspects of stage production

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 your 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
COCC 150	College Composition (Composition Placement Examscore of 3 to 6 or COCC 192/CO 130)	3	2A
THCC 141	Introduction to Theatre ¹	3	3B
OR			
THCC 192	From Page to Stage: Freshman Theatre Seminar ²	3	1
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
	Biological/physical science ⁴	3	3A
	Health and wellness ⁵	2	3G
	Mathematics ⁶	3	2C
	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	2D
		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	2B
		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. Students who take THCC 141 are expected to have fulfilled the category 1 (first year seminar) requirement of the All-University Core Curriculum (AUCC).

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 2C 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 2D 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 2B 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

The purpose of the theatre minors is to give students in related majors the opportunity to formalize their interest in theatre with an organized course of study. These minors will give students the opportunity for concentrated study in at least one of the basic theatre crafts as well as a background in general theatre practice and history. Students are encouraged to enroll in additional "cross topic" courses.

Acting/Directing Minor

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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 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			

DEPARTMENT OF PHILOSOPHY

Office in Eddy Hall, Room 243

Professor Ronald G. Williams, Chair

Major in Philosophy

Philosophy is the oldest form of systematic, scholarly inquiry. It is the study of the most basic moral, legal, aesthetic, religious, and metaphysical ideas by which we understand the universe and ourselves. Philosophers pursue fundamental truths, quest for understanding, and study 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 generous choice of elective courses. While some students 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, computer science and technology, or theology. 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.

Characteristics and Skills

- Critical analysis
- Problem-solving skills
- Organizational skills
- Interpretation skills
- Decision-making skills
- Articulation
- Persuasion
- Logical reasoning
- Mediation skills
- Diagnosis
- Conflict resolution
- Value identification
- Observation
- Evaluation
- Argumentation
- Excellent communication skills
- Interviewing
- Ability to listen critically
- Journalistic writing skills
- Interpersonal relations
- Debating skills
- Grant proposal development
- Advertising skills
- Public relations skills

Potential Occupations

A major in philosophy prepares students for a wide variety of professional and life goals including graduate school in philosophy as well as other disciplines, professional and paraprofessional 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, and working with people enable them to secure jobs requiring complex thinking 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; foreign service agent; legislator; education professional; foreign diplomacy representative; teacher; higher education administrator; social worker; program coordinator; community developer; philanthropic organizer; anthropologist; biographer; curator; medical doctor; lawyer; researcher; writer; theologian; pastoral counselor; human resource manager; publisher; market research specialist; 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 COCC 192/CO 130)	3	2A
PLCC 192	Conceptions of the Good Life	3	1
	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	2D
	Social/behavioral sciences ⁶	3	3C
	TOTAL	27	
SOPHOMORE			
	Additional communication ⁷	3-5	2B
	Global and cultural awareness ⁸	3	3E
	Mathematics ⁹	3	2C
	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 2D 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 2B 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 2C 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 for 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	17th and 18th Century European Philosophy (PL 206 or PL 210 or PL 300)	3	4A
PL 302	19th-Century Philosophy (PL 301)	3	
OR			
PL 409	20th-Century Philosophy (PL 301)	3	
Upper-division philosophy		3	
TOTAL		12	
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	17th and 18th 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 369	Mind and Body in Eastern Thought (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	
PL	447	Ethical Theory (PL 205 or PL 300 or PL 301)	3	
OR				
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	17th and 18th Century European Philosophy (PL 206 or PL 210 or PL 300)	3	4A
PL 302	19th-Century Philosophy (PL 301)	3	
OR			
PL 409	20th-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 PL/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 courses: PL 300, PL 301, PL 302, PL 409)	3	4B, 4C
TOTAL			12	

PROGRAM TOTAL = 120 credits

¹ Three credits in addition to the AUCC science requirement. Course must be in the College of Natural Sciences or the College of Engineering.

Minors in Philosophy

A minor in philosophy is intended to broaden students' education and to complement and encourage critical and constructive reflection in other courses. Students may choose a minor in general philosophy or in religious studies.

Students are required to receive at least a C- (1.67) 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>			
PL 105	Introduction to Philosophy	3	
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	
LOWER OR UPPER DIVISION			
<i>Select one of the following courses:</i>			
PLCC 110	Logic and Critical Thinking	3	2D
PL 210	Introduction to Formal Logic (sophomore standing or higher or written consent of instructor)	3	
PL 410*	Formal Logic (CS 270 or PL 210)	3	
PL 415	Logic and Scientific Method	3	

UPPER DIVISION			
PL	300*	Ancient Greek Philosophy (PL 205 or PL 206 or PL 210)	3
OR			
PL	301*	17th and 18th Century European Philosophy (PL 206 or PL 210 or PL 300)	3
PL	305A-F	Philosophical Issues in the Professions	3
OR			
PL	447*	Ethical Theory (PL 205 or PL 300 or PL 301)	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*		Philosophy, upper division	6
TOTAL			15

PROGRAM TOTAL = 21 credits without prerequisites

Substitutions allowed with prior approval of department chair.

*Additional course work may be required because of prerequisites.

Minor in Religious Studies

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
<i>Select one course from the following:</i>			
PLCC	100	Appreciation of Philosophy	3 3B
PL	105	Introduction to Philosophy	3
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
OR			
<i>Select two courses from the following:</i>			
PL	171	Religions of the West	3
PL	172	Religions of the East	3
PL	270	Issues in the Study of Religion (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
OR			
PL	301	17th and 18th Century European Philosophy (PL 206 or PL 210 or PL 300)	3
OR			
<i>Select three courses from the following:</i>			
PL	309	Ideas in Oriental Art and Literature	3
PL	349	Philosophy of Tao and Zen (written consent of instructor)	3
PL	355	Philosophy of Religion (PL 106 or PL 171 or PL 172 or PL 270)	3
PL	360	Topics in Oriental Philosophy (sophomore standing or higher or written consent of instructor)	3

(Continued in the next column)

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
TOTAL			12

PROGRAM TOTAL = 21 credits

Substitutions allowed with prior approval of department chair.

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, environmental, and international ethics, comparative philosophy, as well as 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 C 346
Professor William J. Chaloupka, Chair

Major in Political Science

Political science is the study of political power, how it is developed, used, and controlled. Political science majors develop an understanding of political life in the United States, and in other nations. They investigate the origins and effects of political behavior, analyze political process, and interpret the political and social consequences of law. Political science majors receive a broad liberal arts education, learn to analyze information about political processes, become informed about approaches to and theories of politics, and are stimulated to clarify their own political perspectives. Students study the values that give rise to a rich variety of behaviors, institutional forms, and public policies that influence our world. Courses in political science are complemented by courses in history, communication, economics, philosophy, foreign languages, anthropology, and statistics. There is plenty of room to

explore other interests with elective credits. Students are also required to select an “option” or minor. These include: foreign language support option, methods option, a minor in a different department, a second major or an interdisciplinary certificate program.

Characteristics and Skills

- Intellectual curiosity
- Excellent communications skills, including writing clear and concise reports
- Ability to analyze critically and think objectively
- Ability to process data systematically
- Ability to work alone and in groups
- Problem solving skills
- Commitment to public service
- Tact and diplomacy
- Patience and persistence
- Flexibility
- Familiarity with computers and computer technology
- Dealing effectively with individuals or groups to obtain information
- Using surveys and interview techniques for research
- Creative and versatile thinking
- Understanding of human institutions and values
- Independent thinking
- Multicultural awareness

Potential Occupations

Political science, like many liberal arts majors, provides students with a broad academic background suitable for a variety of jobs in the public and private sectors. Political science 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. Internship opportunities provide training and development. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels. Political science provides a solid preparation for further study in political science, public administration, business, public policy, international affairs, and law. Students who are interested in teaching political science in junior high or high schools must complete teaching endorsement area requirements in social studies through the School of Education.

The following are some of the career opportunities available to political science graduates: community organizer; consumer advocate; community relations/ombudsman; judicial clerk; paralegal or legal assistant; legal researcher; law librarian; attorney; public policy administrator; civil rights enforcement officer; labor relations specialist; foreign relations specialist; legislative assistant; probation officer; foreign service officer; government intelligence analyst; congressional aide; diplomatic officer; cultural affairs officer; demographer; foreign correspondent; international relations specialist;

legislative advocate; criminal investigator; interest group coordinator; campaign worker; politician; lobbyist; consultant; public relations specialist; financier; advertising representative; correspondent; columnist/critic; urban/regional planner; international trade specialist; personnel administrator; market research analyst.

<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 COCC 192/CO 130)	3	2A
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
	First-year seminar ³	2-3	1
	Health and wellness ⁴	2	3G
	Logical/critical thinking ⁵	3	2D
	Mathematics ⁶	3	2C
	Electives	3-4	
	TOTAL	30	
SOPHOMORE			
ECCC 101	<i>Select from the following:</i> Economics of Social Issues	3	3C
ECCC 202	OR Principles of Microeconomics ⁷ (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
ECCC 204	AND Principles of Macroeconomics ⁷ (EC/ECCC 202 or EA/EACC 202)	3	3F
POCC 232	International Relations	3	3D
POCC 241	Comparative Government and Politics	3	3E
	Additional communications ⁸	3	2B
	Arts/humanities ⁹	3	
	Biological/physical sciences ¹⁰	3	3A
	Political science, upper division ¹¹	3	
	Support option ¹²	3-6	
	Electives	3-6	
	TOTAL	30-33	
JUNIOR			
	Political science, upper-division ¹¹	9	
	Support option ¹²	6-12	
	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 ¹¹	9	4A, 4B

Support option ¹²	6-12
Electives ¹³	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 1 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 2D in the AUCC.

⁶ Select from the list of courses in category 2C in the AUCC.

⁷ EC/ECCC 202 and EC/ECCC 204 should be taken by students who plan to take advanced courses in economics.

⁸ Select from the list of courses in categories 2B1, 2B2, or 2B3 in the AUCC.

⁹ Any non-studio course from art, dance, English, foreign language, journalism, psychology, or sociology not used to meet AUCC or other departmental requirements.

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

¹¹ 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.

¹² 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 PL 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.

¹³ 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

This minor provides a sound academic core for students in other social science or in non-social science curricula interested in studying politics. It also may be useful for persons preparing for careers in law, teaching in the social sciences, journalism, and the public services.

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 or 3D
POCC 232	International Relations	3	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 description of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF SOCIOLOGY

Office in Clark Building, Room B 258
Professor Louis E. Swanson, Jr., Chair

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 interaction, 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: 1) direct observation of groups; 2) surveying or interviewing individuals; 3) analyzing historical research; and a variety of other methods. Few fields of study have such broad scope and relevance.

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 coursework. 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 [Criminal Justice](#), [Asian Studies](#), [Latin American Studies](#), [Religious Studies](#), or [Russian and East Central European Studies](#).

Majors in other disciplines may also undertake systematic study in criminal justice by completing the [Criminal Justice Interdisciplinary Studies Program](#) listed in the University-Wide Instructional Programs section of this catalog.

Characteristics and Skills

- Ability to analyze the influence of group activities on individual members
- Capacity to study human behavior
- Ability to examine groups and social institutions
- Excellent writing skills
- An understanding of social bonds

- Disciplined study of social interaction, groups, organizations, institutions, whole societies, and interacting sets of societies
- Research and data collection skills
- Following and tracking the components of arguments
- Ability to test ideas by summoning supportive and contrary evidence
- Ability to draw conclusions disciplined by reasoned evidence
- Ability to detect false inferences
- An understanding of population dynamics, social classes, informal and formal organizations, and institutions
- Understanding of the processes of change

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 nonprofit, 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; publisher; sociologist-specialist; consultant; criminologist; industrial sociologist; lawyer; librarian.

Criminal Justice Concentration

The criminal justice concentration supplements general sociological training with coursework focused on the social aspects of crime and criminal justice. Sociology majors who opt for the 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 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 S 371C, if these courses are counted toward the concentration.

<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 COCC 192/CO 130)	3	2A
M CC 117	<i>Select one of the following pairs:</i> College Algebra in Context I (Math Placement Exam)	1	2C
M CC 118	College Algebra in Context II (M/M CC 117)	1	2C
M CC 120A-B	OR College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 124	Logarithmic and Exponential Functions (M/M CC 118 or M/M CC 121 or placement)	1	2C
S CC 100	General Sociology	3	3C, 3F
S CC 105	OR Social Problems	3	3C, 3F
S 253	Introduction to Criminal Justice (S/S CC 100 or S/S CC 105)	3	
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	3-4	3A
	First-year seminar ³	2-3	1
	Health and wellness ⁴	2-3	3G
	Social/behavioral sciences ⁵	3	
	Electives	3	
	TOTAL	28-31	
SOPHOMORE			
	Additional communication ⁶	3	2B
	Biological/physical sciences ⁷	3-4	3A
	Global and cultural awareness ⁸	3	3E
	Historical perspectives ⁹	3	3D
	Logical/critical thinking ¹⁰	3	2D
	Social/behavioral sciences ⁵	6	
	Electives	9	
	TOTAL	30-31	
JUNIOR			
S 301	Development of Sociological Thought (S/S CC 100 or S/S CC 105)	3	
S 302	OR Contemporary Sociological Theory (S/S CC 100 or S/S CC 105)	3	
S 310	Quantitative Sociological Analysis (M/M CC 120A-B or M/M CC 117)	3	
S 311	Methods of Sociological Inquiry (S/S CC 100 or S/S CC 105)	3	4A, 4B
S 313	Computer Methods in Sociology (S 310 or written consent of instructor)	1	

S	352	Criminology (S/S CC 100 or S/S CC 105)	3	
OR				
S	372	Sociology of Deviance (S/S CC 100 or S/S CC 105)	3	
S	354	Law Enforcement and Society (S 253)	3	
		Social/behavioral sciences ⁵	6	
		Electives	9	
		TOTAL	31	

SENIOR

PO	413	U.S. Civil Rights and Liberties (PO/POCC 101 or POCC 192A)	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	487	Internship (S 301 or S 302; S 310, S 311, S 313)	4	4C
		Electives ¹¹	17-21	
		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 1 in the AUCC.

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

⁵ Select from a department list of approved courses.

⁶ Select from the list of courses in category 2B in the AUCC.

⁷ Select a minimum of 7 credits from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

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

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

¹⁰ Select from the list of courses in category 2D in the AUCC.

¹¹ 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 to 6 or COCC 192/CO 130)	3	2A
<i>Select one of the following pairs:</i>			
M CC 117	College Algebra in Context I (Math Placement Exam)	1	2C
M CC 118	College Algebra in Context II (M/M CC 117)	1	2C
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C

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
	First-year seminar ³	2-3	1
	Health and wellness ⁴	2-3	3G
	Social/behavioral sciences ⁵	3	
	Sociology electives ⁶	3	
	Electives	3	
	TOTAL	28-31	

SOPHOMORE

	Additional communication ⁷	3	2B
	Biological/physical sciences ²	3-4	3A
	Global and cultural awareness ⁸	3	3E
	Historical perspectives ⁹	3	3D
	Logical/critical thinking ¹⁰	3	2D
	Social/behavioral sciences ¹¹	6	
	Sociology electives ⁶	6	
	Electives	3	
	TOTAL	30-31	

JUNIOR

S 301	Development of Sociological Thought (S/S CC 100 or S/S CC 105)	3	
OR			
S 302	Contemporary Sociological Theory (S/S CC 100 or S/S CC 105)	3	
S 310	Quantitative Sociological Analysis (M/M CC 120A-B or M/M CC 117)	3	
S 311	Methods of Sociological Inquiry (S/S CC 100 or S/S CC 105)	3	4A, 4B
S 313	Computer Methods in Sociology (S 310 or written consent of instructor)	1	
	Social/behavioral sciences ¹¹	6	
	Upper division sociology	3	
	Electives	9-13	
	TOTAL	28-32	

SENIOR

S 403	Capstone Seminar (S 310, S 311; S 301 or S 302; S 313)	3	4C
	Upper division sociology	3	
	Electives ¹²	24	
	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 1 of the AUCC.

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

⁵ Select from a department list of approved courses.

⁶ Select courses representing the major areas of sociology.

⁷ Select from list of courses in category 2B of the AUCC.

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

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

¹⁰ Select from list of courses in category 2D of the AUCC.

¹¹ Select from a department list of approved courses.

¹² Select enough elective credits to bring program total to 120 credits.

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/S CC 100 or S/S CC 105)	3	
OR			
S 311	Methods of Sociological Inquiry (S/S CC 100 or S/S CC 105)	3	
OR			
	Equivalent course work in social research	3	
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			

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, B 258 Clark Building.

DEPARTMENT OF SPEECH COMMUNICATION

Office in Eddy Hall, Room 202
Professor Dennis Phillips, Chair

Major in Speech Communication

Majors in speech communication are prepared for a wide array of careers that involve communication. The major encompasses many facets of oral and electronic communication. Recently, the Department started a virtual communication class, and now offers learning in computer-mediated communication.

Speech communication majors receive a broad-based liberal arts education, designed to equip them in the 21st century, including the likelihood of more than one career and the need to adapt to a rapidly changing workplace. Along with courses in speech communication, the major requires courses in history, English, literature, and philosophy.

The Department's goals for undergraduate majors include development of outstanding oral and written communications skills; knowledge of the history, theory, and criticism of all forms of pragmatic human communication; commitment to the values and ethical obligations of free speech in a diverse, democratic society. In addition to the **major in speech communication**, four concentrations are also offered **communication in media**, **communication theory**, **rhetoric**, or **teacher licensure**.

Characteristics and Skills

- Outstanding oral and written communication skills
- Presenting viewpoints clearly and forcefully in a variety of media
- Expressing complex subject matter in easily understood language
- Speaking clearly and persuasively
- Operating cameras, recorders, and other audio, visual and audiovisual equipment
- Using communication techniques, including listening, to deal different kinds of people, both in groups and individually.
- Effectively creating and using support materials for attention and persuasion.
- Using sight, sound, motion, and words to create powerful and exciting images.
- Speaking and understanding intercultural contexts.

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 occupations include, but are not limited to: program manager, production manager, associate director, television schedule coordinator; camera operator; audio operator;

audiovisual 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 to 6 or COCC 192/CO 130)	3	2A
POCC 101	American Government and Politics	3	3C, 3F
SPCC 100	Communications and Popular Culture	3	3B
SPCC 200	Public Speaking	3	2B1
	Biological/physical sciences ¹	7	3A
	First-year seminar ²	2-3	1
	Health and wellness ³	2	3G
	Historical perspectives ⁴	3	3D
	Mathematics ⁵	3	2C
	TOTAL	29-30	
SOPHOMORE			
SPCC 201	Rhetoric in Western Thought	3	3B
SPCC 207	Rhetoric and Argumentation	3	2D
	Global and cultural awareness ⁶	3	3E
	Historical perspectives ⁷	9	
	Social/behavioral sciences ⁸	9	
	Written communication ⁹	3	
	TOTAL	30	
JUNIOR			
	Arts/humanities ¹⁰	12	
	Social/behavioral sciences ⁸	3	
	Speech electives ¹¹	15	
	TOTAL	30	
SENIOR			
	<i>Select one of the following courses:</i>		
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 ¹¹	9
Electives ¹²	16-17
TOTAL	30-31

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 1 in the AUCC.
- ³ Select from the list of courses in category 3G in the AUCC.
- ⁴ Select one HYCC-prefix course from the list of courses from category 3D in the AUCC.
- ⁵ Select from the list of courses in category 2C in the AUCC.
- ⁶ Select any course in category 3E in the AUCC. This course cannot be double-counted in any other AUCC category.
- ⁷ Nine additional credits from the 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.
- ⁸ Select a total of 12 credits from the following prefixes: AP, EC, ET, HY, JT, PO, PY, or S.
- ⁹ Select either an additional CO course or any course in category 2B2 in the AUCC.
- ¹⁰ Select twelve credits from the following prefixes: AR, D, E, ET, L, MU, PL, or TH.
- ¹¹ 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.
- ¹² Select credits to total 120.

Communication in Media Concentration

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
	<i>Select twelve credits from the following:</i>		
SP 341	Evaluating Contemporary Television	3	
SP 342	Critical Media Studies	3	
SP 346	Virtual Culture and Communication (SP/SPCC 100 or SP 342)	3	
SP 347	Visual Rhetoric (SP/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	
	B.A. Core requirements¹	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 as a requirement.

Communication Theory Concentration

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
	<i>Select twelve credits from the following:</i>		
SPCC 192	Introduction to Intercultural Communication	3	
SP 205	Group Communication (SP/SPCC 200)	3	
	(continued in the next column)		

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	3	
SP 510	Theories of Interpersonal Communication	3	
SP 530	Communication Research Methods	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.

Rhetoric Concentration

Course	Title (Prerequisite)	Cr	AUCC
SENIOR			
<i>Select twelve credits from the following:</i>			
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 417	Communication, Language, and Thought	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 514	British Origins of American Discourse	3	
SP 523	Feminist Theories of Discourse	3	
B.A. Core requirements ¹		108	
TOTAL		120	

PROGRAM TOTAL = 120 credits

¹ All requirements for the Speech Communications (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

Core Courses

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
POCC 101	American Government and Politics	3	3C, 3F

SPCC 100	Communication and Popular Culture	3	3B
SPCC 200	Public Speaking	3	2B1
THCC 141	Introduction to Theatre	3	3B
	Biological/physical sciences ¹	7	3A
	First year seminar ²	3	1
	Health and wellness ³	2	3G
	Mathematics ⁴	3	2C
TOTAL		30	

SOPHOMORE

E CC 270	Introduction to American Literature	3	3B
E CC 275	Introduction to British Literature	3	3B
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F

<i>Select one of the following courses:</i>			
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 216	The Islamic World	3	3D or 3E
HYCC 230	Medieval Europe	3	3D or 3E
HYCC 252	Asian American History	3	3D
SPCC 201	Rhetoric in Western Thought	3	3B
SPCC 207	Rhetoric and Argumentation	3	2D
	Global and cultural awareness ⁵	3	3E
	Option courses ⁶	8-10	
TOTAL		29-31	

JUNIOR

COCC 301A-D	Writing in the Disciplines (CO/COCC 150)	3	2B2
E 402	Teaching Composition (CO/COCC 301A or B or C or D)	3	
E 405	Adolescents' Literature	3	
ED 331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
ED 340	Literacy and the Learner (completion of 30 credits of course work; consent of Teacher Licensure Office)	3	
ED 350	Instruction I-Individualization/Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	

ED	386	Practicum-Instruction I (EDCC 310/EDCC 275, ED 340, concurrent reg. in ED 350; admission to Teacher Licensure Program)	1	
ED	463	Methods in Teaching Language Arts (admission to Teacher Licensure Program)	4	
		English elective ⁷	3	
		Option courses ⁶	6-8	
		TOTAL	30-32	
SENIOR				
ED	450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. 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 450 or ED 426, ED 463, concurrent reg. in ED 485A or B or C)	1	
ED	493B	Seminar-Assessment of Learning (ED 450 or ED 426, ED 463, concurrent reg. in ED 485A or B or C or VE 485)	1	
SP	450	Capstone Seminar	2	4C
		Option courses ⁶	9	
		TOTAL	29	

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 1 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 2C in the AUCC.

⁵ 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.

⁶ Student must also complete one of the following options: speech or theatre.

⁷ Three credit elective with E prefix.

Speech Option

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
SP 205	Group Communication (SP/SPCC 200)	3	
	OR		
SP 310	Interpersonal Communication Skills	3	
SP 215	Intercollegiate Forensics	1	
	OR		
SP 315	Public Discussion and Debate (SP 215)	1	
	Speech electives ¹	6	
	TOTAL	10	
JUNIOR			
	<i>Select one of the following courses:</i>		
SPCC 192	Introduction to Intercultural Communication ²	3	1, 3E
SP 305	Intercultural Communication	3	
SP 306	Co-Cultural Communication	3	

SP	300	Advanced Public Speaking (SP/SPCC 200)	3	
		OR		
SP	303	Business and Professional Speaking (SP/SPCC 200)	3	
		TOTAL	6	
SENIOR				
SP	311	Historical Speeches on American Issues	3	4A, 4B
		OR	3	
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.

² If this course is selected, it fulfills the first-year seminar and category 3E requirement. An additional elective may be required to bring total number of credits to 120.

Theatre Option

Course	Title (Prerequisite)	Cr	AUCC
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. 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*](#).

College of Natural Resources

Office in Natural Resources Building, Room 101
Professor A. Al Dyer, Dean
Associate Professor Joyce Berry, 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 Resources Building, Room 101

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 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
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, fishery 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 electives credit 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 onsite, 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.

Characteristics And Skills

- A strong interest in fish and fisheries
- Strong interest in biological sciences
- A desire to understand fishery management principles
- Aptitude for natural sciences
- Strong analytical ability
- Likes working in nature
- Organizational and decision making skills
- Prefers hands-on work
- Prefers working outdoors-in the field
- Well organized and able to pay attention to detail
- Adaptable to changing conditions and environments
- Interest in policy formation and implementation
- Able to work in a team and independently
- Able to write and speak accurately and clearly
- Interest in data and policy analysis
- Able to integrate knowledge and apply concepts to solve natural resource issues

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 your 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 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 (BZ/BZCC 110 or concurrent reg.)	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 (BY 102/LSCC 102)	4	
<i>Select one of the following sets of courses:¹</i>			
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
OR			
C CC 111	General Chemistry I (M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C CC 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130.)	3	2A

FW 100	Wildlife Fundamentals (concurrent reg. in FWCC 192)	2	
FWCC 192	Wildlife Inquiries (FW 100 or concurrent registration) ²	2	1
M CC 155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125) ³	4	2C
SPCC 200	Public Speaking	3	2B1
	Health and wellness ⁴	2	3G
	TOTAL	29-32	
SOPHOMORE			
BY 320	Ecology (one course in biology; M/M CC 155)	3	
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/C CC 112 or C 114; C 245 or concurrent reg.)	1	
FW 204	Introduction to Fishery Biology (FW 100)	3	
NR 220	Natural Resources Ecology and Measurements (BY/LS 103 or BZ/BZCC 120; M/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 (PH/PHCC 110 or concurrent reg.)	1	3A
OR			
PHCC 121	General Physics I (concurrent reg. in M/M CC 125)	5	3A
PHCC 122	General Physics II (PH/PHCC 121)	5	3A
<i>Depth elective^{1,6}</i>			
		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 (BY/LS 103 or BZ/BZCC 110 and BZ/BZCC 111)	4	
BZ 214	Animal Biology-Vertebrates (BY/LS 103 or BZ/BZCC 111)	4	
BZ 329	Herpetology (BZ 214)	3	
BZ 330	Mammalogy (BY/LS 103 or BZ/BZCC 111)	3	
BZ 335	Ornithology (BY/LS 103 or BZ/BZCC 111)	3	
FW 300	Ichthyology (BY/LS 103 or BZ/BZCC 111)	2	
FW 301	Ichthyology Laboratory (FW 300 or concurrent reg.)	1	
FW 360	Principles of Vertebrate Management (BY 220 or BY 320; M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
NRCC 320	Natural Resources History and Policy	3	3D, 3F

STCC	301	Introduction to Statistical Methods (M/M CC 121)	3	2D
OR				
STCC EHCC	307/ 307	Introduction to Biostatistics (M/M CC 121)	3	2D
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 (BY/LS 103 or BZ/BZCC 111)	4	
BZ	471	Stream Biology and Ecology (BY 220 or BZ 470)	3	
AND				
BZ	472	Stream Biology and Ecology Laboratory (BZ 471 or concurrent reg.)	1	
BZ	474	Limnology (BY 220 or BZ 470)	3	
FW	370	Design of Wildlife Projects (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307)	3	
FW	400	Fish Ecology (BY 220, FW 300, FW 370)	3	
OR				
FW	402	Fish Culture (FW 204, FW 300; FW 301)	4	
FW	401	Fishery Science (FW 300; ST/STCC 301 or ST/STCC 307 or EH/EHCC 307; M/M CC 141 or M/M CC 155 or M/M CC 160)	3	4A, 4B
NR	420	Integrated Ecosystem Management	4	4C
Ecosystem management elective ¹¹			6	
Electives			3-7	
TOTAL			27-28	

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/C CC 111, C/C CC 112, and C 113.

² First year students must take FW 100 and FWCC 192. Students who have already received credit for a first-year seminar should take FW 200.

³ M/M CC 117-M/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 PH/PHCC 121 and PH/PHCC 122.

⁶ Students in the mathematics/statistics depth area select from: M 229, M/M CC 255, ST 302, ST 304, ST 305, ST 321 or additional courses off of the department advising list. Students in the computer program depth area select from CS/CSCC 151, CS/CSCC 153, NR 322, NR 323, or additional class 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: EA/EACC 240 or EC/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/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
OR			
BY 320*	Ecology (one course in biology; M/M CC 155)	3	
<i>Select one of the following pairs of courses:</i>			
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.)	1	3A
OR			
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (BY/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/M CC 141 or M/M CC 155 or M/M CC 160)	3	
FW 370*	Design of Wildlife Projects (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307)	3	
TOTAL		3	
UPPER DIVISION			
FW 300	Ichthyology (BZ/BZCC 111 or BY/LS 103)	2	
FW 301	Ichthyology Laboratory (FW 300 or concurrent reg.)	1	
<i>Select two courses from the following:</i>			
FW 400	Fish Ecology (BY 220, FW 300, FW 370)	3	
FW 401*	Fishery Science (FW 300; ST/STCC 301 or ST/STCC 307 or EH/EHCC 307; M/M CC 141 or M/M CC 155 or M/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 studies. 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 onsite, hands-on look at resource ecology and the measurement of its components. Electives may be used to prepare for one or more of many wildlife specialties; education, law, veterinary medicine, or graduate school.

Characteristics And Skills

- A strong interest in wildlife
- Interest in biological sciences
- A desire to understand wildlife management principles
- Aptitude for natural sciences
- Physical stamina
- Strong analytical ability
- Likes working in nature
- Organizational and decision making skills
- Prefers hands-on work
- Prefers working outdoors in the field
- Well organized and able to pay attention to detail
- Adaptable to changing conditions and environments
- Interest in policy formation, implementation and analysis
- Able to work in a team or independently
- Able to write and speak accurately and clearly
- Interest in data analysis
- Able to integrate knowledge and apply concepts to solve natural resource issues

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 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. 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 (BZ/BZCC 110 or concurrent reg.)	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 (BY/LSCC 102)	4	

		<i>Select one of the following sets of courses:¹</i>		
C CC	107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC	108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
		OR		
C CC	111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
			1	3A
C CC	112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	3	3A
C	113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)		
COCC	150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
FW	100	Wildlife Fundamentals ² (concurrent reg. in FWCC 192)	2	
FWCC	192	Wildlife Inquiries ² (FW 100 or concurrent reg.)	2	1
		<i>Select one of the following:</i>		
G CC	140	Physical Geology	4	3A
G	150	Physical Geology for Scientists and Engineers	4	
SC	240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
M CC	155	Calculus for Biological Scientists I ³ (M/M CC 124, M/M CC 125)	4	2C
SPCC	200	Public Speaking	3	2B1
		TOTAL	31-34	
SOPHOMORE				
BY	320	Ecology (one course in biology, M/M CC 155)	3	
BZ	223	Plant Identification (BY/LS 103 or BZ/BZCC 120)	3	
C	245	Fundamentals of Organic Chemistry ^{1,4} (C/C CC 107 or C 113)	4	
FW	360	Principles of Vertebrate Management (BY 220 or BY 320; M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
NR	220	Natural Resources Ecology and Measurements (BY/LS 103 or BZ/BZCC 120; M/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 (PH/PHCC 110 or concurrent reg.)	1	3A
		OR		
PHCC	121	General Physics I (concurrent reg. in M/M CC 125)	5	3A
PHCC	122	General Physics II (PH/PHCC 121)	5	3A

STCC	301	Introduction to Statistical Methods (M/M CC 121)	3	2D
		OR		
STCC	307/	Introduction to Biostatistics (M/M CC 121)	3	2D
EHCC	307			
		Depth elective ^{1,6}	0-4	
		Social/behavioral sciences ⁷	3	3C
		TOTAL	28-34	
JUNIOR				
		<i>Select one of the following:</i>		
BZ	350	Molecular and General Genetics (BY/LSCC 102, one course in statistics)	4	
LS	201A	Applied Genetics (BY/LSCC 102 or college-level biology course)	3	
LS	201B	Introductory Genetics-Molecular Genetics (BY/LSCC 102 or college-level biology course)	3	
MB	450	Microbial Genetics (MB 300; BC 351 or BC 401 or concurrent reg.)	3	
COCC	301A-D	Writing in the Disciplines (CO/COCC 150)	3	2B2
		OR		
JTCC	300	Professional and Technical Communication (CO/COCC 150)	3	2B2
		<i>Select one of the following:</i>		
EACC	202	Agricultural and Resource Economics	3	3C
EACC	240/	Issues in Environmental	3	3F
ECCC	240	Economics		
ECCC	202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
FW	370	Design of Wildlife Projects (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307)	3	
		Depth elective ⁸	2-4	
		Organismal electives ⁹	6	
		Global and cultural awareness ¹⁰	3	3E
		Electives ¹¹	4-8	
		TOTAL	30-31	
SENIOR				
FW	471	Wildlife Data Collection and Analysis (FW 360, FW 370, NR 220)	4	
NRCC	320	Natural Resources History and Policy	3	3D, 3F
NR	400	Public Relations in Natural Resources (NR/NRCC 320)	3	4A, 4B
NR	420	Integrated Ecosystem Management	4	4C
		Arts/humanities ¹²	3	3B
		Health and wellness ¹³	2	3G
		Management/stewardship electives ¹⁴	5-7	

Electives ¹¹	4-6
TOTAL	30

PROGRAM TOTAL = 120-128 credits

¹ Students must select one area of depth: chemistry, computer science, mathematics or statistics, or physics. Student selecting the chemistry area of depth should take the combination of C/C CC 111, C/C CC 112, and C 113.

² First year students must take FW 100 and FWCC 192. Students who have already received credit for a first-year seminar should take FW 200.

³ M/M CC 117-M/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 Students in the chemistry area of depth must take C 246.

⁵ Students selecting the physics area of depth must take PH/PHCC 121 and PH/PHCC 122.

⁶ Students in the mathematics/statistics depth area select from M 229, M/M CC 255, ST 302, ST 304, ST 305, ST 321, or additional courses off of the department advising list. Students in the computer program depth area select from CS/CSCC 151, CS/CSCC 153, NR 322, NR 323, or additional courses off of the department advising list.

⁷ Select from the list of courses in category 3C in the All-University Core Curriculum (AUCC).

⁸ Students must select a second area of depth: suborganismal biology, organismal biology, or ecology/evolution. Students in the ecology/evolution depth area select from BZ 220, BZ 315, BZ 450, BZ 471, BZ 474, BZ 478, EN 453, F 311, FW 400, RS 331, or additional courses off of the department advising list. Students in the organismal depth area select from the lists of courses in footnote 10. Students in the suborganismal depth area select from BY 310, By 311, BZ 401, MB 300, NR 367, or PA 315A-B, or additional courses off of the department advising list.

⁹ Select one course from list A and one from list A or list B: List A: BZ 330 or BZ 335. List B: BZ 212, BZ 214, BZ 329, BZ 424/BI 424; FW 300 and FW 301, or additional courses off of the department advising list.

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

¹¹ Select enough elective credits to bring the total number of credits to the minimum of 90 in the junior year and 120 to graduate.

¹² Select from the list of courses in category 3B in the AUCC.

¹³ Select from the list of courses in category 3G in the AUCC.

¹⁴ 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 468, FW 469, FW 477, NR 300, or additional courses off of the department advising list. List B: WRCC 304, WR 418, F 424, FW 420, NR 440, RR 330, RR 439, RS 400, RS 478, or additional courses off of 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 WATERSHED STEWARDSHIP

Office in Forestry Building, Room 131
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 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**.

Characteristics And Skills

- Strong interest in forest biology or forest management.
- Aptitude for natural sciences
- Strong analytical ability
- Likes working with physical things and in nature
- Organizational communication, social, and decision making skills
- Prefers hands-on work
- Prefers working outdoors in the field
- Able to combine diverse concepts and facts into an holistic understanding of issues and possible solutions
- Able to work in a team and alone
- Well organized and able to pay attention to detail and think critically
- Adaptable to changing conditions and environments
- Interest in policy formation and implementation

Potential Occupations

Careers in forestry and natural resources are exceptionally varied, challenging, and personally satisfying. Opportunities are available in rural and urban settings worldwide. Participation in internships, volunteer activities, or cooperative education opportunities is highly recommended to enhance practical training and development. Positions are available in industry, education, consulting, public service, and

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

The demographics of an aging workforce in federal natural resource management agencies will be creating significant opportunities for graduates of this program over the next three to five years.

Some examples of career opportunities include, but are not limited to: forest manager; forest/park ranger; environmental policy and conservation consultant; fire fighter/manager; natural resource journalist; naturalist; land use planner; geospatial information systems specialist; forest products business person; researcher/professor.

With the exception of the natural resources management major, 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/M CC 117 or M/M CC 120 A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/COCC 130.)	3	2A
F CC 192	Forestry Inquiries	2	1
F 210	Forest Ecogeography (BZ/BZCC 120)	3	
SPCC 200	Public Speaking	3	2B1
	Health and wellness ¹	2	3G
	TOTAL	22	
SOPHOMORE			
BY 220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
SC 240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
	TOTAL	10	
JUNIOR			
F 311	Forestry Ecology (BY 220 or BY 320)	3	
F 321	Forest Biometry (ST/STCC 201 or ST/STCC 301; NR 220)	3	
F 322	Economics of the Forest Environment (EC/ECCC 202 or EA/EACC 202 or EC/ECCC 240 or EA/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	4	4C
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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/M CC 124, M/M CC 125)	4	2C
	Arts/humanities ¹	3	3B
	TOTAL	7	
SOPHOMORE			
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
F 230	Forestry Field Measurements	2	
NR 220	Natural Resources Ecology and Measurements (BZ/BZCC 120 or BY/LS 103; M/M CC 121)	5	
PHCC 121	General Physics I (concurrent reg. in M/M CC 125)	5	
	Global and cultural awareness ²	3	3E
	TOTAL	19	
JUNIOR			
BZ 440	Plant Physiology (BZ/BZCC 120 or BY/LS 103; C 245 or concurrent reg.)	3	
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
	Field experience ³	0	
	Electives	17	
	TOTAL	23	
SENIOR			
BI 365	Integrated Tree Health Management (BZ/BZCC 120 or BY/LSCC 102)	4	4A
F 493	Seminar in Forestry (senior standing)	1	4B

JTCC	300	Professional and Technical Communication (CO/COCC 150)	3	2B2
		Biology electives ⁴	12	
		TOTAL	<u>20</u>	

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 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 advisor.

Forest Fire Science Concentration

Professor Philip N. Omi, in charge

Forest fire science is the study of fire as an ecological process and its application as a forest management tool. Students learn how to control wildfires and how prescribed fires can enhance habitat, prepare seedbeds, control forest insects and disease, and reduce fuel hazards. This program is the largest of its kind in the United States. The curriculum combines courses in fire science, forest biology, natural resource management, and the physical sciences to build skills for a career or graduate study in fire science.

In addition to the forestry core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
M CC 141	Calculus in Management Sciences ¹ (M/M CC 118 or M/M CC 121)	3	2C
PHCC 110	Descriptive Physics	3	3A
OR			
PHCC 121	General Physics I (concurrent reg. in M/M CC 125)	5	3A
	Elective	3	
	TOTAL	<u>9-11</u>	
SOPHOMORE			
F 224	Wildland Fire Measurements (F CC 192)	1	
F 230	Forestry Field Measurements	2	
F 331	Wood Products in Society	3	
NR 220	Natural Resources Ecology and Measurements (BZ/BZCC 120 or BY/LS 103; M/M CC 121)	5	
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
	Arts/humanities ²	3	3B
	TOTAL	<u>17</u>	
JUNIOR			
AT 350	Introduction to Weather and Climate	2	
COCC 300	Writing Arguments (CO/COCC 150)	3	2B2
F 319	Geomatics for Foresters (F 210, F 230; concurrent reg. in F 311 or F 321)	4	

F 330	Timber Harvesting and the Environment (F 230 or F 321)	3
F 425	Forest Fire Behavior (fire experience)	2
	Field experience ³	0
	Electives	2
	TOTAL	<u>16</u>

SENIOR

BI 365	Integrated Tree Health Management (BZ/BZCC 120 or BY/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)	3	
	Global and cultural awareness ⁴	3	3E
	Electives	4-6	
	TOTAL	<u>25-27</u>	

PROGRAM TOTAL = 120 credits

¹ Students considering graduate study in forest fire science should substitute M/M CC 155-M/M CC 255 or M/M CC 160-M/M CC 161 for M/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/M CC 118 or M/M CC 121 or placement)	1	
M CC 141	Calculus in Management Sciences (M/M CC 118 or M/M CC 121)	3	2C

		Elective	3	
		TOTAL	7	
SOPHOMORE				
F	230	Forestry Field Measurements	2	
F	331	Wood Products in Society	3	
NR	220	Natural Resources Ecology and Measurements (BZ/BZCC 120 or BY/LS 103; M/M CC 121)	5	
STCC	301	Introduction to Statistical Methods (M/M CC 121)	3	2D
		Arts/humanities ¹	3	3B
		Global and cultural awareness ²	3	3E
		TOTAL	19	
JUNIOR				
F	319	Geomatics for Foresters (F 210 and F 230; concurrent reg. in F 311 or F 321)	4	
F	330	Timber Harvesting and the Environment (F 230 or F 321)	3	
JTCC	300	Professional and Technical Communication (CO/COCC 150)	3	2B2
		Field experience ³	0	
		Electives	5	
		TOTAL	15	
SENIOR				
BI	365	Integrated Tree Health Management (BZ/BZCC 120 or BY/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)	3	
		Electives	10	
		TOTAL	28	

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 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 MBA programs.

In addition to the forestry core courses, the following must be completed:

		<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN					
MCC	141		Calculus in Management Sciences (M/M CC 118 or M/M CC 121)	3	2C
SOPHOMORE					
STCC	204		Statistics for Business Students (M/M CC 120 A-B)	3	2D
			Arts/humanities ¹	3	3B
			TOTAL	6	
JUNIOR					
BA	205		Fundamentals of Accounting	3	
BK	305		Fundamentals of Marketing (EC/ECCC 101 or EC/ECCC 202 or EA/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 (CO/COCC 150)	3	2B2
			Global and cultural awareness ²	3	3E
			Field experience ³	0	
			Electives	12	
			TOTAL	30	
SENIOR					
BF	305		Fundamentals of Finance (BA 205, EC/ECCC 204)	3	
BGCC	205		Fundamentals of Business Law	3	3F
BI	365		Integrated Tree Health Management (BZ/BZCC 120 or BY/LSCC 102)	4	
BN	301		Production Fundamentals (ST/STCC 204 or ST/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 (NRM) major is to provide students with a broad-based, rigorous understanding of the use and management of natural resources. The specific objectives of the NRM major are to provide each student with: (1) a science-based core curriculum in the 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 NRM major allows students to specialize in a wide range of topics, including conservation biology, geographic information systems, fisheries, forest management, rangeland ecology, natural resource economics, natural resources policy, recreation resources and management, watershed management, wildlife management, or other topics related to natural resources management.

Students who complete the NRM degree work with land and resource management agencies at all levels of government or internationally, private companies as resource specialists or consultants, or to work for non-profit organizations as technical specialists or in advocacy positions. The NRM major also can serve as a springboard to graduate school in a wide variety of disciplines or to professional schools such as law or business.

The suggested sequence of courses is set out below. In the first year a student is expected to complete most of the undergraduate core curriculum, including a first year seminar, as well as introductory courses in biology, chemistry, and mathematics. In the second year the student develops the initial foundation in natural resources through courses in ecology, ecogeography, geology, microeconomics, soils, and statistics. Field measurements and field skills are an important component of this major, and students are required to attend a four-week summer field course in ecological investigations and resource management at Colorado State's Pingree Park mountain campus.

By the beginning of the third year each student must declare a minor. The required courses in the third year complete much of the core curriculum in the different disciplines that make up the NRM major, and these include courses in natural resources policy, forest ecology, vegetation management, remote sensing and geographic information systems, and technical writing. Students also should begin to take the necessary courses in their chosen specialization. In the fourth and final 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. Courses within the major are designed to provide students with the opportunity to work in interdisciplinary groups as well as individually. At the completion of the program, students should have both the technical and the communication skills that are critical to helping resolve important natural resource management and environmental problems.

Characteristics And Skills

- A strong interest in natural resources and resource management issues
- Able to integrate a variety of concepts to develop a more holistic perspective
- A desire to understand forest wildlife, range, and water management principles
- Interest in policy formation and implementation
- Able to work in multidisciplinary teams as well as independently
- Able to understand and interpret complex issues
- Able to write and speak accurately, clearly, and logically
- Able to work with a wide range of publics
- Organizational and decision making skills
- Good quantitative and decision-making skills
- Adaptable to changing conditions and environments

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 over the next 3 to 5 years for graduates of our program.

Examples of available career choices include, but are not limited to: public natural resource manager; private sector resources manager; professional forester; land use planner; geographic information system (GIS); remote sensing specialist; fishery/wildlife manager; environmental policy analyst; environmental advocate; resource database manager; environmental consultant; fire management specialist; resources/environmental lawyer; real estate manager; mining reclamation specialist; youth agency administrator; natural resource communications specialist; law enforcement officer; natural resources researcher; natural resources/ environmental

educator; restoration specialist; multiple resource use planner; resources management consultant; resource development proposal evaluator; regulatory compliance enforcement officer.

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/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 125	Numerical Trigonometry (M/M CC 118 or M/M CC 121 or placement)	1	2C
M CC 141	Calculus in Management Sciences (M/M CC 118 or M/M CC 121)	3	2C
NRCC 192	First Year Seminar in Environmental Studies	2	1
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ¹	3	3B
	Global and cultural awareness ²	3	3E
	Health and wellness ³	2	3G
	TOTAL	31	
SOPHOMORE			
BY 220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
F 210	Forest Ecogeography (BZ/BZCC 120)	3	
G CC 140	Physical Geology	4	3A
NR 220	Natural Resources Ecology and Measurements (BZ/BZCC 120 or BY/LS 103; M/M CC 121)	5	
SC 240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
	TOTAL	28	
JUNIOR			
COCC 300	Writing Arguments (CO/COCC 150)	3	2B2
	OR		
JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2

F 311	Forest Ecology (BY 220 or BY 320)	3	
F 322	Economics of the Forest Environment (EC/ECCC 202 or EA/EACC 202 or EC/ECCC 240 or EA/EACC 240)	3	
F 325	Silviculture (F 230, F 311, NR 220)	3	
	<i>Select three of the following courses:</i>		
FW 360	Principles of Vertebrate Management (BY 220 or BY 320; M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
NR 330	Human Dimensions in Natural Resources (NR 120A or B or written consent of instructor)	3	
RS 300	Principles of Range Management (BZ/BZCC 120 or BY/LS 103)	3	
WRCC 304	Principles of Watershed Management	3	3A
NRCC 320	Natural Resources History and Policy	3	3D, 3F
	Electives	6	
	TOTAL	30	
SENIOR			
NR 400	Public Relations in Natural Resources (NR/NRCC 320)	3	4A, 4B
NR 420	Integrated Ecosystem Management	4	4C
NR 421	Natural Resources Sampling (ST/STCC 201 or ST/STCC 301; NR 220)	3	
	Minor ⁴	21	
	Summer field experience ⁵	0	
	TOTAL	31	

PROGRAM TOTAL = 120 credits

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

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

³ Select from the list of courses in category 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 Each student is required to complete a summer of acceptable field experience.

Major in Rangeland Ecology

The Department of Forest Rangeland Watershed Stewardship also offers a major in rangeland ecology emphasizing 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 short grass 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**; **restoration ecology**; **rangeland management**; and **science**.

Characteristics and Skills

- Strong interest in applied ecology
- Desire to understand range, wildlife, and watershed management principles
- Aptitude for natural sciences
- Like working with physical things and in nature
- Organizational and decision making skills
- Prefer hands-on work
- Prefers working outdoors-in the field
- Well organized and able to pay attention to detail
- Adaptable to changing conditions and environments
- Interest in policy formation and implementation
- Able to work in a team and alone
- Able to write and speak concisely and clearly
- Interest in data and policy analysis
- Able to integrate knowledge of a variety of concepts to obtain an holistic perspective

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 problem of 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 the Federal and state governments while private industry, colleges and universities, and international agencies are increasingly 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 manager; researcher; commercial sales and service representative; consultants; mine rehabilitation specialist; real estate/land manager; 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 U.S. 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/M CC 124 or M/M CC 141 or M/M CC 155)	3	
BZCC 120	Principles of Plant Biology	4	3A
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120 A-B or placement in M/M CC 121 or higher)	4	3A
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
EACC 202	Agricultural and Resource Economics ²	3	3C
F 230	Forestry Field Measurements	2	
M CC 141	Calculus in Management Sciences (M/M CC 118 or M/M CC 121)	3	2C
NRCC 192	First Year Seminar in Environmental Studies	2	1
	Arts/humanities ³	3	3B
	Health and wellness ⁴	2	3G
	TOTAL	33	
SUMMER SESSION			
NR 220	Natural Resources Ecology and Measurements (BZ/BZCC 120 or BY/LS 103; M/M CC 121)	5	

SOPHOMORE

BZ	223	Plant Identification (BZ/BZCC 120 or BY/LS 103)	3	
F	210	Forest Ecogeography (BZ/BZCC 120)	3	
FW	360	Principles of Vertebrate Management (BY 220 or BY 320, M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
RS	300	Principles of Range Management (BZ/BZCC 120 or BY/LS 103)	3	
SC	240	Introductory Soil Science (C/C CC107 or C/C CC 111)	4	
SPCC	200	Public Speaking	3	2B1
STCC 307/ EHCC 307		Introduction to Biostatistics ⁵ (M/M CC 121)	3	2D
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 (EC/ECCC 202 or EA/EACC 202 or EC/ECCC 240 or EA/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 (ST/STCC 201 or ST/STCC 301 or ST/STCC 307 or EH/EHCC 307; RS 300 or concurrent reg.; 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	Forestry Biometry (ST/STCC 201 or ST/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 (EA/EACC 202, NR 260, RS 300)	2	4A
RS	471	Rangeland Planning and Grazing Management (RS 470 or concurrent reg.)	2	4C

RS	472	Rangeland Ecosystem Planning (RS 471)	4
SC	440	Pedology (SC 240)	4
		Elective	3
TOTAL			30

PROGRAM TOTAL = 120 credits

¹ M/M CC 120, M/M CC 121, and M/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/M CC 141 and BY 220.

² ECCC 202 may be substituted for EACC 202.

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

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

⁵ STCC 301 may be substituted for STCC 307/EHCC 307.

⁶ Select from 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			
A CC 192	Orientation to Agricultural Systems	3	1
BY 220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120 A-B or placement in M/M CC 121 or higher)	4	3A
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
M CC 141	Calculus in Management Sciences ¹ (M/M CC 118 or M/M CC 121)	3	2C
	Health and wellness ²	2	3G
TOTAL			30
SOPHOMORE			
AN 300E	Topics in Animal Sciences-Family Ranching (AN 100)	1	
BZ 223	Plant Identification (BZ/BZCC 120 or BY/LS 103)	3	
EACC 202	Agricultural and Resource Economics ³	3	3C
EA 310	Agricultural Marketing (EA/EACC 202 or EC/ECCC 202)	3	
NR 224/ A 224	Integrated Resource Management I (A/A CC 192 or first year seminar)	3	

RS	300	Principles of Range Management (BZ/BZCC 120 or BY/LS 103)	3	
RS	331	Rangeland Ecogeography (RS 300, BZ 223 or F 210 or NR 220)	3	
SC	240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
SPCC	200	Public Speaking	3	2B1
STCC EHCC	307/ 307	Introduction to Biostatistics ⁴ (M/M CC 121)	3	2D
		Elective	2	
		TOTAL	31	
JUNIOR				
BZ	440	Plant Physiology (BZ/BZCC 120 or BY/LS 103; C 245 or concurrent reg.)	3	
FW	360	Principles of Vertebrate Management (BY 220 or BY 320; M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
NRCC	320	Natural Resources History and Policy	3	3D, 3F
NR A	424/ 424	Integrated Ranch Management II (A 224/NR 224)	3	
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
S	341	Sociology of Rural Life (S/S CC 100 or S/S CC 105)	3	
WRCC	304	Principles of Watershed Management	3	3A
		Arts/humanities ⁵	3	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 (EA/EACC 202 or EC/ECCC 202)	3	
EA	478	Agricultural Policy (EA/EACC 202 or EC/ECCC 202 or EA/EACC 240 or EC/ECCC 240)	3	
NR	367	Concepts in Vertebrate Nutrition (C 245)	2	
NR A	383/ 383	US Travel-Integrated Resource Management (NR 224/A 224)	2	
RS	400	Rangeland Improvements (RS 300 or RS 320/SC 320)	2	
RS	470	Rangeland Economics and Analysis (EA/EACC 202, NR 260, RS 300)	2	4A
RS	471	Rangeland Planning and Grazing Management (RS 470 or concurrent reg.)	2	4C
RS	472	Rangeland Ecosystem Planning (RS 471)	4	4C
SC	440	Pedology (SC 240)	4	

Global and cultural awareness⁶ 3 3E
TOTAL 30

PROGRAM TOTAL = 120 credits

¹ M/M CC 120, M/M CC 121, and M/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/M CC 141 and BY 220.
² Select from 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 list of courses in category 3B in the AUCC.
⁶ Select from 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/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160) ¹	3	
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
M CC 141	Calculus in Management Sciences (M/M CC 118 or M/M CC 121) ¹	3	2C
NRCC 192	First Year Seminar in Environmental Studies	2	1
	Health and wellness ²	2	3G
	TOTAL	29	
SUMMER SESSION			
NR 220	Natural Resources Ecology and Measurements (BZ/BZCC 120 or BY/LS 103; M/M CC 121)	5	
SOPHOMORE			
BZ 223	Plant Identification (BZ/BZCC 120 or BY/LS 103)	3	
EACC 202	Agricultural and Resource Economics ³	3	
RS 300	Principles of Range Management (BZ/BZCC 120 or BY/LS 103)	3	
RS 331	Rangeland Ecogeography (RS 300, BZ 223 or F 210 or NR 220)	3	

SC	240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
SPCC	200	Public Speaking	3	2B1
STCC EHCC	307/ 307	Introduction to Biostatistics ⁴ (M/M CC 121)	3	2D
		Social/behavioral sciences ⁵	3	3C
		TOTAL	25	
JUNIOR				
BZ	440	Plant Physiology (BZ/BZCC 120 or BY/LS 103; C 245 or concurrent reg..)	3	
FW	360	Principles of Vertebrate Management (BY 220 or BY 320; M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
NR	322	Introduction to Geographic Information Systems	4	
RS	332	Range Measurements (ST/STCC 201 or ST/STCC 301 or ST/STCC 307 or EH/EHCC 307; RS 300 or concurrent reg.; 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, ST/STCC 201)	3	
		Arts/humanities ⁶	3	3B
		TOTAL	29	
SENIOR				
<i>Select two of the following courses:</i>				
CB	462	Environmental Law (CO/COCC 150)	3	
EH	446	Environmental Toxicology (C 245 or C 343)	3	
PL	345	Environmental Ethics (sophomore standing or higher or written consent of instructor)	3	
SC	378	Environmental Soil Science (SC 240)	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 (EA/EACC 202, NR 260, RS 300)	2	4A
RS	471	Rangeland Planning and Grazing Management (RS 470 or concurrent reg.)	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/C CC 107, WR 416)	3	

Global and cultural awareness⁷ 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 list of courses in category 3G in the All-University Core Curriculum (AUCC).

³ EACC 202 may be substituted for EACC 202.

⁴ STCC 301 may be substituted for STCC/EHCC 307.

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

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

⁷ Select from 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/M CC 124 or M/M CC 141 or M/M CC 155 OR M/M CC 160)	3	
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
M CC 155	Calculus for Biological Scientists I ¹ (M/M CC 124, M/M CC 125)	4	2C
NRCC 192	First Year Seminar in Environmental Studies	2	1
	Health and wellness ²	2	3G
	TOTAL	30	
SUMMER SESSION			
NR 220	Natural Resources Ecology and Measurements (BZ/BZCC 120 or BY/LS 103; M/M CC121)	5	
SOPHOMORE			
BZ 223	Plant Identification (BZ/BZCC 120 or BY/LS 103)	3	
EACC 202	Agricultural and Resource Economics ³	3	3C
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	

RS	300	Principles of Range Management (BZ/BZCC 120 or BY/LS 103)	3	
RS	331	Rangeland Ecogeography (RS 300, BZ 223 or F 210 or NR 220)	3	
SC	240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
SPCC	200	Public Speaking	3	2B1
STCC	307/	Introduction to Biostatistics ⁴ (M/M CC 121) Global and cultural awareness ⁵	3	2D
EHCC	307			
		TOTAL	30	
JUNIOR				
AT	350	Introduction to Weather and Climate	2	
AT	351	Introduction to Weather and Climate Laboratory (AT 350 or concurrent reg.)	1	
BZ	440	Plant Physiology (BZ/BZCC 120 or BY/LS 103; C 245 or concurrent reg.)	3	
FW	360	Principles of Vertebrate Management (BY 220 or BY 320; M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
NR	322	Introduction to Geographic Information Systems	4	
RS	332	Range Measurements (ST/STCC 201 or ST/STCC 301 or ST/STCC 307 or EH/EHCC 307; RS 300 or concurrent reg.; 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 and 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	
RS	400	Rangeland Improvements (RS 300 or RS 320/SC 320)	2	
RS	470	Rangeland Economics and Analysis (EA/EACC 202, NR 260, RS 300)	2	4A
RS	471	Rangeland Planning and Grazing Management (RS 470 or concurrent reg.)	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/M CC 120, M/M CC 121, and M/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/M CC 141 and BY 220.

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

³ EACC 202 may be substituted for EACC 202.

⁴ STCC 301 may be substituted for STCC/EHCC 307.

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

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

Major in Watershed Science

In Colorado, and many other locations 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.

Characteristics And Skills

- A strong interest in geologic and hydrologic processes.
- Aptitude for natural sciences
- Interest in the physical and biological sciences
- A desire to understand water management principles
- Strong analytical ability
- Enjoys working with physical things and in nature
- Organizational and decision making skills
- Prefers hands on work
- Enjoys working outdoors-in the field
- Well organized and able to pay attention to detail
- Adaptable to changing conditions and environments
- Interest in policy formation and implementation
- Able to work in a team and alone
- Able to write and speak accurately and clearly
- Physical stamina
- Interest in data and policy analysis

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 scientist; 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 OR	3	3A
LS 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
C CC 111	General Chemistry I (M/M CC 117 or M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
G 150	Physical Geology for Scientists and Engineers OR	4	
GR 210	Physical Geography ¹	3	
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
M CC 125	Numerical Trigonometry (M/M CC 118 or M/M CC 121 or placement)	1	2C
M CC 126	Analytical Trigonometry (M/M CC 125 or placement)	1	2C
M CC 155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125) OR	4	2C
M CC 160	Calculus or Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
	First year seminar ²	2	1
	Health and wellness ³	2	3G
	Social/behavioral sciences ⁴	3	3C
	TOTAL	31-33	
SOPHOMORE			
BY 220	<i>Select one of the following courses:</i> Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
BY 320	Ecology (one course in biology, M/M CC 155)	3	
NR 220	Natural Resources Ecology and Measurements (BZ/BZCC 120 or BY/LS 103; M/M CC 121)	5	
COCC 301A-D	Writing in the Disciplines (CO/COCC 150) OR	3	2B2
JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2

M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160) OR	4	2C
M CC 255	Calculus for Biological Scientists II (M/M CC 155; concurrent reg. in M/M CC 126)	4	2C
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
SC 240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
SPCC 200	Public Speaking	3	2B1
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
	Global and cultural awareness ⁵	3	3E
	Historical perspectives ⁶	3	3D
	U.S. public values and institutions ⁷	(3)	3F
	TOTAL	31-33	
JUNIOR			
CE 322/ EV 322	Basic Hydrology ¹ (CE 300 or WR 416 or CH 331, ST/STCC 301 or ST/STCC 309 or CE 308; or written consent of instructor)	3	
SC 322	Principles or Microclimatology (BY 220 or NR 220; PH/PHCC 141)	3	
WR 416	Land Use Hydrology ¹ (SC 240, ST/STCC 201)	3	4B
WR 417	Watershed Measurements ¹ (concurrent reg. in WR 416)	2	
WR 418	Land Use and Water Quality ¹ (C/C CC 107, WR 416)	3	
WR 419	Water Quality Laboratory for Wildland Managers (concurrent reg. in WR 418)	2	
WR 420	Watershed Field Practicum (concurrent reg. in WR 416 and WR 417 or written consent of instructor)	2	
WR 474	Snow Hydrology (WR 416 or CE 322/EV 322)	3	
	Arts/humanities ⁸	3	3B
	Electives ⁹	5	
	TOTAL	29	
SENIOR			
G 452	Hydrogeology (G CC 140 or G 150 or GR 210; PH/PHCC 141; M/M CC 161 or M/M CC 255 or written consent of instructor)	4	
G 454	Geomorphology (G CC 140 or G 150 or GR 210; M/M CC 155 or M/M CC 160)	4	
GR 342	Geography of Water Resources ¹	3	
SC 440	<i>Select one of the following courses:</i> Pedology (SC 240)	4	
SC 442	Forest and Range Soils (SC 240)	3	
WR 465	Eolian and Fluvial Transport Processes (PH/PHCC 141 or written consent of instructor)	4	
SC 470	Soil Physics (SC 240)	3	
SC 471	Soil Physics Laboratory (SC 470 or concurrent reg.)	1	

WR	440	Watershed Problem Analysis (CE 322/EV 322, WR 416)	3	4A, 4B, 4C
		Electives ⁹	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 list of courses in category 1 in the All-University Core Curriculum (AUCC).

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

⁴ Select from the list of courses in category 3C in the AUCC. Course selected to satisfy either 3C or 3D should also satisfy 3F.

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. Course selected to satisfy either 3C or 3D should also satisfy 3F.

⁷ Select from the list of courses in category 3F that also satisfies either category 3C or 3D.

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

⁹ Consult with adviser.

Minors in Forest Rangeland Watershed Stewardship

Minor in Forestry

The minor in forestry provides students with the opportunity to obtain exposure to forest sciences. It provides insight into the management of forested lands and is particularly appropriate for students majoring in other natural resource disciplines or natural sciences.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
F	210* Forest Ecogeography (BZ/BZCC 120)	3	
UPPER DIVISION			
BI	365* Integrated Tree Health Management (BZ/BZCC 120 or BY/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	319* Geomatics for Foresters (F 210, F 230; concurrent reg. in F 311 or F 321)	4	
F	321* Forest Biometry (ST/STCC 201 or ST/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	
	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/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
BZ	223* Plant Identification (BZ/BZCC 120 or BY/LS 103)	3	
F	210* Forest Ecogeography (BZ/BZCC 120)	3	
NR	220* Natural Resources Ecology and Measurements (BZ/BZCC 120 or BY/LS 103; M/M CC 121)	5	
SC	240* Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
UPPER DIVISION			
RS	300* Principles of Range Management (BZ/BZCC 120 or BY/LS 103)	3	
OR			
RS	320/ Forage and Range Management (one	3	
SC	320* course in biological sciences)		
RS	331 Rangeland Ecogeography (RS 300, BZ 223 or F 210 or NR 220)	3	
RS	332* Range Measurements (ST/STCC 201 or ST/STCC 301 or ST/STCC 307 or EH/EHCC 307; RS 300 or concurrent reg.; 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 (EA/EACC 202, NR 260, RS 300)	2	
RS	471 Rangeland Planning and Grazing Management (RS 470 or concurrent reg.)	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

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LOWER DIVISION			
CSCC 151*	C++ for Scientists and Engineers (M/M CC 124, M/M CC 126)	4	2D
LOWER DIVISION OR UPPER DIVISION			
<i>Select a minimum of four credits from the following:¹</i>			
CS 200*	Algorithms and Data Structures (CS/CSCC 153 with a C or better or CS 154 with a C or better; CS 166/M 166 with a C or better)	4	
GR 100	Introduction to Geography	3	
GR 210	Physical Geography	3	
NR 401*	Techniques in Public Relations (SP/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 Techniques (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
ST 312*	Statistics for Behavioral Sciences II (ST/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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LOWER DIVISION			
G 150	Physical Geology for Scientists and Engineers	4	
OR			
GR 210	Physical Geography	3	
UPPER DIVISION			
<i>Select at least 7-9 credits from the following:</i>			
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 (ERCC 140/G CC 140 or ERCC 192A/ER/G 150 or GR 210; PH/PHCC 141; M/M CC 161 or M/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 reg. in WR 416)	2	
WR 419	Water Quality Laboratory for Wildland Managers (concurrent reg. in WR 418)	2	
WR 465*	Eolian and Fluvial Transport Processes (PH/PHCC 141 or written consent of instructor)	4	
WR 474	Snow Hydrology (CE 322/EV 322 or WR 416)	3	
G 454*	Geomorphology (G CC 140 or G 150 or GR 210; M/M CC 155 or M/M CC 160)	4	
WR 416*	Land Use Hydrology (SC 240, ST/STCC 201)	3	
WR 418*	Land Use and Water Quality (C/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 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 of Philosophy degrees in forest sciences and rangeland ecosystem science. A description of these programs may be found in the [Graduate and Professional Bulletin](#).

DEPARTMENT OF GEOSCIENCES

Office in Natural Resources Building, Room 322
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 coursework in math, the physical and biological sciences, communications, and the liberal arts. Two concentrations are offered in **environmental geology** and **geology**.

Characteristics and Skills

- A strong interest in geology
- Aptitude for natural sciences
- Interest in physical sciences
- Strong analytical ability
- Interest in computer applications
- Organizational and decision making skills
- Prefers hands on work
- Prefers working outdoors, in the field
- Well organized, attentive to detail
- Adaptable to changing conditions and environments
- Able to work in a team and alone
- Able to write and speak accurately and clearly
- Interest in data and policy analysis

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 evaluations 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.

The geology program also provides solid grounding in analytical thinking and broad-based physical sciences appropriate for professions such as law or business.

Participation in internships, volunteer activities, or cooperative education opportunities is highly recommended to enhance practical training and development. Graduates who go on for advanced studies can continue in one of a number of geological disciplines or can opt for related fields of study, such as seismology, hydrology, meteorology, oceanography, and the space sciences. Those with advanced degrees can attain more responsible positions with the possibility of rising to top professional levels.

Some examples of career possibilities include, but are not limited to: educator; environmental consultant; exploration geologist; environmental geologist; geologist; geophysicist; hydrologist; mining geologist; oceanographer; production geologist; researcher; resource evaluator; seismologist.

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/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111, M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112, C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A

<i>Select one of the following :</i>				
COCC	300	Writing Arguments (CO/COCC 150)	3	2B2
COCC	301B	Writing in the Disciplines-Science (CO/COCC 150)	3	2B2
SPCC	200	Public Speaking	3	2B1
CSCC	151	C++ for Scientists and Engineers (M/M CC 124, M/M CC 126)	4	2D
OR				
NR	322	Introduction to Geographic Information Systems	4	
G CC	140	Physical Geology	4	
OR				
G	150	Physical Geology for Scientists and Engineers	4	
G	154	Historical and Analytical Geology (G CC 130 or G CC 140 or G 150)	4	
M CC	125	Numerical Trigonometry (M/M CC 118 or M/M CC 121 or placement)	1	2C
M CC	126	Analytic Trigonometry (M/M CC 125 or placement)	1	2C
		First year seminar ¹	2	1
		Health and wellness ²	2	3G
		TOTAL	33	
SOPHOMORE				
G	232	Mineralogy (G CC 140 or G 150; C/C CC 111 and M/M CC 124 or concurrent reg., concurrent reg. in G 332; or written consent of instructor)	3	
G	332	Optical Mineralogy (G 232 or concurrent reg. or written consent of instructor)	2	
G	364	Igneous and Metamorphic Petrology (G 232)	4	4B
M CC	155	Calculus for Biological Scientists I ³ (M/M CC 124, M/M CC 125)	4	2C
M CC	255	Calculus for Biological Scientists II (M/M CC 155; concurrent reg. in M/M CC 126)	4	2C
PHCC	141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
		Global and cultural awareness ⁴	3	3E
		Historical perspectives ⁵	3	3D
		Social/behavioral sciences ⁶	3	3C
		U.S. public values and institutions ⁷	(3)	3F
		TOTAL	31	
JUNIOR				
G	344	Stratigraphy and Sedimentology (G 154)	4	4A
G	372	Structural Geology (G 154, M/M CC 125, concurrent reg. PH/PHCC 141)	4	4B
G	376	Geologic Field Methods (G 344, G 372 or concurrent reg.)	3	4A, 4C
G	454	Geomorphology (G CC 140 or G 150 or GR 210; M/M CC 155 or M/M CC 160)	4	
PHCC	142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
OR				
SC	470	Soil Physics (SC 240)	3	

SC	240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
STCC	301	Introduction to Statistical Methods (M/M CC 121)	3	2D
		Arts/humanities ⁸	3	3B
		TOTAL	28-30	

SUMMER SESSION

G	436	Geology Summer Field Course (G 364, G 376)	6	4C
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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 (BZ/BZCC 110 or concurrent reg.)	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 reg.)	3	
G	452	Hydrogeology (G CC 140 or G 150 or GR 210; PH/PHCC 141; M/M CC 161 or M/M CC 255 or written consent of instructor)	4	
		Sociopolitical elective ⁹	3	
		Technical elective ¹⁰	3	
		Electives	0-1	
		TOTAL	21-22	

PROGRAM TOTAL = 120-121 credits

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

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

³ M CC 160, M CC 161, and M 261 may be substituted for M CC 155 and M CC 255.

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

⁵ Select from list of courses in category 3D in the AUCC. Course selected to satisfy either 3D or 3C should also satisfy 3F.

⁶ Select from list of courses in category 3C in the AUCC. Course selected to satisfy either 3C or 3D should also satisfy 3F.

⁷ Select from list of courses in category 3F that can also satisfy either 3C or 3D.

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

⁹ Chosen from departmental advising list.

¹⁰ 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
FRESHMAN			
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
CSCC 151	C++ for Scientists and Engineers (M/M CC 124, M/M CC 126)	4	2D
OR			
NR 322	Introduction to Geographic Information Systems	4	
G CC 140	Physical Geology	4	
OR			
G 150	Physical Geology for Scientists and Engineers	4	
G 154	Historical and Analytical Geology (G CC 130 or G CC 140 or G 150)	4	
M CC 125	Numerical Trigonometry (M/M CC 118 or M/M CC 121 or placement)	1	2C
M CC 126	Analytic Trigonometry (M/M CC 125 or placement)	1	2C
SPCC 200	Public Speaking	3	2B1
	First year seminar ¹	2	1
	Health and wellness ²	2	3G
	TOTAL	33	
SOPHOMORE			
G 232	Mineralogy (G CC 140 or G 150; C/C CC 111 and M/M CC 124 or concurrent reg., concurrent reg. in G 332; or written consent of instructor)	3	
G 332	Optical Mineralogy (G 232 or concurrent reg. or written consent of instructor)	2	
G 364	Igneous and Metamorphic Petrology (G 232)	4	4B
M CC 155	Calculus for Biological Scientists I ³ (M/M CC 124, M/M CC 125)	4	2C
M CC 255	Calculus for Biological Scientists II (M/M CC 155; concurrent reg. in M/M CC 126)	4	2C
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
	Global and cultural awareness ⁴	3	3E
	Historical perspectives ⁵	3	3D

Social/behavioral sciences ⁶	3	3C
U.S. public values and institutions ⁷	(3)	3F
TOTAL	31	

JUNIOR			
COCC 300	Writing Arguments (CO/COCC 150)	3	2B2
OR			
COCC 301B	Writing in the Disciplines-Science (CO/COCC 150)	3	2B2
G 344	Stratigraphy and Sedimentology (G 154)	4	4A
G 372	Structural Geology (G 154, M/M CC 125, concurrent reg. in PH/PHCC 141)	4	4B
G 376	Geologic Field Methods (G 344, G 372 or concurrent reg.)	3	4A, 4C
G 454	Geomorphology (G CC 140 or G 150 or GR 210; M/M CC 155 or M/M CC 160)	4	
PHCC 142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
OR			
SC 470	Soil Physics (SC 240)	3	
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
	Arts/humanities ⁸	3	3B
	TOTAL	27-29	

SUMMER SESSION

G 436	Geology Summer Field Course (G 364, G 376)	6	4C
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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 (BZ/BZCC 110 or concurrent reg.)	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 ⁹	6	
	Technical elective ¹⁰	3	
	Electives	4-6	
	TOTAL	21-23	

PROGRAM TOTAL = 120 credits

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

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

³ M CC 160, M CC 161, and M 261 may be substituted for M CC 155 and M CC 255.

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

⁵ Select from list of courses in category 3D in the AUCC. Course selected to satisfy either category 3C or category 3D should also satisfy category 3F.

⁶ Select from list of courses in category 3C in the AUCC. Course selected to satisfy either category 3C or category 3D should also satisfy category 3F.

⁷ Select from list of courses in category 3F that also satisfies either category 3C or category 3D.

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

⁹ Select upper-division geology course with upper-division prerequisite and/or G 342. Written adviser approval required.

¹⁰ Select upper-division science or engineering course, excluding geology, from departmental advising list.

Minor in Geology

The minor in geology provides an opportunity to obtain a valuable background in geology to enhance other majors. While it is flexibly designed to be applicable to a variety of disciplines, the minor is especially suitable for the natural science major in the College of Natural Sciences or the natural resource management major in the College of Natural Resources. The geology minor adviser can provide advice on the selection of minor electives.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LOWER DIVISION			
Required:			
GCC 140	Physical Geology	4	3A
OR			
G 150	Physical Geology for Scientists and Engineers	4	
G 154	Historical and Analytical Geology (G CC 130 or G CC 140 or G 150)	4	
TOTAL		8	
Recommended:			
G 232*	Mineralogy ¹ (G CC 140 or G 150; C/C CC 111 and M/M CC 124 or concurrent reg.; concurrent reg. in G 332; or written consent of instructor)	3	
UPPER DIVISION			
<i>Select 10 credits from the following:</i>			
G 332	Optical Mineralogy (G 232 or concurrent reg., 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/M CC 125, concurrent reg. in PH/PHCC 141)	4	
G 376	Geologic Field Methods (G 344; G 372 or concurrent reg.)	3	
G 446*	Environmental Geology (G 454 or concurrent reg.)	3	
G 452*	Hydrogeology (G CC 140 or G 150 or GR 210; PH/PHCC 141; M/M CC 161 or M/M CC 255 or written consent of instructor)	4	
G 454*	Geomorphology (G CC 140 or G 150 or GR 210; M/M CC 155 or M/M CC 160)	4	
Upper division geology ²		2	
TOTAL		12	
PROGRAM TOTAL = 21 credits without prerequisites			

¹If 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.

²Additional 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 of Geosciences offers graduate programs leading to the 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
Professor Michael Manfredo, Chairman

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**.

Characteristics and Skills

- Love for working outdoors with people and natural resources
- Values natural resource conservation and stewardship
- Ability to be creative and resourceful
- Good written and oral communications skills
- Good teamwork skills
- Analytical ability
- Enjoy working with people

Potential Occupations

Graduates work in a variety of federal, state, and local resource management agencies, nonprofit environmental conservation and education organizations, and private commercial recreation enterprises. Competition can be intense for full time/permanent positions in highly attractive natural resource locations, although ample opportunities exist to gain experience through seasonal/temporary and volunteer work. Participation in a high quality, pre-approved internship is required for the degree. Additional cooperative education opportunities are highly recommended to enhance your

practical training and development. Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels.

The following are some of the career opportunities available to natural resource recreation and tourism majors with an environmental communication concentration: public involvement coordinator; interpretive writer, planner, consultant; outdoor education specialist; nature photographer; exhibit developer/evaluator; environmental/conservation education/visitor information specialist; interpretive ranger; naturalist; nature center manager; museum interpreter/educator; public relations/affairs specialist; park ranger. Examples of opportunities available to graduates in the global and natural resource tourism concentrations include, but are not limited to: convention sales coordinator; marketing/public relations specialist; trip counselor; small tourism enterprise 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 curriculum allows students to pursue positions with public, private, and nonprofit organizations that aim to increase public awareness and education on environmental/natural resource management issues, involve the public in decision-making with a goal of consensus building and decision ownership, and enhance the quality of people's recreational experiences. 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 to 6 or COCC 192/CO 130)	3	2A
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C

M CC	124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
NRCC	192	First Year Seminar in Environmental Studies	2	1
RR	100	Foundations of Recreation and Tourism	3	
		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
		TOTAL	29	

SOPHOMORE

BY	220	Fundamentals of Ecology (1 course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/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/M CC 118 or M/M CC 121)	3	
NR	300	Biological Diversity (NR 120A or B or one course in biology)	3	
RS	300	Principles of Range Management (BZ/BZCC 120 or BY/LS 103)	3	
WRCC	304	Principles of Watershed Management	3	
JTCC	300	Professional and Technical Communication (CO/COCC 150)	3	
NR	220	Natural Resource Ecology and Measurements (BZ/BZCC 120 or BY/LS 103; M/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	2B
STCC	201	General Statistics (M/M CC 120A-B)	3	2D
OR				
STCC	204	Statistics for Business Students (M/M CC 120A-B)	3	2D
		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	3	
JT	342	Writing for Specialized Electronic Media (JTCC 192 or JT 210; JT 211)	3	
SP	205	Group Communication (SP/SPCC 200)	3	
SP	300	Advanced Public Speaking (SP/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 (ST/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 (JTCC 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 (NR/NRCC 320)	3	4B, 4C
PY	340	Organizational Psychology (PY/PYCC 100, ST/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 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 in the All-University Core Curriculum.

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

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

⁶ Select from list of courses in category 3E of 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

Global tourism prepares students for careers with private, for-profit enterprises that provide services to tourists. Additionally, opportunities can be found with some non-profit and governmental organizations in various countries. Specific jobs might include ecotourism operator, conference and event planner, marketing director, tourism information center director, park concession manager, and convention and visitor bureau director. The curriculum is focused on a unique blend of subjects. Business and tourism topics provide students with planning, management, 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 CC 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 to 6 or COCC 192/CO 130)	3	2A
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
L CC 107	First Year Language II (L/L CC 105 or L 106)	5	
OR			
L 108	Intensive Language I (A in L/L CC 105 or L 106 and written consent of instructor or placement exam)	5	
M CC 120A-B	College Algebra I (Mathematics Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120 A or B or placement)	1	2C
M CC 124	Logarithms and Exponential Function (M CC 118 or M/M CC 121 or placement)	1	2C
NR 120A-B	Environmental Conservation	3-4	
NRCC 192	First Year Seminar in Environmental Studies	2	1
SPCC 200	Public Speaking	3	2B
	Biological/physical sciences ¹	7	3A
	Health and wellness ²	2	3G
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/L CC 107 or L 108 or placement exam)	3	
L CC 201	Second Year Language II (L/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/M CC 120A-B)	3	2D
	Arts/humanities ³	3	3B
TOTAL			27

JUNIOR

BK	305	Fundamentals of Marketing (EC/ECCC 101 or EC/ECCC 202 or EA/EACC 202)	3	
BN	305	Fundamentals of Management	3	
COCC	300	<i>Select one of the following courses:</i> Writing Arguments (CO/COCC 150)	3	
COCC	301A-D	Writing in the Disciplines (CO/COCC 150)	3	
JTCC	300	Professional and Technical Communication (CO/COCC 150)	3	
L CC	300	Reading and Writing for Communication (L/L CC 201 or L 208)	3	
OR				
L	304	Third-Year Language I (L/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/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 (ST/STCC 201)	3	
		Global and cultural awareness ⁴	0	3E
		TOTAL	28	

SENIOR

BK	365	International Marketing (BK 300 or BK 305)	3	
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

Natural resource tourism prepares students for careers in natural resource-related tourism positions in the private, public, and non-profit sectors. Opportunities are available in resorts, tour companies, outfitting and guiding companies, major corporations, ecotourism companies, cruise lines, etc. Public sector opportunities are available with state travel and tourism offices, as well as national and international tourism offices. Non-profits such as travel and tourism bureaus, hotel and lodging associations, meeting planner groups, and ski/tour associations value natural resource tourism graduates. The 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.

<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 COCC 192/CO 130)	3	2A
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
NRCC 192	First Year Seminar in Environmental Studies	2	1
RR 100	Foundations of Recreation and Tourism	3	
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	7	3A
	Health and wellness ³	2	3G
	TOTAL	29	
SOPHOMORE			
BA 205	Fundamentals of Accounting	3	
BGCC 205	Fundamentals of Business Law	3	3F
COCC 300	<i>Select one of the following:</i> Writing Arguments (CO/COCC 150)	3	2B2
COCC 301A-D	Writing in the Disciplines (CO/COCC 150)	3	2B2
JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2
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/M CC 120A-B)	3	2D
		Guided elective ⁴	3	
		TOTAL	27	
JUNIOR				
BK	305	Fundamentals of Marketing (EC/ECCC 101 or EC/ECCC 202 or EA/EACC 202)	3	
BN	305	Fundamentals of Management	3	
EC	300	Managerial Economics (EA/EACC 202 or EC/ECCC 202)	3	
JT	350	Public Relations	3	
		OR		
NR	400	Public Relations in Natural Resources (NR/NRCC 320)	3	
NRCC	320	Natural Resources History and Policy	3	3D, 3F
NR	387	Internship I	1	
RR	376	Recreation Measurements (ST/STCC 201)	3	
		Global and cultural awareness ⁵	3	3E
		Guided electives ⁴	6	
		Electives	3	
		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 list of courses in category 3G in the All-University Core Curriculum.

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 managing and planning 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 non-profit 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			
Select four credits from the following courses:			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZ/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 to 6 or COCC 192/CO 130)	3	2A
ECCC 202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
G CC 130	Earth System Science	3	3A
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
NRCC 192	First Year Seminar in Environmental Studies	2	1
PYCC 100	General Psychology	3	3C
RR 100	Foundations of Recreation and Tourism	3	
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ¹	3	3B
	Health and wellness ²	2	3G
	TOTAL	31	
SOPHOMORE			
BY 220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
COCC 301A-D	Writing in the Disciplines (CO/COCC 150)	3	2B2
JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2
M CC 141	Calculus in Management Sciences (M/M CC 118 or M/M CC 121)	3	2C
NR 220	Natural Resources Ecology and Measurements (BZ/BZCC 120 or BY/LS 103; M/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/M CC 120A-B)	3	2D
		Global and cultural awareness ³	3	3E
TOTAL			29	

JUNIOR

FW	360	Principles of Vertebrate Management (BY 220 or BY 320; M/M CC 141 or M/M CC 155 or M/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 (ST/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	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 list of courses in category 3G in the All-University Core Curriculum.

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

⁴ Select from departmental 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 is through the [Division of Continuing Education](#) and will require separate payment and enrollment procedures. Contact the Division for more information. Students must be enrolled in a degree program to complete a minor.

Course	Title (Prerequisite)	Cr	AUCC
UPPER DIVISION			
RR 450	Wilderness Philosophy and Ethic Development	3	
RR 451	National Wilderness Preservation System (RR 450)	3	
RR 452	Management of the Wilderness Resource (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](#).

College of Natural Sciences

Office in Statistics Building, Room 117
Professor Rick Miranda, Dean
Professor Janice L. Nerger, Associate Dean
Professor Peter K. Dorhout, Associate Dean
Dr. John C. McGrew, Assistant Dean

UNDERGRADUATE MAJORS

Biochemistry
Biological Science
Botany
Chemistry
Computer Science
Mathematics
Natural Sciences
Physics
Psychology
Zoology

UNDERGRADUATE MINORS

Biochemistry
Botany
Chemistry
Computer Science
Mathematics
Physics
Statistics
Zoology

In addition to degree programs, the College of Natural Sciences provides fundamental courses in the biological, mathematical, behavioral, and physical sciences for Colorado State's seven other colleges. In this role the college serves Colorado State's broad liberal and general education objectives.

COLLEGE PROGRAMS

Undergraduate Majors

The college's 8 departments offer 10 undergraduate majors, all leading to a Bachelor of Science degree which requires a minimum of 120 credits with a minimum of 42 credits in upper-division courses.

Preparation for the Health Professions

Special advisers assist students in planning for entrance into accredited colleges of dentistry and dental hygiene, human medicine and osteopathy, nursing, optometry, pharmacy, physical therapy, physician assistant, podiatry, chiropractic, and other health professions. Since the advisers are acquainted with University courses and the 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 University's academic support services center (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 inter-departmental major anytime 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 and 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 Science Open Option

University Academic Support Services
Aylesworth Hall, Northeast Wing

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 University academic support services.

Study Abroad

Study abroad programs are available to students in the College of Natural Sciences. Because the knowledge of at least one other culture is valuable in understanding our own, students are strongly encouraged to take a semester or longer to study outside the United States as part of their overall program at Colorado State University. Students interested in study abroad should plan, 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.

Characteristics And Skills

The two options in the natural sciences major require similar personal attributes:

- Aptitude for science and mathematics
- Interest in the physical and/or life sciences
- Curiosity and creativity
- Keen power of observation
- Attention to detail
- Logical and critical thinking ability

- Patience and perseverance
- Enjoyment of reading
- Written and oral communications skills
- Ability to work independently or on a team

Potential Occupations

Graduates with *licensure in secondary science education* will find a strong demand for high school and junior high/ middle school teachers in Colorado and elsewhere in the nation. In addition, these graduates will also have the background required for graduate science education programs.

With proper planning, *physical science* graduates can meet requirements for professional schools (e.g., medicine or law) or graduate programs in the basic or applied sciences. Internships and volunteer activities can provide practical training and experience.

Recent graduates have found employment as: technical writers; atmospheric scientists; computer sales representatives; crime laboratory analysts; patent examiners; quality control technicians.

Secondary Education

The Bachelor of Science in natural sciences degree provides the subject matter, the education classes, and the classroom experience required for secondary education licensure in Colorado.

Concentrations in the natural sciences major include: *biology education*; *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.; the All-University Core Curriculum; and professional classes in the School of Education (SOE). In addition, the SOE helps schedule classroom visits and practica. The experience culminates in a semester of student teaching under the supervision of a master teacher.

Biology Education Concentration

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
BZCC 111	Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.)	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 (BY/LSCC 102)	4	

C CC	111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC	112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C	113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C	114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
M CC	155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	2C
		Arts/humanities ¹	3	3B
		First year seminar ²	2	1
		Written communication ³	3	2A
		TOTAL	29	

SOPHOMORE

BZ	220	Introduction to Evolution (BZ/BZCC 110 and BZ/BZCC 111 or BZ/BZCC 120 or BY/LS 103)	3	
<i>Select one of the following:</i>				
BZ	350	Molecular and General Genetics (BY/LSCC 102, one course in statistics)	4	
BZ	455	Human Heredity and Birth Defects (BZ/BZCC 111 or BY/LS 103)	3	
SC	330	Principles of Genetics (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102)	3	
C	245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
C	246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/C CC 112 or C 114; C 245 or concurrent reg.)	1	
<i>Select one of the following pairs of courses:</i>				
PHCC	121	General Physics I (concurrent reg. in M/M CC 125)	5	3A
PHCC	122	General Physics II (PH/PHCC 121)	5	3A
OR				
PHCC	141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
PHCC	142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
STCC	301	Introduction to Statistical Methods (M/M CC 121)	3	2D
		Biological science electives	6	
		TOTAL	30-31	

JUNIOR

AACC	100	Introduction to Astronomy	3	3A
AND				
AACC	101	Astronomy Laboratory (AA/AACC 100 or concurrent reg.)	1	3A
OR				
G CC	140	Physical Geology	4	3A
BY	310	Cell Biology (one semester of organic chemistry or concurrent reg.; 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 (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
ED	350	Instruction I-Individualization/Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED	386	Practicum-Instruction I (EDCC 310/EDCC 275, ED 340, concurrent reg. in ED 350, admission to Teacher Licensure Program)	1	
EDCC	430	Diversity and Communication (ED 310/EDCC 275; admission to Teacher Licensure Program)	3	3D
		Additional communication ⁴	3	2B
		Historical perspectives ⁵	3	3D
		Social/behavioral sciences ⁶	3	3C
		TOTAL	32	

SENIOR

BC	351	Principles of Biochemistry (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 343 or concurrent reg. in C 343)	4	
BC	352	Principles of Biochemistry Laboratory (BC 351 or BC 401 or concurrent reg., 2 credits of college chemistry laboratory)	1	
ED	450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. 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 450 or ED 426, ED 460, concurrent reg. in ED 485A or B or C)	1	4C
ED	493B	Seminar-Assessment of Learning (ED 450 or ED 426, ED 460, concurrent reg. in ED 485A or B or C or VE 485)	1	4B
		Health and wellness ⁷	2	3G
		TOTAL	29	

PROGRAM TOTAL = 120-121 credits¹ Select from list of courses in category 3B in the All-University Core Curriculum (AUCC).² Select from list of courses in category 1 in the AUCC.³ Select from list of courses in category 2A in the AUCC.⁴ Select from list of courses in category 2B in the AUCC.⁵ Select from list of courses in category 3D in the AUCC.⁶ Select from list of courses in category 3C in the AUCC.⁷ Select from list of courses in category 3G in the AUCC.

**Biology/Natural Resources Education
Concentration**

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
G CC 140	Physical Geology	4	3A
M CC 155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	2C
	Arts/humanities ¹	3	3B
	First-year seminar ²	2	1
	Written communication ³	3	2A
	TOTAL	29	
SOPHOMORE			
BY 220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160)	3	

	<i>Select four credits from the following:</i>		
BI 302	Applied and General Entomology	2	
	AND		
BI 303A	General Entomology Laboratory (BI 302 or concurrent reg.)	2	
BZ 212	Biology-Invertebrates (BZCC 110 and BZ/BZCC 111 or BY/LS 103)	4	
BZ 214	Animal Biology-Vertebrates (BZ/BZCC 111 or BY/LS 103)	4	

C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/C CC 112 or C 114; C 245 or concurrent reg.)	1	
NR 120A-B	Environmental Conservation (B) participation in University Honors Program)	3-4	
PHCC 110	Descriptive Physics	3	3A
PHCC 111	Descriptive Physics Laboratory (PH/PHCC 110 or concurrent reg.)	1	3A
SC 240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
	Directed electives ⁴	6	
	TOTAL	32-33	

JUNIOR			
BC 351	Principles of Biochemistry (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 343 or concurrent reg. in C 343)	4	
BZ 220	Introduction to Evolution (BZ/BZCC 110 and BZ/BZCC 111 or BZ/BZCC 120 or BY/LS 103)	3	
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
ED 350	Instruction I-Individualization/Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 310/EDCC 275, ED 340, concurrent reg. in ED 350; admission to Teacher Licensure Program)	1	
EDCC 430	Diversity and Communication (ED 310/EDCC 275; admission to Teacher Licensure Program)	3	3E
	Additional communication ⁵	3	2B
	Historical perspectives ⁶	3	3D
	Social/behavioral sciences ⁷	3	3C
	Directed elective ⁴	3-5	
	TOTAL	30-32	

SENIOR			
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. 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 450 or ED 426, ED 460, concurrent reg. in ED 485A or B or C)	1	4C
ED 493B	Seminar-Assessment of Learning (ED 450 or ED 426, ED 460, concurrent reg. in ED 485A or B or C or VE 485)	1	4B
MB 300	General Microbiology (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 345 or concurrent reg.)	3	
	Health and wellness ⁸	2	2G
	Electives	0-2	
	TOTAL	27-29	

PROGRAM TOTAL = 120-121 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 1 in the AUCC.

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

⁴ Select from the following: EACC 240 or ECCC 240, FW 360, GR 210, NR 220, RR 100, RS 300, WRCC 304.

⁵ Select from list of courses in category 2B in the AUCC.

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

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

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

Chemistry Education 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 (BZ/BZCC 110 or concurrent reg.)	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 (BY/LSCC 102)	4	
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 11 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	
	First year seminar ¹	2	1
	Written communication ²	3	2A
	TOTAL	30	
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/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
	Additional communication ³	3	2B
	Arts/humanities ⁴	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 (AA/AACC 100 or concurrent reg.)	1	3A
G CC 140	Physical Geology	4	3A
C 331	Quantitative Analysis (C 113)	3	
C 332	Quantitative Analysis Laboratory (C 114; and C 335 or concurrent reg.)	2	
OR			
C 334	Quantitative Analysis Laboratory (C 114; C 331 or concurrent reg.)	1	
C 471	Physical Chemistry for Biological Sciences (C 113; M/M CC 161 or M/M CC 255; PH/PHCC 122 or PH/PHCC 142)	4	
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
ED 350	Instruction I-Individualization/Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 310/EDCC 275, ED 340, concurrent reg. in ED 350, admission to Teacher Licensure Program)	1	
EDCC 430	Diversity and Communication (ED 310/EDCC 275; admission to Teacher Licensure Program)	3	3E
	Historical perspectives ⁵	3	3D
	Social/behavioral science ⁶	3	3C
	TOTAL	29-30	

SENIOR

BC 301	Survey of Biochemistry (C 245)	3	
OR			
BC 351	Principles of Biochemistry (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 343 or concurrent reg. in C 343)	4	
BC 352	Principles of Biochemistry Laboratory (BC 301 or BC 351 or BC 401 or concurrent reg., 2 credits of college chemistry laboratory)	1	
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. 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 450 or ED 426, ED 460, concurrent reg. in ED 485A or B or C)	1	4C

ED	493B	Seminar-Assessment of Learning (ED 450 or ED 426, ED 460, concurrent reg. in ED 485A or B or C or VE 485)	1	4B
		Health and wellness ⁷	2	3G
		Electives	0-3	
		TOTAL	30-31	

PROGRAM TOTAL = 120 credits

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

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

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

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

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

General Science Education 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 (BZ/BZCC 110 or concurrent reg.)	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 (BY/LSCC 102)	4	
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
<i>Select one of the following pairs of courses:</i>			
M CC 155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	2C
M CC 255	Calculus for Biological Scientists II (M/M CC 155; concurrent reg. in M/M CC 126)	4	2C
OR			
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	2C
	First year seminar ¹	2	1
	Written communication ²	3	2A
	TOTAL	30	

SOPHOMORE

G CC 140	Physical Geology	4	3A
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<i>Select one of the following pairs of courses:</i>			
PHCC 121	General Physics I (concurrent reg. in M/M CC 125)	5	3A
PHCC 122	General Physics II (PH/PHCC 121)	5	3A
OR			
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
	Arts/humanities ³	3	3B
	Social/behavioral sciences ⁴	3	3C
	Requirement for minor ⁵	9	
	TOTAL	32	

JUNIOR

EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
ED 350	Instruction I-Individualization/Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 310/EDCC 275, ED 340, concurrent reg. in ED 350, admission to Teacher Licensure Program)	1	
EDCC 430	Diversity and Communication (ED 310/EDCC 275; admission to Teacher Licensure Program)	3	3E
	Additional communication ⁶	3	2B
	Health and wellness ⁷	2	3G
	Historical perspectives ⁸	3	3D
	Requirement for minor ⁵	12	
	TOTAL	31	

SENIOR

ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. 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 450 or ED 426, ED 460, concurrent reg. in ED 485A or B or C)	1	4C
ED 493B	Seminar-Assessment of Learning (ED 450 or ED 426, ED 460, concurrent reg. in ED 485A or B or C or VE 485)	1	4B
	Electives	5	
	TOTAL	27	

PROGRAM TOTAL = 120 credits

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

⁵ 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.

⁶ Select from list of courses in category 2B in the AUCC.

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

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

Geology Education Concentration

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
AACC 100	Introduction to Astronomy OR	3	3A
NR 272	Oceanography I	3	
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
G CC 140	Physical Geology OR	4	
G 150	Physical Geology for Scientists and Engineers	4	
G 154	Historical and Analytic Geology (G CC 130 or G CC 140 or G 150)	4	
M CC 155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125) OR	4	2C
M CC 160	Calculus for Physical Scientists I (M/M CC 126, concurrent reg. in M/M CC 124)	4	2C
	Arts/humanities ¹	3	3B
	First year seminar ²	2-3	1
	Social/behavioral science ³	3	3C
	Written communication ⁴	3	2A
	TOTAL	31-32	
SOPHOMORE			
BZCC 110	Select 4 credits from the following: Principles of Animal Biology AND	3	3A
BZCC 111	Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.)	1	3A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
G 232	Mineralogy (G CC 140 or G 150, C/C CC 111, M/M CC 124 or concurrent reg.; concurrent reg. in G 332; or written consent of instructor)	3	
G 454	Geomorphology (G CC 140 or G 150 or GR 210; M/M CC 155 or M/M CC 160)	4	

PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
	Additional communication ⁵	3	2B
	Historical perspectives ⁶	3	3D
	G elective (select from list in junior year)	3-4	
	TOTAL	29-30	

JUNIOR

BZCC 120	Principles of Plant Biology OR	4	3A
LS 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
ED 350	Instruction I-Individualization/Management (ED 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 310/EDCC 275, ED 340, concurrent reg. in ED 350, admission to Teacher Licensure Program)	1	
EDCC 430	Diversity and Communication (EDCC 310/EDCC 275; admission to Teacher Licensure Program)	3	3E
	Select two of the following courses:		
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/M CC 125, concurrent reg. in PH/PHCC 141)	4	
G 446	Environmental Geology (G 454 or concurrent reg.)	3	
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160) OR	4	2C
M CC 255	Calculus for Biological Scientists II (M/M CC 155; concurrent reg. in M/M CC 126)	4	2C
PHCC 142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
	TOTAL	30-32	
SENIOR			
AT 350	Introduction to Weather and Climate	2	
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. 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 450 or ED 426, ED 460, concurrent reg. in ED 485A or B or C)	1	4C
ED	493B	Seminar-Assessment of Learning (ED 450 or ED 426, ED 460, concurrent reg. in ED 485A or B or C or VE 485)	1	4B
STCC	301	Introduction to Statistical Methods (M/M CC 121)	3	2D
		Health and wellness ⁷	2	3G
TOTAL			29	

PROGRAM TOTAL = 121 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 1 in the AUCC.

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

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

⁵ Select from list of courses in category 2B in the AUCC.

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

⁷ 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/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
M CC 125	Numerical Trigonometry (M/M CC 118 or M/M CC 121 or placement)	1	2C
M CC 126	Analytic Trigonometry (M/M CC 125 or placement)	1	2C
	Additional communication ¹	3	2B

		First year seminar ²	2-3	1
		Minor ³	9	
TOTAL			27-28	

SOPHOMORE

C	113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C	114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	

Select one of the following pairs of courses:

M CC	155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	2C
M CC	255	Calculus for Biological Scientists II (M/M CC 155; concurrent reg. in M/M CC 126)	4	2C

OR

M CC	160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC	161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	2C

PHCC	141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
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PHCC	142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
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Logical/critical thinking⁴

3 2D

Minor³

6

TOTAL 31

JUNIOR

Arts/humanities⁵ 3 3B

Biological/physical sciences⁶ 3 3A

Global and cultural awareness⁷ 3 3E

Health and wellness⁸ 2 3G

Historical perspectives⁹ 3 3D

Minor³ 15

Social/behavioral sciences¹⁰ 3 3C

U.S. public values and institutions¹¹ (3) 3F

TOTAL 32

SENIOR				
		Building foundations/perspectives ¹²	3	4B
		Capstone course ¹³	3	4C
		Using competencies ¹⁴	3	4A
		Minor ³	12	
		Electives ¹⁵	8-9	
TOTAL			29-30	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 2B in the All-University Core Curriculum (AUCC).

² Complete a course satisfying AUCC category 1 that is offered within a major that is the same as one of the minors that will be completed.

³ Declare and complete two minors from the following list: biochemistry, chemistry, computer science, geology, mathematics, physics, statistics.

⁴ Select from the list of courses in category 2D 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 3A 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 3G in the AUCC.

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

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

¹¹ Select from the list of courses in category 3F in the AUCC. Some of these courses will also satisfy the requirement for another category.

¹² 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.

¹³ 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.

¹⁴ 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.

¹⁵ 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

Course	Title (Prerequisite)	Cr	AUCC
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FRESHMAN

C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	2C
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
PHCC 192	The Flying Circus of Physics	2	1
	Social/behavioral sciences ¹	3	3C
	TOTAL	30	

SOPHOMORE

AACC 100	Introduction to Astronomy	3	3A
AACC 101	Astronomy Laboratory (AA/AACC 100 or concurrent reg.)	1	3A
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.)	1	3A
BZCC 120	Principles of Plant Biology	4	3A
M 261	Calculus for Physical Scientists III (M/M CC 161)	4	
PHCC 142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A

PH 314	Introduction to Modern Physics (PH/PHCC 142, concurrent reg. in M 261)	4	4A, 4B
	Additional communication ²	3	2B
	Health and wellness ³	2	3G
	TOTAL	30	

JUNIOR

CSCC 151	C++ for Scientists and Engineers (M/M CC 124, M/M CC 126)	4	2D
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
EDCC 430	Diversity and Communication (ED 310/EDCC 275; admission to Teacher Licensure Program)	3	3E
PH 245	Introduction to Electronics (PH/PHCC 142, M/M CC 161)	3	
PH 315	Modern Physics Laboratory (concurrent reg. in PH 314)	2	4A, 4B
PH 361	Physical Thermodynamics (PH/PHCC 142, M 261)	3	4A, 4B
	Arts/humanities ⁴	3	3B
	Historical perspectives ⁵	3	3D
	Electives	5	
	TOTAL	30	

SENIOR

ED 350	Instruction I-Individualization/ Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED 386	Practicum-Instruction I (EDCC 310/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 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 450 or ED 426, ED 460, concurrent reg. in ED 485A or B or C)	1	4C
ED 493B	Seminar-Assessment of Learning (ED 450 or ED 426, ED 460, concurrent reg. in ED 485A or B or C or VE 485)	1	4B
PH 353	Optics and Waves (M 261, PH/PHCC 142)	4	4A, 4B
	TOTAL	30	

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 2B 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 Biosciences Building,
Room 316*

Professor Norman P. Curthoys, Chair

Major in Biochemistry

As the name suggests, biochemistry links biology and chemistry. Biochemistry is most simply defined as the chemistry of living systems. It is the science which 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 diseases such 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. Opportunities exist for independent study, internships, or advanced research-oriented laboratory classes during your junior and senior years, which provide opportunities for experiential learning and working closely with our faculty.

Characteristics and Skills

- Interest in sciences
- Motivation to learn, intellectual curiosity
- Attention to detail
- Critical thinking skills
- Strong organizational skills
- Analytical skills
- Problem solving skills

- Imaginative, yet logical
- Interpreting technical/scientific data
- Perceiving/defining cause and effect relationships
- Ability to work as part of a team
- Patience
- Good decision maker
- Strong communication skills—oral and written
- Computer literate
- Ability to use scientific instruments and equipment

Potential Occupations

Because biochemistry is such a broad science, it is an excellent preparation for many different careers. Over one-half of Colorado State’s biochemistry graduates continue in graduate studies (biochemistry, molecular biology, or related life sciences). Graduates who go on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels. Approximately one-fourth enter medical, veterinary, dental, or other health professional schools, and one-fourth obtain employment in industrial, governmental, academic, or biotechnology sectors of the job market. Participation in independent research projects or internships is highly recommended to enhance practical training and development. This type of experience provides the opportunity to build a relationship with a faculty member. Thus, a student obtains experience and a meaningful reference, which greatly enhances their ability to obtain a job of their choosing or entrance into a top graduate or professional program.

Biochemists are involved in laboratory-based research and development, production, marketing, sales, and management in pharmaceutical, agricultural, food, biotechnology, and health care industries. Some of the Federal government employers are the Food and Drug Administration, U.S. Departments of Agriculture, Interior, and Defense, and the National Institute of Health. Good employment opportunities exist in biotechnology, genetic engineering, cancer research, and pharmacology. However, considerable competition exists for academic positions.

Possible opportunities, which may require further training or education, for graduates in biochemistry include, but are not limited to: process research technician; production/quality assurance lab technician; biomedical/pharmaceutical researcher or salesperson; molecular biologist; biophysicist; cytologist; toxicologist; bio-technologist; 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
FRESHMAN			
BCCC 192	Biochemistry Freshman Seminar	2	1
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
LS 103	Biology of Organisms (BY/LSCC 102)	4	
<i>Select one pair of the following:</i>			
M CC 155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	2C
M CC 255	Calculus for Biological Scientists II (M/M CC 155; concurrent reg. in M/M CC 126)	4	2C
OR			
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	2C
Category 3 course ¹		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 (BY/LSCC 102 or college-level introductory biology course)	3	
LS 202B	Introductory Genetics Recitation (concurrent reg. in LSCC 201B)	1	
LS 210	Introductory Eukaryotic Cell Biology (BY/LSCC 102; C/C CC 111, C/C CC 112 or concurrent reg.)	3	
LS 211	Eukaryotic Cell Biology Recitation (LS 210 or concurrent reg.)	1	
LS 212	Eukaryotic Cell Biology Laboratory (C/C CC 112; LS 210 or concurrent reg.)	1	

NS 203	Genetic Mechanisms Laboratory (C/C CC 112)	1	
PHCC 121	General Physics I (concurrent reg. in M/M CC 125)	5	3A
OR			
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126, M/M CC 155 or M/M CC 160)	5	3A
Additional communication ²		3	2B
Category 3 courses ¹		3	3B-3F
Health and wellness ³		2	3G
TOTAL		31	
JUNIOR			
BC 401	Comprehensive Biochemistry I (C 245 or C 343 or concurrent reg. in C 343; M/M CC 155 or M/M CC 160)	3	4A
BC 403	Comprehensive Biochemistry II (BC 401)	3	4B
BC 404	Comprehensive Biochemistry Laboratory (BC 401 or concurrent reg.; 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 reg.)	1	
PHCC 122	General Physics II (PH/PHCC 121)	5	3A
OR			
PHCC 142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
OR			
STCC 307/ EHCC 307	Introduction to Biostatistics (M/M CC 121)	3	2D
Bioscience elective ⁴		3-4	
Category 3 courses ¹		3	3B-3F
Electives		2-3	
TOTAL		29	
SENIOR			
<i>Select four credits from one or more of the following:</i>			
BC 406A	Protein Biochemistry (BC 404)	2	
BC 406B	Molecular Genetics (BC 404)	2	
BC 406C	Cellular 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 487A	Internship (BC 401, BC 403, BC 404 with minimum GPA of 2.0; written consent of instructor)	Var.	
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 reg. or BC 351; LSCC 201B)	3	4C

BC	465	Molecular Regulation of Cell Function (LS 210; BC 403 or concurrent reg. or BC 351)	3	
BC	493	Senior Seminar (BC 401 or concurrent reg.)	1	4A, 4C
C	471	Physical Chemistry for Biological Sciences (C 113; M/M CC 161 or M/M CC 255; PH/PHCC 122 or PH/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 2B 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 (BY/LSCC 102 or college-level introductory biology course)	3	3A
LS 202B	Introductory Genetics Recitation (Concurrent reg. in LSCC 201B)	1	
LS 210	Introductory Eukaryotic Cell Biology (BY/LSCC 102; C/C CC 111, C/C CC 112 or concurrent reg.)	3	
LS 211	Eukaryotic Cell Biology Recitation (LS 210 or concurrent reg.)	1	
LS 212	Eukaryotic Cell Biology Laboratory (C/C CC 112; LS 210 or concurrent reg.)	1	
	TOTAL	9	
UPPER DIVISION			
BC 401*	Comprehensive Biochemistry I (C 245 or C 346 or concurrent reg. in C 346; M/M CC 155 or M/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	
BC 441	3D Molecular Models for Biochemistry (BC 401 or written consent of instructor)	1	
BC 493	OR Senior Seminar (BC 401 or concurrent reg.)	1	

BC	463*	Molecular Genetics (LSCC 201B; BC 401 or concurrent reg. or BC 351)	3
BC	465*	OR Molecular Regulation of Cell Function (LS 210; BC 403 or concurrent reg. or BC 351)	3
		TOTAL	12

PROGRAM TOTAL = 21 credits without prerequisites

*Additional work may be required because of prerequisites.

Graduate Programs in Biochemistry

The department offers a combined B.S./M.S. degree program. See department office for details.

Master of Science and Doctor of Philosophy degrees are offered. A description of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF BIOLOGY

Office in Anatomy-Zoology Building, Room E 106
Professor Donald Mykles, Interim Chair

Major in Biological Science

Biology is the study of all living things—from bacteria and viruses that can be seen only under a microscope, to plants, animals, and humans and their relationship to their environments. Biology majors study the structure and function of cells, organ systems and tissues in animals and humans, the structure and function of plants, ecology (the relationship between living things and their environment), and evolution. They learn about forensic biology (identification of human remains), genetics and heredity, aquatic toxicology (methods that biologists use to measure the impact of pollution on water), microscopic organisms such as bacteria, and laboratory techniques that biologists use in research. This major provides a broad background 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 for health professions, aquatic biology for marine biologists, 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. In addition, students choose a selected field of 12 credits in 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. A calculus course and a statistics course are also required.

Characteristics and Skills

- Attention to detail
- Critical thinking
- Strong organization skills
- Analytical skills
- Problem solving skills
- Interpreting technical/scientific data
- Perceiving/defining cause and effect relationships
- Good decision maker
- Communication skills - oral and written

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 complete isolation; some are narrowly specific, others require knowledge far beyond science. Without advanced degrees, the demand for this major has never been high in any given employment area, but because of the diversity of career options, most students find employment. Career options related to biology include water quality assessments, field and lab technician work, biotechnology, genetic research, agriculture, or sales (i.e., pharmaceutical, agricultural). Biological sciences can also be the beginning of an education towards dental, medical, or veterinary school, and a number of health professions such as podiatry or optometry. Graduates are encouraged to pursue advanced degrees to attain higher salaried positions and opportunities for rising to top professional levels. Participation in internships and laboratory or research experience is highly recommended and encouraged by the department to enhance practical training and development.

Combining biology with nonscience skills can involve some exciting careers as well. Incorporate biology and English to become a technical writer or science fiction novelist. Combine biology and art and go into medical and scientific illustration. Link biology and computer science to become a bioinformaticist, historian of science or medicine. Work in both biology and philosophy/religion to be a medical ethicist or bioethicist. Combine biology and psychology as a neuroscientist or genetic counselor. Join 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 and biotechnology administration. There are specialized master's degrees designed for many of these unique career paths.

The following are some of the career opportunities for biology majors: aquarium and museum worker; assistant research scientist; biological researcher; biology photographer; bio-technologist; 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 2.00 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, botany, or zoology.

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 (BZ/BZCC 110 or concurrent reg.)	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 (BY/LSCC 102)	4	
<hr/>			
BZCC 192	First-Year Seminar in Life Sciences	2	1
OR			
	First year seminar ¹	2	1
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C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112 and C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
<hr/>			
M CC 155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	2C
OR			
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
<hr/>			
	Additional communication ²	3	2B
	Arts/humanities ³	3	3B
<hr/>			
	TOTAL	32	

SOPHOMORE				
BY	310	Cell Biology (one semester of organic chemistry or concurrent reg.; two semesters of introductory biology)	4	
BY	311	Developmental Biology (BY 310 or written consent of instructor)	4	
BZ	220	Introduction to Evolution (BY/LS 103 or BZ/BZCC 110 and BZ/BZCC 111 or BZ/BZCC 120)	3	
<hr/>				
<i>Select one of the following sets of courses:</i>				
C	245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
C	246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/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	
STCC	301	Introduction to Statistical Methods (M/M CC 121)	3	2D
OR				
STCC	307/ EHCC 307	Introduction to Biostatistics (M/M CC 121)	3	2D
<hr/>				
		Arts/humanities ³	3	3B
		Health and wellness ⁴	2	3G
		Historical perspectives ⁵	3	3D
		Social/behavioral sciences ⁶	3	3C
		TOTAL	30-33	

JUNIOR				
BZ	350	Molecular and General Genetics (BY/LSCC 102; one course in statistics)	4	4A, 4B
<hr/>				
<i>Select one of the following pairs of courses:</i>				
PHCC	121	General Physics I (concurrent reg. in M/M CC 125)	5	3A
PHCC	122	General Physics II (PH/PHCC 121)	5	3A
OR				
PHCC	141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
PHCC	142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
<hr/>				
		Arts/humanities ³	3	3B
		U.S. public values and institutions ⁷	(3)	3F
		Selected field ⁸	6	
		Additional fields ⁹	3	
		Elective	3	
		TOTAL	29	

SENIOR				
BC	351	Principles of Biochemistry (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 346 or concurrent reg. in C 346)	4	
OR				
BC	401	Comprehensive Biochemistry I (C 245 or C 346 or concurrent reg. in C 346; M/M CC 155 or M/M CC 160)	3	
AND				
BC	403	Comprehensive Biochemistry II (BC 401)	3	
<hr/>				
BY	320	Ecology (one course in biology; M/M CC 155)	3	4C
OR				
BZ	450	Plant Ecology (BZ 223 or BZ 325)	4	4C
<hr/>				
		Global and cultural awareness ¹⁰	3	3E
		Selected field ⁸	6	
		Additional field ⁹	3	
		Electives	10	
		TOTAL	29-32	

PROGRAM TOTAL = 120-126 credits

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

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

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

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

⁵ 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.

⁶ 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.

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

⁸ The Biology Department maintains a list of current selected fields. Twelve credits must be taken from one field.

⁹ 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.

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

Major in Botany

Botany is the general study of plants from microscopic algae to giant redwoods, from mushrooming fungi to flowering angiosperms. Plant anatomy, how plants function and grow, and how they survive and interrelate within their environments are topics of study. If you like the outdoors, a career in ecology, taxonomy or forestry might appeal to you. If you are attracted to the beauty and design of the microscopic world, you might enjoy a career in plant anatomy, morphology or cytology. Those interested in chemistry might enjoy plant biochemistry or molecular biology. Those intrigued by plant diseases may become plant pathologists. The mathematically oriented might explore systems ecology, genetics, biotechnology or biophysics.

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.

Characteristics and Skills

- A strong general interest in plants
- A strong interest in science
- Able to gather and analyze data
- Skilled at designing projects, perceiving patterns and relationships
- Interest in experiments, lab work
- Able to operate scientific equipment, organize and classify data
- A desire to test ideas/hypothesis, draw conclusions from data, and solve problems
- Strong writing and oral communication skills
- Able to work independently or in teams

Potential Occupations

Botanists work in a wide array of private and public capacities in agriculture, biotechnology, education, natural resources management, government, health, human services, and research. Botany can also lead to a career as a naturopathic physician. Participation in internship opportunities is highly recommended to enhance practical training and development. Graduates who pursue advanced studies can attain higher salaried positions with the possibility of rising to top professional levels.

The following career opportunities are examples only, and by no means exhaust the available opportunities: *Environment/Ecology*—park naturalist; environmental impact specialist; greenhouse technician; U.S. Forest Service employee; landscape manager; botanist; horticulturist; ecologist; plant specialist; *Communication*—National Forestry or Conservation Association staff writer; biological photographer or columnist; *Health Fields*—lab technician; biological researcher; state or county health department worker; education production manager; *Human Services*—Peace Corps volunteer; environmental educator; *Agriculture*—agronomist; plant biochemist/molecular biologist; tissue culture specialist; plant physiologist/pathologist; biotechnology specialist; international development specialist; pesticide specialist; *Government*—plant quarantine officer; county extension agent; highway roadside maintenance worker; administrator; state department of natural resources employee; museum worker; public health officer; science librarian; *Business/Industry*—florist; greenhouse owner; sales representative; environmental consultant; plant buyer; agricultural or pharmaceutical salesperson.

To be qualified for graduation, students in the botany 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 2.00 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, botany, or zoology.

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 (BZ/BZCC 110 or concurrent reg.)	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 (BY/LSCC 102)	4	
<hr/>			
BZCC 192	First-Year Seminar in Life Sciences	2	1
OR			
	First year seminar ¹	2	1
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
<hr/>			
M CC 155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	2C
OR			
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
<hr/>			
	Additional communication ²	3	2B
	Arts /humanities ³	3	3B
	TOTAL	32	
<hr/>			
SOPHOMORE			
BZ 220	Introduction to Evolution (BZCC 110 and BZCC 111 or BZCC 120 or BY/LS 103)	3	
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<i>Select one of the following sets of courses:</i>				
C	245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
C	246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/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	
STCC	301	Introduction to Statistical Methods (M/M CC 121)	3	2D
OR				
STCC	307/ EHCC 307	Introduction to Biostatistics (M/M CC 121)	3	2D
<i>Select two of the following courses:</i>				
AT	350	Introduction to Weather and Climate	2	
G CC	130	Earth System Science	3	3A
GR	210	Physical Geography	3	
SC	240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
<hr/>				
		Health and wellness ⁴	2	3G
		Historical perspectives ⁵	3	3D
		Social/behavioral sciences ⁶	3	3C
		Electives	3	
		TOTAL	27-32	
<hr/>				
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 (BY/LSCC 102; one course in statistics)	4	4A, 4B
BZ	450	Plant Ecology (BZ 223 or BZ 325)	4	4C
<hr/>				
<i>Select one of the following pairs of courses:</i>				
PHCC	121	General Physics I (concurrent reg. in M/M CC 125)	5	3A
PHCC	122	General Physics II (PH/PHCC 121)	5	3A
OR				
PHCC	141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
PHCC	142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
<hr/>				
		Global and cultural awareness ⁷	3	3E
		U.S. public values and institutions ⁸	(3)	3F
		Electives	3	
		TOTAL	28	
<hr/>				
SENIOR				
BC	351	Principles of Biochemistry (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 346 or concurrent reg. in C 346)	4	
OR				
BC	401	Comprehensive Biochemistry I (C 245 or C 346 or concurrent reg. in C 346; M/M CC 155 or M/M CC 160)	3	
AND				
BC	403	Comprehensive Biochemistry II (BC 401)	3	
BZ	325	Plant Systematics (BZ 220 or BY/LS 103)	4	

BZ	331	Developmental Plant Anatomy (BZ/BZCC 120 or BY/LS 103; C 245 or C 346; BZ 350 or concurrent reg.)	4	
<hr/>				
<i>Select at least two courses from the following:</i>				
BZ	332	Introductory Phycology (BZ/BZCC 120 or BY/LSCC 102 or BY/LS 103)	4	
BZ	333	Introductory Mycology (BZ/BZCC 120 or BY/LS 103 or written consent of instructor)	4	
BZ	338	Comparative Morphology of Vascular Plants (BZ/BZCC 120 or BY/LS 103)	4	
BZ	440	Plant Physiology (BZ/BZCC 120 or BY/LS 103; C 245 or concurrent reg.)	3	
BZ	441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
		Electives ⁹		1-8
		TOTAL		28-33

PROGRAM TOTAL = 120 credits

- ¹ Select from the list of courses in category 1 in the All-University Core Curriculum (AUCC).
² Select from the list of courses in category 2B in the AUCC.
³ Select from the list of courses in category 3B in the AUCC.
⁴ Select from the list of courses in category 3G in the AUCC.
⁵ 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.
⁶ 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.
⁷ Select from the list of courses in category 3E in the AUCC.
⁸ 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.
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 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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 (BY/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

Graduate Programs in Botany

The Master of Science and Doctor of Philosophy degree programs are offered in most areas of botany. A description of these programs may be found in the *Graduate and Professional Bulletin*.

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 animal tissue and structure in a laboratory setting. Some zoologists go on to study veterinary medicine. Zoologists collect facts useful to people in farming, medicine, pharmacy, wildlife conservation, and pest control. Zoology encompasses many specialties. At Colorado State, you may focus on general training in animal biology or concentrate in the following areas: animal behavior, aquatic biology (the study of plants and animals living in water), ecology (how animals adapt to their environments), genetics and evolution, invertebrate organisms, cellular/molecular biology and physiology, systematics and morphology, or 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 facts and theories. The program encourages flexibility, strength, and depth. The coursework 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 introductory chemistry, and at least one course in organic chemistry, two courses in physics, and one in biochemistry, including labs in each. In addition, students select a minimum of 16 credits of zoology courses in their chosen areas of concentration. A calculus and statistics course is also required.

Characteristics and Skills

- Love for animals
- Attention to detail
- Critical thinking
- Strong organization skills
- Analytical skills
- Problem solving skills
- Interpreting technical/scientific data
- Perceiving/defining cause and effect relationships
- Good decision maker
- Communication skills—oral and written

Potential Occupations

This major prepares students to work in various areas of animal biology, such as research or private industry, or to begin graduate school or professional studies. Career opportunities include medical caretakers such as veterinarians,

protective agencies such as shelters and refuges, trainers and handlers, animal-related businesses, aquatic/marine biologists, exotic animal specialists, and wildlife conservation. It is an appropriate major for students planning to attend medical or veterinary school. Graduates who pursue advanced studies can attain higher salaried positions with the possibility of rising to top professional levels. Participation in internships, laboratory or research opportunities is highly recommended and encouraged by the Department to enhance practical training and development.

Opportunities 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; various positions in a humane society; 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 2.00 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, botany, or zoology.

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 (BZ/BZCC 110 or concurrent reg.)	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 (BY/LSCC 102)	4	
BZCC 192	First-Year Seminar in Life Sciences	2	1
OR			
	First year seminar ¹	2	1
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	

C	114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1				
COCC	150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A			
M CC	155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	2C			
M CC	160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C			
		Additional communication ²	3	2B			
		Social/behavioral sciences ³	3	3C			
		TOTAL	32				
SOPHOMORE							
BZ	212	Animal Biology-Invertebrates (BZ/BZCC 110 and BZ/BZCC 111 or BY/LS 103)	4				
BZ	214	Animal Biology-Vertebrates (BZ/BZCC 111 or BY/LS 103)	4				
BZ	220	Introduction to Evolution (BZ/BZCC 110 and BZ/BZCC 111 or BZ/BZCC 120 or BY/LS 103)	3				
		<i>Select one of the following sets of courses:</i>					
C	245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4				
C	246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/C CC 112 or C 114; C 245 or concurrent reg.)	1				
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/M CC 121)	3	2D			
STCC	307/	Introduction to Biostatistics (M/M CC 121)	3	2D			
EHCC	307						
					Arts/humanities ⁴	3	3B
					Global and cultural awareness ⁵	3	3E
					Health and wellness ⁶	2	3G
		Historical perspectives ⁷	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 (BY/LSCC 102; one course in statistics)	4	4A, 4B			

		<i>Select one of the following pairs of courses:</i>		
PHCC	121	General Physics I (concurrent reg. in M/M CC 125)	5	3A
PHCC	122	General Physics II (PH/PHCC 121)	5	3A
		OR		
PHCC	141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
PHCC	142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
		Social/behavioral sciences ³	3	3C
		U.S. public values and institutions ⁸	(3)	3F
		Upper-division zoology courses ⁹	6	
		Electives	2	
		TOTAL	29	

SENIOR

BC	351	Principles of Biochemistry (BZ/BZCC 110 or BZ/BZCC 120 or BY/LS 103; C 245 or C 346 or concurrent reg. in C 346)	4	
		OR		
BC	401	Comprehensive Biochemistry I (C 245 or C 346 or concurrent reg. in C 346; M/M CC 155 or M/M CC 160)	3	
		AND		
BC	403	Comprehensive Biochemistry II (BC 401)	3	
BY	320	Ecology (one course in biology, M/M CC 155)	3	4C
		Upper-division zoology courses ⁹	9	
		Electives ¹⁰	8-13	
		TOTAL	26-29	

PROGRAM TOTAL = 120-125 credits

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

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

³ 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.

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 3G in the AUCC.

⁷ 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.

⁸ 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.

⁹ A minimum of 15 upper-division zoology credits must be taken. A list of acceptable courses is available in the Biology Department.

¹⁰ 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 (BZ/BZCC 110 and BZ/BZCC 111 or BY/LS 103)	4

BZ	214	Animal Biology-Vertebrates (BZ/BZCC 111 or BY/LS 103)	4	
LSCC	102	Attributes of Living Systems (high school chemistry)	4	3A
LS	103	Biology of Organisms-Animals and Plants (BY/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 (specialities in zoology) is available from the department office.

*Additional course work may be required because of prerequisites.

Graduate Programs in Zoology

The department offers graduate programs leading to Master of Science and Doctor of Philosophy degrees in zoology. A description of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF CHEMISTRY

Office in Chemistry Building, Room B 101
Professor C. Michael Elliott, 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 coursework 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, there are ample opportunities 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

Characteristics And Skills

- Strong interest in chemistry
- Strong aptitude for and interest in mathematics and the physical sciences
- Inquisitive and curious nature
- Innovative
- Analytical thinker
- Flexible, patient, and persevering
- Strong problem-solving ability
- Able to work independently or in a group
- Able to see the “big picture” while paying attention to detail
- Interest in experimentation and data analysis
- Good oral and written communications skills

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. Participation in internships, volunteer activities, or cooperative education opportunities is highly recommended to enhance your practical training and development. Recent Colorado State B.S. chemists with research experience have been exceptionally successful getting jobs in the chemical industry with starting salaries between \$37k and \$45k per year. Graduates who continue on for advanced studies can attain more responsible positions with the possibility of rising to top professional levels. Chemistry is also an excellent major for those preparing for careers in veterinary medicine and the health professions. Students whose career goals involve teaching at the secondary school level have the opportunity to complete the teacher licensure program through the School of Education.

Examples of possible 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/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
C CC 192	Introductory Seminar in Chemistry	2	1
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	2C
	Additional communication ¹	3	2B
	Biological sciences ²	4	3A
	Health and wellness ³	2	3G
	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/M CC 161)	4	
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126, M/M CC 155 or M/M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
	TOTAL	25	
JUNIOR			
C 332	Quantitative Analysis Laboratory (C 114 and C 335 or concurrent reg.)	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, PH/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
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CORE TOTAL = 78 credits⁷

¹ Select from the list of courses in category 2B 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 concentrations—ACS certified or non-ACS certified.

ACS Certified Concentration

Students who wish to work as professional chemists should select the ACS Certified concentration to obtain professional certification by the American Chemical Society. This objective entails courses in inorganic chemistry, biochemistry, instrumental analysis, and statistics.

In addition to the chemistry core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
OR			
STCC 309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
	Arts/humanities ¹	3	3B
	TOTAL	6	
JUNIOR			
C 440	Advanced Organic Chemistry Laboratory (C 346, C 344)	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 (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 346 or concurrent reg. in C 346)	4
OR			
BC	401	Comprehensive Biochemistry I (C 245 or C 346 or concurrent reg. in C 346; M/M CC 155 or M/M CC 160)	3
C	431	Instrumental Analysis (C 332 or C 334; C 471 or C 474 or concurrent reg.)	4
C	461	Inorganic Chemistry (C 261; C 476 or concurrent reg.)	3
C	462	Inorganic Chemistry Laboratory (C 461 or concurrent reg.)	2
		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	2D
	Mathematics-based requirement ²	3	
	TOTAL	6	
JUNIOR			
C	431 Instrumental Analysis (C 332 or C 334; C 471 or C 474 or concurrent reg.)	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, C 344)	2	
OR			
C	462 Inorganic Chemistry Laboratory (C 461 or concurrent reg.)	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 2D 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/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC	112 General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C	113* General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C	114 General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
	TOTAL	9	
UPPER DIVISION			
C	331 Quantitative Analysis (C 113)	3	
C	332* Quantitative Analysis Laboratory (C 114 and C 335 or concurrent reg.)	2	
OR			
C	334 Quantitative Analysis Laboratory (C 114; C 331 or concurrent reg.)	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/M CC 161 or M/M CC 255; PH/PHCC 122 or PH/PHCC 142)	4	
OR			
C	474* Physical Chemistry I (C 113, M 261, PH/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
Associate Professor Dale Grit, Interim Chair

Major in Computer Science

Computer science is the study of computer software design. 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 building, 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.

Characteristics and Skills

- Able to analyze and solve complex problems
- Effective writing and oral communication skills
- Knowledge of how to organize data
- Logical thought
- Patience and perseverance
- Talent for mathematics and physics
- Creativity
- Able to grasp the big picture but pay attention to details

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 and 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 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 to 6 or COCC 192/CO 130)	3	2A
CSCC 153	Java Programming (M/M CC 118 with a C or better or M/M CC 121 with a C or better)	4	2D
CS 166/ M 166	Discrete Structures (CS/CSCC 153 with a C or better ; M/M CC 124)	4	
M CC 160	Calculus for Physical Scientists I ¹ (M/M CC 126; concurrent registration in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	2C
CSCC 192	First Year Seminar in Computer Science	2	1
	OR		
	First year seminar ²	2	1
	Biological/physical sciences ³	7	3A
	Electives ⁴	3	
	TOTAL	31	
SOPHOMORE			
CS 200	Algorithms and Data Structures (CS/CSCC 153 with a C or better; CS 166/M 166 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)	4	
CS 270	Computer Organization (CS 166/M 166 with a C or better, M/M CC 124 with a C or better, concurrent reg. in CS 200)	4	
M 229	Matrices and Linear Equations (M/M CC 141 or M/M CC 155 or M/M CC 160)	2	
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
	OR		
STCC 309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
	Additional communication ⁵	3	2B
	Arts/humanities ⁶	3	3B
	Health and wellness ⁷	2	3G

Social/behavioral sciences ⁸	3	3C
Electives ⁴	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/M CC 161 with a C or better, M 229 with a C or better)	4	
CS 314	Software Development Methods (CS 253 with a C or better)	4	
CS 370	System Architecture and Software (CS 200 with a C or better, CS 270 with a C or better, ST/STCC 301 with a C or better or ST/STCC 309 with a C or better)	4	
	Additional science ⁹	5	
	Global and cultural awareness ¹⁰	3	3E
	Historical perspectives ¹¹	3	3D
	U.S. public values and institutions ¹²	3	3F
	Upper division electives ¹³	2	
TOTAL		28	

SENIOR

CS 410	<i>Select one course from the following:</i> 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 ¹⁴	9	4B
	Capstone experience ¹⁵	12	4C
	Electives ⁴	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 Select from the list of courses in category 1 of the All-University Core Curriculum (AUCC).

³ Choose two courses from two different departments (at least one with lab, lab is a separate course in some cases) 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 140, PHCC 141, PHCC 142.

⁴ Any course, except IMP math.

⁵ Select from the list of courses in category 2B of the AUCC.

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

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

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

⁹ Choose a minimum of 5 credits from the approved department list for satisfying category 3A of the AUCC or from the following courses: AA 301, AT 350, AT 351, AT 440, C 113, C 114, CE 260, G 154, LSCC 102, PHCC 142, PY 352, PY 353, SC 330, SC 331.

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

¹¹ Select from the list of courses in category 3D of the AUCC.

¹² Select from the list of courses in category 3F of the AUCC.

¹³ Choose five credits of courses numbered 300 or above.

¹⁴ Select three courses from the CS Department Group II list.

¹⁵ 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 offices, and scientific laboratories, among other organizations.

<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 COCC 192/CO 130)	3	2A
CSCC 153	Java Programming (M/M CC 118 with a C or better or M/M CC 121 with a C or better)	4	2D
CS 166/ M 166	Discrete Structures (CS/CSCC 153 with a C or better; M/M CC 124)	4	
M CC 160	Calculus for Physical Scientists I ¹ (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	2C
M CC 192	First-Year Seminar in Mathematical Sciences	1	1
AND			
STCC 192	First-Year Seminar in Mathematical Sciences	1	1
OR			
NSSC 192	Introductory Seminar	2	2
	Biological/physical sciences ²	7	3A
	Electives ³	3	
	TOTAL	31	
SOPHOMORE			
CS 200	Algorithms and Data Structures (CS/CSCC 153 with a C or better ; CS 1166/M 166 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)	4	
CS 270	Computer Organization (CS 166/M 166 with a C or better, M/M CC 124 with a C or better, concurrent reg. in CS 200)	4	
M 229	Matrices and Linear Equations (M/M CC 141 or M/M CC 155 or M/M CC 160)	2	
STCC 309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
	Additional communication ⁴	3	2B
	Arts/humanities ⁵	3	3B
	Health and wellness ⁶	2	3G
	Social/behavioral science 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/M CC 161 with a C or better, M 229 with a C or better)	4	
CS	314	Software Development Methods (CS 253 with a C or better)	4	
CS	370	System Architecture and Software (CS 200 with a C or better, CS 270 with a C or better, ST/STCC 301 with a C or better or ST/STCC 309 with a C or better)	4	
ST	304	Multiple Regression Analysis (M 229, ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
ST	321	Elementary Probabilistic/Stochastic Modeling (M/M CC 155 or M/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 of the following courses:</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 (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
ST	472	Statistical Consulting (ST 310 or concurrent reg. 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 course 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 140, PHCC 141, PHCC 142.
³ Any course, except IMP math.
⁴ Select from the list of courses in category 2B in the All-University Core Curriculum (AUCC).
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 3C in 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.

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/M CC 118 with a C or better or M/M CC 121 with a C or better)	4	2D
OR			
CS 154*	C++ to Java Programming Module (college-level C++ course)	2	
CS 166/M 166*	Discrete Structures (CS/CSCC 153 with a C or better; M/M CC 124)	4	
CS 200	Algorithms and Data Structures (CS/CSCC 153 with a C or better; CS 166/M 166 with a C or better)	4	
CS 270*	Computer Organization (CS 166/M 166 with a C or better, M/M CC 124 with a C or better, concurrent reg. 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
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 its 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 so as 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.

Six concentrations are available in the program: **general mathematics**, **mathematics education**, **applied mathematics**, **computational mathematics**, **actuarial science**, and **statistics**.

Characteristics And Skills

- A strong interest and aptitude for mathematics
- An ability to think logically
- An ability to think abstractly
- An inquisitive nature
- A propensity to be both methodical and precise and to persevere
- Innovative
- Facility with numbers
- Good communications skills
- An ability to work independently or in a team

Potential Occupations

The mathematics major prepares students for a wide variety of occupations in business, industry, government, and education. Although there is no longer a national shortage of mathematics teachers, our math 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 math 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 math 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; 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 lay 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 315, M 340, and mathematics courses ending in -80 to -99.

<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 COCC 192/CO 130)	3	2A
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	
M 229	Matrices and Linear Equations (M/M CC 141 or M/M CC 155 or M/M CC 160)	2	
	Additional communication ¹	3	2B
	Arts/humanities ²	3	3B
	First-year seminar ³	2	1
	Global and cultural awareness ⁴	3	3E
	Health and wellness ⁵	2	3G

		Historical perspectives ⁶	3	3D
		TOTAL	29	
SOPHOMORE				
BA	210	Introduction to Financial Accounting	3	
CSCC	153	Java Programming (M/M CC 118 with a C or better or M/M CC 121 with a C or better)	4	2D
ECCC	202	Principles of Microeconomics (M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/M CC 160)	3	3C
ECCC	204	Principles of Macroeconomics (EC/ECCC 202 or EA/EACC 202)	3	3F
M	261	Calculus for Physical Scientists III (M/M CC 161)	4	
M	345	Differential Equations (M 229; M/M CC 161 or M/M CC 255)	4	
STCC	309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
		Biological/physical sciences ⁷	5	3A
		TOTAL	29	
JUNIOR				
BF	300	Principles of Finance (BA 205 or BA 210, EC/ECCC 204)	3	
BF	311	Investments-Fixed Income Securities (BF 300 or BF 305)	3	
BF	370	Financial Management-Theory and Application (BF 300 or BF 305)	3	
EC EA	335/ 335	Introduction to Econometrics (EC/ECCC 204 or ST/STCC 201 or ST/STCC 204 or ST/STCC 301)	3	
M	369	Linear Algebra (M/M CC 161, M 229)	3	4A
ST	321	Elementary Probabilistic-Stochastic Modeling (M/M CC 155 or M/M CC 160; knowledge of a computer language)	3	
ST	420	Probability and Mathematical Statistics I (M/M CC 255 or M 261)	3	
ST	430	Probability and Mathematical Statistics II (ST 420)	3	
		Electives	8	
		TOTAL	32	
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/M CC 161)	4	4B
M	417	Advanced Analysis (M 261, M 317, M 369)	3	4C
M	495	Independent Study ⁸	1	
		Biological/physical sciences ⁷	5	3A
		Electives ⁹	11	
		TOTAL	30	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 2B 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 1 in the AUCC. M CC 192 and STCC 192 are recommended.
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 from the list of courses in category 3A in the AUCC. One course must have a laboratory component.
⁸ Preparation for Exam I.
⁹ At least one credit of electives must come from a 300- or 400- level course.

Applied Mathematics Concentration

The applied mathematics concentration prepares students for careers as applied mathematicians working in business, government, and industry. It is recommended that students supplement the core mathematical program with courses in their chosen application area, for example, engineering, public health, finance, electronics, or geology. Course requirements emphasize mathematical foundations as well as the application of mathematics in other disciplines. In particular, students receive training in numerical analysis, mathematical modeling, statistics, and computing, as well as a solid preparation for further study.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	
M 229	Matrices and Linear Equations (M/M CC 141 or M/M CC 155 or M/M CC 160)	2	
	Additional communication ¹	3	2B
	Arts/humanities ²	3	3B
	First-year seminar ³	2	1
	Health and wellness ⁴	2	3G
	Historical perspectives ⁵	3	3D
	Social/behavioral sciences ⁶	3	3C
	TOTAL	29	
SOPHOMORE			
CSCC 153	Java Programming (M/M CC 118 with a C or better or M/M CC 121 with a C or better)	4	2D
CS 166/ M 166	Discrete Structures (CS/CSCC 153 with a C or better; M/M CC 124)	4	
M 301	Introduction to Combinatorial Theory (M/M CC 160)	3	
M 261	Calculus for Physical Scientists III (M/M CC 161)	4	
M 345	Differential Equations (M 229; M/M CC 161 or M/M CC 255)	4	
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A

PHCC	142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
<hr/>				
ST	302	<i>Select from the following:</i> Design of Experiments (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
ST	304	Multiple Regression Analysis (M 229, ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
ST	321	Elementary Probabilistic-Stochastic Modeling (M/M CC 155 or M/M CC 160; knowledge of a computer language)	3	
<hr/>				
STCC	309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
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/M CC 161 or M 229)	3	4A
		Biological/physical sciences ⁷	3	3A
		Global and cultural awareness ⁸	3	3E
		Mathematics sciences ⁹	3	
		Related area ¹⁰	6	
		U.S. public values and institutions ¹¹	3	3F
		Electives	2	
TOTAL			31	
SENIOR				
M	317	Advanced Calculus of One Variable (M/M CC 161)	4	4B
<hr/>				
<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	
<hr/>				
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 ⁹	3	
		Related area ¹⁰	6	
		Electives	6-7	
TOTAL			28-29	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 2B 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 1 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 3C in the AUCC.

⁷ Select from the list of courses (in a department other than Physics) in category 3A in the AUCC.

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

⁹ Select from upper-division M, CS, ST courses, except those ending in -80 to -99.

¹⁰ A coherent set of courses outside the Mathematics Department in which mathematics is applied, approved by the concentration coordinator.

¹¹ 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, however the course work in this concentration emphasizes the use of numerical methods in applied mathematics.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
<hr/>			
<i>Select one of the following courses:</i>			
COCC 300	Writing Arguments (CO/COCC 150)	3	2B2
COCC 301A-D	Writing in the Disciplines (CO/COCC 150)	3	2B2
COCC 302	Writing Online (CO/COCC 150)	3	2B2
JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2
SPCC 200	Public Speaking	3	2B1
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	
M 229	Matrices and Linear Equations (M/M CC 141 or M/M CC 155 or M/M CC 160)	2	
	Arts/humanities ¹	3	3B
	First year seminar ²	2	1
	Health and wellness ³	2	3G
	Historical perspectives ⁴	3	3D
	Social/behavioral sciences ⁵	3	3C
TOTAL			29
SOPHOMORE			
CSCC 153	Java Programming (M/M CC 118 with a C or better or M/M CC 121 with a C or better)	4	2D
CS 166/ M 166	Discrete Structures (CS/CSCC 153 with a C or better; M/M CC 124)	4	
OR			
M 301	Introduction to Combinatorial Theory (M/M CC 160)	3	
M 261	Calculus for Physical Scientists III (M/M CC 161)	4	
M 331	Introduction to Mathematical Modeling (concurrent reg. in M/M CC 161)	3	
M 345	Differential Equations (M 229; M/M CC 161 or M/M CC 255)	4	

PHCC	141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
PHCC	142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
STCC	309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
TOTAL			31-32	
JUNIOR				
CS	200	Algorithms and Data Structures (CS/CSCC 153 with a C or better ; CS 166/M 166 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/M CC 161, M 229)	3	4A
ST	321	Elementary Probabilistic-Stochastic Modeling (M/M CC 155 or M/M CC 160; knowledge of a computer language)	3	
		Biological/physical sciences ⁶	3-5	3A
		Global and cultural awareness ⁷	3	3E
		U.S. public values and institutions ⁸	3	3F
TOTAL			30-32	
SENIOR				
M	317	Advanced Calculus of One Variable (M/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			17-20	
TOTAL			27-30	

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 1 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 category 3A 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 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score 3 to 6 or COCC 192/CO 130)	3	2A
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	
M 229	Matrices and Linear Equations (M/M CC 141 or M/M CC 155 or M/M CC 160)	2	
	Additional communication ¹	3	2B
	Arts/humanities ²	3	3B
	First year seminar(s) ³	2	1
	Health and wellness ⁴	2	3G
	Historical perspectives ⁵	3	3D
	Social/behavioral sciences ⁶	2-3	3C
TOTAL			29-30
SOPHOMORE			
CSCC 153	Java Programming (M/M CC 118 with a C or better or M/M CC 121 with a C or better)	4	2D
M 261	Calculus for Physical Scientists III (M/M CC 161)	4	
M 369	Linear Algebra (M/M CC 161, M 229)	3	4A
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PH/PHCC 141; concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
STCC 309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
	Global and cultural awareness ⁷	3	3E
	U.S. public values and institutions ⁸	3	3F
TOTAL			30
JUNIOR			
M 360	Mathematics of Information Security (M 229)	3	
OR			
M 366	Introduction to Abstract Algebra (M/M CC 161)	3	
	Biological/physical sciences ⁹	3	3A
	Mathematical sciences ¹⁰	7	
	Electives ¹¹	17	
TOTAL			30
SENIOR			
M 317	Advanced Calculus of One Variable (M/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 ¹² (M 261, M 317, M 369)	3 4C
OR			
M	466	Groups, Rings, and Fields ¹² (M 366, M 369)	3 4C
Mathematical sciences ¹⁰			5
Electives ¹¹			16
TOTAL			31

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 2B 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 1 in the AUCC, M CC 192 and STCC 192 are recommended.

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 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 3F in the AUCC.

⁹ Select a non-physics course from category 3A in the AUCC.

¹⁰ Select a total of 15 credits from the following, with 6 or more from (a). (a) Upper-division mathematics courses except M 315 and those ending in -80 to -99. (b) Upper-division M, CS, or ST courses, except those ending in -80 to -99.

¹¹ Enough upper-division elective credits must be taken to bring the total of upper-division credits to 42.

¹² 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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	2C
M 229	Matrices and Linear Equations (M/M CC 141 or M/M CC 155 or M/M CC 160)	2	
	Arts/humanities ¹	3	3B
	First year seminar ²	2-3	1
	Global and cultural awareness ³	3	3E
	Health and wellness ⁴	2-3	3G
	Historical perspectives ⁵	3	3D

		Social/behavioral sciences ⁶	3	3C
		TOTAL	29-31	
SOPHOMORE				
CSCC	153	Java Programming (M/M CC 118 with a C or better or M/M CC 121 with a C or better)	4	2D
EDCC	275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED	331	Educational Technology (BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office)	1	
ED	340	Literacy and the Learner (completion of 30 credits of course work; consent of Teacher Licensure Office)	3	
M	261	Calculus for Physical Scientists III (M/M CC 161)	4	
M	369	Linear Algebra (M/M CC 161, M 229)	3	4A
SPCC	200	Public Speaking	3	2B1
<i>Select nine to ten credits from the following set of courses:</i>				
C CC	111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC	112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C	113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C	114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
OR				
PHCC	121	General Physics I (concurrent reg. in M/M CC 125)	5	3A
PHCC	122	General Physics II (PH/PHCC 121)	5	3A
OR				
PHCC	141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
PHCC	142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
TOTAL			30-31	

		JUNIOR		
ED	350	Instruction I-Individualization/Management (EDCC 310/EDCC 275, ED 340; concurrent reg. in ED 386; admission to Teacher Licensure Program)	3	
ED	386	Practicum-Instruction I (EDCC 310/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	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/M CC 161)	4	4B
M	330	Discrete Mathematics for Educators (M/M CC 161)	3	
M	366	Introduction to Abstract Algebra (M/M CC 161)	3	
STCC	309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
		Mathematical sciences elective ⁷	3	
		TOTAL	29	

SENIOR

ED	485B	Student Teaching-Secondary (ED 450, ED 464)	11	
ED	493A	Seminar-Professional Relations (ED 450 or ED 426, ED 464, concurrent reg. in ED 485A or B or C)	1	
ED	493B	Seminar-Assessment of Learning (ED 450 or ED 426, ED 464, concurrent reg. in ED 485A or B or C or VE 485)	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 209, M 261)	3	
		Natural sciences ⁸	3-4	
		Electives	6-10	
		TOTAL	29-32	

PROGRAM TOTAL = 120 credits

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

² Select from the list of courses in category 1 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 3C in the AUCC.

⁷ Select from ST 420, ST 430, or upper-division mathematics courses except M CC 315 and those ending in -80 to -99.

⁸ With sequence chosen above, must total at least 13 credits from AUCC category 3A and include courses with at least two different prefixes.

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.

<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 COCC 192/CO 130)	3	2A

M CC	160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC	161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	2C
		Additional communications ¹	3	2B
		First-year seminar ²	2-3	1
		Global and cultural awareness ³	3	3E
		Health and wellness ⁴	2	3G
		Historical perspectives ⁵	3	3D
		Electives	6	
		TOTAL	30-31	

SOPHOMORE

CSCC	153	Java Programming (M/M CC 118 with a C or better or M/M CC 121 with a C or better)	4	2D
M	229	Matrices and Linear Equations (M/M CC 141 or M/M CC 155 or M/M CC 160)	2	
M	261	Calculus for Physical Scientists III (M/M CC 161)	4	
STCC	301	<i>Select one of the following:</i> Introduction to Statistical Methods (M/M CC 121)	3	2D
STCC	307/	Introduction to Biostatistics (M/M CC 121)	3	2D
EHCC	307			
STCC	309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
		Biological/physical sciences ⁶	7	3A
		U.S. public values and institutions ⁷	3	3F
		Electives	7	
		TOTAL	30	

JUNIOR

M	317	Advanced Calculus of One Variable (M/M CC 161)	4	
ST	302	Design of Experiments (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
ST	304	Multiple Regression Analysis (M 229, ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
ST	305	<i>Select one of following:</i> Sampling Techniques (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
ST	321	Elementary Probabilistic-Stochastic Modeling (M/M CC 155 or M/M CC 160; knowledge of a computer language)	3	
ST	460	Applied Multivariate Analysis (ST 304)	3	
		Arts/humanities ⁸	3	3B
		Social/behavioral sciences ⁹	3	3C
		Upper division CS/M/ST electives ¹⁰	6	
		Electives	5	
		TOTAL	30	

SENIOR

M	369	Linear Algebra (M/M CC 161, M 229)	3	
ST	310	Data Analysis and Database Management Tools (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
ST	420	Probability and Mathematical Statistics I (M/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 reg. or written consent to instructor)	3	4A, 4B, 4C
		Upper division CS/M/ST elective ¹⁰	3	
		Electives	12	
		TOTAL	30	

PROGRAM TOTAL = 120-121 credits

¹ Select from the list of courses in category 2B1 or 2B2 in the All-University Core Curriculum (AUCC).

² Select from the list of courses in category 1 in the AUCC; STCC 192 and M/M CC 192 are preferred options.

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.

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

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

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

¹⁰ 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 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/M CC 118 or M/M CC 121)	3	2C
M CC 315	Mathematics for Economists (M/M CC 141)	4	2C
OR			
M CC 155*	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	2C
M CC 255*	Calculus for Biological Scientists II (M/M CC 155; concurrent reg. in M/M CC 126)	4	2C
OR			
M CC 160*	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161*	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	2C
	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 314 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
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 communications 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 speculate on 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.

Characteristics And Skills

- Strong aptitude for science and mathematics
- Strong interest in physics
- Curious/innovative
- Logical and critical thinking ability
- Patience and perseverance
- Enjoys reading
- Keen power of observation
- Mechanical, electronic, and computer skills
- Good writing and oral communications skills
- Ability to work independently or in a team
- Enjoys experimentation and gathering data

Potential Occupations

Physicists find employment in industry in electronics, computers, medical technology, engineering-related fields, quality control and sales. Others teach high school physics. Physics graduates' excellent math skills are useful in business and finance as well. Those pursuing graduate degrees can work in college teaching and in research for industry, government, and education. Participation in internships, undergraduate research, 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.

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 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

<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 COCC 192/CO 130)	3	2A
CSCC 153	Java Programming (M/M CC 118 [with a C or better], or M/M CC 121 [with a C or better])	4	2D
M CC 160	Calculus for Physical Scientists I ¹ (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	2C
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
PHCC 142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A

PHCC 192	The Flying Circus of Physics	2	1
	Biological/physical sciences ²	3	
	TOTAL	30	

SOPHOMORE

C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
M 261	Calculus for Physical Scientists III (M/M CC 161)	4	
M 340	Introduction to Ordinary Differential Equations (M/M CC 255 or M 261)	4	
PH 245	Introduction to Electronics (M/M CC 161, PH/PHCC 142)	3	
PH 314	Introduction to Modern Physics (PH/PHCC 142, concurrent reg. in M 261)	4	4A, 4B
PH 315	Modern Physics Laboratory (concurrent reg. in PH 314)	2	4A, 4B
	Health and wellness ³	2	3G
	Logical/critical thinking ⁴	3	2D
	Social/behavioral sciences ⁵	3	3C
	TOTAL	30	

JUNIOR

COCC 301A-D	Writing in the Disciplines (CO/COCC 150)	3	2B2
OR			
JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2
PH 341	Mechanics (M 340, PH/PHCC 141)	4	4A, 4B
PH 351	Electricity and Magnetism (M 340, PH/PHCC 142)	4	4A, 4B
PH 353	Optics and Waves (M 261, PH/PHCC 142)	4	4A, 4B
PH 361	Physical Thermodynamics (M 261, PH/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 reg. in JT/JTCC 300)	2	4C
PH 451	Introductory Quantum Mechanics I (M 340, PH 314)	3	4A, 4B
PH 492	Seminar	1	4C
	Electives	6	
	TOTAL	12	

CORE 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 course used to satisfy AUCC category 3A.

¹ M/M CC 120A-B, M/M CC 121, M/M CC 124, M/M CC 125, and M/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 2D 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. The electronics, semiconductors, and optics option is designed for students interested in the rapidly changing technology or in areas that overlap the boundaries of traditional engineering disciplines. The computers option focuses on the application of modern computer technology to problems in physics. The chemical physics option combines thorough knowledge of both chemistry and physics, which is useful in such interdisciplinary areas as materials science, surface science, and studies of molecular systems. The medical physics option prepares students for further study in health physics; a field in increasing demand as theoretical advances are applied to medical research and practice.

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 which 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.

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)	3	4B

Technical electives ¹	12
TOTAL	18

PROGRAM TOTAL = 120 credits

¹ Majors must achieve a minimum grade of C- in PH 452, PH 462, and the technical electives selected from the departmental list.

Minor in Physics

Most technical fields require some background in physics. A minor in physics could provide students with a stronger theoretical foundation for their chosen major. For students majoring in the mathematical sciences, such as computer science and mathematics, a minor in physics will provide experience in more practical problems.

A minimum grade of C is required in all physics courses required for the minor in physics.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
PHCC 141*	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
PHCC 142*	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
TOTAL		10	
UPPER DIVISION			
PH 314*	Introduction to Modern Physics (PH/PHCC 142, concurrent reg. 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/M CC 124, M/M CC 126; PH/PHCC 110 or PH/PHCC 121 or PH/PHCC 141)	5	
AA 302*	Astrophysics II (M/M CC 124, M/M CC 126; PH/PHCC 110 or PH/PHCC 121 or PH/PHCC 141)	5	
AA 303*	Astrophysics III (M/M CC 124, M/M CC 126; PH/PHCC 110 or PH/PHCC 121 or PH/PHCC 141)	5	
PH 315	Modern Physics Laboratory (concurrent reg. in PH 314)	2	
PH 325*	Advanced Physics Laboratory (PH 315, concurrent reg. in JT/JTCC 300)	2	
PH 341*	Mechanics (M 340, PH/PHCC 141)	4	
PH 351*	Electricity and Magnetism (M 340, PH/PHCC 142)	4	
PH 353*	Optics and Waves (M 261, PH/PHCC 142)	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 B 219
Professor Ernest L .Chavez, Chair

Major in Psychology

Psychology is one of the most popular and versatile majors providing a pre-professional education in the liberal arts 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 or sociology, philosophy, technical writing and history. Undergraduate psychology courses acquaint students with the basic theories, principles, and laws of human and animal behavior with a substantial emphasis on psychological measurement and testing. Psychology graduates are expected to demonstrate knowledge of psychological principles and concepts across several basic content areas. Graduates are also expected to possess an ability to engage in analytical and critical thinking, and to demonstrate knowledge and appreciation of the scientific methods used in psychological research.

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.
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.

Characteristics and Skills

- A strong interest in the study of human behavior and development
- Preference for a strong liberal arts and sciences background
- Enjoy working with people
- Desire to develop analytical and critical thinking skills
- Enjoy obtaining and analyzing data
- Ability to apply theory to concrete issues
- Interest in psychological measurement and testing
- Prefer concrete rather than abstract problems
- Good written and oral communications skills
- Work well in structured situations
- Able to work independently or in a team

Potential Occupations

A bachelor's degree in psychology prepares students for an exceptional variety of career options. Because of the major's 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 chances 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 master's program); 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; physician.

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/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
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	2C
M CC 118	College Algebra in Context II (M/M CC 117)	1	2C
OR			
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C
PLCC 100	Appreciation of Philosophy	3	3B
PYCC 100	General Psychology	3	3C
PYCC 192	Introductory Seminar (PY/PYCC 100 or concurrent registration)	2	1
S CC 100	General Sociology	3	3C, 3F
	TOTAL	30	
SOPHOMORE			
PY 250	Experimental Psychology (PY/PYCC 100)	4	
SPCC 200	Public Speaking	3	2B1
	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
	Electives	9-10	
	TOTAL	31	
JUNIOR			
BS 300	Principles of Human Anatomy and Physiology (BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 102; C/C CC 103 or C/C CC 107 or C/C CC 111)	4	
COCC 300	Writing Arguments (CO/COCC 150)	3	2D

<i>Select two of the following:</i>			
PY 260	Child Psychology (PY/PYCC 100)	3	
PY 315	Social Psychology (PY/PYCC 100)	3	4B
PY 320	Abnormal Psychology (PY/PYCC 100)	3	4B
PY 325	Psychology of Personality (PY/PYCC 100)	3	4B
<i>Select one of the following:</i>			
PY 317	Social Psychology Laboratory (PY 250; concurrent reg. in PY 315)	2	4A
PY 341	Organizational Psychology Laboratory (PY 250, concurrent reg. in PY 340, departmental statistics requirement)	1	4A
PY 441	Industrial Psychology Laboratory (PY 250, concurrent reg. 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/M CC 121)	3	2D
ST 302	Design of Experiments (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
OR			
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
ST 310	Data Analysis and Data Base Management Tools (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
OR			
ST 310	Data Analysis and Data Base Management Tools (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
STCC 311	Statistics for Behavioral Sciences I (M/M CC 121)	3	2D
OR			
STCC 311	Statistics for Behavioral Sciences I (M/M CC 121)	3	2D
ST 312	Statistics for Behavioral Sciences II (ST/STCC 311 or written consent of instructor)	3	
Psychology elective⁶			
		0-3	
Social/behavioral sciences⁵			
		3	3C
Electives			
		9	
TOTAL			
		32-33	
SENIOR			
PY 352	Psychology of Learning (PY/PYCC 100 or written consent of instructor)	3	
OR			
PY 452	Cognitive Psychology (PY/PYCC 100 or written consent of instructor)	3	
PY 370	Psychological Measurement and Testing (PY/PYCC 100, ST/STCC 301 or ST/STCC 311, concurrent reg. in PY 371)	3	
PY 371	Psychological Measurement and Testing Laboratory (concurrent reg. in PY 370)	1	4A
PY 401	History and Systems of Psychology (PY/PYCC 100, PL 105 or PL/PLCC 120)	3	4C

		<i>Select one of the following:</i>		
PY	453	Cognitive Psychology Laboratory (PY 250; PY 452 or concurrent reg.)	2	4A
PY	455A-B	Physiological Psychology Laboratory (PY 250; concurrent reg. in PY 454A or B)	2	4A
PY	457	Sensation and Perception Laboratory (PY 250; PY 456 or concurrent reg.)	2	4A
		<i>Select one of the following:</i>		
PY	454A	Physiological Psychology (PY/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	9	
		TOTAL	27	

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 Master of Science and Doctor of Philosophy degrees are offered. A description of these programs may be found in the [Graduate and Professional Bulletin](#).

DEPARTMENT OF STATISTICS

Office in Statistics Building, Room 101
Professor Richard A. Davis, Chair

Although there is no undergraduate major in statistics offered within the department, instructional programs in the Department of Statistics 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 from a list provided in the Statistics Department. A minimum grade of C must be achieved in all statistics courses required for the minor. At least 12 credits must be in courses offered by the Statistics Department and at least 12 credits must be upper division. Any deviations must be proposed in writing by the student and approved by the undergraduate adviser in statistics or the Statistics Department Chair.

Course	Title (Prerequisite)	Cr	AUCC
ST 321*	Elementary Probabilistic-Stochastic Modeling (M/M CC 155 or M/M CC 160; knowledge of a computer language)	3	
ST 420*	Probability and Mathematical Statistics I (M/M CC 255 or M 261)	3	
STCC 301*	<i>Select one of the following courses:</i> Introduction to Statistical Methods (M/M CC 121)	3	2D
STCC 307/ EHCC 307	Introduction to Biostatistics (M/M CC 121)	3	2D
STCC 309*	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
STCC 311*	Statistics for Behavioral Sciences I (M/M CC 121)	3	2D
ST 302	Design of Experiments (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
ST 304*	Multiple Regression Analysis (M 229, ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
ST 305	<i>Select one of the following courses:</i> Sampling Techniques (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/STCC 311)	3	
ST 430	Probability and Mathematical Statistics II (ST 420)	3	
ST 460	Applied Multivariate Analysis (ST 304)	3	
	Electives*	6	
	TOTAL	21	

PROGRAM TOTAL = 21 credits without prerequisites

*Additional course work may be required because of prerequisites.

Graduate Program in Statistics

The Master of Science and Doctor of Philosophy degrees are offered. A description of these programs may be found in the [Graduate and Professional Bulletin](#).

College of Veterinary Medicine and Biomedical Sciences

Office in Anatomy-Zoology Building, Room W 102
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

Biomedical Sciences Open Option
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. Graduate studies in each of the four departments of the college lead to Master of Science and Doctor of Philosophy degrees. The college also offers a nondegree preveterinary medical program.

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 biological sciences or professional studies in veterinary medical, medical, or dental schools. Students who intend to apply to veterinary school may complete the Colorado State preveterinary requirements within the Open Option program with appropriate course selection and credit loads.

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 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, 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 which enable practicing veterinarians to obtain new medical information and meet the Colorado Veterinary Practice Act's continuing education requirements for relicensing. 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 offered in the Departments of Biomedical Sciences; Clinical Sciences; Environmental and Radiological Health Sciences; and Microbiology, Immunology, and Pathology.

The College of Veterinary Medicine and Biomedical Sciences (CVMBBS) and the College of Business have created a combined five-year program of study that can result in earning both the master of business administration degree and doctor of veterinary medicine degree. Applicants to the Professional Veterinary Medical (PVM) program are encouraged to consider extending their veterinary education to include a one-year start to an M.B.A. degree. After successfully completing the first year of the M.B.A. program, students will be guaranteed admission to the first year of the PVM program and will be expected to complete the remaining M.B.A. course requirements concurrently with the first two years of the PVM curriculum. A recent national study of the veterinary profession indicated that traditional scientific skills and knowledge might not be sufficient to capitalize on future economic opportunities. This program was undertaken to improve training of our students in veterinary practice management and business skills.

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 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 evaluates each applicant to recommend those best qualified. Information concerning the academic program which leads to the Doctor of Veterinary Medicine (D.V.M.) degree may be found in the [Graduate and Professional Bulletin](#) or at www.cvmbbs.colostate.edu/cvmbbs/pvmpro.html. The full course of study requires a 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 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 which 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 preveterinary requirement is a minimum of 68 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 so 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 these 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 (BZ/BZCC 110 or concurrent reg.)	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 (BY/LSCC 102)	4	

<i>Select one of the following sets of courses:</i>			
C CC 107	Fundamentals of Chemistry (M/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A
OR			
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111, M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
M CC 155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	2C
	Arts/humanities ¹	3	3B
	First year seminar ²	2-3	1
	Historical perspectives ³	3	3D
	Social/behavioral sciences ⁴	3	3C
TOTAL		31-36	
SOPHOMORE			
BC 351	Principles of Biochemistry (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 343 or concurrent reg. in C 343)	4	
<i>Select one of the following courses:</i>			
BZ 346	Population and Evolutionary Genetics (BZ 220, M/M CC 155, ST/STCC 301 or ST/STCC 307 or EH/EHCC 307)	3	
BZ 350	Molecular and General Genetics (BY/LSCC 102; one course in statistics)	4	
BZ 455	Human Heredity and Birth Defects (BZ/BZCC 111 or BY/LS 103)	3	
MB 450	Microbial Genetics (MB 300; BC 351 or BC 401 or concurrent reg.)	3	
SC 330	Principles of Genetics (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102)	3	
<i>Select one of the following sets of courses:</i>			
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
C 246	Fundamentals of Organic Chemistry Laboratory (C/C CC 108 or C/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	
PHCC 121	General Physics I (concurrent reg. in M/M CC 125)	5	3A
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
OR			
STCC 307/ EHCC 307	Introduction to Biostatistics (M/M CC 121)	3	2D
	Additional communication ⁵	3	2B
	Global and cultural awareness ⁶	3	3E

Health and wellness ⁷	2-3	3G
U.S. public values and institutions ⁸	3	3F
TOTAL	31-36	

PROGRAM TOTAL = 62-72 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 1 in the AUCC; IUCC 192 is preferred.

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 2B1, 2B2, or 2B3 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 3F in the AUCC.

DEPARTMENT OF BIOMEDICAL SCIENCES

Office in Physiology Building, Room 101
Professor Barbara M. Sanborn, Head

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 but no undergraduate major is offered. Plans for a major in biomedical sciences are proceeding with a tentative start date of Fall Semester 2004.

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 educational goals and interests.

Course	Title (Prerequisite)	Cr	AUCC
REQUIRED COURSES			
BS 230*	Animal Anatomy and Physiology (C/C CC 107, BY/LSCC 102)	3	
	AND		
BS 231	Gross Anatomy of Domestic Animals (BS 230 or concurrent reg.)	2	
	OR		
BS 300*	Principles of Human Anatomy and Physiology (BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 102; C/C CC 103 or C/C CC 107 or C/C CC 111)	4	

BS 301	Human Gross Anatomy ¹ (BZ/BZCC 110 or BY/LSCC 102)	5
	OR	
BS 331	Histology ¹ (BS 230 or BS 300)	4
BS 325	Cellular Neurobiology ¹ (BS 300 or BY 310)	3
	OR	
BS 345	Functional Neuroanatomy ¹ (BS 300)	4
	TOTAL	11-14

ELECTIVE COURSES

BS 200	Concepts in Human Anatomy and Physiology (concurrent reg. in BS 300)	1
BS 301	Human Gross Anatomy (BZ/BZCC 110 or BY/LSCC 102)	5
BS 325	Cellular Neurobiology (BS 300 or BY 310)	3
BS 331	Histology (BS 230 or BS 300)	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	Var.
BS 495	Independent Study	Var.
BS 575	Human Anatomy Dissection (BS 301 and written consent of instructor)	4
BY 310*	Cell Biology (one semester of organic chemistry or concurrent reg.; two semesters of introductory biology)	4
BY 311	Developmental Biology (BY 310 or written consent of instructor)	4
	TOTAL	7-10

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 anatomy or physiology. 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 A 201
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
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, problem 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).

Characteristics And Skills

- Strong interest in how people interact with their environment
- Aptitude for natural and biological sciences as well as mathematics
- Strong analytical ability and investigative skills
- Prefers hands on work
- Well organized and pays attention to detail
- Ability to work in a team or independently
- Strong communication skills
- Can work indoors and in the field

Potential Occupations

As society becomes more aware of the human health effects of internal and external environments, the need for experts trained to analyze and manage environmental health issues will expand. Participation in internships, volunteer activities, or cooperative education opportunities is highly recommended to enhance your practical training and development. Graduates who continue 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: toxicologist; epidemiologist; occupational health physician and nurse; industrial hygienist; health educator; hazardous and solid waste specialist; air and water pollution specialist; sanitarian.

M CC 120A-B, M CC 121, and M CC 124 are considered review courses in the major.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BSCC 192	First Year Seminar in Biomedical Sciences	2	1
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.)	1	3A
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
EHCC 110/ BSCC 110	Human Health and Environmental Perspective (high school biology)	3	3G
EH 220	Environmental Health (BZ/BZCC 101 or BZ/BZCC 104 or BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102 or concurrent reg.)	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/M CC 124, M/M CC 125)	4	2C
	Social/behavioral sciences ¹	3	3C

		U.S. public values and historical perspectives ²	3	3D, 3F
		TOTAL	32	
SOPHOMORE				
C CC	111	General Chemistry I (MM CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC	112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C CC	113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C CC	114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
EHCC STCC	307/ 307	Introduction to Biostatistics (M/M CC 121)	3	2D
PHCC	121	General Physics I (concurrent reg. in M/M CC 125)	5	3A
PHCC	122	General Physics II (PH/PHCC 121)	5	3A
		Additional communication ³	3	2B
		Arts/humanities ⁴	3	3B
		Global and cultural awareness ⁵	3	3E
		TOTAL	31	
JUNIOR				
BS	300	Principles of Human Anatomy and Physiology (BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 102; C/C CC 103 or C/C CC 107 or C/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 reg.)	3	4A
EH	332	Principles of Epidemiology (EH/EHCC 307 or ST/STCC 307; MB/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 (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 345 or concurrent reg.)	3	
MB	302	General Microbiology Laboratory (MB 300 or concurrent reg.)	2	
R	300	Introduction to Radiation Biology (BY/LSCC 102, PH/PHCC 121)	3	
		TOTAL	30	
SENIOR				
BC	351	Principles of Biochemistry (BZ/BZCC 110 or BZ/BZCC 120 or BY/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 laboratory)	1	

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, EH 350)	2	
EH	487V	Internship-Environmental Health Program electives ⁶	7	4C
		TOTAL	4	
		TOTAL	27	

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 2B1, 2B2, or 2B3 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 the 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. 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 B 116
Professor Stephen A. Benjamin, Interim Head

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 past work in this field was directed toward the cure, control, or eradication of disease in humans and animals. Recent research has focused upon the use of microorganisms for the production of improved foods and new medicines. Discoveries of how to insert new genes into microorganisms and how to produce antibodies against organisms that cause disease has great potential to influence human health. Use of microbial agents to “digest” toxic wastes may help clean up local environments or avert major disasters.

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.

Characteristics and Skills

- Understanding of physics, chemistry, mathematics
- Knowledge of microbial genetics, microbial physiology, organic chemistry, biochemistry, molecular biology, virology and immunology
- Ability to analyze data and test theories
- Knowledge and practice in laboratory techniques and procedures
- Ability to write and speak effectively
- Creativity and problem solving skills
- Ability to work independently and cooperate with other scientists
- A deep curiosity about the origins, structure, and behavior of microbial life

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, and an increasing concern for the impact of industrial and accidental pollution of soil and water.

Academic programs in microbiology prepare students for employment in research and production laboratories operated by government agencies, industry, or private foundations. Microbiologists also work in hospitals, clinics, and public health agencies. 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 your chances for permanent full time employment. Positions are available in government, industry, and academic institutions.

Depending on student interests, the electives taken, and the minor selected, available career choices include, but are not limited to: medical microbiologist; diagnostic microbiologist; public health microbiologist; environmental microbiologist; virologist; mycologist (studies fungi); immunologist; microbial geneticist; microbial physiologist; industrial microbiologist; agricultural microbiologist; space microbiologist; medical technologist; bacteriologist.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
C CC 111	General Chemistry I (M/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher)	4	3A
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
C 113	General Chemistry II (C/C CC 107 or C/C CC 111; M/M CC 124, M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent reg. in M/M CC 155 or M/M CC 160)	3	
C 114	General Chemistry Laboratory II (C/C CC 112, C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam score of 3 to 6 or COCC 192/CO 130)	3	2A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
M CC 155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	2C
	OR		
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C
MBCC 192	Microbiology First-Year Seminar	2	1
SPCC 200	Public Speaking ¹	3	2B1
	Biology elective ²	3-5	
	TOTAL	28-30	
SOPHOMORE			
C 331	Quantitative Analysis (C 113)	3	
C 334	Quantitative Analysis Laboratory (C 114; C 331 or concurrent reg.)	1	
C 345	Organic Chemistry I (C 113, C 114)	4	
C 346	Organic Chemistry II (C 345)	4	
MB 300	General Microbiology (BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 345 or concurrent reg.)	3	4B
MB 302	General Microbiology Laboratory (MB 300 or concurrent reg.)	2	4B
MB 342	Immunology (MB 300)	4	
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
	OR		
STCC 307/ EHCC 307	Introduction to Biostatistics (M/M CC 121)	3	2D
	U.S. public values and institutions ³	3	3F
	Electives	6	
	TOTAL	33	
JUNIOR			
	<i>Select one of the following sets of courses:</i>		
BC 351	Principles of Biochemistry (BZ/BZCC 110 or BZ/BZCC 120 or BY/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 laboratory)	1	
	OR		
BC 401	Comprehensive Biochemistry I (C	3	

<i>Select one pair of the following courses:</i>				
PHCC	121	General Physics I (concurrent reg. in M/M CC 125)	5	3A
PHCC	122	General Physics II (PH/PHCC 121)	5	3A
OR				
PHCC	141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A
PHCC	142	Physics for Scientists and Engineers II (PH/PHCC 141, concurrent reg. in M/M CC 161 or M/M CC 255)	5	3A
MB	351	Medical Microbiology (MB 342)	3	
		Arts/humanities ⁴	3	3B
		Microbiology electives ⁵	4	
		Electives	3	
		TOTAL	28-31	

SENIOR

MB	400A-F	Capstones in Microbiology (MB 420 or concurrent reg.)	2	4C
OR				
MB	498	Research (MB 301 or MB 302)	1-6	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 ⁶	3	3E
		Health and wellness ⁷	2	3G
		Historical perspectives ⁸	3	3D
		Social/behavioral sciences ⁹	3	3C
		Microbiology electives ¹⁰	3	
		Electives ¹¹	0-4	
		TOTAL	30-31	

PROGRAM TOTAL = 120-124 credits

¹ A number of additional courses will work for this category; refer to categories 2B1, 2B2, and 2B3 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 3F in the AUCC.

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

⁵ Select from approved list in department. One chosen course must be a laboratory course.

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 list in department.

¹¹ Student may take 0-4 elective credits depending upon earlier biology or biochemistry choices to yield a 120 credit program.

Medical Technology Program

Students who complete the B.S. degree in microbiology are eligible to enter a 12-month medical technology internship at any hospital accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). Students are awarded a certificate in medical technology by the hospital at the conclusion of the internship and, upon successful completion of a national board examination, are certified to practice as professional clinical laboratory scientists.

Students who wish to enter a medical technology program should consult the key adviser in the Department of Microbiology, Immunology, and Pathology for assistance in selection of elective courses, and in selecting and applying to an internship program.

Minor in Microbiology

A minor in microbiology will be of considerable benefit to students majoring in biological science, natural science, food science, biochemistry, some fields of engineering, and other science-related fields. Microbiology courses can be selected on the basis of students' specialized interest in biomedical, environmental, industrial (biotechnology), or food microbiology.

Course	Title (Prerequisite)	Cr	AUCC
UPPER DIVISION			
MB 300*	General Microbiology (C 245 or C 345 or concurrent reg.; BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	3	
MB 302	General Microbiology Laboratory (MB 300 or concurrent reg.)	2	
MB 342	Immunology (MB 300)	4	
A total of 12 credits must be selected from the following lists.			
<i>Select at least one course from each of the following pairs:</i>			
MB 351	Medical Microbiology (MB 342)	3	
OR			
MB 420	Medical and Molecular Virology (MB 342; BC 351 or BC 401 or concurrent reg.)	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 reg.)	3	
<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 (MB 300)	3	
MB 343	Immunology Laboratory (MB 301 or MB 302; MB 342 or concurrent reg.)	2	
MB 350	Microbial Diversity (MB 300)	3	
MB 351	Medical Microbiology (MB 342)	3	
MB 352	Medical Microbiology Laboratory (MB 301 or MB 302; MB 351 or concurrent reg.)	3	
MB 420*	Medical and Molecular Virology (MB 342; BC 351 or BC 401 or concurrent reg.)	4	
MB 425	Virology and Cell Culture Laboratory (MB 301 or MB 302; MB 420 or concurrent reg.)	2	
MB 432	Aquatic Microbiology (MB 301 or MB 302)	4	
MB 436	Industrial Microbiology (MB 301 or MB 302)	4	
MB 443*	Microbial Physiology (MB 300; BC 351 or BC 401)	4	

(Continued in the next column)

MB	450*	Microbial Genetics (MB 300; BC 351 or BC 401 or concurrent reg.)	3
MB	462/	Parasitology and Vector Biology	5
BZ	462/	(BZ/BZCC 110 or BY/LS 103; MB 301 or MB 302 or BZ 212)	
BI	462*		
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

Programs leading to the Master of Science degree in microbiology and Doctor of Philosophy degrees in microbiology or pathology are offered. A description of these programs may be found in the [Graduate and Professional Bulletin](#).

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 2A). F, S, SS.

7
 |
 Prerequisite: Composition Placement Examination score of 3 to 6 or COCC 192/CO 130.

Expository and argumentative writing emphasizing purpose and audience; writing and reading processes; development of ideas; coherence; effective style. (\$, 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 2003 and alternate years thereafter.
- * Offered in 2004 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
Agronomy (see Soil and Crop Sciences)	SC

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 Industrial Relations (see Business Management)	BN
Business Information Systems	BD
Business Management	BN
Business Management Science	BQ
Business Marketing	BK
Business Production and Operations Management (see Business Management)	BN
Cell and Molecular Biology	CM
Chemical Engineering	CH
Chemistry	C
Civil Engineering	CE
Clinical Sciences	VS
Composition	CO
Computer Science	CS
Construction Management, Manufacturing Technology and	MC
Consumer and Family Studies	CF
Dance	D
Design and Merchandising	DM
Earth Resources (see Geosciences or Watershed Science)	
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
Ethnicity, American	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
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	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 2A)

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 *First Year Seminar*
- 2 *Core Competencies*
 - 2A Written Communication
 - 2B Additional Communication
 - 2C Mathematics
 - 2D Logical/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 class schedule and addendum for a listing of courses 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.

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)

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

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/A CC 116 and IE/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)

A CC 192A-B 02(0-0-2). Orientation to Agricultural Systems. (AUCC 1). +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 CC 192 or first-year seminar. 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/A CC 270 and IE 270A/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)

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) C) Communications. (Ω) D) Project management. (Ω) E) Spreadsheets. (Ω) F) Presentation technology. (Ω)

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 346 03(3-0-0). Principles of Cooperative Extension. F.

Traditional and contemporary delivery systems of Cooperative Extension emphasizing structures of nonformal education. (Ω)

+A 383/NR 383 02(0-2-1). U.S. Travel-Integrated Resource Management. S. Prerequisite: A 224/NR 224. 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)

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)

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)

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)

A 487 Var [1-12]. Internship. Prerequisite: A 346.

A 492A-B Var [1-3]. Seminar. Prerequisite: A) A 346; concurrent registration in A 487.

A) Agricultural extension education. B) General.

A 495 Var. 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 547 04(2-0-2). Delivery of Cooperative Extension Programs. F. Prerequisite: A 346 or concurrent registration.

Methods, techniques, and procedures in planning, implementation, and delivery of Cooperative Extension programs. (Ω)

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. 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.

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. Independent Study.

A 698 Var. Research. (Ω)

ASTRONOMY COURSES

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: AA/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/M CC 124, M/M CC 126; PH/PHCC 110 or PH/PHCC 121 or PH/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/M CC 124, M/M CC 126; PH/PHCC 110 or PH/PHCC 121 or PH/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/MCC 124, M/M CC 126; PH/PHCC 110 or PH/PHCC 121 or PH/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

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.

APPAREL AND MERCHANDISING COURSES

Department of Design and Merchandising College of Applied Human Sciences

AM 101 03(3-0-0). Fashion Industries. F, S, SS.

Development, organization, and trends of domestic and foreign fashion industries. (Ω)

AM 130 03(3-0-0). Design Appreciation-Apparel and Merchandising. F, S, SS. Credit not allowed for both AM 130 and DM 130.

Impact of elements and principles of design on apparel and merchandising. (Ω)

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)

AMCC 250 03(3-0-0). Clothing, Adornment and Human Behavior. (AUCC 3E). S.

Psychological, sociological and cultural factors influencing clothing and adornment.

AM 270 03(3-0-0). Merchandising Processes. S. Prerequisite: M/M CC 117 and M/M CC 118 or M/M CC 120A-B and M/M CC 121; M/M CC 124 or three credits of higher level math.

Forecasting, planning, evaluating, and presenting merchandise lines to meet target market demands. (Ω)

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 EC/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 345 03(0-6-0). Draping Design. F. 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)

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: AM/AMCC 250, PY/PYCC 100 or S/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.** F. Prerequisite: AM 270; DM 130.

Application of design/merchandising principles to retail selling environments, including traditional store design/layout, direct mail, and Websites.

AM 479 03(3-0-0). Merchandising Policies and Strategies. F, S. Prerequisite: AM 270, AM 330, AM 366, AM 371, DM 360/BK 360.

Examination of merchandising environment as influenced by its structure, and economic, legal, demographic, and psychographic trends.

AM 490A-D Var. Workshop.

A) Merchandising. B) Apparel design. C) Apparel production. D) Textiles and clothing.

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 590A-B Var. Workshop.

A) Merchandising. B) Apparel.

ANIMAL SCIENCE COURSES

*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 100.

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. (\$)

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 100. 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)

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)

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.

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 6 credits allowed in course.

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/C CC 107 or C/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 10 credits allowed in course.

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, C 246 or C 342 or C 346, C 344.

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. S. Prerequisite: AN 240, 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. 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 100, 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. F. Prerequisite: AN 360

Formulation, processing, and analysis of meat products.

AN 474 03(2-2-0). Swine Production. F. 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 towards graduation.

AN 495 Var. Independent Study. Maximum of 6 credits allowed towards graduation.

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 560 03(3-0-0). Issues in the Meat Industry. F. Prerequisite: AN 100.

Current issues in U.S. meat production, processing, marketing, and consumption.

AN 565 03(3-0-0). Interpreting Animal Science Research. S. Prerequisite: AN 100; ST/STCC 301 or ST/STCC 307 or EH/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 100.

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.** S. 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. F. 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****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 192A 03(1-0-2) Cultures of the World. (AUCC 1 and 3C). F, S.

Interactive introduction to a broad variety of cultures using anthropological methods of investigation.

APCC 192B 03 (1-0-2) Humans in Prehistory. (AUCC 1 and 3D). F.

Contemporary methods used by archaeologists; prehistoric human cultural developments world wide.

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: AP/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: AP/APCC 100.

Sub-Saharan life styles including marriage and family, traditional government, religion and magic, ecology and economy, art, music, and literature.

°AP 312 03(3-0-0). Modern Indian Culture and Society. S. Prerequisite: AP/APCC 100 or AP/APCC 200.

Anthropological contributions to the understanding of contemporary India.

AP 315 03(3-0-0). Psychological Anthropology. F. Prerequisite: AP/APCC 100, PY/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: AP/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)

***AP 319 03(2-0-1). Latin American Peasantries.** S. Prerequisite: AP/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: AP/APCC 100 or AP/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: AP/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: AP/APCC 100; AP 150/APCC 120 or BY 220 or BZ/BZCC 101.

Roles of technology, economics, social organization, and ideology in human adaptations to and survival in natural and cultural environments.

***AP 331 03(3-0-0). Peoples of Latin America.** F.

Economic, religious, and social bases of cultural variation as result of both colonization and recent impacts from global restructuring.

***AP 332 03(3-0-0). Peoples of the Caribbean.** F. Prerequisite: AP/APCC 100 or AP/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: AP/APCC 100 or AP/APCC 200 or E/E CC 140 or S/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: AP/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: AP/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: AP/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: AP/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 370 03(3-0-0). Primate Behavior and Ecology. S. Prerequisite: AP 150/APCC 120 or BZ/BZCC 101.

Behavioral patterns, ecological relationships, and communication of nonhuman primates.

AP 372 03(2-2-0). Human Osteology. F. Prerequisite: AP 150/APCC 120 or BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 102 .

Human bones and teeth in a review of functional human evolution.

AP 373 03(3-0-0). Human Evolution. S. Prerequisite: AP 150/APCC 120 or BZ/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: AP 150/APCC 120 or BZ/BZCC 101 or BZ/BZCC 110 or BY/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: AP 150/APCC 120 or BZ/BZCC 110 or BY/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: AP 150/APCC 120 or BZ/BZCC 110 or BY/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: AP/APCC 100 or APCC 192A or AP/APCC 200; AP/APCC 140 and APCC 192B or AP 150/APCC 120 and AP 151/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: AP/APCC 100 or AP/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: AP/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 Aborigines.

***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.

***AP 422/*S 422 03(3-0-0). Comparative Legal Systems.** S. Prerequisite: AP/APCC 100 or S/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: AP/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: AP/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: AP/APCC 100, ET/ETCC 200 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: AP/APCC 100 or APCC 101/APCC 192A; AP 150/APCC 120 and AP 151/APCC 121; AP/APCC 140 or APCC 141/APCC 192B.

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: AP/APCC 100 or AP/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: AP/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: AP 150/APCC 120, AP/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: AP 150/APCC 120 or BZ/BZCC 101 or BZ/BZCC 110 or BY/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 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: AP/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 “traditional” 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.

***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 543 03(3-0-0). Method and Theory in Ethnology. F, S. Prerequisite: Nine credits in cultural anthropology.

Major schools of thought in cultural anthropological theory, field work, and analytical methods and models.

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 548 03(1-0-2). Altered States of Consciousness. S. Prerequisite: Nine credits in anthropology or written consent of instructor.

Cultural theories of altered states of consciousness; various social and expressive aspects of trance, spirit possession, glossolalia.

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: AP/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.

Theory and applications in biological anthropology focusing on syntheses and interpretations of human biology, variation, adaptability, and evolution.

***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

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 106A-E 03(0-6-0). Art Studio. F, S, SS.

A) Painting. B) Printmaking. C) Sculpture. D) Fibers. E) Metalsmithing and jewelry.

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.

Use of photographic imagery as an art medium. (\$)

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. (\$)

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-L Var [1-4]. Independent Study.

A) Painting. B) Printmaking. C) Sculpture. (S) D) Fibers. E) Metalsmithing and jewelry. (S) F) Drawing. G) Graphic design. H) Art history. I) Art education. J) Pottery. K) Photo image making. L) Papermaking.

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: AR/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: AR/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: AR/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; AR/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: ED 310/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 310/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. (\$)

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. (\$)
- 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. (\$) M) Metalsmithing and jewelry. (\$) N) Drawing. O) Graphic design. P) Art history.

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. (\$) M) Metalsmithing and jewelry. (\$) N) Drawing. O) Graphic design. P) Art history.

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) Metal smithing 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**Department of Aerospace Studies****Office of Provost/Academic Vice President****AS 101 01(1-0-0). Foundations of the Air Force I.** F, S.

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.

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**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, PH/PHCC 122 or PH/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: PH/PHCC 142, ST/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-S 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.

***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.

***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 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, M/MCC 161, PH/PHCC 122 or PH/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-S 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.

AMERICAN STUDIES COURSES

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; senior status or written consent of instructor.

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.

ANATOMY AND NEUROBIOLOGY COURSES (AY)

Prefix changed to Biomedical Sciences (BS)

BUSINESS ACCOUNTING COURSES

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). Applications of Accounting Technology. S. Prerequisite: BA 220.

Communicating and processing accounting information using current software applications.

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. Prerequisite: BA 205 or BA 210.

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 421 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.

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)

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)

BA 601 03(3-0-0). Professional Practice. F. Prerequisite: BA 441.

Management of accounting practice; professional ethics and regulation; research techniques.

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.

BA 622 03(3-0-0). Advanced Cost and Managerial Accounting. S. Prerequisite: BA 321.

Contributions of cost accounting to decision making and planning.

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)

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)

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.

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)

BA 641 03(3-0-0). Contemporary Auditing. S. Prerequisite: BA 441.

Seminar exploring various facets of the assurance services environment. (Ω)

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.

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.

BA 695 Var. Independent Study.

BA 696 Var. Group Study.

BIOCHEMISTRY AND MOLECULAR BIOLOGY COURSES

*Department of Biochemistry and
Molecular Biology*

College of Natural Sciences

BCCC192 02(1-0-1). Biochemistry Freshman Seminar. (AUCC 1). F.

Introduction to curriculum and career options for biochemistry majors.

BC 295 Var [1-3]. Introductory Independent Study. F, S, SS. Prerequisite: BY/LSCC 102 and C/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: BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 342 or C 346 or concurrent registration in C 342 or 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 342 or C 346 or concurrent registration in C 342 or C 346; M/M CC 155 or M/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.

BC 441 01(0-1.5-.5). 3D Molecular Models for Biochemistry. S. Prerequisite: BC 401 or written consent of instructor.

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.

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 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 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 bio-molecular 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.

BC 798 Var. Research.

BC 799 Var. Dissertation.

BUSINESS INFORMATION SYSTEMS COURSES

Department of Computer Information Systems College of Business

BD 111 01(1-0-0). Software Productivity Tool Proficiency. F, S, SS. Credit not allowed for both BD 111 and BD 150.

Certification of expertise in software packages such as Excel, Word, Windows, and Powerpoint.

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. Credit not allowed for both BD 150 and BD 111.

System hardware, operating environments, and software applications. (Ω)

BD 200 03(3-0-0). Information Technology. F, S.

Overview of technology used in e-commerce, development of e-commerce sites, ethical and social issues of e-commerce.

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)

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 345 03(3-0-0). Operating Environments and Systems. F. Prerequisite: BD 240 with grade of C or better; CS/CSCC 153 with grade of C or better.

Fundamentals of computer hardware and operating systems including Unix and Windows/NT server.

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.

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 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 575 03(3-0-0). Quality and Productivity Improvement. S. Prerequisite: BQ 270.

TQM concepts including hoshin planning, quality function deployment, ISO 9000; selected management, planning, quality control tools; quality awards.

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.

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

College of Engineering

BE 470 03(3-0-0). Biomedical Engineering. S. Prerequisite: BS 300.

Application of engineering toward understanding 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 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 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/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.

°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/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

Department of Finance and Real Estate College of Business

BF 250 03(3-0-0). Personal Investments. F.

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; EC/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, EC/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.

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: EC/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: BG/BGCC 205 or BG/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. F. 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. 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. 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)

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.****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.**BG 496 Var. Group Study.****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 620 02(2-0-0). Leadership, Ethics and Team Dynamics. F. Prerequisite: Admission to M.B.A. program.

Roles of leaders in dynamic work environment: successful teams; elements of team relationships; workplace diversity, team processes and performance.

BG 621 02(2-0-0). Strategic Management for Competitive Advantage. F. Prerequisite: Admission to M.B.A. program.

Working knowledge of the strategic dimension of management in a competitive environment, including business simulation.

BG 625 02(2-0-0). Managerial Communication Strategies. F, S.

Problem solving and strategic communication skills through experiential learning.

BG 630 02(2-0-0). Information Technology Infrastructure. F, S. Prerequisite: Admission to M.B.A. program.

Hardware, systems software, and communications technology infrastructure and its enterprise, process, and functional implications.

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). Manufacturing and Service. F, S. Prerequisite: Admission to M.B.A. program.

Basic understanding of production systems, and functions of both line and staff components.

BUSINESS GENERAL COURSES

College of Business

BG 100 03(3-0-0). Business Concepts and Issues. F, S, SS.

Business concepts: accounting, finance, information systems, management, marketing, international business, small business, ethics, diversity, careers.

BGCC 192 03(1-0-2). First Year Seminar in Business. (AUCC 1). F, S, SS.

Development of university survival skills, as well as critical thinking skills, with emphasis on business applications.

BG 200 03(3-0-0). Business Communications and Report Writing. F, S, SS. Prerequisite: CO/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 BG/BGCC 205 and BG/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). Legal Environment of Business. F, S, SS. Credit not allowed for both BG/BGCC 260 and BG/BGCC 205.

Norms, rules, laws, ethical principles, and values central to public life in the United States in the conduct of business.

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 655 04(4-0-0). Marketing Management. F, S. Prerequisite: BG 635.

Marketing systems including products and services, domestic and global markets, traditional and electronic modes.

BG 660 02(2-0-0). Social and Regulatory Issues in Business. SS. Prerequisite: Admission to M.B.A. program.

Social, ethical, and global issues relevant to business decision making.

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). Analysis of Dynamic Enterprises. S, SS. Prerequisite: BG 620, BG 621, BG 625, BG 630, BG 641, BG 650, BG 655.

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.

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: BZ/BZCC 120 or BY/LS 103; C/C CC 107 or C/C CC 111.

Classification, characteristics, reproduction, identification, ecology of weeds; weed control by cultural, biological, and chemical means; herbicides. (\$)

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: BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100 or BY/LSCC 102.

Diseases of economic plants.

+BI 365 04(3-3-0). Integrated Tree Health Management. F. Prerequisite: BZ/BZCC 120 or BY/LSCC 102.

Insects and diseases in forest and urban ecosystems. Effects, diagnosis, prevention, and interactions. (\$)

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, F) Two courses in plant pathology, weed science, or entomology. C) BI 402G or concurrent registration and one course in plant pathology, weed science, or entomology. G) One course in plant pathology, entomology or weed science.

Application of plant health principles to: A) Vegetable and field plants. (\$) B) Greenhouse and foliar plants (\$) C) Turf and woody ornamental plants. (\$) 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: BZ/BZCC 111 or BY/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: BZ/BZCC 111 or BY/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.** F. 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 BI308 or 10 credits of biology.

Concepts of integrated pest management and the strategies and tactics employed in the application of these concepts.

BIOTECHNOLOGY COURSES

College of Veterinary Medicine and Biomedical Sciences

BH 306 04(3-2-0). Bioprocess Engineering. S. Prerequisite: C/C CC 107 or C/C CC 111; PH/PHCC 121 or PH/PHCC 141.

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.

BIOAGRICULTURAL SCIENCES AND PEST MANAGEMENT COURSES

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 100. Credit not allowed for both BI 300 and AN 300B.

Identification, biology, and management of insect, tick, and mite pests.

BI 460 01(0-2-0). Plant Health Capstone. S. Prerequisite: Senior standing. Collaboration on case studies based on faculty field experiences.

BI 462/MB 462/BZ 462 05(3-4-0). Parasitology and Vector Biology. F. Prerequisite: BZ/BZCC 110 or BY/LS 103; MB 301 or MB 302 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(.5-1-0). F. °D) Plant nematology 01(.5-1-0). F. °E) Molecular plant-microbe interactions 01(1-0-0). S. °F) Plant disease epidemiology. 01(1-0-0). S. °G) Plant disease management 01(1-0-0). S.

°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.

***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/°BZ 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 340 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 350 or BZ 346 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

Department of Marketing *College of Business*

BK 300 03(3-0-0). Marketing. F, S, SS. Prerequisite: EA/EACC 202 or EC/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: EC/ECCC 101 or EC/ECCC 202 or EA/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)

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.

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, ST/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 615 02(2-0-0). Marketing Research and Needs Identification. S, SS. Prerequisite: Admission to graduate degree program.

Analysis of consumer industrial product developments, market needs and research, and related management issues.

BK 625 02(2-0-0). Managing Customer Service. F. Prerequisite: Minimum of 9 graduate credits in management.

Understanding impact of operations, human resources, and marketing on customer service.

BK 640/BK 640 02(2-0-0). Supply Chain Management Strategies. F. Prerequisite: BN 600. Credit not allowed for both BK 640 and BK 640.

How to create an effective supply chain management system to establish an efficient network for supplying final consumption.

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.

BUSINESS MANAGEMENT COURSES

Department of Management *College of Business*

BN 301 03(3-0-0). Production Fundamentals. F, S, SS. Prerequisite: ST/STCC 204 or ST/STCC 301.

Fundamental concepts in design, planning, operation, and control of producing systems, and decision making in the production function.

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(2-0-1). 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.

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. Prerequisite: BG 200.

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.

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, BK 615.

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/BK 640 02(2-0-0). Supply Chain Management Strategies. F. Prerequisite: BN 600. Credit not allowed for both BN 640 and BK 640.

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

Department of Computer Information Systems College of Business

BQ 270 03(2-2-0). Basic Business Statistics. F, S, SS. Prerequisite: ST/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: ST/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

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.

BSCC 192 02(0-0-2). First Year Seminar in Biomedical Sciences. (AUCC 1). F.

The university and its resources, college survival skills, careers in the biomedical sciences; current issues in health and biotechnology.

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/C CC107, BY/LSCC 102.

Comparative systemic anatomy and physiology of farm animals.

BS 231 02(1-2-0). Gross Anatomy of Domestic Animals. S. Prerequisite: BS 230 or concurrent registration.

Comparative gross anatomy of domestic animals. (\$)

BS 240 03(3-0-0). Human-Animal Interactions. S. Prerequisite: BY/LSCC 102.

Animal cognition and behavior, animal ethics, and human-animal interactions: pets, livestock, service, entertainment, wildlife, teaching, and research.

BS 254/HD 254 03(3-0-0). Biological Aspects of Human Development. F, S. Prerequisite: BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 102. Credit not allowed for both BS 254 and HD 254.

Human embryology, genetics, developmental processes resulting in birth defects, human physical development through the lifespan.

BS 300 04(4-0-0). Principles of Human Anatomy and Physiology. F, S, SS. Prerequisite: BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 102; C/C CC 103 or C/C CC 107 or C/C CC 111.

Anatomy and physiology of humans.

BS 301 05(3-2-1). Human Gross Anatomy. F. Prerequisite: BZ/BZCC 110 or BY/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 310/BZ 310 03(3-0-0). Fundamentals of Physiology. S. Prerequisite: BZ/BZCC 101 or BZ/BZCC 110 or BY/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.

BS331 04(3-2-0). Histology. F, S, SS. Prerequisite: BS 230 or BS 300. Credit not allowed for both BS 331 and BS 502.

Analysis of animal cells, tissues and organs emphasizing light microscopy. (Ω)

BS 332 01(0-2-0). Microscopy. F, S, SS. Corequisite: BS 331.

Hands-on manipulation of glass slides utilizing microscopes with primary focus on animal histological structures.

BS 345 04(3-2-0). Functional Neuroanatomy. S. Prerequisite: BS 300.

Functional systems and circuits of the human brain and spinal cord. (\$)

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 401 03(3-0-0). Animal Cell Ultrastructure. S. Prerequisite: BS 300; BY 310.

Ultrastructure and function of animal cells; emphasis on organelle structure and function in mammalian tissues.

BS 404 02(1-3-0). Biological Preparation for Light Microscopy. S. Prerequisite: BY 310.

Traditional and contemporary techniques for preparation of tissues for light microscopy.

- 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 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 502 04(3-3-0). Histology.** F. Prerequisite: BS500 or concurrent registration. Credit not allowed for both BS 502 and BS 331.
Analysis of animal cells, tissues and organs emphasizing light microscopy; reference to ultrastructural details.
- BS 531 03(0-4-1). Domestic Animal Dissection.** S. Prerequisite: BS 231.
Detailed dissection of domestic animals; special projects or specimens will be included as available.
- 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: PH/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 610 01(1-0-0). Managing a Career in Science.** F.
Survival skills for professionals. How to succeed in science, including improving writing, teaching, speaking; finding the right job.
- 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.
- *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 01(0-0-1). 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

Office of Provost/Academic Vice President

BY 220 03(3-0-0). Fundamentals of Ecology. F, S. Prerequisite: One course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160. Credit not allowed for both BY 220 and BY 320.

Interrelationships among organisms and their environments. (Ω)

+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/M CC 155. 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

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)

BZCC 101 03(3-0-0). Humans and Other Animals. (AUCC 3A). F, S, SS. Credit not allowed for students who have already taken BZ/BZCC 110 or BY/LSCC 102 or BY/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 BZ/BZCC 120 or BY/LSCC 102 or BY/LS 103.

Broad concepts of biology with major emphasis on plant life.

BZCC 105 01(0-2-0). Basic Concepts of Plant Life Laboratory. (AUCC 3A). F, S, SS. Prerequisite: BZ/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: BZ/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. (\$)

BZCC 192 02(0-0-2) First Year Seminar in Life Sciences. (AUCC 1). F, S. Restricted to Botany, Zoology, and Biological Science majors.

Introduction to the resources and academic programs in biology; the role of biosciences.

BZ 212 04(3-3-0). Animal Biology-Invertebrates. S. Prerequisite: BZ/BZCC 110 and BZ/BZCC 111 or BY/LS 103.

General biology of invertebrates; their characteristics, classification, and adaptations. (\$)

+BZ 214 04(3-3-0). Animal Biology-Vertebrates. F. Prerequisite: BZ/BZCC 111 or BY/LS 103.

General biology of vertebrates; their characteristics, classification, and adaptations. (\$)

BZ 220 03(3-0-0). Introduction to Evolution. F, S. Prerequisite: BZ/BZCC 110 and BZ/BZCC 111 or BZ/BZCC 120 or BY/LS 103.

Fundamental concepts in evolutionary biology.

BZ 223 03(2-2-0). Plant Identification. F, S. Prerequisite: BZ/BZCC 120 or BY/LS 103.

Relationships and identification of flowering plants.

BZ 300 03(3-0-0). Animal Behavior. S. Prerequisite: BZ/BZCC 111 or BY/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: BZ/BZCC 120 or BY/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: BZ/BZCC 101 or BZ/BZCC 110 or BY/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: BZ/BZCC 111 and BZ/BZCC 120 or BY/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: BZ/BZCC 111 or BY/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: BZ/BZCC 120 or BY/LS 103; C 245 or C 342 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: BZ/BZCC 120 or BY/LSCC 102 or BY/LS 103.

Morphology, ultrastructure, physiology, ecology, and phylogeny of freshwater and marine algae.

BZ 333 04(2-4-0). Introductory Mycology. F. Prerequisite: BZ/BZCC 120 or BY/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: BZ/BZCC 111 or BY/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: BZ/BZCC 120 or BY/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/M CC 155, ST/STCC 301 or ST/STCC 307 or EH/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: BY/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: BZ/BZCC 111 or BY/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.

***BZ 424/BI 424 03(3-0-0). Principles of Systematic Zoology.** S. Prerequisite: BZ/BZCC 111 or BY/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 425 02(2-0-0). History of Biology. S. Prerequisite: BY/LS 103 or BZ/BZCC 111 and BZ/BZCC 120.

History of biological concepts from prehistoric to modern times.

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: BZ/BZCC 120 or BY/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 445 03(2-2-0). Physiology of Plant Growth and Development. S. Prerequisite: BZ 440.

Nature and physiological mechanisms of plant growth.

BZ 450 04(3-2-0). Plant Ecology. F. Prerequisite: BZ 223 or BZ 325.

Relation of plants to their environment.

BZ 455 03(3-0-0). Human Heredity and Birth Defects. S. Prerequisite: BZ/BZCC 111 or BY/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: BZ/BZCC 110 or BY/LS 103; MB 301 or MB 302 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 470 04(2-4-0). Freshwater Biology. S. Prerequisite: BZ/BZCC 111 or BY/LS 103.

Biology and evolutionary ecology of freshwater organisms, including collection and identification.

°BZ 471 03(3-0-0). Stream Biology and Ecology. F. Prerequisite: BY 220 or BZ 470.

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 or BZ 470.

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 477 05(2-6-0). Field Biology. S, SS. Prerequisite: BZ/BZCC 111 or BY/LS 103, BZ/BZCC 120.

Techniques useful in analysis of natural populations including field experience.

BZ 478 03(3-0-0). Molecular and Developmental Evolution. S. Prerequisite: BZ 220, M/M CC 155, ST/STCC 301 or ST/STCC 307 or EH/EHCC 307. Credit not allowed for both BZ 478 and BZ 571.

Processes and patterns of evolution at the level of gene, genome, development, and phenotype.

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-F Var [1-3]. Seminar.

A) Behavior. B) Ecology. C) Genetics. D) Ornithology. E) Herpetology. F) Evolution.

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 505 03(2-3-0). Ecology of Parasitism.** S. Prerequisite: BZ 462/BI 462/MB 462.

Host, parasite, and environment as interacting systems.

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/EN 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: BZ/BZCC 111 or BY/LS 103; BZ 300, M/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 560 03(1-0-2). Ethological Methods.** S. Prerequisite: BZ 300.

Ethological methods used in both descriptive and experimental studies of animal behavior.

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 562/MB 562/BI 562 05(1-8-0). Field Ecology of Disease Vectors.** S. Prerequisite: BZ 462/MB 462/BI 462 or MB 300;BI 302. Credit allowed for only one of the following: BZ 562, MB 562, BI 562.

Evolution, morphology, life cycles, and field biology of disease vectors; field techniques and experience in surveillance of arthropods and pathogens.

***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/M CC 155, ST/STCC 301 or ST/STCC 307 or EH/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: BZ/BZCC 120 or BY/LS 103.

Environmental cleanup using plants.

BZ 576 03(2-2-0). Biophysical Ecology. S. Prerequisite: BZ 450; M/M CC 155, PH/PHCC 110.

Interactions of organisms with their environments to exchange energy and mass; physiological, behavioral, and ecological implications.

***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. (\$)

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-G Var [1-3]. Seminar.

A) Behavior. B) Development. C) Ecology. D) Genetics. E) Ornithology. F) Limnology. G) Evolution.

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

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/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/M CC 117 or M/M CC 120A-B or placement in M/M CC 121 or higher. For students in science-related programs requiring a year of chemistry. Quantitative reasoning but with less focus on mathematical calculations than C/C CC 111/C 113. Credit not allowed for both C/C CC 107 and C/C CC 111.

Atomic/molecular theory, gases, liquids, solids, solutions, acid/ base and oxidation/reduction reactions, kinetics, selected topics.

CCC 108 01(0-3-0). Fundamentals of Chemistry Laboratory. (AUCC 3A). F, S, SS. Prerequisite: C/C CC 107 or concurrent registration. Credit not allowed for both C/C CC 108 and C/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/M CC 118 or M/M CC 121 or placement in M/M CC 124 or higher. Intended for science majors. Students should complete the sequence: C/C CC 111, C/C CC 112, C 113 and C 114. Credit not allowed for both C/C CC 111 and C/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/C CC 111 or concurrent registration. Credit not allowed for both C/C CC 112 and C/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/C CC 107 or C/C CC 111; M/M CC 124 or M/M CC 141 or M/M CC 155 or M/M CC 160 or concurrent registration in M/M CC 155 or M/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/C CC 112; C 113 or concurrent registration.

Laboratory applications of principles covered in C 113.

C CC 192 02(1-0-1). Introductory Seminar in Chemistry. (AUCC 1). F.

Small-group discussions of aspects of University life and of chemistry.

C 245 04(4-0-0). Fundamentals of Organic Chemistry. F, S, SS. Prerequisite: C/C CC 107 or C 113. Credit allowed for only one of the following: C 245, C 340, C 341, or C 345. Intended for students in science-related programs requiring a year of 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/C CC 108 or C/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. F, S. Prerequisite: C 114; C 331 or concurrent registration.

Laboratory applications of principles presented in C 331. (\$)

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 340 04(3-3-0). Honors Organic Chemistry I. F. Prerequisite: C 113, C 114. Participation in the University Honors Program. Intended for science majors. Students should plan to complete the sequence C 340, C 342.

Structure, nomenclature, dynamics, spectroscopy, reactions of organic molecules. Laboratory applications of principles presented in lecture.

C 342 04(3-3-0). Honors Organic Chemistry II. S. Prerequisite: C 340. Participation in the University Honors Program. Intended for science majors. Students should plan to complete the sequence C 340, C 342.

Continue studies of reactions and mechanisms of organic molecules. Laboratory applications of principles presented in lecture.

C 344 02(0-6-0). Organic Chemistry Laboratory. F, S. Prerequisite: C 114; C 342 or C 346 or concurrent registration. Credit not allowed for both C 344 and C 246.

Laboratory applications of principles presented in C 341/C 343. (\$)

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, C 340, C 341, 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 340 or 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 342 or C 344 or 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/M CC 161 or M/M CC 255; PH/PHCC 122 or PH/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, PH/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, PH/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: Twenty 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.
- 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 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.** S. Prerequisite: C 342 or 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). High Resolution NMR Analysis of Liquids.** S. Prerequisite: C 342 or C 346, C 474.
A) Basic NMR principles. B) 1D and 2D NMR concepts and principles. C) Advanced NMR 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 342 or C 346.
Structure including stereochemistry and conformational isomerism; reactivity and mechanisms in organic chemistry.
- 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 342 or 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

Department of Civil Engineering *College of Engineering*

CE 104 01(0-3-0). Surveying. F. Prerequisite: M/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/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.

CECC 192 03(2-2-0). Civil Engineering Principles II. (AUCC 1). 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: PH/PHCC 110 or PH/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 2D). F. Prerequisite: CE 109/ CECC 192.

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/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/M CC 160, PH/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; CE 108 or CBCC/CHCC 192 or ME 101/ MECC 192.

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/M CC 161, PH/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 ER/WR 416, ST/STCC 301 or ST/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/M CC 125, M/M CC 141, PH/PHCC 110 or PH/PHCC 121 or PH/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 384 Var [1-5]. Supervised College Teaching. F, S, SS. Maximum of 10 credits allowed in course.

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.

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)

CE 423 03(3-0-0). Groundwater Engineering. S. Prerequisite: CE 300 or CH 331 or ER/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.

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 473/ME 440 04(3-2-0). Design of Off-Highway Vehicles.** S. Prerequisite: ME 237, CE 261 or CE 262. Credit not allowed for both CE 473 and ME 440.
Power sources, transmissions, wheels, tracks, and human factors for off-highway vehicles, tillage, and earthmoving machinery.
- 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, ST/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 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 ER/WR 416, ST 304 or ST/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 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.
- °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 03(3-0-0). Treatment of Water Contaminants I.** F. Prerequisite: M 340, CE 438/EV 438; CE 300 or CH 331 or ME 342.
Evolution of practice, modeling approaches for process design, spectrum of contaminants, process designs for removal of particles.
- 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 543 03(3-0-0). Industrial Wastes Management.** F. Corequisite: CE 540.
Management of industrial wastes. Analysis of waste sources within industrial processes, minimization, treatment, and disposal standards; case studies.
- 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(3-0-0). 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)

CE 547/ST 547 03(3-0-0). Statistics for Environmental Monitoring. S. Prerequisite: ST/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)

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 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/F 569 03(3-0-0). Intermediate Design of Wood Structures. F. Prerequisite: CE 367, F 432. Credit not allowed for both CE 569 and F 569.

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.

***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, ST/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.

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 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

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 687 Var [1-15]. **Internship.**

CF 692 Var [1-3]. **Seminar.**

CF 694 Var [1-3]. **Independent Study.**

CF 698 Var. **Research.**

CF 699 Var. **Thesis.**

CHEMICAL ENGINEERING COURSES

Department of Chemical Engineering College of Engineering

CHCC 104 03(2-2-0). **Strategies of Engineering Problem Solving.** (AUCC 2D). S. Prerequisite: CBCC/CHCC 192.

Engineering approach to problem solving, computer program-ming, term project.

CHCC 192 03(2-2-0). **Strategies of Engineering Design.** (AUCC 1). 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/C CC 111, M/M CC 160, PH/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.

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/EV 443 02(0-6-0). Mass Transfer and Separation Laboratory. F. Prerequisite: CH 341 or CH 442/EV 442 or concurrent registration. Credit not allowed for both CH 443 and EV 443.

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 03(3-0-0). Fundamentals of Biochemical Engineering. F. Prerequisite: MB 300; M/M CC 255 or M 340; BH 306 or CH 420 or concurrent registration.

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 342 or 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). Bioreseparation 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 03(3-0-0). Environmental Biotechnology. S. Prerequisite: MB 300; CH 420 or CH 504 or CH 439/CE 439.

Use of microorganisms for pollution control. Biodegradation kinetics, bioreactor design, and in situ bioremediation.

CH 525/BE 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 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 603 03(3-0-0). Advanced Mass Transfer. S. Prerequisite: CH 503.

Molecular and turbulent diffusion and interphase mass transport. Applications to continuous contact separation processes.

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.

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

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/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/M CC 255.

B) Mammalian cell culture techniques 01(0-3-0). C) Immunochemical 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 350 or MB 450 or SC 330 or BZ 346. 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

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 2A). F, S, SS. Prerequisite: Composition Placement Examination score of 3 to 6 or COCC 192/CO 130.

Expository and argumentative writing emphasizing purpose and audience; writing and reading processes; development of ideas; coherence; effective style. (Ω, GT-CO2)

COCC 300 03(3-0-0). Writing Arguments. (AUCC 2B2 or 2D). F, S, SS. Prerequisite: CO/COCC 150.

Reading, analyzing, researching, and writing arguments.

COCC 301A-D 03(3-0-0). Writing in the Disciplines. (AUCC 2B2). F, S, SS. Prerequisite: CO/COCC 150.

Learning writing strategies for addressing general audiences in: A) Arts and humanities. B) Sciences. C) Social sciences. (Ω) D) Education.

COCC 302 03(3-0-0). Writing Online. (AUCC 2B2). F, S. Prerequisite: CO/COCC 150.

Writing and analysis of electronic texts.

CO 401 03(3-0-0). Advanced Composition. F, S. Prerequisite: CO/COCC 300 or CO/COCC 301A or B or C or D or CO/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: CO/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.

COMPUTER SCIENCE COURSES

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)

CSCC 150 04(3-0-1). Interactive Programming with Java. (AUCC 2D). F, S. Prerequisite: Some familiarity with personal computers. Credit not allowed for computer science majors or 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.

CSCC 153 04(3-0-1). Java Programming. (AUCC 2D). F, S, SS. Prerequisite: M/M CC 118 (with a C [2.0] or better) or M/M CC 121 (with a C [2.0] or better). Credit not allowed for both CS/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: CS/CSCC 153 (with a C [2.0] or better); M/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.

CSCC 192 02(1-0-1). First Year Seminar in Computer Science. (AUCC 1). 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. Prerequisite: CS/CSCC 153 (with a C [2.0] or better), CS 166/M 166 (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).

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/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/M CC 161 (with a C [2.0] or better), M 229 (with a C [2.0] or better).

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), ST/STCC 301 (with a C [2.0] or better) or ST/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)

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)

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)

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)

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)

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)

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)

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 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)

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)

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)

CS 612 04(3-2-0). Topics in Computer Graphics. F. Prerequisite: CS 510.

Computer graphics research topics.

CS 614-D 03(3-0-0). Advanced Topics in Software Engineering. S. Prerequisite: CS 514.

Research topics in software engineering. A) Specification and design. B) Testing and verification. C) Software environments and tools. D) Software measurement, analysis and evaluation.

***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.

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)

CS 670A-F/EE 670A-F 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 670A-F and EE 670A-F.

A) Data flow. B) Performance evaluation and modeling. C) Distributed systems. D) Architecture of advanced systems. E) Computer arithmetic. F) Microarchitecture.

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 420A-C. 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.

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 221 A or D 221B or D221C; D 324, D 424. Theory and practice of teaching methods in dance.

D 491 Var [1-3]. Workshop.

D 495 Var. Independent Study.

D 496 Var. Group Study.

D 527 02(0-4-0). Contemporary Dance. S. Techniques of dance movement and choreography.

DESIGN AND MERCHANDISING COURSES

Department of Design and Merchandising College of Applied Human Sciences

DM 120 03(2-2-0). Textiles. F, S, SS. Also offered as correspondence course. Fibers, fabrics, and finishes basic to selection, use, and care.

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)

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)

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)

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)

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 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 [1-5]. Workshop.

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.

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 3D). 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: AU/AUCC 100, AU/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: CO/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) CO/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 320A-D 03(3-0-0). Introduction to the Study of Language. F, S, SS.

A) General linguistics. B) Language and literature. C) Language and society. D) Language and basic and applied sciences.

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.

ENGLISH COURSES

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 324 03(3-0-0). Teaching English as a Second Language.** F, S. Prerequisite: E 320A-D 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.
- 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 HY/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: CO/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: CO/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 CO/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 406A-D 03(3-0-0). Topics in Literacy.** F, S. Maximum of 6 credits allowed in course.
Exploring literacy through written theory: A) Literacy and cultural difference. B) Literacy and gender. C) Literacy and technology. D) Literacy and education.
- 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 Brontës, 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)
- 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/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 160, 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 160, 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 505A-C 03(3-0-0). Major Authors.** F, S. Prerequisite: Six credits of literature.
Intensive study of the works of one or two major authors. A) English. B) American. C) World.
- E 506A-C 03(3-0-0). Literature Survey.** F, S. Prerequisite: Six credits of literature.
Synthesis of literary attitudes, modes, genres of an age. A) English. B) American. C) Comparative.
- E 507 03(3-0-0). Special Topics in Linguistics.** F, S. Prerequisite: Written consent of instructor.
- E 513A-C 03(3-0-0). Form and Technique in Modern Literature.** F. Prerequisite: Written consent of instructor.
Selected readings in and discussions of modern literature and criticism from the writer's point of view with emphasis on form and technique. A) Fiction. B) Poetry. C) Essay.
- E 514 03(3-0-0). Phonology/Morphology-ESL/EFL.** F.
English sound system and word formation in relation to second language acquisition and teaching.

E 515 03(3-0-0). Syntax for ESL/EFL. F.

Major grammatical structures of English in relation to second language acquisition and teaching.

E 520 03(3-0-0). English Phonetics and Phonology. S.

Articulatory phonetics, phonological theory and analysis with principal applications to American English and to pedagogy.

E 522 03(3-0-0). Semantics, Pragmatics, and Discourse. F.

Linguistic study of literal and nonliteral meaning, including role of textual and situational context.

E 526 03(3-0-0). Teaching English as Foreign/Second Language. F.

Principles of teaching English as a foreign/second language. Development of a coherent method, including activities, materials, and course design.

E 527 03(3-0-0). Theories of Foreign/Second Language Learning. S.

Prerequisite: E 526.

Theories of second language learning/acquisition; emphasis on psycholinguistic processes of language learning.

E 590 Var [1-3]. Workshop in TESOL. F, S. Prerequisite: E 526.

Methodology/linguistic theory designed to solve practical problems in teaching, testing, and materials development.

E 600 03(3-0-0). Research Methods and Theory. F.

Materials and methods of literary scholarship: bibliography, documentation, textual criticism, editing, and literary criticism.

E 601 Var [2-3]. Research in Teaching English as Second Language. F.

Prerequisite: E 526.

Evaluation and design of research in language acquisition.

E 603 03(3-0-0). Computers and Composition. S.

Relationship of computer-assisted instruction to rhetoric and composition.

E 605 03(3-0-0). Reading/Writing Connection. S.

Theoretical understanding of reading and writing processes; practical implications for professional writers and teachers of writing.

E 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 633A-D 03(3-0-0). Special Topics in Discourse Studies. F, S, SS.

A) Cultural/contextual studies. B) Historical studies. C) Discourse theory and practice. D) 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

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 EA/EACC 202 and EC/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:

EA/EACC 202 or EC/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 EA/EACC 240 and EC/ECCC 240.

Discussion and economic analysis of current environmental issues with special emphasis on the impact of economic growth. (Ω)

EA 305 03(2-2-0). Agricultural and Resource Enterprise Analysis. F, S.

Prerequisite: EA/EACC 202 or EC/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: EA/EACC 202 or

EC/ECCC 202.

Monetary affairs of farming and ranching emphasizing agricultural credit, facilities, procurement, extension, and management. (\$, Ω)

EA 310 03(3-0-0). Agricultural Marketing. F, S, SS. Prerequisite: EA/EACC 202 or EC/ECCC 202.

Market structure, behavior, and performance including futures market and market games theory. (Ω)

EA 328 03(3-0-0). Small Agribusiness Management. F, S. Prerequisite: EA/EACC 202 or EC/ECCC 202.

Apply business principles to small agribusinesses and cooperatives.

EA 335/EC 335 03(3-0-0). Introduction to Econometrics. F, S. Prerequisite: EC/ECCC 204 or ST/STCC 201 or ST/STCC 204 or ST/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.

EA 340/EC 340 03(3-0-0). Introduction to Economics of Natural Resources. F. Prerequisite: EA/EACC 202 or EC/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: EA/EACC 202 or EC/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: EA/EACC 202 or EC/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: EA/EACC 202 or EC/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. (S)

EA 415 03(3-0-0). International Agricultural Trade. F. Prerequisite: EC/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: EA/EACC 202 or EC/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: EA/EACC 202 or EC/ECCC 202 or EA/EACC 240 or EC/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/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/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/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/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: EA/EACC 202 or EC/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/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.

***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 Policy. F. Prerequisite: EA 478.

Public policy in agriculture emphasizing economic criteria for policy; considerations of welfare and economic efficiency.

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.

EC 204 03(2-0-1). Principles of Macroeconomics. (AUCC 3F). F, S, SS. Prerequisite: EC/ECCC 202 or EA/EACC 202.

Determinants of national output, employment, and price level; inflation and unemployment; fiscal and monetary policy.

EC 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.

EC 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.

EC 240/EACC 240 03(3-0-0). Issues in Environmental Economics. (AUCC 3F). F, S. Credit not allowed for both EC/ECCC 240 and EA/EACC 240.

Discussion and economic analysis of current environmental issues with special emphasis on the impact of economic growth. (Ω)

EC 304 03(3-0-0). Intermediate Macroeconomics. F, S, SS. Prerequisite: EC/ECCC 204, M/M CC 141.

Theory of national income, its measurement and determinants; analysis of inflation, growth, debt, and public policy. (Ω)

EC 306 03(3-0-0). Intermediate Microeconomics. F, S, SS. Prerequisite: EC/ECCC 204, M/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: EC/ECCC 101 or EC/ECCC 202 or EA/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: EC/ECCC 204.

Monetary theory and policy; description of financial institutions and markets. (Ω)

EC 320 03(3-0-0). Economics of Public Finance. F, S, SS. Prerequisite: EC/ECCC 204.

Impact of taxes, government expenditures on allocation of resources, distribution of income; evaluation of government expenditure program; tax policies. (Ω)

EC 332/PO 332 03(3-0-0). International Political Economy. F, S. Prerequisite: EA/EACC 202 or EC/ECCC 202 and POCC 192C or PO/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: EC/ECCC 204 or ST/STCC 201 or ST/STCC 204 or ST/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: EA/EACC 202 or EC/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.

ECONOMICS COURSES

Department of Economics *College of Liberal Arts*

EC 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.

EC 202 03(2-0-1). Principles of Microeconomics. (AUCC 3C). F, S, SS. Prerequisite: M/M CC 117 or M/M CC 118 or M/M CC 120A-B or M/M CC 121 or M/M CC 141 or M/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.

EC 344 03(3-0-0). Economics of Energy Resources. S. Prerequisite: EA/EACC 202 or EC/ECCC 202.

Supply, consumption trends and projected demand for alternative energy resources in domestic and world perspective; economics of public energy policies.

EC 346/EA 346 03(3-0-0). Economics of Outdoor Recreation. F. Prerequisite: EA/EACC 202 or EC/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: EC/ECCC 101 or EC/ECCC 202 or EA/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: EC/ECCC 101 or EC/ECCC 202 or EA/EACC 202.

Origins and development of capitalist institutions including contemporary issues of alienation, loss of community, and changing values. (Ω)

EC 376 03(3-0-0). Marxist Economic Thought. S. Prerequisite: EC/ECCC 101 or EC/ECCC 202 or EA/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: EC/ECCC 101 or EC/ECCC 202 or EA/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: EC/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/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/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/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.

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/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/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/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

School of Education

College of Applied Human Sciences

EDCC 192 03(1-0-2). Learning and Community. (AUCC 1). F

Perspectives on college learning, motivation and group dynamics for first year students.

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)

ED 331 01(0-2-0). Educational Technology. F, S, SS. Prerequisite: BD 111 or BD 150 or CS 110 or computer proficiency exam; completion of 30 credits of course work; consent of Teacher Licensure Office.

Skills and strategies for use of appropriate technology in education.

ED 340 03(0-2-2). Literacy and the Learner. F, S, SS. Prerequisite: Completion of 30 credits of course work; consent of Teacher Licensure Office.

Understanding and supporting literacy development. Field experiences, service learning experiences.

ED 350 03(0-2-2). Instruction I-Individualization/Management. F, S, SS. Prerequisite: EDCC 310/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 and learners with special needs.

ED 386 Var [1-3]. Practicum-Instruction I. Prerequisite: EDCC 310/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 310/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(2-4-0). Early Childhood Education I. F, S. Prerequisite: EDCC 310/EDCC 275; admission to Teacher Licensure Program.

Integrated methods; theoretical bases; teacher's role; appropriate curriculum; measurement; environments; pedagogy; instructional design and decisions.

ED 426 04(1-4-1). 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(0-4-2) 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(0-2-3). 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(0-0-4). 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(0-0-4). 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(0-0-4). 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 310/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 450 or ED 426 and appropriate content methods course, concurrent registration in ED 485A or B or C. B) ED 450 or ED 426 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.

ED 530 02(0-2-1). 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) F) Annenberg/CPB mathematics instruction. Var [1-3]. (Ω) G) Annenberg/CPB educational theory and issues. Var [1-3]. (Ω) H) Annenberg/CPB humanities instruction. Var[1-3]. (Ω)

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(1-0-2). 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(0-0-3). Curriculum Development. S, SS. Prerequisite: ED 485A or B.

Principles and procedures for school personnel in planning the public school curriculum.

ED 620 02(0-0-2). Philosophy of Education. S. Prerequisite: Written consent of department head.

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 628 03(0-0-3). Models of Teaching. F. Prerequisite: ED 320. Also offered as telecourse.

Exploration of pedagogical topics and skill development related to instructional approaches.

ED 629 03(0-0-3). Communication and Classrooms. F, S, SS. Prerequisite: ED 320 or written consent of instructor. Also offered as telecourse.

Exploration of pedagogical topics and growth experiences related to classroom management and presentation skills.

***ED 635 03(0-0-3). 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(0-0-3). 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(0-0-3). School Resource Management. SS. Prerequisite: Admission to Administrator Licensure Program.

School resource management including fiscal, personnel, and organization.

ED 647 02(0-0-2). 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 650 03(0-0-3). Individual Guidance and Counseling. F, SS. Prerequisite: Bachelor's degree.

Theory and techniques of individual guidance and counseling.

ED 651 03(0-0-3). Group Guidance and Counseling. S, SS. 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-F Var. Seminar.

A) Administrator. B) Principal. D) Guidance and counseling. E) Instruction. F) Leadership capstone.

ED 694 Var. Independent Field Studies.

ED 695 Var. Independent Study.

ED 696 Var. Group Study.

ED 698 Var. Research.

ED 699 Var. Thesis.

ED 704 03(2-0-1). Qualitative Research. F. Prerequisite: ED 600.

Examination of qualitative research theory, methods, and applications to education and the social sciences. (Ω)

ED 705 03(2-0-1). 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)

ED 709 03(0-0-3). Leadership Development. S, SS. Prerequisite: VE 601.

Principles, theories, attributes, and skills related to individual leadership development.

ED 713 03(0-0-3). 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

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.

EECC 192 03(2-2-0). Electrical Engineering Fundamentals. (AUCC 1). 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: EECC 192; concurrent registration in M/M CC 161 and PH/PHCC 142.

Basic circuit analysis techniques and applications to engineering design problems.

EE 202 04(3-3-0). Circuit Theory Applications. S. Prerequisite: EE 201.

Step and sinusoidal response of networks; modeling of active devices.

EE 204 03(3-0-0). Introduction to Electrical Engineering. S. Prerequisite: M/M CC 161, PH/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.

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 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.

Laplace and Z transforms, applications to modulation, filtering and sampling, state space representation.

EE 325 03(3-0-0). Telecommunication Networks. S. Prerequisite: M/M CC 141, M/M CC 155, or M/M CC 160.

Principle technologies that support data and voice communications.

EE 331 04(3-3-0). Electronics Principles I. F. Prerequisite: EE 202 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.

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.

Basic concepts of time varying electromagnetic fields and transmission lines.

EE 343 04(4-0-0). Electrodynamics for Computer Engineers. F. Prerequisite: EE 202 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, EE 331, EE 341.

Operating principles and analysis of electromechanical devices including transformers, motors, and generators.

EE 372 03(3-0-0). Physical Electronics. S. Prerequisite: EE 341, PH/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, EE 332, and EE 342 or EE 343.

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.

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, EE 312.

Digital communication (source coding; modulation and detection; channel coding), analog communication (modulation). (Ω)

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.

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.

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; 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.

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.

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 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: CS/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; EE 342 or EE 343.

Introduction to optical systems for signal and information processing with emphasis on Fourier optics.

EE 461 03(3-0-0). Power Systems. F. Prerequisite: EE 341, EE 362.

Multi-phase power systems; power generation, transformer design, power distribution, power costs.

EE 471 03(3-0-0). Semiconductor Devices. F. Prerequisite: EE 332, EE 372; EE 342 or EE 343.

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.

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 or written consent of instructor.

Discrete time signals and systems, digital filter design and implementation, fast algorithms, quantization effects. (Ω)

EE 513 03(3-0-0). Digital Image Processing. S, SS. Prerequisite: EE 303/ST 303 and EE 312.

Image acquisition and display systems, image enhancement, restoration and encoding, image analysis; real-life applications. (Ω)

EE 514 03(3-0-0). Applications of Random Processes. F. Prerequisite: EE 303/ST 303, EE 312.

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)

EE 534 03(3-0-0). Analog Integrated Circuit Design. F. Prerequisite: EE 332.

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.

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)

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 251 or EE 550A.

Current machine architectures such as SIMD, MIMD, and stack machine; overlap pipeline, parallel, and associative processing.

EE 555 03(3-0-0). Robot Motion Planning. F. Prerequisite: EE 312 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.

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 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.

***EE 641 03(3-0-0). Electromagnetics.** F. Prerequisite: EE 342, 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)

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 670A-F/CS 670A-F 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 670A-F and CS 670A-F.

A) Data flow. B) Performance evaluation and modeling. C) Distributed systems. D) Architecture of advanced systems. E) Computer arithmetic. F) Microarchitecture.

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 695 Var. Independent Study.

EE 699 Var. Thesis.

*EE 712 03(3-0-0). **Topics in Control Theory.** S. Prerequisite: EE 411.

Adaptive control of deterministic systems, stochastic control, system identification, and nonlinear systems.

*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

College of Engineering

EGCC 100 02(1-2-0). **Engineering Greatness.** (AUCC 1, currently not being taught as a first year seminar). F.

Will not meet degree requirements in the College of Engineering.

Problem solving, team, and attitudinal skills for engineers and scientists.

EG 192 01(0-0-1). **Seminar.**

Engineering/society/humanities relationships. Combined program requirements and opportunities.

EG 384 Var [1-5]. **Supervised College Teaching.** F, S, SS. Prerequisite: Written consent of instructor.

EG 510/M 510 03(3-0-0). **Linear Programming and Network Flows.** F, S, SS. Prerequisite: M 261 or M/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.

ENVIRONMENTAL HEALTH COURSES

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: BZ/BZCC 101 or BZ/BZCC 104 or BZ/BZCC 110 or BZ/BZCC 120 or BY/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 2D). F, S, SS. Prerequisite: M/M CC 121. Credit allowed for only one of the following: EH/EHCC 307 or ST/STCC 307, ST/STCC 301, ST/STCC 309, ST/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: EH/EHCC 307 or ST/STCC 307; MB/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 342 or 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 342 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, EH 350.

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 502 03(3-0-0). Fundamentals of Toxicology. F. Prerequisite: BS 300, C 245 or C 342 or C 346.

Fundamental principles of toxicology; dose-response, organ targets, toxic agents.

***EH 515 03(0-0-3). Women's Health.** F. Prerequisite: WS 200 or written consent of instructor.

Current issues in women's health.

EH 520 03(1-0-2). Advanced Environmental Health. F. Prerequisite: MB 300, C 342 or 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 340 or C 345; PH/PHCC 110 or PH/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: EH/EHCC 307 or ST/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: EH/EHCC 307 or ST/STCC 301 or ST/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: EH/EHCC 307 or ST/STCC 307 or ST/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.

***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)

***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: EH/EHCC 307 or ST/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.

ENTOMOLOGY COURSES (EN)

Prefix changed to Bioagricultural Sciences and Pest Management (BI)

EARTH RESOURCES COURSES (ER)

Prefix changed to Geosciences (G) or Watershed Science (WR)

ENGINEERING SCIENCE COURSES

College of Engineering

ES 492 01(0-0-1). Seminar.

ES 495 Var. Independent Study.

AMERICAN ETHNICITY COURSES

Center for Applied Studies in American Ethnicity College of Liberal Arts

ETCC 200 03(3-0-0). Ethnicity in America. (AUCC 3F). F, S, SS.

Key concepts and experiences which illustrate the central role ethnicity has played in American life and institutions.

ETCC 204 03(2-0-1). 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. (\$)

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 ET/ETCC 250 and HY/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 ET/ETCC 251 and HY/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 ET/ETCC 252 and HY/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 ET/ETCC 255 and HY/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 260 03(3-0-0). The Asian Diaspora-Cultures and Communities. S.

Retention, transformation, and creation of cultures among selected populations of Asian descent in Europe and Americas.

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 292 03(3-0-0). Ethnic Studies Research Methods and Writing. F.

Research ethics, methodology, theory, and writing in ethnic studies.

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: AP/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)

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 342 03(3-0-0). Indigenous Women, Children and Tribes. F.

Historical and contemporary lives of women, children, and tribal communities.

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 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.

°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:

AP/APCC 100, ET/ETCC 200 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 200.

ET 492 03(0-0-3). Seminar.

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 695 Var. Independent Study.

ET 698 Var. Research in Ethnicity.

ENVIRONMENTAL ENGINEERING COURSES

College of Engineering

EV 101 02(1-2-0). Environmental Engineering I. F.

The environmental engineering profession, engineering approach to problem solving, computer programming.

EV 102 03(2-2-0). Environmental Engineering II. S. Prerequisite: EV 101.

Environmental engineering problem solving and design including use of graphics and digital computing; team project.

EV 204/CE 204 03(2-2-0). Agricultural and Environmental Measurements. S. Prerequisite: PH/PHCC 110 or PH/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 ER 416 or CH 331, ST/STCC 301 or ST/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 401 01(1-0-0). Environmental Engineering Design I. S. Prerequisite: EV 322/CE 322.

Introduction to design of environmental engineering systems; preparation of formal proposal.

EV 402 03(2-0-1). Environmental Engineering Design II. F. Prerequisite: EV 401.

Detailed design of environmental engineering system; preparation and presentation of (oral and written) reports.

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 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 443/CH 443 02(0-6-0). Mass Transfer and Separation Laboratory. F. Prerequisite: CH 341 or EV 442/CH 442 or concurrent registration. Credit not allowed for both EV 443 and CH 443.

Mass transfer experimentation: evaporation, distillation, solvent extraction, ion exchange, gas absorption, humidification.

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.

EV 693 01(1-0-0). Environmental Engineering Seminar. Prerequisite: CE 438/EV 438.

Current topics in practice and research.

EV 695 Var. Independent Study.

EV 699 Var. Thesis.

EV 799 Var. Dissertation.

HEALTH AND EXERCISE SCIENCE COURSES

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. B) Badminton. 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 EX/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 EX/EXCC 145.

Personal health behaviors and personal choice in response to wellness.

EX 203 03(3-0-0). Motor Learning. F, S, SS. Prerequisite: PY/PYCC 100.

Motor skill acquisition as function of maturation and experience. Emphasis on strategies for facilitating skill learning in normal school-age population.

EX 212 03(2-2-0). Lifeguard Training/Instructor. F, S, SS. Prerequisite: Intermediate swimming ability.

Lifesaving water rescue, water safety, and lifeguard training. Meets requirements for American Red Cross Lifeguard Training/ Instructors certification.

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 303 03(2-2-0). Anatomical Kinesiology. F, S, SS. Prerequisite: BS 300.

Human movement emphasizing influence of intrinsic dynamics, task demands, and environmental conditions.

EX 307 03(3-0-0). Biomechanical Principles of Human Movement. F, S.

Prerequisite: PH/PHCC 121 or PH/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 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:

EX/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: EX/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: EX 303.

Preventive measures, taping, bandaging, massage and manipulation, diet and conditioning of athletes.

EX 356 03(3-0-0). Wellness Programming. F, S, SS. Prerequisite: EX/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) EX/EXCC 145, EX 240, EX 332F, EX 332H, FN/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: EX 403.

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.

EX 444 02(2-0-0). Exercise and Aging. F, S, SS. Prerequisite: EX 403.

Understanding the aging process and what impact exercise has on this process.

EX 453 03(3-0-0). Applied Statistics for the Health Sciences. F, S, SS.

Prerequisite: M/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 240, EX 303.

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: PY/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 491C-I Var [1-3]. Workshop.

C) Curriculum. G) Health. I) Athletics.

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. S. 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. F.
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 695A-E Var. Independent Study.

A) Physical education. 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.

ECOLOGY COURSES

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 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
***Department of Forest Rangeland Watershed
Stewardship
College of Natural Resources***

F CC 192 02(0-0-2). Forestry Inquiries. (AUCC 1). F.

Field and laboratory exercises in forest sciences; discussion of current topics in forestry.

F 210 03(2-2-0). Forest Ecogeography. F, S. Prerequisite: BZ/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. Prerequisite: F CC 192.

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 319 04(2-4-0). Geomatics for Foresters. F. Prerequisite: F 210 and F 230; concurrent registration in F 311 or F 321.

Remote sensing, GPS, and GIS as applied to forestry. (\$)

+F 321 03(2-2-0). Forest Biometry. F. Prerequisite: ST/STCC 201 or ST/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: EC/ECCC 202 or EA/EACC 202 or EC/ECCC 240 or EA/EACC 240.

Economic principles and techniques applied to forested environments.

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 333 03(3-0-0). Forest Products in Society. S.

Society's dependence on wood and fiber derived from forests.

F 341 04(3-2-0). Wood Protection. S. Prerequisite: F 331.

Degradative effects of water and biological organisms on wood; methods of protecting wood from these factors.

F 387 Var [3-12]. Internship. Prerequisite: Written consent of department head.**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 431A-B. Mechanics of Wood and Wood Composites. F.

Elastic, strength, and rheological behavior of wood and wood composites; laboratory involves testing procedures, data analysis, and interpretation. A) 03(3-0-0). B) 04(3-2-0).

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 435 04(3-2-0). Mechanical Processing of Wood Products. S. Prerequisite: F 331.

Machining and manufacturing of lumber, plywood, and particleboard.

***F 466/H 466 03(2-2-0). Community Forestry.** S. Prerequisite: F 210 or H 221, H 464. Credit not allowed for both F 466 and H 466.

Policies and management of public and privately owned community forests in urbanized areas.

F 487 Var [3-12]. Professional Forestry Internship. Prerequisite: Written consent of department head.

Professional-level field experience with forestry organization.

F 489A-F 03(3-0-0). Technical Fire Management. F, S, SS. Prerequisite: A) ST/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 511 03(3-0-0). Pollution Effects on Forest Ecosystems. F. Prerequisite: F 325, SC 240.

Major pollutants and their direct and indirect effects on forest ecosystems.

F 520 03(3-0-0). Advanced Quantitative Methods in Forestry I. F. Prerequisite: F 322, M/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 569/CE 569 03(3-0-0). Intermediate Design of Wood Structures. F. Prerequisite: CE 367, F 432. Credit not allowed for both F 569 and CE 569.

Characteristics of structural products and their consideration in design; behavior of glulam members, wood trusses, and other wood structural systems.

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 633 03(3-0-0). Fundamentals of Wood Adhesion.** F. Prerequisite: Written consent of instructor.

Adhesion and its applications in the bonding of the wood.

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: NR/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

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)

FN 300 03(3-0-0). Food Principles and Applications. F, S. Prerequisite: C/C CC 107, FN/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. (\$)

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 340 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 or C 344, FN 350.

Principles of anthropometric, dietary, and biochemical assessment of nutritional status.

FN 386 02(0-4-0). Practicum in Food Service Management.

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: FN/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(3-2-1). Diet and Disease. F. Prerequisite: FN 350, BC 351.

Dietary modifications to meet nutritional needs under normal and pathological conditions. (\$)

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). 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 as a correspondence course.

Nutrition-related issues of atherosclerotic cardiovascular disease risk reduction and background in the art/science of facilitating behavior change.

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)

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; ST/STCC 301 or ST/STCC 307 or EH/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. °B) 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.

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***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, PH/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.** F. 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 340 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***Department of Fishery and Wildlife Biology******College of Natural Resources***

FW 100 02(2-0-0). Wildlife Fundamentals. F, S. Corequisite: FWCC 192. 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.

+FWCC 192 02(0-2-1). Wildlife Inquiries. (AUCC 1). F. Prerequisite: FW 100 or concurrent registration.

Field and laboratory exercises and discussions in fishery and wildlife ecology and conservation. (\$)

FW 200 03(3-0-0). Wildlife Conservation. S. Prerequisite: M/M CC 118 or M/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: BZ/BZCC 111 or BY/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 312 03(3-0-0). Diseases of Wildlife. F. Prerequisite: BZ/BZCC 111 or BY/LS 103.

Etiological agents, reservoir hosts, transmission, susceptible hosts, environmental influence, diagnostic samples, and preventive and/or control measures.

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)

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)

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)

FW 360 03(3-0-0). Principles of Vertebrate Management. F, S. Prerequisite: BY 220 or BY 320; M/M CC 141 or M/M CC 155 or M/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 Wildlife Projects. F, S. Prerequisite: ST/STCC 301 or ST/STCC 307 or EH/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.

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, 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; ST/STCC 301 or ST/STCC 307 or EH/EHCC 307; M/M CC 141 or M/M CC 155 or M/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/C CC 108 or C/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, ST/STCC 301 or ST/STCC 307 or EH/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 360, FW 370, NR 220.

Field, laboratory, and analysis methods used in wildlife management, research. (\$)

FW 474 03(2-0-1). Wildlife Ecology. S. Prerequisite: BY 220, ST/STCC 301 or ST/STCC 307 or EH/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: BZ 470 or 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 and ST/STCC 301.

Ecological effects of contaminants on populations, communities, and ecosystems.

FW 551 Var [2-3]. Design of Fish and Wildlife Studies. F. Prerequisite: ST/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 or EY 500A or B; ST/STCC 307 or EH/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.

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)

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)

°FW 662 03(1-2-1). Wildlife Population Dynamics. S. Prerequisite: FW 360, M/M CC 155 or M/M CC 160, NR 260, ST/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, ST/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.

G 150 04(3-3-0). Physical Geology for Scientists and Engineers.

F. Credit allowed for only one of the following: ER/ERCC/G CC 130, ER/ERCC/G CC 140, ERCC192A/ER/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 130 or G CC 140 or G 150.

Physical and biological history of Earth with introduction to laboratory, computer, and field techniques. (\$)

G CC 192 02(0-0-2). First-Year Seminar in Geosciences. (AUCC 1). F, S. Introduction to critical issues in earth resources.

+G 232 03(2-3-0). Mineralogy. F. Prerequisite: G CC 140 or G 150; C/C CC 111, M/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. (\$)

+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/M CC 125, concurrent registration in PH/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 434 03(3-0-0). Geology of National Parks and Monuments. F. Prerequisite: G CC 130 or G CC 140.

Geology of outdoor museums with consideration of environmental problems. (\$)

GEOSCIENCE COURSES

Department of Geosciences

College of Natural Resources

+G CC 130 03(3-0-0). Earth System Science. (AUCC 3A). F, S, SS. Credit allowed for only one of the following: ER/ER/G CC 130, ER/ERCC/ G CC 140, ERCC 192A/ER/G 150. Also, credit not allowed for G CC 130 and NRCC 130.

Descriptions, dynamics, and interactions of the four earth science subsystems: tectonics, surficial processes, oceanography, and atmospheric sciences. (\$)

+G CC 140 04(3-3-0). Physical Geology. (AUCC 3A). F, S, SS. Credit allowed for only one of the following: ER/ERCC/G CC 130, ER/ERCC/G CC 140, ERCC 192A/ER/G 150.

Develops scientific understanding and thinking skills through introduction to earth processes, materials, resources, and hazards. (\$)

+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 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 372.

Occurrence, origin, and exploration of economic metallic mineral deposits.

G 450 03(3-0-0). Marine Geology. F. Prerequisite: G CC 130 or G CC 140 or G 272.

Geology of oceans including structure, geomorphology, sedimentation.

+G 452 04(3-3-0). Hydrogeology. F. Prerequisite: G CC 140 or G 150 or GR 210; PH/PHCC 141; M/M CC 161 or M/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 140 or G 150 or GR 210; M/M CC 155 or M/M CC 160.

Origin of landforms; morphology and processes. (\$)

G 460 04(3-3-0). Advanced Petrology and Geochemistry. F. Prerequisite: G 364.

Petrology of igneous and metamorphic rocks; magma generation and emplacement; thermodynamics; quantitative methods; isotopes; ore deposits.

+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 500 03(2-3-0). Quaternary Geology. S. Prerequisite: G 154, G 454.

Quaternary geologic processes as analogs for future and more distant past.

***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 544 03(2-3-0). Engineering Geology. F. Prerequisite: G CC 140.

Geology and geologic methods applied to civil engineering problems.

+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 549 03(3-0-0). History of Geology.** F. Prerequisite: G CC 140, G 154.

Historical development of geological ideas.

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 564 03(2-3-0). X-Ray Mineralogy. S. Prerequisite: Written consent of instructor.

Identification, analysis, interpretation of minerals and rocks using X-ray techniques.

***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 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 140.

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.

G 695 Var. Independent Study.

+G 696 Var. Group Study. (\$)

G 698 Var. Research.

G 699 Var. Thesis.

G 732 03(3-0-0). Geochemistry. F. Prerequisite: C 474, written consent of instructor.

Chemical principles applied to geologic systems; emphasis on occurrence, distribution of major elements, their roles in the weathering cycle.

***G 737 04(3-3-0). Advanced Igneous Petrology.** S. Prerequisite: G 364.

Physicochemical principles of igneous systems utilizing phase rule chemistry and thermodynamics.

***G 738 04(3-3-0). Advanced Metamorphic Petrology.** S. Prerequisite: G 364.

Physicochemical principles utilizing phase rule chemistry, thermodynamics, petrofabric analysis.

G 746 03(2-3-0). Techniques in Environmental Geology. S. Prerequisite: G 652.

Advanced techniques and legal aspects pertinent to environmental geology; field application of methods to problems.

***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

Department of Geosciences

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)

+GR 342 03(3-0-0). Geography of Water Resources. F.

Overview of spatial and temporal issues. (\$)

***GR 345 03(3-0-0). Geography of Hazards.** S. Prerequisite: GR 210.

Causes, effects, distributional patterns, and human adjustments to environmental hazards.

GR 495 Var. Independent Study.

GRADUATE SCHOOL COURSES

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, Biology, Forest Sciences, Horticulture, Physiology, Radiological Health Sciences, Soil and Crop Sciences, and Statistics.

HORTICULTURE COURSES

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/M CC 118 or M/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/H CC 100.

Theories, principles, and techniques of sexual and asexual propagation. (\$)

+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)

+*H 321 04(3-2-0). Nursery Production and Management. S. Prerequisite: H/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/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 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 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, \$)

+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: BZ/BZCC 120, H 341, SC 240.

Examination of turfgrass management practices from a scientific perspective; discussion of advanced turfgrass management technologies. (\$)

+°H 450A-D 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. (\$)

+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/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/F 466 03(2-2-0). Community Forestry.** S. Prerequisite: F 210 or H 221, H 464. Credit not allowed for both H 466 and F 466.

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.

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 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

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.

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)

HD 217 03(3-0-0). Creative Experiences for Children. F, S, SS. Prerequisite: HD/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)

HD 254/BS 254 03(3-0-0). Biological Aspects of Human Development. F, S. Prerequisite: BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 102. Credit not allowed for both HD 254 and BS 254.

Human embryology, genetics, developmental processes resulting in birth defects, human physical development through the lifespan.

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)

HD 277 02(2-0-0). Professional Skills Development I. F, S. Prerequisite: HD/HDCC 101 and CO/COCC 150.

Exploration of the relation of human development and family studies to professional opportunities in family and community services and research.

HD 286 03(1-6-0). Practicum-Observational Skills. Prerequisite: CO/COCC 150 and HD/HDCC 101 or concurrent registration.

Observational experience with children, adolescents, adults, and families.

HD 302 03(3-0-0). Marriage and Family Relationships. F, S, SS. Prerequisite: PY/PYCC 100, S/S CC 100.

Preparation for and adjustment to marital and family relationships throughout the life cycle. (Ω)

HD 310 03(3-0-0). Infant and Child Development in Context. F, S. Prerequisite: HD/HDCC 101 and PY/PYCC 100.

Physical, cognitive, and socioemotional development from conception through middle childhood in context of family, relationships, and culture. (Ω)

HD 311 03(3-0-0). Adolescent/Early Adult Development in Context. F, S, SS. Prerequisite: HD/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: HD/HDCC 101 or PY/PYCC 100 or S/S CC 100.

Developmental issues and processes pertaining to middle and later adulthood. Contexts in which adult development and aging occur are emphasized. (Ω)

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)

HD 332 03(2-0-1). Death, Dying, and Grief. F, S, SS. Prerequisite: HD/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: HD/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)

HD 354 03(3-0-0). Biological Aspects of Aging. S. Prerequisite: BZ/BZCC 101 or BZ/BZCC 110 or BY/LSCC 102.

Biological human and comparative aging, including cellular and genetic mechanisms, alterations to organ systems due to aging, and disease conditions. (Ω)

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)

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.

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: HD/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: HD/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)

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)

HD 477 01(1-0-0). Professional Skills Development II. F, S, SS. Prerequisite: HD 277, HD 286; concurrent registration in HD 488.

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-E Var [1-14]. Field Placement. Prerequisite: HD 277, HD 286, concurrent registration with HD 477.

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. E) Student teaching.

HD 490A-B Var [1-3]. Workshop.

A) Human development. B) Family studies.

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 E 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(0-0-3). 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 530 03(3-0-0). Socioemotional Development. F, S. Prerequisite: Six credits of upper-division behavioral sciences.

Examination of theory and research on issues in social, emotional, and personality development of youth.

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: ST/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)

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 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 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)

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 688 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.

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.

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.

HIGHER EDUCATION COURSES

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 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.

HONORS COURSES

University Honors Program

Office of Provost/Academic Vice President

HP 100 01(0-0-1). Honors Western Civilization I. F. Corequisite: HY/HYCC 100; participation in University Honors Program.
Selected readings complementing Western Civilization material.

HP 101 01(0-0-1). Honors Western Civilization II. S. Corequisite: HY/HYCC 101; participation in University Honors Program.
Selected readings complementing Western Civilization material.

HP 103 02(1-0-1). Honors Biology of Organisms. S. Corequisite: BY/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: HY/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: HY/HYCC 171; participation in University Honors Program.
Selected readings complementing "World Civilizations, 1500- Present" material.

HPCC 192 04(0-0-4). First Year Seminar. (AUCC 1). 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.

HPCC 193 03(0-0-3). Seminar. (AUCC 2A). F, S. Prerequisite: HPCC 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.

HUMAN SCIENCES COURSES

College of Applied Human Sciences

HSCC 192 02(0-0-2). Applied Human Sciences First Year Seminar. (AUCC 1). 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: HD/HDCC 101 or PY/PYCC 100 or S/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)

HSCC 300 03(3-0-0). Research in Applied Professions. (AUCC 2D). 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.

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 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)

***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)

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)

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)

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)

°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)

HS 692 Var [1-5]. Seminar.

HS 695 Var [1-5]. Independent Study.

HISTORY COURSES

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.

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 HY/HYCC 250 and ET/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 HY/HYCC 251 and ET/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 HY/HYCC 252 and ET/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 HY/HYCC 255 and ET/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 301 03(3-0-0). Historical Methods. F, S. Prerequisite: Sophomore standing or written consent of instructor. History majors only. To count toward the major, the course must be completed with a grade of C or better.

Basic historical skills and methods with emphasis on research, writing, and interpretation. Topics vary by instructor.

***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: HY/HYCC 100 or HYCC 273/HYCC 120 or HY/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.

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: HY/HYCC 101 or HY/HYCC 151 or HY/HYCC 171 or HYCC 215 or HYCC 274/HYCC 220 or written consent of instructor.

Historical developments in Japan since 1600.

HY 337 03(3-0-0). Ancient China. F. Prerequisite: HY/HYCC 100 or HYCC 273/HYCC 120 or HY/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: HY/HYCC 100 or HYCC 115 or HYCC 273/HYCC 120 or HY/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: HY/HYCC 101 or HY/HYCC 151 or HY/HYCC 171 or HYCC 215 or HYCC 274/HYCC 220 or written consent of instructor.

Historical developments in China since 1600.

***HY 344 03(3-0-0). Muhammad and the Origins of Islam.** F. Prerequisite: HY/HYCC 100 or HYCC 115 or HYCC 273/HYCC 120 or HY/HYCC 170 or HY/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: HY/HYCC 100 or HYCC 115 or HYCC 273/HYCC 120 or HY/HYCC 170 or HY/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: HY/HYCC 101 or HY/HYCC 151 or HY/HYCC 171 or HYCC 215 or HY/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: HY/HYCC 101 or HY/HYCC 171 or HYCC 270/HY 354.

Socioeconomic, political, and cultural development of the nations of the Caribbean.

HY 354 03(3-0-0). Colonial Latin America. F, S. Prerequisite: HY/HYCC 101 or HY/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: HY/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: HY/HYCC 150.

National growth, 1815 to 1850, emphasizing political, social, and economic developments.

HY 370 03(3-0-0). Civil War Era. S. Prerequisite: HY/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: HY/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: EC/ECCC 101 or EC/ECCC 202 or EA/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.

***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.

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: HY/HYCC 101 or HY/HYCC 151 or HY/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 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. Prerequisite: HY 301; 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.

INTERIOR DESIGN COURSES

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)

ID 166 03(0-6-0). Visual Communication/Sketching. F.

Free-hand sketching and conceptualization to communicate interior design concepts.

ID 210 03(3-0-0). Interior Design Anatomy. F. Prerequisite: Portfolio review; advancement to Interior Design second year.

Concept theory and space planning as they influence human behavior in interior space.

ID 230 02(2-0-0). Color in Interior Design. F. Prerequisite: Concurrent registration in ID 256; portfolio review; advancement to interior design second year or written consent of instructor.

Color principles, theories, and systems used in understanding interior spaces.

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: Portfolio review advancement of the Interior Design second year.

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 230.

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 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. F. Prerequisite: ID 276 and advancement to Interior Design second year or written consent of instructor.

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: CO/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. S. Prerequisite: AR/ARCC 100.

Major international interior periods/styles from Middle Ages through 19th century.

ID 358 03(3-0-0). History of American and 20th Century Interiors. F. Prerequisite: AR/ARCC 100.

Historical interiors in the United States through the 20th century.

ID 360 03(3-0-0). Interior Project Management. S. Prerequisite: ID 256, ID 276.

Objectives, processes, and practices in managing interior projects.

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 400 02(1-0-1). Interior Design Research Proposal. F. Prerequisite: ID 376, HS/HSCC 300 or concurrent registration.

Research, development, and presentation of a programming proposal for a large scale interior design project.

ID 420 03(1-4-0). Computer Multimedia in Interior Design. S. Prerequisite: ID 256.

Three-dimensional communication of interior spaces using multimedia technologies.

ID 440 02(2-0-0). Professional Practice for Interior Designers. S.

Specific professional practice issues in the field of interior design.

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 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 575 Var [1-8]. Problems-Interior Design. F, S. Prerequisite: Nine credits of interior design.

ID 578 03(2-0-1). Trends/Issues in Interior Design. F. Prerequisite: Written consent of instructor.

ID 590 Var. Workshop.

ID 675 Var [1-8]. Problems-Interior Design. F, S. Prerequisite: Four credits of ID 575.

ID 692 02(0-0-2). Seminar.

INTERNATIONAL EDUCATION COURSES

Office of Provost/Academic Vice President

IECC 116/A CC 116 03(3-0-0). Plants and Civilizations. (AUCC 3E). F, S. Credit not allowed for both IE/IECC 116 and A/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 IE 270/IECC 270 and A/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 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 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

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 273/HYCC 120, HYCC 274/HYCC 220, IN 300. B) HY/HYCC 270/HY 354, IN 300. C) Two courses in European history, IN 300.

A) Asia. B) Latin America. C) Europe.

INTRA-UNIVERSITY COURSES

Office of Provost/Academic Vice President

IUCC 192 03(1-0-2). The Individual, University, and Society. (AUCC 1). F, S.

Develop communication, research, and critical thinking skills; analyze various societal issues; explore academic choices and university resources.

TECHNICAL JOURNALISM COURSES

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.

JTCC 192 03(1-4-0). Journalistic Writing. (AUCC 1). F, S, SS. Prerequisite: admission to major. Credit not allowed for both JTCC 192 and JT 210.

Basic journalism skills; newsgathering and newswriting.

JT 200 03(1-0-2). Professional Writing. F, S. Prerequisite: CO/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 JTCC 192.

Theory and practice in newswriting.

JT 211 03(3-0-0). Computer-Mediated Visual Communication. F, S. Prerequisite: 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 2B2). F, S, SS. Prerequisite: CO/COCC 150.

Professional writing and presentation skills applied to students' major fields.

JT 301 03(2-0-1). Business Communication. F, S. Prerequisite: CO/COCC 150.

Principles and practice of effective business communication with emphasis on written professional reports. (Ω)

JT 310 04(2-4-0). Copy Editing and Production. F, S. Prerequisite: JTCC 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: JTCC 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: JTCC 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.

Theory and technique of editing picture and sound on analog and digital platforms. (\$)

JT 341 03(2-2-0). Broadcast News. F, S. Prerequisite: JTCC 192 or JT 210; JT 211.

Practical application of principles, techniques used in broadcast news writing and radio and television reporting. (\$)

JT 342 03(2-2-0). Writing for Specialized Electronic Media. F. Prerequisite: JTCC 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)

JT 351 03(2-2-0). Public Relations Practices. F, S. Prerequisite: JTCC 192 or JT 210; JT 211 and JT 350.

Planning, preparation, and application of public relations techniques.

JT 361 03(2-2-0). Writing for Specialized Magazines. S. Prerequisite: JTCC 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)

JT 372 03(2-2-0). Web Design and Management. F, S. Prerequisite: JTCC 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)

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(2-2-0). 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: JTCC 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.

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

Office of Provost/Academic Vice President

KACC 192 03(0-0-3). Key Academic Community Seminar. (AUCC 1). 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

Department of Foreign Languages and Literatures College of Liberal Arts

L CC 105 05(5-2-0). First-Year Language I. (AUCC 2B3¹). F, S, SS. Prerequisite: Registration allowed only for students with no previous study in the language. Credit not allowed for both L/L CC 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.

¹ L CC 105, First Year Language I, and/or L CC 107, First Year Language II, fulfill AUCC category 2B3 only if the student is already proficient (as determined by a testing procedure) in a second language and L CC 105 and/or L CC 107 is in a third language. Students are encouraged to use L CC 200, L CC 201, or L CC 300 to fulfill 2B3, which is one of three options available in AUCC category 2B.

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/L CC 105.

Basic review of essential skills: aural comprehension, speaking, reading, writing. F) French. G) German. J) Japanese. S) Spanish.

L CC 107 05(5-2-0). First-Year Language II. (AUCC 2B3¹). F, S, SS. Prerequisite: L/L CC 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/L CC 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/L CC 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 1 and 3E). S.

Language, cultural issues, and historical heritage of modern Italian and Japanese societies.

L CC 200. Second-Year Language I. (AUCC 2B3). F, S, . Prerequisite: L/L CC 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 2B3). F, S. Prerequisite: L/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/L CC 107J. K) L CC 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/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 296 Var [1-5]. Group Study. Prerequisite: L/L CC 107 or L 108.

Group study in language/literature/culture. C) Chinese. F) French. 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 2B3). F, S, SS. Prerequisite: L/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/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/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/L CC 300 or written consent of instructor. G) L/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/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/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/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/L CC 201 or L 208.
Historical context of contemporary issues in the culture of French-, German-, or Spanish-speaking countries. F) French. S) German. S) Spanish. F.
- L 336 03(3-0-0). Introduction to Spanish-American Civilization.** F. Prerequisite: L/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/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/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/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 442 03(3-0-0). Social Manifestations of Hispanic Poetry.** F, S. Prerequisite: L/L CC 300S, L 310S.
Presentation and representation of societal roles in poetry by Hispanic writers.
- L 443 03(3-0-0). Spanish Theatre.** F, S. Prerequisite: L/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/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/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. Prerequisite: L/L CC 300, L 310.
Studies in selected literary movements and periods of France, Germany, or Spain, such as classicism, realism, naturalism, existentialism. F) French. G) German. S) Spanish.
- L 452 03(3-0-0). Genre Studies.** F. Prerequisite: L/L CC 300, L 310.
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.** S. Prerequisite: L/L CC 300, L 310.
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.** S. Prerequisite: L/L CC 300, L 310.
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/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 Syntax and Semantics-Teaching Methods.** S. Prerequisite: L 312.
Theory and teaching methods of Spanish grammatical constructions (word order, word formation, and sentence structure) and their relationship to meaning.
- L 479 01(0-2-0). Service Learning.** F, S, SS. Prerequisite: Concurrent registration with 400-level language course.
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.

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

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 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.

***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

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)

LBCC 192 03(0-0-3). College of Liberal Arts First-Year Seminar. (AUCC 1). F.

Traditions, concepts, and topics integral to the liberal arts; cultivates reading, communication, and critical thinking.

LB/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 JT 456 and LB 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)

LB 495 Var. Independent Study.

LIBRARY INFORMATION COURSE

Dean, University Libraries

LI 301 01(1-0-0). Research in the Information Age. F, S, SS.

Developing strategies for library research; locating appropriate resources; and selecting, evaluating, and recording relevant information. (Ω)

LIFE SCIENCE COURSES***Office of Provost/Academic Vice President***

LSCC 102 04(3-3-0). Attributes of Living Systems. 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(3-2-0). Biology of Organisms-Animals and Plants. F, S, SS. Prerequisite: BY/LSCC 102.

Diversity of animals and plants; their structural and functional characteristics. (\$)

LSCC 201A-B 03(3-0-0). Introductory Genetics. F, S. Prerequisite: BY/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 205 03(3-0-0). Survey of Microbial Biology. F, S. Prerequisite: C/C CC 107 or C 113 and BY/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: BY/LSCC 102; C/C CC 111, C/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/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: BY/LSCC 102, BY/LS 103; M/M CC 141 or M/M CC 155 or M/M CC 160.

Interrelationships between organisms and the environment, with emphasis on quantitative thought.

MATHEMATICS COURSES***Department of Mathematics
College of Natural Sciences***

M CC 117 01(1-0-0). College Algebra in Context I. (AUCC 2C). F, S, SS. Prerequisite: Satisfactory performance on the Colorado State Mathematics Placement Examination. Credit allowed for only one of the following: M/M CC 117, M/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. (AUCC 2C). F, S, SS. Prerequisite: M/M CC 117. Credit not allowed for both M/M CC 118 and M/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. (AUCC 2C). F, S, SS. Prerequisite: Satisfactory performance on Colorado State Mathematics Placement Examination. Credit allowed for only one of the following: M/M CC 117, M/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. (AUCC 2C). F, S, SS. Prerequisite: M/M CC 120A-B or placement. Credit not allowed for both M/M CC 121 and M/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. (AUCC 2C). F, S, SS. Prerequisite: M/M CC 118 or M/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. (AUCC 2C). F, S, SS. Prerequisite: M/M CC 118 or M/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. (AUCC 2C). F, S, SS. Prerequisite: M/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. (AUCC 2C). 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. (AUCC 2C). 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. (AUCC 2C). 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. (AUCC 2C). F, S, SS. Prerequisite: M/M CC 118 or M/M CC 121. Credit allowed for only one of the following sequences: M/M CC 141; M/M CC 155, M/M CC 255; M/M CC 160, M/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 2C). F, S, SS. Prerequisite: M/M CC 124, M/M CC 125. Credit allowed for only one of the following sequences: M/M CC 141; M/M CC 155, M/M CC 255; M/M CC 160, M/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 2C). F, S, SS. Prerequisite: M/M CC 126; concurrent registration in M/M CC 124. Credit allowed for only one of the following sequences: M/M CC 141; M/M CC 155, M/M CC 255; M/M CC 160, M/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 2C). F, S, SS. Prerequisite: M/M CC 124, M/M CC 160. Credit allowed for only one of the following sequences: M/M CC 141; M/M CC 155, M/M CC 255; M/M CC 160, M/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: CS/CSCC 153 (with a C [2.0] or better); M/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 CC 192 01(0-0-1). First-Year Seminar in Mathematical Sciences. (AUCC 1). F. Prerequisites: In order to fulfill first-year seminar requirement, students will also need to complete STCC 192.

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/M CC 141 or M/M CC 155 or M/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 2C). F, S. Prerequisite: M/M CC 155; concurrent registration in M/M CC 126. Credit allowed for only one of the following sequences: M/M CC 141; M/M CC 155, M/M CC 255; M/M CC 160, M/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/M CC 161. Credit allowed for only one of the following sequences: M/M CC 141; M/M CC 155, M/M CC 255; M/M CC 160, M/M CC 161, M 261.

Vector functions, partial differentiation, cylindrical and spherical coordinates, multiple integrals, line integrals, Green's theorem.

M 301 03(3-0-0). Introduction to Combinatorial Theory. F. Prerequisite: M/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 2C). F. Prerequisite: M/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/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. S. Prerequisite: M/M CC 161. 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: Concurrent registration in M/M CC 161.

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/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/M CC 161 or M/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/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/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/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/M CC 161 or M/M CC 255 or M/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. S. 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.

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.

M 510/EG 510 03(3-0-0). Linear Programming and Network Flows. F, S, SS. Prerequisite: M 261 or M/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, Reimann-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, L_p 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.
- 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.
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

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.

MBCC 192 02(0-0-2). Microbiology First-Year Seminar. (AUCC 1). 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: BZ/BZCC 110 or BZ/BZCC 120 or BY/LSCC 102; C 245 or C 340 or C 345 or concurrent registration.

Structure, function, development, physiology, and molecular biology of microorganisms emphasizing bacteria.

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: 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: MB 301 or MB 302.

Laboratory skills and techniques related to the presence of micro-organisms in food, production, and preservation.

MB 342 04(3-0-1). Immunology. S, SS. Prerequisite: MB 300.

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 Microbiology. S. Prerequisite: MB 342.

Bacteria and fungi which cause human and veterinary diseases; host-parasite relationships; disease mechanisms, prevention, and therapy.

MB 352 03(0-6-0). Medical Microbiology Laboratory. S. Prerequisite: MB 301 or MB 302; MB 351 or concurrent registration.

Laboratory skills and techniques necessary for identifying medically important bacteria and fungi.

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 420 or concurrent registration.

A) Medical microbiology. B) Biotechnology. C) Immunology. D) Microbial diversity, ecology. E) Microbial genetics. F) Virology.

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: 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.

MB 462/BZ 462/BI 462 05(3-4-0). Parasitology and Vector Biology. F. Prerequisite: BZ/BZCC 110 or BY/LS 103; MB 301 or MB 302 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 500 01(0-0-1). Topics in Medical Microbiology. S. Prerequisite: MB 420; MB 351 or concurrent registration.

Current topics in medical microbiology and infectious disease.

***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 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/BZ 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 allowed for only one of the following: MB 562, BZ 562, 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.

***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 342 or 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.

MANUFACTURING TECHNOLOGY AND CONSTRUCTION MANAGEMENT COURSES

Department of Manufacturing Technology and Construction Management College of Applied Human Sciences

MC 110 02(1-0-1). 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)

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)

MC 235 03(2-2-0). Construction Graphics. F, S. Prerequisite: MC 131 Interior Design students must be approved for advancement to 2nd year level.

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, PH/PHCC 111.

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: M/MCC 125.

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 of technology education and training. 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)

MC 332 03(3-0-0). Fire Suppression Leadership. F, S. Prerequisite: Admission to fire service emphasis of technology education and training. 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 of technology education and training. 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 of technology education and training. 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 of technology education and training. 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.

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.

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 271 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, MC 366 or concurrent registration.

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 375 03(2-2-0). Information and Communication for Technology. S. Prerequisite: MC 241.

Information and communication systems; focus in applied electronic communication systems technology for technology education. (\$)

MC 384 Var [1-5]. Supervised College Teaching. F, S, SS. Maximum of 10 credits allowed in course.**MC 386D-F Var [1-3]. Practicum.** Prerequisite: Admission to Teacher Licensure Program.

D) Construction management. F) Technology education and training.

MC 430 03(2-0-1). Industrial Processes and Fire Protection. F, S, SS. Prerequisite: Admission to fire service emphasis of the technology education and training program. 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 of technology education and training. 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 of technology education and training. 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 of technology education and training. 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.

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; MC 487A or MC 487D and MC 487E; MC 462 or concurrent registration. Construction management majors only.

Professional practice using an understanding of the contractual and working relationships among all participants in the design/construction process.

MC 473 03(1-4-0). Technology Applications. F. Prerequisite: MC 241, MC 251.

Integration of concepts of mathematics and science with technology, industrial processes, and career demands.

MC 477 02(1-2-0). Rapid Technologies. F. Prerequisite: MC 471 or written consent of instructor.

Emerging technologies impacting rapid development of conceptual and functional modeling in product design and biomedical prototypes for industry. (\$)

MC 487A-E Internship.

A) Construction management. 06(0-18-0). Prerequisite: MC 267 and MC 317. C) Technology education and training. Var. D) Construction management I. 03(0-9-0). Prerequisite: MC 267 and MC 317. E) Construction management II 03(0-9-0). Prerequisite: MC 487D.

MC 495B-E Var. Independent Study.

B) Construction. E) Technology education and training.

MC 496A-B Var. Group Study. Maximum of 9 credits allowed per subtopic.

A) Construction. B) Technology education and training.

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 501A-C Var [1-3]. Special Problems in Technology Education. F, S, SS.

A) Woods. (\$) 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 564 03(2-0-1). Impacts of Emerging Technologies. F. Prerequisite: Admission to the MTCM master's program or written consent of instructor.

Analytical tools designed to help the manager evaluate, align, select, and implement emerging technologies.

MC 565 03(3-0-0). Legal Aspects of Construction Process. S. Prerequisite: MC 560.

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.

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 472 or 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.****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/C CC 112, C 113, PH/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 440/CE 473 04(3-2-0). Design of Off-Highway Vehicles. S. Prerequisite: ME 237, CE 261 or CE 262. Credit not allowed for both ME 440 and CE 473.

Power sources, transmissions, wheels, tracks, and human factors for off-highway vehicles, tillage, and earthmoving machinery.

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.

MECHANICAL ENGINEERING COURSES

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.

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.

MECC 192 02(1-2-0). Introduction to Mechanical Engineering. (AUCC 1). 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: PH/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 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: ST/STCC 309, M 340, ME 250.

Design of decision-making models for industrial engineering.

***ME 510 03(2-0-1). Capital Budgeting.** S. Prerequisite: ME 304, ST/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: ST/STCC 309.

Models to predict time to failure of mechanical or electronic devices, reliability data analysis and case studies.

ME 513 03(3-0-0) Simulation Fundamentals. F, S, SS. Prerequisite: ST/STCC 309.

Theoretically-based and commercial simulation languages, input processes, statistics, interdependencies, manufacturing and service operations.

***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 03(3-0-0). Materials Issues in Mechanical Design. F. Prerequisite: ME 331.

Failure mechanisms from materials viewpoint with emphasis on use in design. Fracture, creep, fatigue, and corrosion.

ME 537 03(3-0-0). Thermodynamics. S. Prerequisite: ME 337.

Statistical interpretations of first, second, and third laws; irreversible thermodynamics; quantum statistics.

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 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/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.

***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.

***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.

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 744 03(3-0-0). Advanced Topics in Heat Transfer.** F. Prerequisite: ME 644 or ME 645 or ME 646 or written consent of instructor.

Advanced numerical methods; two-phase flow; experimental, asymptotic, perturbation, and variational methods.

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

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.

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

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)

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: MU/MUCC 111 or satisfactory completion of placement examination.

Introduction to diatonic harmony and part-writing; basic sight singing, ear training, and keyboard harmony skills.

MU 118 04(3-3-0). Music Theory II. S. Prerequisite: MU 117.

Four-part diatonic writing; diatonic modulation; diatonic sight singing, ear training, and keyboard harmony skills.

MU 150 02(2-0-0). Piano Class I. F, S, SS.

Basic piano technique; keyboard harmony and music rudiments.

MU 151 02(2-0-0). Piano Class II. F, S. Prerequisite: MU 150.

Intermediate piano technique; introduction to ensemble playing.

MU 152 02(2-0-0). Piano Class III. F, S. Prerequisite: MU 151.

Advanced piano techniques; further development of technical skills.

MU 153 02(2-0-0). Piano Class IV. F, S. Prerequisite: MU 152.

Practical application of piano skills as a teaching tool in the classroom.

MU 155 02(2-0-0). Guitar Class I. F, S, SS.

Fundamental techniques for guitar emphasizing chord study and related literature.

MU 156 02(2-0-0). Guitar Class II. F, S. Prerequisite: MU 155.

Fundamentals of guitar emphasizing solo literature and accompaniment.

MU 157 02(2-0-0). Voice Class I. F, S.

Techniques of singing, emphasizing posture, breathing, tone production and diction, as applied to song literature.

MU 158 02(2-0-0). Voice Class II. F, S. Prerequisite: MU 157.

Techniques of singing, emphasizing resonance, articulation, projection, and repertoire.

MUCC 192 03(0-0-3). Introduction to Music History and Literature. (AUCC 1). F, S.

Landmarks of music history and literature from 1300 to the present.

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(0-3-0). 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.

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. 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 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 192.

One or two half-hour lessons per week.

MU 286 01(0-2-0). Practicum-Music Education.**MU 301 01(0-3-0). University Chorus.** F, S.

Rehearsal and performance of a variety of types and styles of music for mixed voices.

MU 302 01(0-5-0). University Orchestra. F, S.

Rehearsal and performance of standard orchestral literature.

MU 304 01(0-3-0). Symphonic Band. F, S, SS. Prerequisite: Written consent of instructor.

Preparation for public performance of full symphonic instrumentation of concert band literature.

MU 305 01(0-3-0). University Singers. F, S. Prerequisite: Written consent of instructor.

Rehearsal and performance of choral literature emphasizing extended works with orchestral accompaniment.

MU 309 01(0-3-0). Jazz Ensemble. F, S. Prerequisite: Written consent of instructor.

Rehearsal and performance of jazz ensemble literature of standard and experimental types.

***MU 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 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; MU/MUCC 100 or MUCC 192.

Music of the medieval, Renaissance, and baroque periods.

MU 335 03(3-0-0). Music History II. S. Prerequisite: MU 118; MU/MUCC 100 or MUCC 192.

Music of the classical, Romantic, and contemporary periods.

MU 342 03(3-0-0). Psychology of Music. F. Prerequisite: PY/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: ST/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 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.

***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 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 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

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.

NATURAL RESOURCES COURSES

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). Also offered as an on-line course. 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.

NRCC 192 02(0-0-2). First Year Seminar in Environmental Studies. (AUCC 1). F.

Introduction to the disciplines involved in natural resources through exposure to current issues.

+NR 220 05(2-6-0). Natural Resources Ecology and Measurements. SS. Prerequisite: BZ/BZCC 120 or BY/LS 103; M/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 CC 192 or first-year seminar. 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 260 02(2-0-0). Introduction to Natural Resource Analysis. F, S, SS.

Communication and analysis techniques with computers for natural resource management.

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.

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)

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. Prerequisite: NR 224/A 224. 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: NR/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: SP/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.

Natural resource management exercises; quantitative integration techniques, group dynamics.

NR 421 03(3-0-0). Natural Resources Sampling. S. Prerequisite: ST/STCC 201 or ST/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.

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)

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)

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)

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)

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)

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)

NR 440 03(2-2-0). Land Use Planning. F.

Integration of natural resource, social, institutional factors in regional resource planning. (Ω)

NR 444 03(3-0-0). Fire Economics and Policy. S. Prerequisite: EC/ECCC 202 or EA/EACC 202 or written consent of instructor.

Development of wildlife and fuel management economics integrated with critical federal policies.

NR 445 01(1-0-0). Gender and Natural Resources. S.

Influence of gender in natural resources science management and its implications for professional development.

+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 500 03(2-2-0). Microcomputer Applications in Natural Resources. F, S. Prerequisite: ST/STCC 301; NR 260 or CS 110.

Use of microcomputer packages in natural resources management and analysis.

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)

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: NR 260 or NR 500, ST/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: ST/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)

***NR 521 02(2-0-0). Natural Resource Administration.** F. Prerequisite: NR/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: ST/STCC 301 or ST/STCC 307 or EH/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.

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 550 03(2-3-0). Farming Systems Research and Development. F. Prerequisite: Written consent of instructor.

Principles of farming systems research methods for agricultural development projects.

NR 555 02(2-0-0). Preparation of Grant Proposals. S. Prerequisite: ST/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/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; NR 260; CS 110 or.

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

College of Natural Sciences

NSCC 101 04(2-2-1). Phenomena of Matter and Energy. 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.

NSCC 102 04(2-2-1). Phenomena of Life. S. Prerequisite: University admissions requirements for high school mathematics and science.

Biological sciences for non-technical majors considered in historic and philosophic context and from the view points of multiple disciplines.

NSCC 192 02(0-0-2). Introductory Seminar. F.

Introduction to the culture and values of science and the College of Natural Sciences.

NS 203 01(0-3-0). Genetic Mechanisms Laboratory. S. Prerequisite: LSCC 201B or concurrent registration.

Basic molecular genetics and molecular aspects of development laboratory.

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

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)

OT 215 01(0-0-1). Medical Terminology. F, S.

Definition and use of medical terms. (Ω)

OT 355 02(1-0-1). Handicapped Individual in Society. F, S. Prerequisite: PY/PYCC 100 or S/S CC 100.

Description and exploration of handicapping conditions; review of support systems including legal and financial implications.

OT 403 02(0-2-1). Professional Seminar II. F. Prerequisite: OT 303.

Small group integration of fieldwork with OT theories and practice issues.

OT 488I-Z Var [1-20]. Field Placement. F, S, SS. Prerequisite: Written consent of department head.

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. (\$) 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 588I-Z Var [1-20]. Field Placement. Prerequisite: Written consent of department head.

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. (\$) 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 590 Var [1-9]. Workshop.

OT 594 Var [1-9]. Independent Study.

OT 596 Var [1-9]. Group Study.

OT 601 04(2-2-1). Occupational Therapy Process. F. Prerequisite: Admission to program or written consent of instructor.

Professional reasoning and skills used to design and deliver occupational therapy services.

OT 602 03(2-0-1). Occupational Therapy Theories. S. Prerequisite: OT 601.

Critical analysis of occupational therapy theory base including history, philosophy, and models of practice.

OT 603 01(0-0-1). Graduate Professional Seminar. S. Prerequisite: OT 601 or 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: OT 601 or written consent of instructor.

Delivery of OT using educational and consultative approaches.

OT 610 04(2-2-1). Psychosocial Interventions in OT I. S. Prerequisite: Admission to program or written consent of instructor.

Psychosocial and cultural issues in health care and strategies for OT intervention with diverse populations.

OT 611 04(2-2-1). Psychosocial Interventions in OT II. F. Prerequisite: OT 610.

Evaluation and intervention principles in practice of psychiatric occupational therapy.

OT 620 04(3-2-0). Biomechanical Interventions in OT I. F. Prerequisite: OT 601.

Foundation for understanding the challenges to occupational performance based on biomechanical impairments.

OT 621 04(3-2-0). Biomechanical Interventions in OT II. S. Prerequisite: OT 620.

OT practices and remediation and compensation strategies with persons with biomechanical occupational performance problems. (\$))

OT 630 04(3-2-0). Neurobehavioral Interventions in OT I. F. Prerequisite: OT 606.

Theory and practice related to assessment, intervention, and occupational performance with children with neurobehavioral difficulties in various settings. (\$))

OT 631 04(2-2-1). Neurobehavioral Interventions in OT II. S. Prerequisite: OT 630.

Evaluation and intervention for adults with difficulty performing daily occupations because of neurobehavioral dysfunction.

OT 645 03(0-0-3). Leadership and Administration. F. Prerequisite: OTR or 10 credits of OT 688I-Z.

Leadership and administration processes applied in occupational therapy.

OT 646 03(2-0-1). 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. Prerequisite: OT 601.

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.

OT 696 Var. Group Study.

OT 698 Var. Research.

OT 699 Var. Thesis.

PATHOLOGY COURSES

Department of Microbiology, Immunology, and Pathology

College of Veterinary Medicine and Biomedical Sciences

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 02(1-2-0). Pathology of Laboratory Animals.** S. Prerequisite: VM 742.

Specific disease problems of common laboratory animals emphasizing morphologic, clinical pathologic features of spontaneous, selected induced diseases.

PA 784 Var. Supervised College Teaching. F, S, SS.

PA 786A-C Var. Practicum.

A) Comparative gross and histologic pathology. B) Surgical pathology. C) Clinical pathology.

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.

PLANT DISEASE COURSES (PD)

Prefix changed to Bioagricultural Sciences and Pest Management (BI)

PERFORMING ARTS COURSES

Department of Music, Theatre, and Dance *College of Liberal Arts*

PFCC 110 03(2-0-1). Performing Arts Around the World. (AUCC 3F). 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

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 PH/PHCC 110 and PH/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: PH/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/M CC 125. Credit not allowed for both PH/PHCC 121 and PH/PHCC 110; or for both PH/PHCC 121 and PH/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: PH/PHCC 121. Credit not allowed for both PH/PHCC 122 and PH/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/M CC 126; M/M CC 155 or M/M CC 160. Students who have had high school physics may enroll in M/M CC 155 or M/M CC 160 concurrently. Credit not allowed for both PH/PHCC 141 and PH/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: PH/PHCC 141, concurrent registration in M/M CC 161 or M/M CC 255. Credit not allowed for both PH/PHCC 142 and PH/PHCC 122.

Electricity and magnetism, circuits, light, optics (calculus based).

PH 160 03. Basic Physics and Physical Worldview. F, S, SS. Prerequisite: High school algebra or M/M CC 121, M/M CC 126. Offered as telecourse only.

Physics, cultural and historical background of physical thought, humans' relationship to physical world.

PHCC 192 02(0-0-2). The Flying Circus of Physics. (AUCC 1). 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/M CC 161, PH/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: PH/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 JT/JTCC 300.

Advanced experiments in electricity and magnetism, statistical physics and quantum mechanics.

PH 341 04(4-0-0). Mechanics. F. Prerequisite: M 340, PH/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, PH/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, PH/PHCC 142.

Geometrical optics; wave optics; interference, diffraction, and polarization; quantum optics.

PH 361 03(3-0-0). Physical Thermodynamics. S. Prerequisite: M 261, PH/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: PH/PHCC 121 or PH/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.

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, PH 751.

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: PH 751.

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.

PHILOSOPHY COURSES

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 PL/PLCC 110. Offered as correspondence course only.

Analyzing and judging passages of argument; identifying tacit assumptions; recognizing necessary/sufficient conditions. (Ω)

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 2D). F, S, SS.

Credit not allowed for both PL/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. (GT-AH3)

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.

PLCC 192 03(0-0-3). Conceptions of the Good Life. (AUCC 1). 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.

- 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 PL/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.
- 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 "nature" 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.

***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

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 192A-D 03(0-0-3). Seminar in Politics F.

A) Credit not allowed for both POCC 192A and POCC 101. (AUCC 1 and 3C or 3F). B) Credit not allowed for both POCC 192B and POCC 103. (AUCC 1 and 3C or 3F). C) Credit not allowed for both POCC 192C and POCC 232. (AUCC 1 and 3C or 3D). D) Credit not allowed for both POCC 192D and POCC 241. (AUCC 1 and 3C or 3E).

A) U.S. national government and politics. B) State and local government and politics. C) International relations. D) Comparative government and politics.

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)

PO 301 03(3-0-0). Political Parties and Interest Groups. F. Prerequisite: PO/POCC 101 or POCC 192A.

Institutional and behavioral features of American political parties and interest groups.

PO 304 03(3-0-0). Legislative Politics. F, S. Prerequisite: PO/POCC 101 or POCC 192A.

Structure, organization, behavior, processes, and policy implications of U.S. legislatures.

PO 305 03(3-0-0). Judicial Politics. F. Prerequisite: PO/POCC 101 or POCC 192A.

Allocation of powers among judicial structures in American federal system.

PO 306 03(3-0-0). Executive Politics. F. Prerequisite: PO/POCC 101 or POCC 192A.

Structure, organization, behavior, processes, and policy implications of U.S. executive leadership.

PO 309 03(3-0-0). Urban Politics. F, S. Prerequisite: PO/POCC 101 or PO/POCC 103 or POCC 192A or POCC 192B.

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: EA/EACC 202 or EC/ECCC 202 and POCC 192C or PO/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 192D or PO/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 192D or PO/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: PO/POCC 101 or POCC 192A.

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: PO/POCC 101 or POCC 192A.

Public and contemporary issues relating to U.S. environmental policy. (Ω)

PO 362 03(3-0-0). Global Environmental Politics. F, S, SS. Prerequisite: POCC 192C or POCC 192D or PO/POCC 232 or PO/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)

PO 409 03(3-0-0). Regional Governance. F, S. Prerequisite: PO/POCC 101 or PO/POCC 103 or POCC 192A or POCC 192B.

Governance processes and public policies in metropolitan regions.

PO 410 03(3-0-0). American Constitutional Law. F. Prerequisite: PO/POCC 101 or POCC 192A.

Allocation of powers among structures in American federal system.

PO 413 03(3-0-0). U.S. Civil Rights and Liberties S, SS. Prerequisite: PO/POCC 101 or POCC 192A.

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)

PO 421 03(3-0-0). Modern Political Theories. F.

Major political theories and ideologies of modern times.

PO 423 03(3-0-0). American Political Theories. S. Prerequisite: PO/POCC 101 or POCC 192A.

Major American theories and ideologies: their development and present uses.

PO 431 03(3-0-0). International Law. F, S. Prerequisite: POCC 192C or PO/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 192C or PO/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 192C or PO/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: PO/POCC 192C or PO/POCC 232; POCC 192D or PO/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)

PO 444 03(3-0-0). Comparative African Politics. S, SS. Prerequisite: POCC 192D or PO/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 192D or PO/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 192D or PO/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 192D or PO/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: PO/POCC 101 or POCC 192A.

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 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.

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.

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)

PY 250 04(4-0-0). Experimental Psychology. F, S, SS. Prerequisite: PY/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: PY/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: PY/PYCC 100, PY 250.

Psychological and context influences on creativity; creativity implications and outcomes.

PY 295 Var [1-3]. Independent Study.

Individual investigation of a special topic in psychology under direction of faculty.

²PY 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 PY/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: PY/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: PY/PYCC 100.

Social psychological theory and research on effects of behavior on the environment; environmental influences on behavior. (Ω)

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: PY/PYCC 100.

Definition and description of behavior pathology; theory and research on factors in etiology and treatment of behavior disorders. (Ω)

PY 325 03(3-0-0). Psychology of Personality. F, S, SS. Prerequisite: PY/PYCC 100.

Theory and research related to personality as a psychological concept; analytic, phenomenological, and behavioristic views.

PY 327 03(2-0-1). Psychological Perspectives on Female Experience. S. Prerequisite: PY/PYCC 100.

Contemporary theory and research focusing on emotional, cognitive, biosocial, and interpersonal contributions to female identity and sex role.

PHYSIOLOGY COURSES (PS)

Prefix changed to Biomedical Sciences (BS)

PSYCHOLOGY COURSES

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)

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)

PYCC 192 02(1-0-1). Introductory Seminar. (AUCC 1). F, S. Prerequisite: PY/PYCC 100 or concurrent registration. Freshman psychology majors only.

Introduction to the University and the field of psychology. Examination of subareas within psychology and research methods used.

²Maximum 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.

***PY 330 03(3-0-0). Clinical and Counseling Psychology.** S. Prerequisite: PY/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: PY/PYCC 100, ST/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: PY/PYCC 100 or written consent of instructor.

Current research and theoretical issues on reinforcement, punishment, extinction, generalization, discrimination learning, transfer, and retention.

PY 353 02(0-4-0). Psychology of Learning Laboratory. F, S. Prerequisite: PY 250; PY 352 or concurrent registration.

Operant techniques emphasizing behavior theory, equipment, animal care, shaping; selected experiments in operant behavior.

PY 370 03(3-0-0). Psychological Measurement and Testing. F, S. Prerequisite: PY/PYCC 100, ST/STCC 301 or ST/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. (\$)

²PY 384 Var [1-3]. Supervised College Teaching. F, S, SS. Prerequisite: PY/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: PY/PYCC 100; PL 105 or PL/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: PY/PYCC 100, ST/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: PY/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)

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) PY/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: PY/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: PY/PYCC 100.

Contemporary theory and research on adolescence including physiological and psychological changes, social influences.

²PY 486 Var [1-3]. Practicum.

Supervised work experience in approved psychological setting with periodic consultation of faculty.

²PY 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.

²PY 495 Var [1-3]. Independent Study.

Individual investigation of a special topic in psychology under direction of faculty.

²PY 496 Var [1-3]. Group Study.

Collective investigation of a special topic in psychology under direction of faculty.

²PY 498 Var [1-3]. Research.

Independent research project culminating in formal research paper.

²PY 499 Var [1-6]. Thesis.

Independent research project culminating in a thesis presented to a faculty committee.

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. J) PY 340. 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. J) Group and organizational. 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: ST/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.

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

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: BY/LSCC 102, PH/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/C CC 112, PH/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: ST/STCC 201.

Data management and analysis for biologists via interactive terminals.

R 530 03(3-0-0). Radiological Physics and Dosimetry I. F. Prerequisite: PH/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/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/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.

***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

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/C CC 103 or C/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/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

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.

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 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: ST/STCC 201.

Recreation measurement techniques.

RR 377 02(1-0-1). Recreation Resources Administration. S. Prerequisite: RR 100.

Concepts, theory, and principles applied to administrative concerns of recreation resources organizations.

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)

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)

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)

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)

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)

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)

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)

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 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)

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)

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)

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)

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)

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)

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)

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)

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)

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 461 03(3-0-0). Interpretive Planning. S. Prerequisite: RR 261.

Interpretive master planning and visitor studies for natural resource management. (\$)

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 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/ER 504 02(2-0-0). Water-Based Recreation. S. Prerequisite: Written consent of instructor. Credit not allowed for both RR 504 and ER 504.

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 604 02(2-0-0). Administration of Recreation Areas. S. Prerequisite: NR/NRCC 320.

Case studies of current problems facing public park and recreation area administrators.

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, ST/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.

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: ST/STCC 201 or ST/STCC 301 or ST/STCC 307 or EH/EHCC 307; RS 300 or concurrent registration; NR 220 or RS 331.

Field measurements of rangelands emphasizing vegetation sampling. (S)

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)

RS 470 02(2-0-0). Rangeland Economics and Analysis. F. Prerequisite: EA/EACC 202, NR 260, RS 300.

Economics of rangeland resource use; analytical techniques for allocation of rangeland resources.

RS 471 02(2-0-0). Rangeland Planning and Grazing Management. F. Prerequisite: RS 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 493 01(0-0-1). Seminar in Grassland and Shrubland Ecology.

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)

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.

RANGELAND ECOSYSTEM SCIENCE COURSES

Department of Forest Rangeland Watershed Stewardship

College of Natural Resources

RS 289 02(1-2-0). Range-Watershed Survey. SS. Prerequisite: Written consent of instructor. Offered only through Division of Educational Outreach.

Field course in integrated natural resource management emphasizing range-watershed management and field measurement techniques. (Ω)

RS 300 03(3-0-0). Principles of Range Management. F, S, SS. Prerequisite: BZ/BZCC 120 or BY/LS 103.

Conservation and management of rangeland-ecosystem values using sustainable practices. (Ω)

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 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)

+RS 532 03(3-0-0). Range Ecosystem Sampling. F. Prerequisite: ST/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)

***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: ST/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.

RS 652 04(3-2-0). Secondary Production in Rangeland Ecosystems. S. Prerequisite: One course in ecology; one course in animal nutrition.

Energy transfer from primary to secondary producers; nutritional balances and biological efficiency of consumers.

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****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 CC 192 03(0-0-3). Civic Culture and Social Responsibility. (AUCC 1). 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/S CC 100 or S/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/S CC 100 or S/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/S CC 100 or S/S CC 105.

Theoretical approaches and models in sociology.

S 310 03(3-0-0). Quantitative Sociological Analysis. F, S. Prerequisite: M/M CC 120A-B or M/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/S CC 100 or S/S CC 105.

Application of sociological concepts to sociological problems including problem formulation, data gathering, and research design.

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/S CC 100 or S/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/S CC 100 or S/S CC 105.

Theories of social inequality and mobility and their ramifications in American society. (Ω)

S 331 03(3-0-0). Community Dynamics and Development. F. Prerequisite: S/S CC 100 or S/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/S CC 100 or S/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/S CC 100 or S/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/S CC 100 or S/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/S CC 100 or S/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)

S 342 03(3-0-0). Leisure and Society. F, S, SS. Prerequisite: S/S CC 100 or S/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/S CC 100 or S/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 356 03(3-0-0). Public Opinion in Mass Society.** S. Prerequisite: S/S CC 100 or S/S CC 105.

Role of mass media in serving information needs of various publics.

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/S CC 100 or S/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/S CC 100 or S/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/S CC 100 or S/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/S CC 100 or S/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/S CC 100 or S/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/S CC 100 or S/S CC 105.

Description, comparison, and analysis of theories and research of deviance.

***S 374 03(3-0-0). Sociology of Occupations and Professions.** F. Prerequisite: S/S CC 100 or S/S CC 105.

Sociological analysis of various occupations, professions; overview of organization, processes, relationships, implications of work as a social activity.

S 375 03(3-0-0). Sociology of Religion and Medicine. F. Prerequisite: S/S CC 100 or S/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: AP/APCC 100 or S/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/S CC 100 or S/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/S CC 100 or S/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/S CC 100 or S/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/S CC 100 or S/S CC 105.

Determinants and consequences of behavior and response to environmental extremes including floods, earthquakes, wind, severe storms, and technological emergencies.

S 464 03(3-0-0). Environmental Justice. F, S. Prerequisite: S/S CC 100 or S/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/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 04(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.

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/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.

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 751 03(0-0-3). Seminar in Theories of Autonomous Change.** S.
Prerequisite: S 660.

Review and critique of selected theories of autonomous change.

***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 764 03(0-0-3). World System Theory. F. Prerequisite: S 660.

Global interconnectedness of social change and development processes.

***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.

SC 201 01(0-2-0). Seed Development and Metabolism. F, S, SS.
Prerequisite: One course in biology or SC 100 or H/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)

SC 240 04(3-2-0). Introductory Soil Science. F, S, SS. Prerequisite: C/C CC 107 or C/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)

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)

***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/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.

SC 322 03(3-0-0). Principles of Microclimatology. S. Prerequisite: BY 220 or NR 220; PH/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: BZ/BZCC 110 or BZ/BZCC 120 or BY/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/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. (\$)

STUDY ABROAD

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

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.

SCCC 192 03(0-0-3). Water in the West. (AUCC 1 and 3E). 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/H CC 100 or written consent of instructor.

Principles of seed anatomy including reproduction, identification, and seed characteristics of plant families. (Ω)

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: ST/STCC 201 or ST/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/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/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 100, 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.

SC 522 03(3-0-0). Plant Canopy Meteorology. S. Prerequisite: BY 220 or BZ 440; PH/PHCC 141; M/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 720A-B . 02(2-0-0). Advanced Plant Breeding. 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. °A) Cross-pollinated species. S. *B) Self-pollinated species. S.

***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.

SPCC 200 03(3-0-0). Public Speaking. (AUCC 2B1). 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: SP/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 2D). 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.

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: SP/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: SP/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.

SPEECH COMMUNICATION COURSES

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 1 and 3E). F.

Analysis of communication differences and similarities across cultures and co-cultures; effective communication in intercultural interactions.

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 nonentertainment 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: SP/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: SP/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)

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: SP/SPCC 100 or SP 342, SP/SPCC 200, SP/SPCC 201, SP/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 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.

SP 420 03(3-0-0). Political Communication. F.

Rhetoric of political campaigns. (Ω)

SP 427 03(3-0-0). Communication in Organizations. F..

Communication theory and strategy for empowerment of nonsupervisory 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)

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: SP/SPCC 201 or graduate status.

Changes in rhetorical theory from 1450 to 1950, including psychological, dramatic, literary, historical, and political influences.

SP 505 03(3-0-0). Ethnography of Communication. F.

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.

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 514 03(3-0-0). British Origins of American Discourse. S.

Major British speakers from 18th, 19th, and 20th centuries who significantly influenced American discourse.

SP 523 03(3-0-0). Feminist Theories of Discourse. F.

Exploration and evaluation of contemporary feminist theories of rhetoric and discourse.

SP 530 03(3-0-0). Communication Research Methods. S.

Historical and philosophical context of communication research; relationship between theory and method; dominant forms of communication research.

SP 546 03(3-0-0). Media Criticism. S. Prerequisite: Seniors and graduate students only. Fifteen 300-400 level credits in speech and/or English.

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.****STCC 201 03(2-0-1). General Statistics.** F, S, SS. (AUCC 2D). Prerequisite: M/M CC 120A-B. Intended as a one-semester terminal course. Credit not allowed for both ST/STCC 201 and ST/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 2D). F, S, SS. Prerequisite: M/M CC 120A-B. Credit not allowed for both ST/STCC 204 and ST/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 2D). F, S, SS. Prerequisite: M/M CC 121. Credit allowed for only one course: ST/STCC 301, ST/STCC 307, EH/EHCC 307, ST/STCC 309, ST/STCC 311.

Techniques in statistical inference; confidence intervals, hypothesis tests, correlation and regression, analysis of variance, chi-square tests. (GT-MA1)

ST 302 03(3-0-0). Design of Experiments. F, SS. Prerequisite: ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/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, ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/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: ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/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 2D). F, S, SS. Prerequisite: M/M CC 121. Credit allowed for only one course: ST/STCC 301, ST/STCC 307 or EH/EHCC 307, ST/STCC 309, ST/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 2D). F, S, SS. Prerequisite: M/M CC 161 or M/M CC 255. Credit allowed for only one course: ST/STCC 301, ST/STCC 307 or EH/EHCC 307, ST/STCC 309, ST/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: ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/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 2D). F. Prerequisite: M/M CC 121. Credit allowed for only one course: ST/STCC 301, ST/STCC 307 or EH/EHCC 307, ST/STCC 309, ST/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: ST/STCC 311 or written consent of instructor.

One-way analysis of variance, factorial designs, blocked designs, multiple comparisons of means, and multiple regression.

STATISTICS COURSES

*Department of Statistics**College of Natural Sciences***STCC 101 03(2-2-0). Activity Based Statistics.** (AUCC 2D). 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 2D). 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.

STCC 192 01(0-0-1). First-Year Seminar in Mathematical Sciences. (AUCC 1). S. Prerequisites: In order to fulfill first-year seminar requirement, students also need to pass M/M CC 192.

Richness and variety of problems encountered in the mathematical sciences.

ST 321 03(3-0-0). Elementary Probabilistic-Stochastic Modeling. S. Prerequisite: M/M CC 155 or M/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/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: ST/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.

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: ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/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: ST/STCC 301 or ST/STCC 307 or EH/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: EH/EHCC 307 or ST/STCC 307 or ST/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: ST/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 605 03(3-0-0). Theory of Sampling Techniques. F. Prerequisite: ST/STCC 301 or ST/STCC 307 or EH/EHCC 307 or ST/STCC 309 or ST/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.

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

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: PY/PYCC 100 or concurrent registration; S/S CC 100 or S/S CC 105 or concurrent registration.

Historical development of social welfare. Knowledge, values, intervention skills, settings, and groups served by social workers. (Ω)

SW 233 03(3-0-0). Systems Perspective for Social Work. F, S. Prerequisite: HD/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.

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 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 488 Var [5-10]. Field Placement. F, S, SS. Prerequisite: S 311 or HS/HSCC 300 or concurrent registration in S 311 or HS/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. (Ω)

SW 510 03(0-0-3). Theoretical Analysis of Small Client Systems. F. Prerequisite: SW 500.

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, admission to M.S.W. program, concurrent registration in SW 512.

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). Animal Assisted Therapy/Human-Animal Bond. SS.

Nature of human-animal bond and animal assisted therapy as an intervention method.

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: ST/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.

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.

THEATRE COURSES

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. (\$)

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.

+THCC 192 03(0-03). From Page to Stage: Freshman Theatre Seminar. (AUCC 1). F, S, SS.

Collaborative creative processes required to transfer literature to theatrical performances with faculty artists/scholars. (\$)

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.

TH 470A-D 02(0-6-0). Applied Theatre Production. F, S. Prerequisite: Written consent of instructor.

A) Acting, directing, stage managing. B) Lighting, sound, technical production. C) Costume, makeup, wardrobe. D) Scenic design, painting, props.

TH 475 03(2-0-1). Playwriting. S. Prerequisite: E 210 or TH 355.

Special techniques of writing for the stage.

TH 484 Var. [1-3]. Supervised College Teaching.

TH 486 01(0-3-0). Practicum. F, S, SS. Prerequisite: TH 286. Maximum of 4 credits allowed in course.

Practical experience in the supervisory capacities involved in mounting theatrical productions.

TH 487 Var. [1-12]. Theatre Internship. F, S, SS.

Adviser-approved position at a professional regional theatre, a professional training program, or professional summer theatre.

TH 491 Var. Repertory Theatre Workshop. Prerequisite: Audition only.

Principles and practice of repertory theatre operation; practical experience offered.

TH 495 Var. Independent Study.

TH 499 03. Thesis. Prerequisite: TH 341, TH 342; performing arts-theatre majors only.

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.

VOCATIONAL EDUCATION COURSES

School of Education

College of Applied Human Sciences

VE 300 02(0-0-2). Principles of Vocational Education. F, S, SS. Offered only through Continuing Education, School of Education

History, purpose, administration, funding, programs and services, delivery system; relationship to total educational system including needs of exceptional students in vocational classrooms. (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 in Vocational Education. F, S, SS. Offered only through Continuing Education, School of Education.

Skills and techniques necessary for advising vocational 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(0-0-3). Agricultural Experience and Adult Education. S.

Developing secondary agriculture experience programs. Organizing and teaching adult education classes in agriculture.

VE 425 04(0-0-4). 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(0-0-4). 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)

VE 441 01(0-0-1). Methods/Materials-Vocational Marketing Education. F. Prerequisite: ED 320; 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)

VE 451 04(0-2-3). Methods-Consumer and Family Studies Education. F. Prerequisite: ED 320, concurrent registration in ED 450.

Teaching methods, processes, and materials for consumer and family studies education.

VE 465 03(0-0-3). 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.

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(0-0-3). Philosophy/Organization of Workforce Education. F, S, SS.

Principles, philosophy, practices, and innovations of workforce education and human resources.

VE 610 03(0-0-3). Principles of Supervision and Evaluation. F. Prerequisite: VE 601.

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(0-0-2). Organization of Business and Office Education.** SS. Prerequisite: VE 300.

Procedures for organizing new programs and for managing or modifying existing programs. (Ω)

***VE 631 02(0-0-2). Management of Business-Office Departments.** SS. Prerequisite: VE 300.

Preparation of teachers and administrators for implementation of vocational business and office education programs. (Ω)

***VE 640 02(0-0-2). Methods in Vocational Marketing Education.** SS. Prerequisite: VE 441.

Instruction and curricula for secondary and postsecondary vocational marketing education. (Ω)

***VE 641 02(0-0-2). Programs in Vocational Marketing Education.** SS. Prerequisite: VE 441.

Techniques used in determining need for and implementations of new or additional programs of vocational marketing education. (Ω)

VE 656 03(0-0-3). Tests and Assessment. S. Prerequisite: ED 606.

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 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(0-0-3). Quantitative Research Methods. F, S. Prerequisite: ED 606.

Design, data analysis, interpretation of results, and evaluation of educational research studies.

VE 706 03(0-0-3). Analysis of Relationships. S, SS. Prerequisite: 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.

***VE 765 03(0-0-3). 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(0-0-3). 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 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.

VETERINARY MEDICINE COURSES

College of Veterinary Medicine and Biomedical Sciences

VM 601 01(1-0-0). Perspectives in Veterinary Medicine. F. Prerequisite: Admission to professional curriculum in veterinary medicine.

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 623 02(2-0-0). Veterinary Nutrition and Metabolism. S. Prerequisite: Enrolled in professional veterinary medicine program.

Intermediary metabolism, nutrients, and animal nutrition.

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.

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-B) VM 747. D) VM 753.

Diagnosis and treatment of diseases of selected species of animals. A) Avian and exotic animal medicine. 02(0-0-2). B) Biology and disease of rabbits and rodents. 01(0-0-1). 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

Department of Clinical Sciences

College of Veterinary Medicine and Biomedical Sciences

VS 300 03(3-0-0). Prevention and Control of Livestock Diseases. F.
Common ailments of livestock; sanitation and disease prevention and control.

VS 320 03(3-0-0). Birds of Prey-Health Care and Natural History. S, SS.
Prerequisite: BZ/BZCC 110 or BY/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 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.

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: EH/EHCC 307 or ST/STCC 307 or ST/STCC 301.
Method of evaluating scientific literature. Students present critiques of papers they have chosen.

³VS 605 02(2-0-0). Comparative Anesthesiology. S. Prerequisite: BS 450.
Techniques in anesthesia for large and small animals.

³VS 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.

³VS 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.

³VS 630 03(3-0-0). Orthopedic Surgery. F.
Techniques, devices, and prosthetic materials in rehabilitating musculoskeletal problems.

³VS 631 01(0-3-0). Orthopedic Surgery Laboratory. F. Prerequisite: VM 786A or B; VS 630 or concurrent registration.F
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.

³VS 645 03(2-3-0). Surgery of the Eye. S. Prerequisite: VS 642.
Techniques, indications, and complications.

³VS 650 03(3-0-0). Comparative Abdominal Surgery. F.
New techniques in surgery of abdominal viscera.

³VS 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.

³VS 660 03(3-0-0). Neurology and Neurosurgery. S.
Diagnostic and surgical techniques for the nervous system.

³VS 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.

³VS 662/EH 662 03(2-0-1). Applied Research-Planning/ Design/Analysis. S. Prerequisite: EH/EHCC 307/ST/STCC 307. Credit not allowed for both VS 662 and EH 662.
Training to conceptualize and execute an independent research project.

³VS 673 03(3-0-0). Thoracic and Cardiovascular Surgery. F.
Surgical approaches to the thorax and the central and peripheral cardiovascular system.

³ Offered every third year.

³VS 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.

³VS 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.

³VS 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.

³VS 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.

³VS 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.

WEED SCIENCE COURSES (W)

Prefix changed to Bioagricultural Sciences and Pest Management (BI)

WATERSHED SCIENCE COURSES

Department of Forest Rangeland 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, ST/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/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: PH/PHCC 141 or written consent of instructor. Fundamental physical principles of eolian and fluvial transport processes.

^oWR 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 504/RR 504 02(2-0-0). Water-Based Recreation. S. Prerequisite: Written consent of instructor. Credit not allowed for both ER 504 and RR 504. Identify issues and management strategies for recreation utilization of water resources.

WR 510 02(2-0-0). Watershed Management in Developing Countries. F. Prerequisite: CE 322/EV 322 or ER/ERCC/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: PH/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 ST/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 589 04(3-3-0). Watershed Planning for Developing Countries. SS. Prerequisite: Hydrology course or professional experience in watershed and soil conservation. Offered only through Division of Educational Outreach.

Basic training in watershed and soil conservation survey, planning, monitoring, and evaluation, emphasizing microcomputer technology. (Ω)

***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.

WOMEN'S STUDIES COURSES

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.

Index

Absence from class	94	Admission (continued)	
Academic		General Educational Development (GED) Test	20
Achievement Award	24	good standing requirement	21
calendar	9	high school graduates	20
Computing and Network Services (ACNS)	52	Honors Program	89
degrees, graduate	112	immunization policy	19
dishonesty	33, 35	international students	22
dismissal	93	interview	21
Fresh Start	90, 93	mathematics requirement	20, 21
integrity	35	non-high school graduates	20
materials, unauthorized possession or disposition of	36	personal identifier (PID)	19
record	96	requirements and procedures	19
probation	92	Selective Service registration	20
progress, satisfactory	25	Social Security number	19
transcripts	96	teacher licensure	158
Academic support services	41	Test of English as a Foreign Language (TOEFL)	22
advising services	41, 53	transcripts, official	20, 21, 22
changing majors	97	transfer	
human health professions advising	59	appeals process	22
life sciences	58	grades	22
open option advising program	41, 58	students	21
orientation programs	41	undergraduate policies and procedures	19
pre-veterinary medicine advising	59	Adult education courses (AD)	365
retroactive withdrawal	97	Adult Learners, Resources for	42
scholastic standards	92	Adult technical education (career and technical)	160
student clubs	59	Advanced placement credit	103, 107
students called to active duty	91	Advising, undergraduate	37, 94
withdrawal from University	32, 41, 96, 97	Advanced Writing (AUCC)	100
Accounting concentration (Business Administration)	190	Advocacy Programs	41
Accounting courses (BA)	378	Asian/Pacific American Student Services	41, 49
Accounting, Department of	190	Black Student Services	42, 49
Accounting concentration (Business Administration)	190	El Centro Student Services	42, 49
business education option	191	Gay, Lesbian, Bisexual and Transgender Student Services	42, 49
courses (BA)	378	Native American Student Services	42, 49
Accounts, student	31	Off-Campus Student Services	42, 49
housing deposit	32	Resources for Adult Learners	42, 49
late payment	31	Resources for Disabled Students	42
payment of	31	Women's Programs and Studies	43
registration, transcript, and diploma holds	31	Aerospace Studies, Department of	86
returned checks	31	courses (AS)	375
schedule	31	minor in	87
summer session	31	scholarships	86
tuition and fee adjustments	32	Aggie Village	48
Accreditation	14	Agricultural and Resource Economics, Department of	119
ACNS	52	Agricultural Business, major in	119
ACS Certified concentration (Chemistry)	335	Agricultural Economics, major in	120
Acting/Directing minor	273	Agricultural Economics concentration	121
Active duty, students called to	91	Farm and Ranch Management concentration	122
Activities Center, Campus	49	Natural Resource Economics concentration	123
Actuarial Science concentration (Mathematics)	340	courses (EA)	409
Adding courses	9, 96	environmental studies	56
Additional Communication (AUCC)	100	graduate programs	124
Address change	96	minor in	124
Address, current	31, 94, 96	Agricultural	
Adjustments, tuition and fee schedule	32	Business, major in	119
Admission		College of Colorado	13
academic probation	21, 92	Economics	
ACT or SAT scores	20, 21	concentration (Agricultural Economics)	121
application deadlines	19, 21, 22	courses (EA)	409
application processing fee	20, 21, 22, 27	major in	120
College of Business	188	Education	
College of Engineering	20, 21, 200	career and technical	160
composition	21	concentration (Agricultural Education)	116
evaluation of transfer credit	21	major in	116
former Colorado State students	22		

- Agricultural (continued)
- Engineering concentration (Bioresource and Agricultural Engineering) 212
 - Engineering courses (CE) 395
 - Extension Education concentration (Agricultural Education) 118
 - Experiment Station 13, 14, 15, 54
- Agricultural Sciences, College of 115
- Agricultural Education, major in 116
 - Agricultural Education concentration 116
 - Agricultural Extension Education concentration 118
 - agriculture courses (A) 364
 - career internships 116
 - charge for technology 27
 - environmental studies 56
 - Extension emphasis 115
 - honor societies 111
 - interdepartmental major 116
 - international agriculture emphasis 115
 - open option students 115
 - shared interest living 47
 - study abroad 116
 - transfer of credits into 116
 - undergraduate majors and minors 115
- Agriculture
- courses (A) 364
 - Research Development Education Center (ARDEC) 16
 - State Board of (see Board of Governors)
- Agronomic Production Management concentration (Soil and Crop Sciences) 144
- Agronomy (see Soil and Crop Sciences, Department of)
- Aims Community College cooperative agreement 97
- Aims, University 14
- Air Force ROTC 86
- scholarships 24
- All-University Core Curriculum (AUCC) 22, 99-103, 105, 363
- Core Competencies 100
 - Additional Communication 100
 - Logical/Critical Thinking 100
 - Mathematics 100
 - Written Communication 100
 - cumulative grade point average 99
 - Depth and Integration 99
 - First Year Seminar 99
 - Foundations and Perspectives 101
 - Arts/Humanities 101
 - Biological/Physical Sciences 101
 - Global and Cultural Awareness 102
 - Health and Wellness 103
 - Historical Perspectives 102
 - Social/Behavioral Sciences 101
 - U.S. Public Values and Institutions 103
- Alumni Association 16
- American College Testing Program (ACT) 20, 21, 45
- American Ethnicity
- courses (ET) 421
 - Interdisciplinary Studies Program 59
- American Studies
- concentration (Liberal Arts) 222
 - courses (AU) 377
- American West Program 54
- Anatomy and Neurobiology (see Biomedical Sciences, Department of)
- Anatomy and Neurobiology courses (BS) 388
- Animal science courses (AN) 367
- Animal Sciences, Department of 124
- courses (AN) 367
 - Equine Science, major in 126
 - Industry concentration 127
 - Science concentration 128
 - graduate programs 129
- Animal Sciences, Department of (continued)
- major in 124
 - Industry concentration 124
 - Science concentration 125
 - preveternary medicine 129
 - Anthropology courses (AP) 369
 - Anthropology, Department of 232
 - Anthropology, major in 232
 - Anthropology, minor in 233
 - courses (AP) 369
 - environmental studies 57
 - graduate program 234
- Apartments, University 48
- Aggie Village 48
 - contract agreement 32
 - deposit 32
 - housing assignments 48
 - single student apartments 48
 - University Village 48
- Apparel and merchandising
- courses (AM) 366
 - major in 161
 - Apparel Design and Production concentration 162
 - Merchandising concentration 163
- Apparel design and production concentration (Apparel and Merchandising) 162
- Appeals
- academic dismissal 93
 - grade 90
 - transfer 22
- Application procedures for
- admission 20-22
 - financial aid 25
- Application processing fee 27
- professional program in occupational therapy 27
 - professional program in veterinary medicine 27
- Applied Human Sciences, College of 152
- charge for technology 27
 - consumer and family studies courses (CF) 400
 - Consumer and Family Studies, major in 153
 - Consumer and Family Studies concentration 153
 - Consumer and Family Studies Education concentration 155
 - environmental studies 57
 - honor societies 111
 - human sciences courses (HS) 438
 - interdepartmental major 153
 - open option program 153
 - study abroad 153
 - undergraduate majors and minors 152
 - undergraduate programs 152
- Applied Information Technology concentration (Soil and Crop Sciences) 145
- Applied Mathematics concentration (Mathematics) 341
- Applied Physics concentration (Physics) 348
- Applied Studies in American Ethnicity, Center
- courses (ET) 421
- ARDEC 16
- Armed Forces Services, Division of 86
- Armed services courses, credit for 108
- Army ROTC 87
- scholarships 24
- Art courses (AR) 372
- Art, Department of 234
- Art History minor 240
 - Bachelor of Arts 237
 - Art Education concentration 237
 - Art History concentration 238
 - Studio concentration 239
 - Bachelor of Fine Arts 234
 - Drawing concentration 235
 - Fibers concentration 235
 - Graphic Design concentration 236

- Bachelor of Fine Arts (continued)
- Metalsmithing concentration 236
 - Painting concentration 236
 - Photo Image Making concentration 236
 - Pottery concentration 236
 - Printmaking concentration 237
 - Sculpture concentration 237
 - courses (AR) 372
 - graduate programs 240
 - Studio Art minor 240
 - Art Education concentration (Art) 237
 - Art History concentration (Art) 238
 - Arts and Humanities concentration (Liberal Arts) 224
 - Arts and Humanities and Engineering Science concentration (Liberal Arts/Engineering Science) 225
 - Arts/Humanities (AUCC) 101
 - ASCSU 33, 50
 - Asian Interdisciplinary Studies Program 62
 - Asian/Pacific American Student Services 41
 - Assembly, peaceful 38, 39
 - Assessment 15
 - Associated Students of Colorado State University (ASCSU) 33, 50
 - Astronomy courses (AA) 365
 - Attendance (term) certification 97
 - Athletics 43
 - ATM 49
 - Atmospheric Science, Department of 206
 - courses (AT) 375
 - environmental studies 57
 - graduate programs 206
 - Attendance, class 94
 - AUCC 22, 99-103, 105, 363
 - Auditions, performance 260
 - Auditing a class 95
- Bachelor
- of Arts (B.A.) 112
 - of Fine Arts (B.F.A.) 112
 - of Music (B.M.) 112
 - of Science (B.S.) 112
- Bachelor's degree
- course restrictions 106
 - exclusion of courses from 106
 - second 106
 - credits 107
- Bank 49
- BEEP 51
- Behavior, classroom 36
- Bicycle Education and Enforcement Program (BEEP) 51
- Bike repair shop 49
- Bioagricultural sciences and pest management courses (BI) 384
- Bioagricultural Sciences and Pest Management, Department of 129
 - bioagricultural science and pest management courses (BI) 384
 - Entomology
 - courses (BI) 384
 - minor in 130
 - environmental studies 56
 - graduate programs 130
 - Plant Health, minor in 130
 - plant disease courses (BI) 384
 - weed science courses (BI) 384
- Biochemistry and Molecular Biology, Department of 325
 - Biochemistry, major in 325
 - Biochemistry, minor in 327
 - courses (BC) 379
 - graduate programs 327
- Biochemistry courses (BC) 379
- Biochemistry, major in 325
- Biochemistry, minor in 327
- Biological/Physical Sciences (AUCC) 101
- Biological Science
 - courses (BY) 390
 - major in 327
- Biology, Department of 327
 - Biological Science, major in 327
 - Botany, major in 329
 - Botany, minor in 331
 - courses (BZ) 390
 - environmental studies 58
 - graduate programs 332
 - Zoology, major in 332
 - Zoology, minor in 333
- Biology Education concentration (Natural Sciences) 317
- Biology/Natural Resources Education concentration (Natural Sciences) 319
- Biomedical Engineering
 - courses (BE) 382
 - Interdisciplinary Studies Program 63
- Biomedical sciences courses (BS) 388
- Biomedical Sciences, Department of 355
 - Anatomy and Neurobiology courses (BS) 388
 - Biomedical Sciences, minor in 355
 - courses (BS) 388
 - environmental studies 58
 - graduate programs 355
 - Physiology courses (BS) 388
- Biomedical Sciences, minor in 355
- Biomedical Sciences open option 352
- Bioresource and Agricultural Engineering, major in 211
- Bioresource Engineering
 - concentration (Bioresource and Agricultural Engineering) 212
 - courses (CE) 395
- Biotechnology
 - courses (BH) 384
 - Interdisciplinary Studies Program 65
- Black Student Services 42
- Board of Governors of the Colorado State University System 13, 19, 27, 33
- Board of Student Communications 39
- Bookstore 49
- Botany
 - courses (BZ) 390
 - graduate programs 332
 - major in 329
 - minor in 331
- Business Administration, major in 188
- Business, College of 188
 - admission 188
 - Business Administration, major in 188
 - core curriculum 189
 - Accounting concentration 190
 - Finance-Real Estate concentration 192
 - Information Systems concentration 192
 - Marketing concentration 196
 - Organizational Management concentration 194
 - charge for technology 27
 - education (career and technical) 160, 191, 194
 - general business courses (BG) 383
 - graduate programs 198
 - honor societies 111
 - marketing education (career and technical) 161, 197
 - study abroad 188
- Business courses
 - accounting (BA) 378
 - general (BG) 383
 - finance and real estate (BF) 382
 - information systems (BD) 380
 - management (BN) 386
 - management science (BQ) 388
 - marketing (BK) 386
- Business education (career and technical) 160, 191, 194

- Calendar 9
- Campus
- Activities Center 49
 - description 15
 - foothills 16
 - Information Services 50
- Media (see Student Media)
- recreation 43
 - Service Officers 51
 - Television 49, 50
- Cancellation of registration 32
- Career and technical (vocational) teaching endorsement requirements
- adult technical education 160
 - agricultural education 160
 - business education 160
 - consumer and family studies 161
 - credentialing 160
 - credit for work experience 160
 - graduate programs 161
 - marketing education 161
 - professional core requirements 160
 - trade and industrial education 161
 - vocational education courses (VE) 496
- Career Center, The 45
- Catalog changes, effect on requirements 106
- Catalog, current 105
- CCHE 20, 25
- Cell and Molecular Biology
- courses (CM) 401
 - Graduate Degree Program 83
- Certification
- enrollment 97
 - grade point average 97
 - level 97
 - terms of attendance 97
- Challenging courses for credit 27, 108
- Challenge ropes course 45
- Chancellor, Colorado State University System 1, 13
- message 1
- Changing address 96
- Changing majors 97
- Charge for Technology 27
- Cheating 33, 35
- Chemical engineering courses (CH) 400
- Chemical Engineering, Department of 207
- Chemical Engineering, major in 207
 - courses (CH) 400
 - environmental studies 57
 - graduate programs 208
- Chemical Engineering, major in 207
- Chemistry courses (C) 393
- Chemistry, Department of 334
- Chemistry, major in 334
 - ACS Certified concentration 335
 - Non-ACS Certified concentration 336
 - Chemistry, minor in 336
 - courses (C) 393
 - environmental studies 58
 - graduate programs 336
- Chemistry Education concentration (Natural Sciences) 320
- Chemistry, major in 334
- minor in 336
- Childhood and elementary education, early 179
- Chiropractic, preparation for 59
- Civil Engineering courses (CE) 395
- Civil Engineering, Department of 208
- Bioresource and Agricultural Engineer, major in 211
 - Agricultural Engineering concentration 212
 - Bioresource Engineering concentration 212
 - Civil Engineering, major in 208
- Civil Engineering, Department of (continued)
- courses (CE) 395
 - Environmental Engineering courses (EV) 423
 - environmental studies 57
 - graduate programs 213
- Civil Engineering, major in 208
- Class
- attendance 94
 - auditing 95
 - schedule 94
- Classification
- residency 28
 - undergraduate 96
- Classroom behavior 36
- Clinical sciences courses (VS) 499
- Clinical Sciences, Department of 355
- courses (VS) 499
 - environmental studies 58
 - graduate programs 356
- Clock hour distribution and credits 362
- Club sports 44
- Coaching, minor in 176
- College Board Advanced Placement Program 103, 107
- College-level courses completed while in high school 107
- College-Level Examination Program (CLEP) 103, 108
- Colleges
- Agricultural Sciences 115
 - Applied Human Sciences 152
 - Business 188
 - Engineering 199
 - Liberal Arts 220
 - Natural Resources 287
 - Natural Sciences 316
 - Veterinary Medicine and Biomedical Sciences 352
- Collegian 49, 50
- Colorado
- Commission on Higher Education (CCHE) 20, 25
 - Exchange Program (graduate) 98
 - Graduate Grant Program 26
 - Leveraging Educational Partnership Program 24
 - School of Mines 98
- Colorado State Forest Service 13, 14, 15, 16, 55
- Colorado State University
- Alumni Association 16
 - Pueblo 13
 - System (CSUS) 13
- Colorado Student Grant 24
- Colorado, University of 98
- Colorado Water Resources Research Institute 13
- Commencement 110
- Communication in Media concentration (Speech Communication) 283
- Communication, Oral (AUCC) 100
- Communication Theory concentration (Speech Communication) 283
- Community College Cooperative Registration Agreements 97
- Community living options 47
- Conference Services 52
- Composition
- concentration (Music) 261
 - courses (CO) 402
 - placement
 - examination fee 27, 104
 - procedures 104
 - requirement 103
- Computational Mathematics concentration (Mathematics) 342
- Computational Statistics concentration (Computer Science) 338
- Computer Engineering
- courses (EE) 416
 - major in 214
- Computer Information Systems, Department of 192
- Information Systems concentration (Business Administration) 192
 - information systems courses (BD) 380
 - management science courses (BQ) 388

- Computer Science courses (CS) 402
- Computer Science, Department of 337
- Computer Science, major in 337
- Computational Statistics concentration 338
- Computer Science, minor in 339
- courses (CS) 402
- graduate programs 339
- Computer Science, major in 337
- minor in 339
- Computing and Network Services, Academic 52
- Concentration, definition of 105
- Conflict Resolution and Student Conduct Services 34, 36, 51
- Conservation Biology Interdisciplinary Studies Program 65
- Construction Management
- courses (MC) 456
- major in 180
- minor in 182
- Consumer and family studies
- concentration 153
- concentration (career and technical) 161
- education concentration 155
- courses (CF) 400
- major in 153
- Continuing Education, Division of 41, 52
- tuition and fees assessed 27
- Contract for graduation 105, 106, 109
- Convenience store 49
- Cooperative Extension 13, 14, 15, 55
- Cooperative registration agreements, community colleges 97
- Core Competencies (AUCC) 100
- Core Curriculum, All-University 99
- Core Curriculum, Honors 89
- Correspondence courses 363
- Counseling Center, University 45
- Course
- All-University Core Curriculum (AUCC) 363
- auditing 95
- clock hour distribution and credits 362
- credit load and overload 94
- exclusion from bachelor's degree 106
- fees, special 28, 363
- nontraditional course offering 363
- numbering 106, 362
- prefixes 361
- prerequisites 363
- repeating a 95
- restrictions in undergraduate programs 106
- State Guaranteed Transfer 363
- symbols 361
- taking at another institution 97
- term 363
- variable credit 362
- Courses of instruction 361
- Courses of the armed services 108
- Creative and Performing Arts Award 24
- Creative Writing concentration (English) 243
- Credentialing, career and technical teaching 160
- Credit hour 94
- Credit load 94
- Credit overload 94
- Credit policies
- Challenging courses for credit 108
- College Board Advanced Placement Program 107
- College-level courses completed while in high school 107
- College-Level Examination Program 108
- Courses of the armed services 108
- International Baccalaureate 108
- minimum for graduation 107
- Noncollegiate institutions 109
- Service schools 108
- Study abroad 107, 109
- Credit policies (continued)
- Time limitation 109
- Two-year colleges 109
- Credit requirement
- “in residence” 107
- minimum for graduation 107
- senior year 107
- upper-division 107
- Credit union 49
- Criminal Justice
- concentration (Sociology) 280
- Interdisciplinary Studies Program 66
- Curfman Gallery 49
- Cum Laude designation 110
- Current address 31, 94, 96
- Current catalog, fulfilling requirements in 105, 106
- Curriculum changes, effect of 106
- Dance
- concentration (Performing Arts) 270
- courses (D) 404
- Deadlines
- application 19, 21, 22
- payment of tuition and fees 31
- registration 94
- residency classification petition 29
- Degree programs 112
- graduate 112
- undergraduate 112
- Degree requirements, off-campus completion 109
- Degree, second bachelor's 106
- Dentistry and dental hygiene, preparation for 59
- Denver Center for Professional Development 53
- Departments of Instruction
- Accounting 190
- Agricultural and Resource Economics 119
- Anatomy and Neurobiology (see Biomedical Sciences)
- Animal Sciences 124
- Anthropology 232
- Art 234
- Atmospheric Science 206
- Bioagricultural Sciences and Pest Management 129
- Biochemistry and Molecular Biology 325
- Biology 327
- Biomedical Sciences 355
- Chemical Engineering 207
- Chemistry 334
- Civil Engineering 208
- Clinical Sciences 355
- Computer Information Systems 192
- Computer Science 337
- Design and Merchandising 161
- Earth Resources (see Geosciences)
- Economics 240
- Education, School of 156
- Electrical and Computer Engineering 213
- English 242
- Environmental and Radiological Health Sciences 356
- Finance and Real Estate 192
- Fishery and Wildlife Biology 288
- Food Science and Human Nutrition 166
- Foreign Languages and Literatures 248
- Forest Rangeland Watershed Stewardship 293
- Forest Sciences (see Forest Rangeland Watershed Stewardship)
- Geosciences 307
- Health and Exercise Science 173
- History 253
- Horticulture and Landscape Architecture 130
- Human Development and Family Studies 176
- Journalism and Technical Communication 257
- Management 194
- Manufacturing Technology and Construction Management 180

- Departments of Instruction (continued)
- Marketing 196
 - Mathematics 340
 - Mechanical Engineering 218
 - Microbiology, Immunology, and Pathology 357
 - Music, Theatre, and Dance 260
 - Natural Resource Recreation and Tourism 310
 - Occupational Therapy 185
 - Pathology (see Microbiology, Immunology, and Pathology)
 - Philosophy 273
 - Physics 346
 - Physiology (see Biomedical Sciences)
 - Political Science 277
 - Psychology 349
 - Radiological Health Sciences (see Environmental and Radiological Health Sciences)
 - Rangeland Ecosystem Science (see Forest Rangeland Watershed Stewardship)
 - Social Work, School of 185
 - Sociology 279
 - Soil and Crop Sciences 142
 - Speech Communication 282
 - Statistics 351
- Deposit, housing 32, 48
- Design and merchandising courses (DM) 405
- Design and Merchandising, Department of 161
- Apparel and Merchandising
 - courses (AM) 366
 - major in 161
 - Apparel Design and Production concentration 162
 - Merchandising concentration 163
 - design and merchandising courses (DM) 405
 - graduate programs 166
 - Interior Design
 - courses (ID) 443
 - major in 164
 - Merchandising, minor in 164
- Design/Technical Theatre minor 273
- Dietetics (see Food Science and Human Nutrition)
- Diploma 110
- Diploma hold 31
- Directory 7
- Disabled Students, Resources for 42
- Discipline 32, 33, 36
- Discontinuing a class 95, 96
- Dismissal, academic 32, 93
 - appeal of academic dismissal 93
- Dissertation microfilming fee 27
- Distance degree programs 53
- Distance education 53
- Distinction, graduation with 110
- Distinguished Scholars Award 24
- Diversity in Law Interdisciplinary Studies Program 67
- Division of Educational Outreach (see Continuing Education, Division of)
- Doctor of Philosophy (Ph.D.) 113
- Doctor of Veterinary Medicine (D.V.M.) 113
 - Health Professions Loan Program 24
- Domicile, definition of 28
- Dormitories (see Housing and Food Services, Office of)
- Drawing concentration (Art) 235
- Dropping courses 9, 96
- Early childhood and elementary education 179
- Earth Resources (see Geosciences, Department of)
- Earth resources courses (G) or (WR) 431, 500
- Ecology
 - courses (EY) 425
 - Graduate Degree Program 83
- Economics courses (EC) 411
- Economics, Department of 240
 - Economics, major in 240
 - Economics, minor in 242
 - courses (EC) 411
 - graduate programs 242
- Education
 - adult education courses (AD) 365
 - adult technical 160
 - agricultural 116, 160
 - art (concentration) 237
 - biology (concentration) 317
 - biology/natural resources (concentration) 319
 - business 160, 191, 194
 - career and technical (vocational)
 - credentialing 160
 - credit for work experience 160
 - teaching endorsement area requirements 160
 - chemistry (concentration) 320
 - consumer and family studies (concentration) 155, 161
 - Continuing, Division of 52
 - early childhood and elementary education 179
 - education courses (ED) 413
 - English (concentration) 244
 - foreign languages 252
 - foundations requirement 158
 - general science (concentration) 321
 - geology (concentration) 322
 - graduate programs 161
 - higher education courses (HE) 437
 - international education courses (IE) 444
 - licensure endorsement areas 157
 - marketing 161, 196
 - mathematics (concentration) 344
 - music (concentration) 262
 - physics (concentration) 324
 - professional licensing program 156, 159
 - requirements for licensure 158
 - social studies (concentration) 229, 255
 - speech communication (concentration) 284
 - technology education and training 182
 - trade and industrial 161
 - vocational education courses (VE) 496
- Education, School of 156
 - adult education courses (AD) 365
 - education courses (ED) 413
 - higher education courses (HE) 437
 - vocational education courses (VE) 496
- Educational Outreach (see Continuing Education)
- El Centro Student Services 42
- Electrical and Computer Engineering, Department of 213
 - Computer Engineering, major in 214
 - courses (EE) 416
 - Electrical Engineering, major in 215
 - Electrical Engineering concentration 216
 - Optoelectronic Engineering concentration 217
 - graduate programs 217
 - Electrical Engineering concentration (Electrical Engineering) 216
 - Electrical engineering courses (EE) 416
 - Electrical engineering, major in 215
- Employment, Student 24, 25
- Engineering, College of 199
 - admission information 200
 - charge for technology 27
 - curricular requirements 200
 - engineering courses (EG) 419
 - engineering science courses (ES) 421
 - Engineering Science, major in 201
 - Engineering Physics concentration 202
 - Space Engineering concentration 203
 - Liberal Arts concentration 203, 225, 230

- Engineering, College of (continued)
- Environmental Engineering
 - courses (EV) 423
 - major in 204
 - minor in 206
 - environmental studies 57
 - field trips 200
 - honor societies 111
 - interdepartmental majors 201
 - registration as a professional engineer 199
 - shared interest living 47
 - study abroad 200
 - undergraduate majors and minors 199
 - Engineering courses (EG) 419
 - Engineering Physics concentration (Engineering Science) 202
 - Engineering Science
 - Arts and Humanities and (concentration) 203, 225
 - courses (ES) 421
 - major in 201
 - Social Sciences and (concentration) 203, 230
 - English admission requirement 21
 - English courses (E) 406
 - English, Department of 242
 - composition courses (CO) 402
 - composition requirement 103
 - English courses (E) 406
 - English, major in 242
 - Creative Writing concentration 243
 - English Education concentration 244
 - Language concentration 245
 - Literature concentration 246
 - Writing concentration 247
 - English, minor in 248
 - environmental studies 57
 - graduate programs 248
 - English Education concentration (English) 244
 - English proficiency, international students 22
 - Enrollment certification 97
 - Enrollment status, full/half-time 96
 - Entomology
 - courses (BI) 384
 - minor in 130
 - Environmental Affairs Interdisciplinary Studies Program 67
 - Environmental and Radiological Health Sciences, Department of 356
 - Environmental Health
 - courses (EH) 419
 - major in 356
 - environmental studies 58
 - graduate programs 357
 - radiological health sciences courses (R) 480
 - Environmental Communication concentration (Natural Resources Recreation and Tourism) 311
 - Environmental Engineering
 - courses (EV) 423
 - major in 204
 - minor in 206
 - Environmental Geology concentration (Geology) 307
 - Environmental Health
 - courses (EH) 419
 - major in 356
 - Environmental Learning Center 16
 - Environmental Soil Science concentration (Soil and Crop Sciences) 146
 - Environmental Studies
 - Open Option 287
 - programs 56
 - Equal Opportunity, Office of 17, 53
 - Equine Science
 - courses (AN) 367
 - major in 126
 - Industry concentration 127
 - Science concentration 128
 - shared interest living 47
 - Equipment rental, outdoor 49
 - Estimated yearly expenses 29
 - Ethnicity courses (ET) 421
 - Examinations, final 92
 - Exchange students 30
 - Exercise Science and Nutrition Interdisciplinary
 - Graduate Program 69
 - Exercise science courses (EX) 423
 - Expenses, personal and living 29
 - Experiment Station, Agricultural 13, 14, 15, 54
 - Expression and inquiry, freedom of 33, 37
 - Extension, Cooperative 13, 14, 15, 55
 - Facilities management 15
 - FAFSA 25
 - Fall semester 9, 363
 - Falsification 19, 21, 23, 33, 36
 - Family Educational Rights and Privacy Act (FERPA) 33, 34
 - Family housing 48
 - Family studies courses (CF) or (HD) 400, 435
 - Farm and Ranch Management concentration (Agricultural Economics) 122
 - Federal
 - Direct Loan Program 24
 - Direct Parent Loan for Dependent Students 24
 - Pell Grant 24
 - Perkins Loan Program 24
 - Supplemental Educational Opportunity Grant 24
 - Fees
 - adjustments 31, 32
 - application processing 20, 21, 27
 - Charge for Technology 27
 - late registration 27
 - nonrefundable 27
 - research 27
 - special course 28
 - Fibers concentration (Art) 235
 - Final examinations 92
 - Finance and Real Estate concentration (Business Administration) 192
 - Finance and real estate courses (BF) 382
 - Finance and Real Estate, Department of 192
 - Finance and Real Estate concentration (Business Administration) 192
 - courses (BF) 382
 - Financial aid programs 24
 - Financial assistance 24
 - application procedures 25
 - fraudulent receipt of funds 25
 - grants 24
 - graduate students 26
 - international students 22
 - loans 24
 - permanent residents 23
 - reporting changes 25
 - ROTC 86, 88
 - satisfactory academic progress 25
 - scholarships 24
 - student employment 24, 25
 - veterans' benefits 25
 - withdrawal from University 32
 - work-study 24
 - Financial
 - indebtedness 110
 - Services, Student 24
 - First Generation Award 24
 - First Year Seminars (AUCC) 99

- Fishery biology courses (FW) 429
- Fishery Biology, major in 288
- Fishery Biology, minor in 290
- Fishery and Wildlife Biology, Department of 288
- courses (FW) 429
- environmental studies 57
- Fishery Biology
- major in 288
- minor in 290
- Foothills Fishery Facility 16
- graduate programs 293
- Wildlife Biology, major in 291
- Flight training, ROTC 87, 88
- Floral service 49
- Floriculture concentration (Horticulture) 131
- Food Science/Safety Interdisciplinary Studies Programs
 (undergraduate and graduate) 69
- Food science and human nutrition courses (FN) 427
- Food Science and Human Nutrition, Department of 166
- food science and human nutrition courses (FN) 427
- food technology courses (FT) 429
- graduate programs 173
- Nutrition and Food Science, major in 166
- Nutrition, minor in 173
- Restaurant and Resort Management
 courses (RM) 481
- major in 171
- Food technology courses (FT) 429
- Foothills campus 16
- Foreign Language (AUCC) 100
- Foreign language courses (L) 446
- Foreign Language Placement Examination fee 27
- Foreign Languages and Literatures, Department of 248
- courses (L) 446
- French, minor in 253
- German, minor in 253
- graduate programs 253
- Japanese, minor in 253
- Languages, Literatures, and Cultures, major in 248
- French concentration 249
- German concentration 250
- Spanish concentration 251
- Teaching endorsement 252
- Russian, minor in 253
- Spanish, minor in 253
- Foreign service officer career 221
- Forest Biology concentration (Forestry) 294
- Forest Fire Science concentration (Forestry) 295
- Forest Management concentration (Forestry) 295
- Forest Rangeland Watershed Stewardship, Department of 293
- environmental studies 57
- forest science courses (F) 426
- Forestry, major in 293
- Forest Biology concentration 294
- Forest Fire Science concentration 295
- Forest Management concentration 295
- Forestry-Business concentration 296
- Forestry, minor in 305
- graduate programs 306
- Natural Resource Management, major in 297
- Range Ecology, minor in 305
- Rangeland Ecology, major in 298
- Range and Forest Management concentration 299
- Rangeland Management concentration 300
- Restoration Ecology concentration 301
- Science concentration 302
- rangeland ecosystem science courses (RS) 483
- Spatial Information Management, minor in 306
- Watershed Science
 courses (WR) 500
- major in 303
- minor in 306
- Forest science courses (F) 426
- Forest Sciences (see Forest Rangeland Watershed Stewardship,
 Department of)
- Forest Service, Colorado State 13, 14, 15, 16, 55
- Forestry courses (F) 426
- Forestry
- major in 293
- minor in 305
- Forestry-Business concentration (Forestry) 296
- Former Colorado State students, admission 22
- Foundations requirement (education) 158
- Fraudulent receipt of funds 25
- Fraternalities 39
- Free Application of Federal Student Aid (FAFSA) 25
- Freedom from personal abuse 34, 38
- Freedom of expression and inquiry 33, 37
- French concentration (Language, Literature, and Culture Studies) .. 249
- French courses (L) 446
- French, minor in 253
- Fresh Start, Academic 90, 93
- Freshman 96
- Freshman seminar (see First Year Seminar, AUCC)
- Fulbright Graduate Study Program 84
- Gallery, Curfman 49
- Gay, Lesbian, Bisexual, and Transgender Student Services 42
- General business courses (BG) 383
- General Educational Development (GED) test 20, 45
- General Mathematics concentration (Mathematics) 343
- General Philosophy concentration (Philosophy) 275
- General Philosophy, minor in 276
- General Science Education concentration (Natural Sciences) 321
- General Sociology concentration (Sociology) 281
- Geography courses (GR) 433
- Geology concentration (Geology) 308
- Geology courses (G) 431
- Geology Education concentration (Natural Sciences) 322
- Geology, major in 307
- Geology, minor in 310
- Geosciences courses (G) 431
- Geosciences, Department of 307
- courses (G) 431
- environmental studies 58
- geography courses (GR) 433
- Geology, major in 307
- Environmental Geology concentration 307
- Geology concentration 308
- Geology, minor in 310
- graduate programs 310
- Geospatial Science Graduate Interdisciplinary Studies Program 72
- German concentration (Languages, Literatures, and Cultures) 250
- German courses (L) 446
- German, minor in 253
- Gerontology Interdisciplinary Studies Program 72
- Global and Cultural Awareness (AUCC) 102
- Global Tourism concentration (Natural Resource Recreation
 and Tourism) 312
- Good standing requirement, admission 21
- Good standing status, graduation 110
- Golden Key 111
- Government, student 33, 50
- Grade appeals 90
- Grade point average
- certification 97
- minimum cumulative 92, 107
- minimum for graduation 107
- repeat/delete 90, 95
- transfer grades 22
- Grade requirement, minimum for graduation 107
- Grading 90
- Fresh Start 90, 93
- final examinations 92

- Grading (continued)
- grade appeals 90
 - incompletes 90, 91
 - pass/fail 90, 95
 - repeat/delete policy 91, 95
 - student option 95
- Graduate degrees 112
- Graduate Record Exam (GRE) 45
- Graduate School
- courses (GS) 433
 - graduate assistant tuition 27
 - international applicants 22
- Graduate student financial support 26
- Graduation as a University Honors Scholar 89, 110
- Graduation list 109
- Graduation procedures 109-110
- commencement 110
 - contract for graduation 109
 - financial indebtedness 110
 - good standing status 110
 - graduation list 109
 - intent to graduate 109
 - off-campus completion of degree requirements 109
- Graduation requirements 105
- All-University Core Curriculum (AUCC) 99-103
 - changes in undergraduate curriculum requirements 106
 - composition requirement 103
 - concentration requirements 105
 - course restrictions 106
 - current catalog, fulfilling requirements in 105, 106
 - exclusion of courses from bachelor's degree 106
 - graduation average requirement 107
 - "in residence" requirement 107
 - major requirements 105
 - mathematics requirement 104
 - minimum credit requirement 107
 - minimum grade requirement 107
 - minor requirements 105
 - option 105
 - second bachelor's degree 106
 - second major requirements 105
 - senior year requirement 107
 - Student Bill of Rights 105
 - upper-division credit requirement 107
- Graduation with Distinction 110
- Grants 24
- Graphic Design concentration (Art) 236
- Greek Life Office 50
- GUEST registration 41
- Half-time enrollment 96
- Hair salon 49
- Harassment, sexual 17, 33
- Hartshorn Health Service 20, 29, 44, 46
- Health and exercise science courses (EX) 423
- Health and Exercise Science, Department of 173
- Coaching, minor in 176
 - courses (EX) 423
 - graduate programs 176
 - Health and Exercise Science, major in 173
 - Health Promotion concentration 174
 - Sports Medicine concentration 175
- Health and Wellness (AUCC) 103
- Health insurance 29, 30, 46
- Health Professions Loan Program 24
- Health professions, preparation for 59
- Health Promotion concentration (Health and Exercise Science) 174
- Health Service, Hartshorn 20, 29, 44, 46
- Hearing officer, University 32, 33, 36
- Higher education courses (HE) 437
- High school graduates, admission 20
- Higher Learning Commission 14
- Historical Perspectives (AUCC) 102
- History courses (HY) 439
- History, Department of 253
- courses (HY) 439
 - environmental studies 57
 - graduate programs 257
 - History, major in 253
 - Liberal Arts concentration 254
 - Social Studies Teaching concentration 255
 - History, minor in 257
 - History, major in 253
 - History, minor in 257
- Holds, registration/diploma/transcript 31
- Honors courses (HP) 438
- Honors grade (H) 90
- Honors Program, University 89
- admission to program 89
 - community living option 47, 89
 - courses (HP) 438
 - graduation as a University Honors Scholar 89, 110
 - Honors core curriculum 89
 - program philosophy 89
- Honor societies 111
- Horticultural
- Business Management concentration (Horticulture) 132
 - Food Crops concentration (Horticulture) 133
 - Science concentration (Horticulture) 135
- Horticulture and Landscape Architecture, Department of 130
- environmental studies 56
 - graduate programs 142
- Horticulture
- courses (H) 433
 - major in 130
 - Floriculture concentration 131
 - Horticultural Business Management concentration 132
 - Horticultural Food Crops concentration 133
 - Horticultural Science concentration 135
 - minor in 142
- Landscape Architecture
- courses (LA) 449
 - major in 136
- Landscape Horticulture
- major in 138
 - Landscape Design and Contracting concentration 138
 - Nursery and Landscape Management concentration 139
 - Turf Management concentration 141
 - minor in 142
- Horticulture
- courses (H) 433
 - major in 130
 - minor in 142
- Housing and Food Services, Office of 46
- Aggie Village 48
 - apartment housing 48, 85
 - application 46, 48
 - community living options 47
 - deposit 32, 48
 - faculty and staff housing 48
 - family housing 48
 - first-year students 46
 - housing assignments 48
 - Pingree Park campus 49
 - reservation 46
 - residence halls 46, 85
 - shared interest living 47
 - single student apartments 48, 85
 - University Village 48
- Housing assignments 48
- Housing, international students 85
- Housing, off-campus 49
- Hughes Stadium 16

- Human Development and Family Studies, Department of 176
- courses (HD) 435
 - early childhood and elementary education preparation 179
 - graduate programs 180
 - major in 176
- Human development courses (HD) 435
- Human health professions 59
- Human sciences courses (HS) 438
- ID office, University 49
- IELTS 22
- Immunization policy 19
- Improvement, program quality 15
- Incomplete grade (I) 90, 91
- Independent study 96
- Industry concentration
- Animal Science major 124
 - Equine Science major 127
- Informal recreation 44
- Information Science and Technology Interdisciplinary Studies Program 73
- Information Systems
- concentration (Business Administration) 192
 - courses (BD) 380
- Ingersoll Residential College 47
- “In residence” graduation requirement 107
- In-State Residency for Tuition Classification Purposes 28
- appeal of classification 29
 - deadline for petition 29
 - definition 28
 - international students 28
 - initial classification 29
 - military personnel and/or dependents 28
 - petition for reclassification 29
- Instructional Services, Office of 53
- Insurance, health 29, 30, 46
- Integrated Resource Management Interdisciplinary Studies Program 73
- Integrity, academic 35
- Intent to graduate 105, 106, 109
- Intercollegiate athletics 43
- Interdisciplinary Graduate Degree Programs 83
- Interdisciplinary Studies Programs, University 59
- American Ethnicity 59
 - Asian 62
 - Biomedical Engineering (undergraduate and graduate) 63
 - Biotechnology 65
 - Conservation Biology 65
 - Criminal Justice 66
 - Diversity in Law 67
 - Environmental Affairs 67
 - Exercise Science and Nutrition (graduate) 69
 - Food Science/Safety (undergraduate and graduate) 69
 - Geospatial Science (graduate) 72
 - Gerontology 72
 - Information Science and Technology 73
 - Integrated Resource Management 73
 - International Development (undergraduate and graduate) 74
 - Latin American 76
 - Molecular Biology 77
 - Molecular, Cellular and Integrative Neurosciences Graduate Program 79
 - Religious 79
 - Russian, Eastern, and Central European 80
 - Water Resources 81
 - Women’s (undergraduate and graduate) 82
- Interior Design
- courses (ID) 443
 - major in 164
- International Baccalaureate, credit for 103, 108
- International Center for Agricultural and Resource Development 85
- International Development Interdisciplinary Studies Program 74
- International Education
- courses (IE) 84, 444
 - graduate programs 84
 - internships 84
 - scholarship programs 84
- International English Language Testing Service (IELTS) 22
- International House apartments 48
- International Programs, Office of 83
- International Development Interdisciplinary Studies Program 84, 84
 - international education courses (IE) 84, 444
 - international research, development and training 84
 - international student and scholar services 85
 - study abroad 85
 - study abroad courses (SA) 487
 - Transitions 85
- International Research, Development, and Training 84
- International School for Natural Resources 85
- International School for Water Resources and Associated Programs 85
- International Soil and Crop Sciences concentration (Soil and Crop Sciences) 147
- International Student and Scholar Services 85
- International students
- admission procedures 22
 - eligibility for financial assistance 23
 - English proficiency 22
 - estimated expenses 29
 - financial requirements 22
 - housing information 85
 - medical insurance 29, 30
 - residency for tuition classification 28
 - third party billing 30
- International Studies
- concentration (Liberal Arts) 226
 - courses (IN) 444
- Intramural sports 44
- Intra-University
- charge for technology 27
 - courses (IU) 444
- Italian courses (L) 446
- Japanese
- courses (L) 444
 - minor in 253
- Journalism and Technical Communication, Department of 257
- courses (JT) 444
 - graduate program 260
 - Technical Journalism, major in 257
 - News-Editorial concentration 258
 - Public Relations concentration 259
 - Specialized Communication concentration 259
 - Television News and Video Communication concentration 260
- Journalism courses (JT) 444
- Judicial Affairs, Office of (see Conflict Resolution and Student Conduct Services)
- Junior 96
- Key academic community courses (KA) 446
- community living option 47
- KCSU-FM 49, 50
- Korean courses (L) 446
- Land grant mission 13, 14, 16
- Landscape Architecture
- courses (LA) 449
 - major in 136
- Landscape Design and Contracting concentration (Landscape Horticulture) 138
- Landscape Horticulture
- major in 138
 - minor in 142
- Language concentration (English) 245

- Language courses (L) 446
- Language, Literature, and Culture Studies, major in 248
- Language Placement Examination fee 27
- Language, Second (AUCC) 100
- Late
- payment, student accounts 31
 - registration 94
 - registration fee 27, 94
- Latin American Interdisciplinary Studies Program 76
- Leadership shared interest living 47
- Legal Services, Student 49, 50
- Liberal Arts, College of 220
- American studies courses (AU) 377
 - charge for technology 27
 - environmental studies 57
 - foreign service officer career 221
 - graduate programs 221
 - graduation average requirement 220
 - honor societies 111
 - interdepartmental major 221
 - international studies courses (IN) 444
 - liberal arts courses (LB) 450
 - Liberal Arts, major in 221
 - American Studies concentration 222
 - Arts and Humanities concentration 224
 - Arts and Humanities and Engineering Science concentration 225
 - International Studies concentration 226
 - Social Sciences and Engineering Science concentration 230
 - Social Sciences concentration 228
 - Social Sciences concentration with social studies licensure 229
 - Media Studies, minor in 231
 - open option 221
 - prelaw 221
 - study abroad 221
 - undergraduate majors and minors 220
- Liberal Arts concentration (Engineering Science) 203, 225, 230
- Liberal Arts concentration (History) 254
- Liberal arts courses (LB) 450
- Liberal Arts, major in 221
- Libraries, University 16
- Depository 16
- Library information courses (LI) 450
- Licensure
- admission to 158
 - educator 156
 - endorsement areas 157
 - foundations requirement 158
 - requirements for 158, 159
 - student teaching 158
- Life sciences (see also Academic support services) 58
- Life sciences courses (LS) 451
- Literature concentration (English) 246
- Living expenses 29
- Loans, student 24
- Logical/Critical Thinking (AUCC) 100
- Lory Apartments 48
- Lory Student Center (see Student Center) 49
- Magna Cum Laude 110
- Major
- changing 97
 - definition of 105
 - requirements (for graduation) 105
 - second 105
- Majors
- Agricultural business 119
 - Agricultural economics 120
 - Agricultural education 116
 - Animal science 124
 - Anthropology 232
- Majors (continued)
- Apparel and merchandising 161
 - Art (B.A.) 237
 - Art (B.F.A.) 234
 - Biochemistry 325
 - Biological science 327
 - Bioresource and agricultural engineering 211
 - Botany 329
 - Business administration 188
 - Chemical engineering 207
 - Chemistry 334
 - Civil engineering 208
 - Computer engineering 214
 - Computer science 337
 - Construction management 180
 - Consumer and family studies 153
 - Economics 240
 - Electrical engineering 215
 - Engineering science 201
 - English 242
 - Environmental engineering 204
 - Environmental health 356
 - Equine science 126
 - Fishery biology 288
 - Forestry 293
 - Geology 307
 - Health and exercise science 173
 - History 253
 - Horticulture 130
 - Human development and family studies 176
 - Interior design 164
 - Landscape architecture 136
 - Landscape horticulture 138
 - Languages, literatures, and cultures 248
 - Liberal arts 221
 - Mathematics 340
 - Mechanical engineering 218
 - Microbiology 357
 - Music (B.A.) 268
 - Music (B.M.) 261
 - Natural resource recreation and tourism 310
 - Natural resources management 297
 - Natural sciences 317
 - Nutrition and food science 166
 - Performing arts 270
 - Philosophy 273
 - Physics 346
 - Political science 277
 - Psychology 349
 - Rangeland ecology 298
 - Restaurant and resort management 171
 - Social work 185
 - Sociology 279
 - Soil and crop science 142
 - Speech communication 282
 - Technical journalism 257
 - Technology education and training 182
 - Watershed science 303
 - Wildlife biology 291
 - Zoology 332
- Management courses (BN) 386
- Management, Department of 194
- management courses (BN) 386
- Organizational Management concentration (Business Administration) 194
 - business education option 194
- Management, organizational (concentration) 194
- Management science courses (BQ) 388

Manufacturing Technology and Construction Management, Department of	180	Microbiology courses (MB)	455
Construction Management major in	180	Microbiology, Immunology, and Pathology, Department of	357
minor in	182	environmental studies	58
courses (MC)	456	graduate programs	360
environmental studies	56	medical technology program	359
graduate programs	184	Microbiology courses (MB)	455
pre-MTCM program	180	major in	357
Technology Education and Training, major in	182	minor in	359
Technology Education (Licensure) concentration	182	Pathology courses (PA)	470
Technology Education (Non-Licensure) concentration	184	Microbiology, major in	357
Manufacturing technology courses (MC)	456	Microbiology, minor in	359
Marketing concentration (Business Administration)	196	Microfilming fee, dissertation	27
Marketing courses (BK)	386	Military personnel incompletes when called to active duty	91
Marketing, Department of	196	residency	28
courses (BK)	386	withdrawal from university	32
Marketing concentration (Business Administration)	196	Military science courses (MS)	461
education option	197	Military Science, Department of	87
Marketing education (career and technical)	161, 197	courses (MS)	461
Master of		minor in	87
Agriculture (M.Agr.)	113	scholarship	86, 87
Art (M.A.)	112	Minimum credits for graduation	107
Business Administration (M.B.A.)	113	cumulative grade point average	107
Computer Science (M.C.S.)	113	grade requirement	107
Education (M.Ed.)	113	“in-residence” credit requirement	107
Engineering (M.E.)	113	senior year credit requirement	107
Fine Arts (M.F.A.)	113	upper-division credit requirement	107
Forestry (M.F.)	113	Minor, definition of	105
Music (M.M.)	113	Minors	113
Science (M.S.)	113	Acting/directing	273
Social Work (M.S.W.)	113	Aerospace studies	87
Mathematics admission requirement	20, 21	Agricultural and resource economics	124
AUCC	100	Anthropology	233
courses (M)	451	Art history	240
Mathematics, Department of	340	Biochemistry	327
courses (M)	451	Biomedical sciences	355
graduate programs	346	Botany	331
Mathematics, major in	340	Chemistry	336
Actuarial Science concentration	340	Coaching	176
Applied Mathematics concentration	341	Computer science	339
Computational Mathematics concentration	342	Construction management	182
General Mathematics concentration	343	Design/technical theatre	273
Mathematics Education concentration	344	Economics	242
Statistics concentration	345	English	248
Mathematics, minor in	346	Entomology	130
Mathematics Education concentration (Mathematics)	344	Environmental engineering	206
Mathematics graduation requirement	104	Fishery biology	290
major in	340	Forestry	305
minor in	346	French	253
placement exam	27, 104	General philosophy	276
Mechanical engineering courses (ME)	459	Geology	310
Mechanical Engineering, Department of	218	German	253
courses (ME)	459	History	257
environmental studies	57	Horticulture	142
graduate programs	219	Japanese	253
Mechanical Engineering, major in	218	Landscape horticulture	142
Mechanical Engineering, major in	218	Mathematics	346
Media, Student	49, 50	Merchandising	164
Media Studies minor	231	Media studies	231
Medical insurance	29, 30, 46	Microbiology	359
Medical technology program	359	Military science	87
Medicine, preparation for	59	Music	270
Membership in student organizations	38	Nutrition	173
Merchandising concentration (Apparel and Merchandising)	163	Physics	348
minor in	164	Plant health	130
Merit work-study	24	Political science	279
Metalsmithing concentration (Art)	236	Range ecology	305
		Religious studies	277
		Russian	253
		Sociology	282
		Soil Resources and Conservation	151

- Spanish 253
 Spatial information management 306
 Statistics 351
 Studio art 240
 Watershed science 306
 Wilderness management 315
 Zoology 333
 Mission, University 14
 Molecular biology (see Biochemistry and Molecular Biology, Department of)
 Molecular Biology Interdisciplinary Studies Program 77
 Molecular, Cellular, and Integrative Neuroscience Interdisciplinary Graduate Program 79
 Monfort Scholarship 24
 Morgan Library 16
 Mortar Board 111
 Mountain West Conference 43
 Music courses (MU) 462
 Music Education concentration (Music) 262
 Music, Theatre, and Dance, Department of 260
 Bachelor of Arts (B.A.) 268
 Bachelor of Music (B.M.) 261
 Composition concentration 261
 Music Education concentration 262
 Music Therapy concentration 264
 Performance concentration 265
 dance courses (D) 404
 graduate programs 270
 music courses (MU) 462
 Music, minor in 270
 performing arts courses (PF) 470
 Performing Arts, major in 270
 Dance concentration 270
 Theatre concentration 272
 program in music 260
 applied study, ensembles, and recitals 260
 concert/recital attendance 261
 performance auditions 260
 piano proficiency 261
 review of student progress 261
 scholastic standards 261
 second major 261
 theatre courses (TH) 495
 theatre minors
 Acting/Directing 273
 Design/Technical Theatre 273
 Music Therapy concentration (Music) 264
 National Society of Collegiate Scholars 111
 Native American Student Services 42
 Natural Resource
 Ecology Laboratory 58
 Economics concentration (Agricultural Economics) 123
 Recreation and Tourism courses (RR) 481
 Natural Resource Recreation and Tourism, Department of 310
 courses (RR) 481
 environmental studies 58
 graduate programs 315
 major in 310
 Environmental Communication concentration 311
 Global Tourism concentration 312
 Natural Resource Tourism concentration 313
 Parks and Protected Area Management concentration 314
 Wilderness Management, minor in 315
 Natural Resource Recreation and Tourism, major in 310
 Natural Resource Tourism concentration (Natural Resource Recreation and Tourism) 313
 Natural Resources, College of 287
 admission information 288
 charge for technology 27
 college programs 287
 ecology courses (EY) 425
 environmental studies 58
 Environmental Studies Open Option 287
 field training programs 287
 graduate programs 287
 honor societies 111
 international education 287
 natural resource courses (NR) 466
 transfer students 288
 undergraduate majors and minors 287
 Natural resources courses (NR) 466
 Natural Resources Management, major in 297
 Natural Sciences, College of 316
 biology courses (BY) 390
 charge for technology 27
 college programs 316
 community living option 47
 ecology courses (EY) 425
 environmental studies 58
 freshman open option 316
 graduate programs 317
 health profession preparation 316
 honor societies 111
 Ingersoll Residential College 47
 interdepartmental major 317
 Life Science Open Option 317
 natural sciences courses (NS) 468
 Natural Sciences, major in 317
 Biology Education concentration 317
 Biology/Natural Resources Education concentration 319
 Chemistry Education concentration 320
 General Science Education concentration 321
 Geology Education concentration 322
 Physical Science concentration 323
 Physics Education concentration 324
 study abroad 317
 undergraduate majors and minors 316
 Natural sciences courses (NS) 468
 Natural Sciences, major in 317
 Natural Sciences Open Option 316
 NCAA 43
 Neurobiology (see Biomedical Sciences, Department of)
 Neurobiology courses (NB) 465
 News-Editorial concentration (Technical Journalism) 258
 Next Step Transfer Orientation 41
 Nonaccredited college transfer credit 21, 109
 Non-ACS Certified concentration (Chemistry) 336
 Noncollegiate institutions, credit from 21, 109
 Non-credit programs 53
 Nondiscrimination policy 17
 Non-high school graduates, admission 20
 Nontraditional course offering 363
 North Central Association 14
 Northern Colorado, University of 98
 Numbering, course 362
 Nursery and Landscape Management concentration (Landscape Horticulture) 139
 Nursing, preparation for 59
 Nutrition and Food Science, major in 166
 Nutrition, minor in 173
 Occupational therapy courses (OT) 468
 Occupational Therapy, Department of 185
 application fee for professional program 27
 courses (OT) 468
 graduate programs 185
 Occupational therapy, preparation for 59
 Off-campus completion of degree requirements 109

- Off-Campus Student Services 42, 49
 housing 17, 49
 Ombudsman, University (see Conflict Resolution and Student
 Conduct Services)
 On-line courses 363
 Open Option
 Academic support services 41
 Agricultural Sciences 115
 Applied Human Sciences 153
 Biomedical Sciences 352
 Environmental Studies 287
 Liberal Arts 221
 Life Science 317
 Natural Sciences 316
 seeking art 41
 seeking business 41
 seeking engineering 41
 University 41, 112
 Option, definition of 105
 Optoelectronic Engineering concentration (Electrical Engineering) . 217
 Optometry, preparation for 59
 Oral Communication (AUCC) 100
 Organizational Management concentration (Business
 Administration) 194
 Organizations, student 38
 Orientation programs 41
 Outdoor Adventure Program 45, 50
 Outdoor equipment rental 49, 50
 Oval 15
 Overload, credit 94

 Painting concentration (Art) 236
 Panhellenic Council 39
 Parking Services, University 51
 Parks and Protected Area Management concentration (Natural
 Resource Recreation and Tourism) 314
 Part-time enrollment 96
 Pass/fail grading 90, 95
 Pathology (see Microbiology, Immunology, and Pathology,
 Department of)
 Pathology courses (PA) 470
 Payment, student accounts 31
 Peace Corps Masters International Programs 84
 Peaceful assembly 38, 39
 Pell Grant 24
 Performance concentration (Music) 265
 Performing arts courses (PF) 470
 Performing Arts, major in 270
 Perkins Loan Program 24
 Personal abuse, freedom from 34, 38
 Personal and living expenses 29
 Personal computer shared interest living 47
 Personal identified (PID) 19
 Pharmacy, preparation for 59
 Phi Beta Kappa 111
 Phi Kappa Phi 111
 Philosophy and Religion concentration (Philosophy) 275
 Philosophy courses (PL) 472
 Philosophy, Department of 273
 courses (PL) 472
 environmental studies 57
 graduate programs 277
 Philosophy, major in 273
 General Philosophy concentration 275
 Philosophy and Religion concentration 275
 Philosophy, Science, and Technology concentration 276
 Philosophy, minors in
 General Philosophy, minor in 276
 Religious Studies, minor in 277
 Philosophy, major in 273
 Philosophy, Science, and Technology concentration (Philosophy) . 276
 Photo Image Making concentration (Art) 236

 Photocopying service 49
 Physical education (see Health and Exercise Science, Department of)
 Physical Science concentration (Natural Sciences) 323
 Physical therapy, preparation for 59
 Physician assistant, preparation for 59
 Physics courses (PH) 470
 Physics, Department of 346
 Astronomy courses (AA) 365
 environmental studies 58
 graduate programs 349
 Physics courses (PH) 470
 Physics, major in 346
 Applied Physics concentration 348
 Physics concentration 348
 Physics, minor in 348
 Physics concentration (Physics) 348
 Physics Education concentration (Natural Sciences) 324
 Physics
 major in 346
 minor in 348
 Physiology (see Biomedical Sciences, Department of)
 Physiology courses (BS) 388
 PID 19
 Pingree Park campus 16, 49
 Pinnacle International 111
 Placement examinations
 composition 27, 104
 foreign language 27
 mathematics 27, 104
 Plagiarism 33, 36
 Planning, student workload 94
 Plant Biotechnology, Genetics, and Breeding concentration
 (Soil and Crop Sciences) 148
 Plant disease courses (BI) 384
 Plant Health, minor in 130
 Plus/minus grading 90
 Podiatry, preparation for 59
 Police Department, University 51
 Political Science courses (PO) 475
 Political Science, Department of 277
 courses (PO) 475
 environmental studies 57
 graduate programs 279
 major in 277
 minor in 279
 Political Science, major in 277
 Political Science, minor in 279
 Pottery concentration (Art) 236
 Prefixes, course 361
 Prelaw 221
 Premier, The 41
 Pre-MTCM program 180
 Prerequisites, course 363
 Preveterinary medicine 129, 353
 shared interest living 48
 Preview Freshman Orientation and Registration 41
 President's Transfer Scholarship 24
 President's Scholarship 24
 Printmaking concentration (Art) 237
 Probation, academic 92
 Professional engineer, registration as 199
 Professional licensing program (education) 156
 Program quality improvement 15
 Provost/Academic Vice President, Office of
 biological science courses (BY) 390
 cell and molecular biology courses (CM) 401
 international education courses (IE) 444
 intra-university courses (IU) 444
 key academic community courses (KA) 446
 life science courses (LS) 451
 neurobiology courses (NB) 465
 women's studies courses (WS) 501

- Psychology courses (PY) 477
 Psychology, Department of 349
 courses (PY) 477
 environmental studies 58
 graduate programs 351
 Psychology, major in 349
 Psychology, major in 349
 Public Relations concentration (Technical Journalism) 259
- Radiological health sciences courses (R) 480
 Radiological Health Sciences (see Environmental and
 Radiological Health Sciences, Department of)
- Raffles by student organizations 39
 Ram Fest Welcome Week 41
 Ram Pride shared interest living 48
 RAMweb 94
 Range ecology, minor in 305
 Range management courses (RS) 483
 Range and Forest Management concentration
 (Rangeland Ecology) 299
 Rangeland Ecology, major in 298
 Rangeland ecosystem science courses (RS) 483
 Rangeland Ecosystem Science (see Forest Rangeland
 Watershed Stewardship, Department of)
- Rangeland Management concentration (Rangeland Ecology) 300
 Readmission, applying for 22
 Recognition of student organizations 38
 Records, student 96
 change of address 96
 change of undergraduate major 97
 Colorado Exchange Program 98
 community college cooperative registration agreements 97
 full-time/half-time enrollment 96
 retroactive withdrawal 97
 taking courses elsewhere 97
 transcripts 96
 undergraduate classification 96
 withdrawal from university 97
 Recreation, informal 44
 Recreation resources
 courses (RR) 481
 graduate programs in 315
 Recreational sports 43
 Registration 94-96
 advising 94
 auditors 95
 cancellation 32
 changes 32
 class attendance regulations 94
 class schedule 94
 credit load and overload 94
 discontinuing a class 95, 96
 drop periods 9, 96
 enrollment status 96
 faculty advisers 94
 hold 31
 independent study 96
 late registration 27, 94
 repeating a course 95
 schedule change and drop periods 9, 96
 senior citizen visitation privilege 95
 student option pass/fail grading 95
 student workload planning 94
 Religious Interdisciplinary Studies Program 79
 Religious organizations 39
 Religious Studies, minor in (Philosophy) 277
 Rental, outdoor equipment 49
 Repeat/Delete Policy 90, 91
 Repeating a course 95
 Reporting changes, financial aid 25
 Research costs, graduate 27
 Reserve Officers' Training Corps (ROTC) 86-88
- Residence halls 46, 85
 application 46, 48
 community living options 47
 deposit 32, 48
 first-year students 46
 international students 85
 reservation 46
 shared interest living 47
 Residency for tuition purposes 28
 appeal of classification 29
 deadline for petition 29
 definition 28
 initial classification 29
 international students 28
 military personnel and/or dependents 28
 petition for classification review 29
 Resources for Adult Learners 42, 49
 Resources for Disabled Students 42
 Responsibilities, student 33
 Restaurant and Resort Management
 courses (RM) 481
 major in 171
 Restoration Ecology concentration (Rangeland Ecology) 301
 Restrictions, undergraduate course 106
 Retroactive withdrawal 97
 Returned checks 31
 Rhetoric concentration (Speech Communication) 284
 Rights,
 student 33
 victims' 34
 Rocky Mountain Collegian 49, 50
 Ropes course 45
 Rotary Scholarship Program 84
 ROTC 86
 college scholarship program 86
 Department of Aerospace Studies 86
 Aerospace Studies, minor in 87
 Department of Military Science 87
 Military Science, minor in 87
 Russian, Eastern, and Central European Interdisciplinary
 Studies Program 80
 Russian, minor in 253
 Russian courses (L) 446
- Safe Walk Program 51
 Satisfactory academic progress 25
 Satisfactory grade (S) 90
 Schedule changes (adds/drops) 9, 96
 Scholarships 24
 ROTC 86, 88
 Scholastic Standards 92
 academic dismissal 93
 Academic Fresh Start 93
 academic probation 92
 appeal of academic dismissal 93
 minimum cumulative grade point average 92
 School of Education (see also, Education) 156
 adult education courses (AD) 365
 education courses (ED) 413
 higher education courses (HE) 437
 vocational education courses (VE) 496
 Science concentration
 Animal Science major 125
 Equine Science major 128
 Rangeland Ecosystem Science major 302
 Scholastic Aptitude Test (SAT) 20, 21, 45
 Sculpture concentration (Art) 237
 Second
 bachelor's degree, definition of 106
 Language (AUCC) 100
 major requirements (for graduation) 105
 Selective Service registration 20

- Senior 96
- Senior citizen visitation privilege 95
- Senior year credit requirement 107
- Service schools, credit from 108
- Sexual harassment policy 17, 33
- Shared interest living 47
- Sigma Xi 111
- Social/Behavioral Sciences (AUCC) 101
- Social Sciences and Engineering Science concentration
(Liberal Arts) 230
- Social Sciences concentration (Liberal Arts) 228
- with social studies licensure 229
- Social security number 19
- Social Studies Teaching concentration (History) 255
- Social work courses (SW) 493
- Social Work, School of 185
- courses (SW) 493
- graduate programs 187
- major in 185
- Sociology courses (S) 484
- Sociology, Department of 279
- courses (S) 484
- environmental studies 57
- graduate programs 282
- Sociology, major in 279
- Criminal Justice concentration 280
- General Sociology concentration 281
- Sociology, minor in 282
- Sociology, major in 279
- Sociology, minor in 282
- Soil and crop science courses (SC) 487
- Soil and Crop Sciences, Department of 142
- courses (SC) 487
- graduate programs 151
- major in 142
- Agronomic Production Management concentration 144
- Applied Information Technology concentration 145
- Environmental Soil Science concentration 146
- International Soil and Crop Sciences concentration 147
- Plant Biotechnology, Genetics, and Breeding concentration 148
- Soil Resources and Conservation concentration 150
- Soil Resources and Conservation, minor in 151
- Soil Resources and Conservation
 concentration (Soil and Crop Sciences) 150
- minor in 151
- Solicitations 39
- Sophomore 96
- Sororities 39
- Space Engineering concentration (Engineering Science) 203
- Spanish concentration (Languages, Literatures, and Cultures) 251
- Spanish courses (L) 446
- Spanish, minor in 253
- Spatial information management, minor in 306
- Special course fees 28, 363
- Specialized Communication concentration
(Technical Journalism) 259
- Speech communication courses (SP) 489
- Speech Communication, Department of 282
- courses (SP) 489
- graduate programs 286
- Speech Communication, major in 282
- Communication in Media concentration 283
- Communication Theory concentration 283
- Rhetoric concentration 284
- Teacher Licensure concentration 284
- Sports
- club 44
- intercollegiate 43
- recreational 44
- intramural 44
- Sports Medicine concentration (Health and Exercise Science) 175
- Spring semester 9, 363
- Start-Up 41
- State Board of Agriculture (see Board of Governors)
- State Guaranteed Transfer courses 363
- Statistics
- Computational Statistics concentration (Computer Science) 338
- concentration (Mathematics) 345
- courses (ST) 491
- Statistics, Department of 351
- courses (ST) 491
- graduate programs 351
- Statistics, minor in 351
- Statistics, minor in 351
- Strength and fitness program 44
- Student Accounts 31
- housing deposit 32
- late payments 31
- payment of 31
- registration, transcript, diploma holds 31
- returned checks 31
- schedule 31
- tuition and fee adjustments 32
- Student Bill of Rights 105
- Student Center, Charles A. Lory 49
- Campus Activities Center 49
- governing board 49
- student government 50
- Student
- Bill of Rights 105
- Communications, Board of 39
- Employment Services 24, 25
- Financial Services 23, 24, 46
- government 33, 50
- Legal Services 49, 50
- loans 24
- Media 49, 50
- organizations 38, 50
- Recreation Center 43
- Student Rights and Responsibilities 33
- academic integrity 35
- Board of Student Communications 39
- classroom behavior 36
- educational records 33, 34
- fraternities and sororities 39
- freedom from personal abuse 34, 38
- freedom of expression and inquiry 33, 37
- membership in student organizations 33, 38
- other University policies and regulations 40
- peaceful assembly 38, 39
- policy on undergraduate advising 37
- raffles sponsored by student organizations 39
- recognition of student organizations 38
- religious organizations 39
- responsibilities 33
- rights 33
- solicitations of or by students 39
- victims' rights 34
- Student teaching 158
- Student workload planning 94
- Studio Art minor 240
- Studio concentration (Art) 239
- Study abroad 85
- agricultural sciences 116
- applied human sciences 153
- courses (SA) 487
- credit for 107, 109
- engineering 200
- liberal arts 221
- natural sciences 317
- Substance free shared interest living 47

- Summa Cum Laude 110
- Summer Session 9, 54, 96, 363
- Sutherland Sculpture Garden 49
- Symbols, course 361
- Taking courses at another institution 97
- Teacher licensure 156-161
- admission 158
- concentration (Speech Communication) 284
- foundations requirement 158
- endorsement areas 157
- professional program 156, 159
- requirements for 158, 159
- student teaching 158
- Technical journalism courses (JT) 444
- Technical journalism, major in 257
- Technology charge 27
- Technology Education and Training
- courses (MC) 456
- major in 182
- Technology Education (Licensure) concentration 182
- Technology Education (Non-Licensure) concentration 184
- Telecourses 363
- Telephone numbers 7
- Television, campus 49, 50
- Television News and Video Communication concentration
- (Technical Journalism) 260
- Term, course 363
- Test of English as a Foreign Language (TOEFL) 22, 45
- Testing Service, University 45
- Theatre concentration (Performing Arts) 272
- Theatre courses (TH) 495
- Theatre minors
- Acting/Directing minor 273
- Design/Technical Theatre minor 273
- Therapy, music (concentration) 264
- Third party billing 30
- Time limit on credit earned 109
- Title IX 17
- TOEFL 22, 45
- Tourism courses (RR) 481
- Trade and industrial education (career and technical) 161
- Transcripts 96
- fee 27
- for admission 20, 21, 22
- hold 31
- Transfer
- admission procedures 21
- appeals process 22
- College of Natural Resources 288
- courses, State Guaranteed 363
- credit evaluation 21
- Evaluation Office 22
- guides 21
- international students 22
- orientation 41
- Transitions 85
- Travel agency 49
- Tuition and fee schedule 27
- Tuition Classification Officer 29
- Tuition, Fees, Expenses, and Adjustments 27
- adjustments 32
- Continuing Education courses 27
- estimated yearly expenses 29
- exchange students 30
- graduate assistants 27
- health insurance 29
- holds 31
- housing deposit 32
- in-state residency for tuition classification purposes 28
- international students 30
- late payments 31
- Tuition, Fees, Expenses, and Adjustments (continued)
- nonrefundable fees 27
- payment of student accounts 31
- personal and living expenses 29
- returned checks 31
- schedule 27
- special course fees 28
- tuition and fees adjustments 27
- Turf Management concentration (Landscape Horticulture) 141
- Two-year colleges, credit from 109
- Unauthorized possession of academic materials 36
- Undergraduate
- advising policy 37
- classification 96
- course restrictions 106
- curriculum changes 106
- degrees 112
- University
- Advocacy Diversity Award 24
- aims 14
- Alumni Association 16
- calendar 9
- Center for the Arts 15
- Counseling Center 45
- Hearing Officer 36
- Honors Program 89
- ID office 49
- Libraries 16
- mission 14
- of Colorado 98
- of Northern Colorado 98
- Ombudsman (see Conflict Resolution and Student Conduct Services)
- Open Option 41, 112
- Parking Services 51
- Police Department 51
- policy on undergraduate advising 37
- Scholars Award 24
- Studies Program (USP) 106
- Testing Service 45
- Village 48
- Visitor's Center 52
- web address 7
- withdrawal from 32
- Unsatisfactory grade (U) 90
- Upper division credit requirement 107
- U.S. Public Values and Institutions (AUCC) 103
- Variable credit courses 362
- VECTOR 52
- Veterans' benefits 25
- Veterinary Medicine and Biomedical Sciences, College of 352
- Biomedical Sciences open option 352
- biotechnology courses (BH) 384
- charge for technology 27
- college programs 352
- continuing education 353
- environmental studies 58
- graduate programs 353
- honor societies 111
- interdepartmental program 353
- Doctor of Veterinary Medicine 353
- preveterinary training 353
- study abroad 352
- undergraduate majors and minor 352
- veterinary medicine courses (VM) 497
- Veterinary medicine courses (VM) 497
- Veterinary Medicine, Doctor of 353
- application fee 27
- preveterinary training 353
- Veterinary science courses (VS) 499

Veterinary Teaching Hospital	15	Withdrawal	
Vice Provost for Undergraduate Studies	22	from the University	32, 41, 97
Victims rights	34	grades (W)	96
Video courses	363	retroactive	97
Video game room	49	Women's studies courses (WS)	501
Visitors Center	52	Women's Programs and Studies, Office of	43
Vocational education (see Career and technical teaching)		courses (WS)	501
courses (VE)	496	Interdisciplinary Studies Program	82
Vocational-technical institutes, credit from	21	Workload planning	94
		Work-study program	24
Water Resources Interdisciplinary Studies Program	81	Writing, Advanced (AUCC)	100
Watershed Science (see Forest Rangeland Watershed		Writing concentration (English)	247
Stewardship, Department of)		Written Communication (AUCC)	100
courses (WR)	500		
major in	303	Yates Hall	15
minor in	306	Yearly expenses, estimated	29
Web address, University	7		
Weed science courses (BI)	384	Zoology	
Wellness shared interest living	48	courses (BZ)	390
Wilderness Management, minor in	315	graduate program	334
Wildlife biology		major	332
courses (FW)	429	minor	333
major in	291		