



Colorado
State
University

Knowledge to Go Places

GENERAL
2001-2002
CATALOG

**Colorado State University
General Catalog
2001-2002**

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 119,000 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 82° to an average low of 52°; the winter temperature ranges from an average high of 41° 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.

This General Catalog contains basic information about Colorado State University and the educational programs that started in Fall 2000. Some current students and transfer students may be working to complete academic programs last published in the 1999-2000 General Catalog.

Office of the Provost/Academic Vice President
Colorado State University
108 Administration
Fort Collins, CO 80523-1001

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PRESIDENT'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.

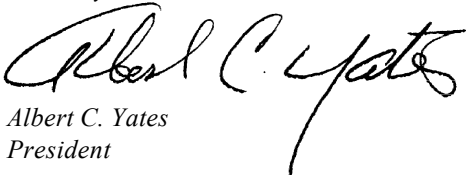
This is an exciting time at our University - a time when we're renewing our commitment to undergraduate education and celebrating excellence in teaching and advising. The introduction of first-year seminars and a rigorous new core curriculum are evidence of this commitment.

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 involves 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, and more. But our University's most important mission is to educate students—undergraduate and graduate. 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.

We welcome you to our University and encourage you to take advantage of all it has to offer.

Sincerely,



Albert C. Yates
President



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

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

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University Calendar

Fall Semester - 2001

Aug. 16-17	Thursday, Friday. Orientation, advising, and registration for new students.
Aug. 20	Monday. Classes begin. Late registration fee assessed for adding first class.
Aug. 23	Thursday. End of limited drop period.
Aug. 26	Sunday. End of initial and limited add period.
Sept. 3	Monday. Holiday - University offices closed.
Sept. 5	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. 15	Monday. End of "W" drop period.
Nov. 17	Saturday. Fall recess begins; no classes next week.
Nov. 22-23	Thursday, Friday. Holiday - University offices closed.
Nov. 26	Monday. Classes resume.
Dec. 7	Friday. Classes end.
Dec. 10-14	Monday through Friday. Final examinations.
Dec. 14-15	Friday, Saturday. Commencement ceremonies.
Dec. 24-26	Monday through Wednesday. Holiday - University offices closed.

Spring Semester - 2002

Jan. 1	Tuesday. Holiday - University offices closed.
Jan. 10-11	Thursday, Friday. Orientation, advising, and registration for new students.
Jan. 14	Monday. Classes begin. Late registration fee assessed for adding first class.
Jan. 21	Monday. Holiday - University offices closed.
Jan. 27	Sunday. End of limited drop period.
Jan. 28	Monday. End of initial and limited add period.
Jan. 30	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 9	Saturday. Spring recess begins.
March 18	Monday. Classes resume.
March 18	Monday. End of "W" drop period.
May 3	Friday. Classes end.
May 6-10	Monday through Friday. Final examinations.
May 10-11	Friday, Saturday. Commencement ceremonies.

Summer Session - 2002

May 13	Monday. First 4- and 12-week terms begin.
May 27	Monday. Holiday - University offices closed; classes in session.
June 7	Friday. First 4-week term ends.

June 10	Monday. 8-week term and second 4-week term begin.
July 4	Thursday. Holiday - University offices closed. No classes.
July 5	Friday. Second 4-week term ends.
July 8	Monday. Third 4-week term begins.
Aug. 2	Friday. Last day of classes for all terms.

Fall Semester - 2002

Aug. 22-23	Thursday, Friday. Orientation, advising, and registration for new students.
Aug. 26	Monday. Classes begin.
Sept. 2	Monday. Holiday - University offices closed.
Nov. 23	Saturday. Fall recess begins; no classes next week.
Nov. 28-29	Thursday, Friday. Holiday - University offices closed.
Dec. 2	Monday. Classes resume.
Dec. 13	Friday. Classes end.
Dec. 16-20	Monday through Friday. Final examinations.
Dec. 20-21	Friday, Saturday. Commencement ceremonies.
Dec. 24-26	Tuesday through Thursday. Holiday - University offices closed.

Spring Semester - 2003

Jan. 1	Wednesday. Holiday - University offices closed.
Jan. 16-17	Thursday, Friday. Orientation, advising, and registration for new students.
Jan. 20	Monday. Holiday - University offices closed.
Jan. 21	Tuesday. Classes begin.
March 8	Saturday. Spring recess begins.
March 17	Monday. Classes resume.
May 9	Friday. Classes end.
May 12-16	Monday through Friday. Final examinations.
May 16-17	Friday, Saturday. Commencement ceremonies.

Summer Session - 2003

May 19	Monday. First 4- and 12-week terms begin.
May 26	Monday. Holiday - University offices closed; classes in session.
June 13	Friday. First 4-week term ends.
June 16	Monday. 8-week term and second 4-week term begin.
July 4	Friday. Holiday - University offices closed.
July 11	Friday. Second 4-week term ends.
July 14	Monday. Third 4-week term begins.
August 8	Friday. Last day of classes for all terms.

The University

THE MISSION OF COLORADO STATE 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. Today the University stands as a comprehensive graduate research university with high admissions standards offering a comprehensive array of undergraduate programs consistent with its land-grant tradition.

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 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.

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 handicap 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 of 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.

COLORADO STATE UNIVERSITY SYSTEM

Administered by the Chancellor, the Colorado State University System promotes collaborative academic programs and related activities between and among Colorado State University, Fort Lewis College, and the University of Southern Colorado. Governed by the State Board of Agriculture, System administrative offices are located in Denver.

STATE BOARD OF AGRICULTURE

The State Board of Agriculture is the governing body for Fort Lewis College, the University of Southern Colorado, and Colorado State University, 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.

ACCREDITATION

Colorado State is accredited by:

North Central Association of Colleges and Schools and
 Commission on Institutions of Higher Education
 Accreditation Board for Engineering and Technology
 Accrediting Council on Education in Journalism and Mass
 Communication
 American Assembly of Collegiate Schools of Business-The
 International Association for Management Education
 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
 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 Industrial Technology
 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.

FACILITIES MANAGEMENT

*Office in Facilities Services Center, North
Ronald A. Baker, Director, Facilities Management*

The University spans five primary campuses on 4,905 acres plus numerous Agricultural Experiment Stations, Cooperative Extension Offices, and Colorado State Forest Service sites across the state that cover an additional 4,675 acres. Altogether, the University has 720 buildings including 231 classrooms and 1,536 laboratories totaling 8,305,069 gross square feet. In addition to acres owned, the University manages an additional 99,095 acres throughout the state, most of which is the Colorado State Forest.

The main campus is a 578-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 1,026 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. An addition to the west of Moby Complex, the Fum McGraw Athletic Center, was completed spring 1999. An addition to the south of this complex, Human Performance Clinical/Research Lab, supports the study of human performance. The \$18.3 million renovation and addition to the Engineering Building, completed fall 1999, accommodates the College of Engineering and Physics Department. The water plaza feature in front of this structure incorporates origin, collection, storage, and distribution of water to celebrate CSU's heritage regarding water engineering/conservation and to serve as a teaching tool for classes. A new Chilled Water Plant Building, adjacent to the existing heating plant, provides chilled water for the campus.

Currently under construction on the main campus is the Chemistry/Biological Sciences addition between Anatomy/Zoology and Chemistry Buildings, consisting of ground-level construction with a bridge connecting the two buildings. Future projects include the Microbiology Building addition for research labs and support space and a transit center/parking garage adjacent to the Lory Student Center designed for bus drop-off, pick-up, waiting area, ticket sales, and retail space.

Nearby the main campus, the Old Fort Collins High School was purchased from the school district in 1997. Renovation will provide space to relocate campus programs and establish the University Center for the Arts. To connect this facility to

the main campus, an underpass was constructed under College Avenue for safe travel to and from the main campus. In addition to the building the University, through its foundation, acquired a park adjacent to the Old Fort Collins High School to relocate the Annual Trial Gardens. The gardens provide students, researchers, and the public a place to evaluate annual flowerbeds and enhance university and community appearance.

The south campus contains the Veterinary Teaching Hospital's research and teaching programs in clinical sciences; and the Natural Resources Research Center, the first of five buildings to be leased to the Federal government, completed in fall 1999. Proposed additions to the Veterinary Teaching Hospital include a \$9.3 million Argus Tumor Center, scheduled to start construction in summer 2001, for bone cancer research and the Equine Orthopaedic addition to house a multidisciplinary program addressing equine musculoskeletal disease and resolve problems in human arthritis where conditions compare to those in horses.

Two miles west of main campus lies the 1,714-acre foothills campus, home to much of the University's research activities; Hughes Stadium, where a \$900,000 lighting project was finished in fall 2000; and the Colorado State Forest Service nursery. A new \$7.5 million biological containment Level III research facility has been recently completed at the Judson M. Harper Research Complex.

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. A new \$1.6 million Visitor's Center was completed in fall 2000 to house city, state, and University offices.

The Agriculture Research Development Education Center (ARDEC), on 776 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. Relocation of the Animal Sciences program from the Rigden Farm to this location is complete.

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. A new classroom building was added to this campus.

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
Camila Aire, 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 new 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), Big Twelve Plus Consortium, 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 located in the 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 the University by developing and strengthening life-long relationships between alumni and the University community by benefitting current and future alumni and friends and by serving as a catalyst for communication and involvement."

The Association is a non-dues based organization which is governed by a 26-member Board of Directors. The Association sponsors over 150 events each year and offers a variety 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, Student Alumni Connection (S.A.C.), in- and out-of-state Alumni Association chapters, Graduates of the Last Decade (GOLD), reunions, On the Road with the Rams, financial services, travel programs and merchandise, Homecoming activities, career services, and many more.

The *Colorado State University Alumni* magazine is published three times a year by Colorado State University in cooperation with the Alumni Association.

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 80523-0015. 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 State Board of Agriculture, 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.

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 Deadlines

The deadline for submission of admission applications and all required documentation is July 1 for fall semester and December 1 for spring semester. All applications and/or supporting documentation postmarked 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.

Social Security Number

All students are requested to submit a social security number. International students are encouraged to file for a social security number although they are not eligible for social security benefits. The social security number is used as a student identifier in maintaining academic and financial records. This number is included on the student's photo identification card which may be solicited in connection with various University-related activities and services, and is used for posting grades. *Students' disclosure of the social security number is voluntary.*

The student 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 State Controller's debt collection procedure.

Immunization Policy

See University Health Service in the Student Programs and Services section of this catalog for immunization requirements.

For High School Graduates

Colorado high school seniors applying for admission should obtain their application from the high school counselor. Out-of-state students should write the Office of Admissions, Colorado State University, Fort Collins, CO 80523-0015 for an application. Students may also apply using the application on the World Wide Web at: <http://admissions.colostate.edu>. A \$30, 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.
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.

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.

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; 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); and d) effective 2002, two units of the same foreign language will be required. If this is

not fulfilled at the high school level, it must be completed while enrolled at Colorado State University.

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 application on the World Wide Web at: <http://admissions.colostate.edu>. A \$30 nonrefundable processing fee is required.

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 application on the World Wide Web at: <http://admissions.colostate.edu>. A \$30 nonrefundable processing fee is required.

Undergraduate students who have graduated from high school and completed more than nine credits at other 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 admission applications and all required documentation is July 1 for fall semester and December 1 for spring semester. All applications and/or supporting documentation postmarked 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. To be admitted, an applicant must have completed a transferable college-level mathematics course (e.g., college algebra) with a grade of C or above, or completed an intermediate algebra course with a grade of B or above, have achieved a satisfactory score on the Colorado State Entry-Level Mathematics Exam, submit a high school transcript showing that algebra I, geometry, and algebra II (or a comparable math sequence) were successfully completed with grades of C or higher, or submit other credible evidence of adequate preparation of university-level mathematics courses.

Effective fall 2002, foreign language will be required. Transfer students may meet this requirement by successfully completing with a grade of C or higher: two years of the same second language in high school (submit a high school transcript) OR two semesters or three quarters of the same second language at the college level. If this is not fulfilled at the high school or college level, it must be completed while enrolled at Colorado State University.

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.

Students who have completed an Associate of Arts or an Associate of Science degree from an accredited Colorado institution will be guaranteed admission providing that it is the last institution attended and that a cumulative 2.00 (A=4.0) has been achieved from ALL institutions attended and provided enrollment limitations have not been met.

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

For example, students applying to the College of Engineering must have completed at least one term of calculus and one term of calculus-based physics or chemistry prior to enrolling. Preference will be given to those applicants with the strongest records in preengineering 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 State Board of Agriculture, Colorado State University System, 110 6th Street, Room 640, Denver, CO 80202.

Credit From Two-Year and Noncollegiate Institutions

See 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 \$30 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. The application deadline is July 1 for fall semester and December 15 for spring semester.

Students who have attended other collegiate institutions after attending Colorado State must file an application for readmission with the \$30 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.

For International Students

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.

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 Immigration and Naturalization Service requires that the University have on file proof of financial support before the visa documentation can be issued. A \$30 nonrefundable processing fee is required. To obtain an international undergraduate application, contact the Office of Admissions. Students may also apply using the application on the World Wide Web at <http://admissions.colostate.edu>. International applicants seeking admission to the Graduate School should refer to the *Graduate and Professional Bulletin*.

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 submit scores from the Test of English as a Foreign Language (TOEFL) or Advanced Placement International English Language (APIEL). The minimum computer-based TOEFL score necessary to be considered for a clear or unconditional admission is 197 (525 paper-based). A score of three (3) on the APIEL is required for a clear admission. Applicants with less than a 197 TOEFL or less than a 3 on the APIEL may be referred to the Colorado State University Intensive English Program. Scores from other English language proficiency examinations may be considered in lieu of the TOEFL. Contact the Office of Admissions for additional information. 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 the Office of Financial Aid for information on applying for assistance.

Financial Assistance

*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.

Financial assistance is subject to the financial resources available to Colorado State. Detailed information on all financial aid programs is available on request from Student Financial Services and on the Student Financial Services Web site at www.colostate.edu/Depts/SFServices. 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, Transfer Achievement Award, and Phi Theta Kappa Transfer Scholarship.

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

The University also administers scholarships offered by private agencies, foundations, service clubs, and individuals. For more detailed information on available scholarships, contact Student Financial Services.

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.

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.

The Colorado Graduate Grant Program is restricted to Colorado residents and is the only need-based grant program available for graduate students.

All grants may be reawarded in subsequent years, providing the student 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 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.

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 application procedures for any of the above programs may be obtained from Student Financial Services.

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. Students must not also receive a combination of F, U, I, or W for a semester. Copies of the complete policy are available at Student Financial Services. The satisfactory academic progress policy is in the Financial Aid Guide which is sent to all students who receive an award notice.

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 knowingly makes a false statement or misrepresentation when applying for financial aid shall be subject to a fine of not more than \$10,000 or imprisonment of not more than 5 years, or both, under provisions of the United States Criminal Code.

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 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 www.colostate.edu/Depts/StudEmp.

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 employment services. Students who enroll less than half time 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. Need-based support, such as loans or work-study positions, may be provided to students who qualify.

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 State Board of Agriculture, 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 www.colostate.edu/Depts/Registrar.

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 educational outreach 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 at least one credit in the fall and spring terms, and such credits as the appointing department may require each summer term during which the appointment is in effect. Assistants may have tuition payments made in their behalf.

Students Registering for Educational Outreach Courses

Tuition and fees assessed for courses offered by the Division of Educational Outreach vary by program, level of instruction, and delivery mode. Consult current Division of Educational Outreach publications for specific rate information or call the Division of Educational Outreach at (970) 491-5288.

Special Fees

Nonrefundable Fees

Admission application fee	\$ 30.00
Application fee for admission to professional program in occupational therapy	\$ 40.00
Application fee for admission to professional program in veterinary medicine	\$ 40.00
Composition Placement Examination fee (each time exam is taken)	\$ 15.00
Credit established by challenge examination per credit attempted	\$ 20.00
Dissertation microfilming fee	\$ 50.00
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	\$ 63.00
Business	\$100.00
Engineering	\$140.50
Intra-University	\$ 35.00
Liberal Arts	\$ 53.00
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 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.

¹For 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.

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 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

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." A copy of the tuition law, as identified above, is available at Student Financial Services, 103 Administration Annex, or on the Web site at: <http://www.colostate.edu/Depts/SFServices>

Initial Classification

The initial tuition classification is determined from the information the student supplies on the application for admission to the University. 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 Classification Review

Students who feel they have subsequently become eligible for in-state status may file a petition with the Tuition Classification Officer in the Student Financial Service Office. Petitioners should consider their tuition classification status to be nonresident until their classification is changed, and personal financial decisions should be made accordingly. 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 either admitted to the University or are currently enrolled for the semester they are requesting a change in classification.

Deadline for Petition

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.

Appeal of Classification

Decisions made by the Tuition Classification Officer are subject to appeal to the Residency Appeals Committee. The appeal must be submitted in writing, no later than 15 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 administrative ruling; however, petitioners may seek legal counsel to be informed of their rights and remedies. Additional information regarding the appeal process is available through Student Financial Services.

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. New students should have sufficient financial resources to insure successful completion of at least one semester.

Expenses not directly related to educational costs are not included in the estimates. Living off campus may result in some savings, but comparable in-town housing and diet will approximate University residence hall costs.

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	\$2451	\$4902
Books and Classroom Supplies	\$ 330	\$ 660
Incidental Personal Expenses	\$1175	\$2350
Total of Estimated Costs	\$3956	\$7912

International Students

Students from other countries should anticipate expenses considerably higher than those quoted above. The above estimates do not include costs of transportation, clothing (particularly winter clothing for those coming from warmer climates), living expenses during vacation periods and during the summer months, and items of personal use which cannot be brought in a suitcase and which must be purchased in the United States after arrival. An unmarried undergraduate student should anticipate living expenses of about \$900 per month in addition to out-of-state tuition, plus \$900 settling-in expense.

The amount of financial support, including the cost of medical insurance for the student, required for a single, undergraduate student is \$24,514 (based on 2000-2001 tuition and fees) and for a single graduate student is \$23,242 (based on 2000-2001 tuition and fees), but the actual total could exceed this minimum requirement. 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. For a list of detailed expenses, write to the Office of International Programs (address listed below). Students enrolled in specialized training courses in nondegree schools should refer to the specific program documents for costs.

Students accompanied by dependents must allow additional funds for a spouse at \$3,000 per year and \$2,400 per year for each child. Medical insurance is required for all foreign students and their accompanying dependents creating an additional approximate expense of \$2,600 per year for spouses, and \$1,300 per year for children.

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 sponsored students who receive services as described above and who use University resources 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, write the Office of International Programs, Attn: Coordinator, Sponsored Degree Programs, Laurel Hall, Colorado State University, Fort Collins, CO 80523-1024.

Exchange Students

International students attending Colorado State, as a part of one of Colorado State's two-way reciprocal exchange programs, should direct questions about their study and expenses to the Office of International Programs (see address above).

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:

Charges	Fall	Spring
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

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 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 cancelled.

Housing Deposit

Residence Halls

The housing deposit for residence hall students serves as both an application fee and a contractual agreement guarantee. Partial refund of this deposit is available if the student cancels his/her request prior to submitting the Residence Hall Contract. For specific information about the refund policy refer to the "Contract/Refund Information" outlined in the Residence Hall Living brochure which accompanies the residence hall reservation form.

University Apartments

A deposit is required for students applying for University Apartments. This deposit serves as an application fee and a contractual agreement guarantee. This deposit will be refunded, upon request, anytime prior to assignment. The refund procedure for current apartment residents is outlined in the Apartment Life Contract Agreement. For further information, refer to the Apartment Life brochure which accompanies the Apartment Life application form.

Tuition and Fees Adjustments

Tuition and fees, as applicable, are charged for all courses added during a term. Tuition and fee adjustments for students dropping courses, if applicable, will be allowed only during the schedule change period as listed in the University Calendar in this publication. After this deadline, there is no adjustment in tuition and fees should a student drop a course.

Withdrawal (to drop all courses and leave the University) is accomplished by contacting the HELP/ Success Center. Adjustments of tuition and fees are made only for these authorized withdrawals. Once a student completes one or more courses in a term (fall semester, spring semester, or summer session) a withdrawal is not authorized; however, the student can terminate remaining courses by contacting the Office of Records and Registration. Normally a withdrawal is not permitted during the last two weeks of the semester.

Cancellation of assessments is authorized for courses which have not started at the time of withdrawal.

Tuition and fees which will be assessed for authorized withdrawals is the percentage according to the following:

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.

The following guidelines apply:

1. In the case of death, adjustment of tuition and fees will be made any time during the semester.
2. Withdrawal as a result of serious illness, disabling accident, military draft, or activation of reserves or national guard units, initiated at the HELP/Success Center, will be subject to review by the Office of the Vice President for Student Affairs which may recommend to the Vice President for Administrative Services a variation from the normal adjustment policy.
3. 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 to financial aid 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.

4. University room and board charges will be assessed through the vacate date from University housing.
5. No adjustment will be made for a student who is suspended, dismissed, or expelled for breach of discipline.

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 and advising. 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 State Board of Agriculture 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, 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 the Office of Judicial Affairs 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 the Office of Judicial Affairs. 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 the Office of Judicial Affairs 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 the Office of Judicial Affairs. 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 Office of the Vice President for Student Affairs. 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 State Board of Agriculture 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, with the advice of the Committee on University Programs, shall develop and implement procedures for recognition of student organizations and shall be responsible for recognizing organizations which qualify. The Committee on University Programs shall monitor the recognition process. In cases of denial or revocation of recognition, appeals may be made to the Committee on University Programs. 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 15 national sororities and 20 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.

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 State Board of Agriculture 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.

Living Regulations

All newly admitted first-year students without previous college experience, who are single, under twenty-one years of age, and not living with their parents are required to live in University residence halls for the first two consecutive terms of their attendance. Inquiries regarding this regulation, including guidelines for requesting an exemption, should be directed to the Office of Housing and Food Services, Palmer Center.

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 Assistant Director of Campus Activities 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 Assistant Director of Campus Activities in the Lory Student Center.

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.

- 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.

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 collaborative with all areas of the University as well as various community agencies. The Office strives to provide a family-like support system made 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 at Colorado State University is an advocacy program that promotes, supports, and encourages the success of all students, especially students that are Hispanic/Chicano/Latino.

Through several resources and programs, El Centro assists students with academic and personal development. El Centro designs and implements programs that will support and enhance students' educational endeavors.

El Centro provides services such as: academic advising, academic counseling, mentoring opportunities, volunteer opportunities, referrals to the pertinent departments, scholarship information, and provides financial support in the way of scholarship.

El Centro is a catalyst to provide cultural and education programs throughout the CSU campus and Fort Collins community. We provide students with work study employment, internships, independent studies, and research opportunities.

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.

The Resources for Adult Learners Office 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. Compensatory, informational, and advocacy services are available without charge and are provided dependent upon student need. Some of the services include: priority registration, note takers, readers, taped textbooks, 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 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 equitably in the multitude of opportunities and resources provided by the University.

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

Women's Programs and Studies provides the following services and programs for students and the campus community: information, counseling and referral; Women's Studies Program advising; materials resource center; campus-wide programs and symposia; and victim assistance/advocacy.

ATHLETICS

Intercollegiate Athletics

*Offices in the McGraw Athletic Center
Tim Weiser, Director of Athletics*

Colorado State University recognizes intercollegiate athletics as an integral part of its mission; and the University is committed to the pursuit of excellence with integrity in its athletic programs, as in all of its endeavors. The mission of intercollegiate athletics at Colorado State is to offer a quality experience in intercollegiate athletic competition to male and female student-athletes; to project a favorable public image of the University; to provide a rallying point for students, faculty, alumni, and the community; to ensure equity in men's and women's sports; to operate in full compliance with University, conference, and National Collegiate Athletic Association (NCAA) rules and regulations; to ensure that student-athletes are given the opportunity to excel to their best abilities in the classroom and on the playing field; to embrace the principles of ethical conduct and sportsmanship; to guard the physical and mental well being of its student-athletes; to assure the fair and equitable treatment of student-athletes, coaches, and staff; and to provide an environment that welcomes and encourages diversity among participants, coaches, staff, and administrators.

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's athletic policies are in harmony with the principles adopted by the North Central Association of Colleges and Schools.

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.

Recreational Sports

Office in Student Recreation Center
Bill Ellis, Director

The Recreational Sports Department, located in the Student Recreation Center, offers a variety of recreation services to students. These include *informal recreation, fitness/wellness programs, physical therapy, intramural sports, club sports, and lifestyle classes.*

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
- two Ricochet courts
- 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

A variety of drop-in fitness classes are offered throughout the day. A complete schedule of open hours and fitness classes is available at the Student Recreation Center.

In addition to offering fitness classes, the *fitness/wellness* program provides personal training, massage therapy, fitness analyses, and exercise program designs. Personal trainers offer students personalized workout programs and certified massage

therapists offer students relaxing, healing, or therapeutic massages. SWEAT is the personalized fitness assessment and exercise design program.

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, spring, and summer terms. League sports include:

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

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

- 5-K run
- flag football
- golf
- indoor soccer
- softball
- ski race
- tennis
- racquetball

Most activities take place on the intramural fields and in Moby Complex, both adjacent to the Student Recreation Center. Entries for all intramural programs are taken on the dates and times listed in the Program Calendar, available at the Intramural Sports Office in the Student Recreation Center.

Club sports at Colorado State are student-run sport organizations which operate on a modest budget and earn additional funding to run programs. The goal of the club sports program is to provide students with the opportunity to organize, coach, or participate in sports activities that fall beyond the scope of the intramural program.

A variety of both competitive and recreational clubs allows students to learn a sport, practice a sport, and oftentimes compete intercollegiately. Currently 36 club sports exist on campus from the highly competitive:

- alpine ski racing
- baseball
- cycling
- ice hockey
- in-line hockey
- lacrosse
- polo
- rodeo
- rugby
- soccer
- ultimate
- volleyball

to the more recreational in nature (participation and practice is usually with other Colorado State students; there is very little outside competition):

- badminton
- gymnastics
- martial arts
- racquetball
- skiing
- tennis
- trap and skeet
- water polo

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

Lifestyle classes are alternative 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 over 100 lifestyle classes offered each year including:

- country western dance
- CPR
- dance
- fencing
- guitar
- lifeguard training
- martial arts
- massage
- photography
- sport instruction
- yoga.

Specific course offerings are listed in the *Lifestyle and Outdoor Adventure* magazine available at the Student Recreation Center and the Lory Student Center. Also listed in the magazine are outdoor classes such as:

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

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

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; computer-assisted guidance programs (e.g., Sigi-Plus); career resource materials; a videotape library; workshops on skills, decision making,

interests and values, and majors; the Colorado State University majors file; and the “Career Connection” alumni contact database. Staff members work with students in group settings through workshops and class presentations as well as individually.

The Career Center gathers and generates current job and labor market information to assist students in their career development and decision process. The Center also provides specific information on occupations and employers as well as opportunities for major-related summer jobs and internship positions. In addition, the Center also compiles employment statistics on recent graduates.

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, 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.stuser.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, and administers national tests. Some national tests are available on computer. 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 study strategies for reading flexibility. In addition, diagnostic and limited remediation services are available for learning disabled students.

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 come to 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. Saturday hours are 9:00 a.m.-12:00 noon; the Health Center is always closed on Sundays. 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.

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.

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.

HELP/SUCCESS CENTER Orientation and Advising Services

*Offices in Aylesworth NE, Second and Third Floors
Paul Shang, Director*

The HELP/Success Center provides orientation programs which includes the Preview Summer Orientation and Registration Program, the Next Step Transfer Orientation Program, The Premier, and the Ram Fest Welcome Week.

Advising services are provided for students enrolled in University Open Option, Open Option seeking business and engineering, Applied Human Sciences Open Option, ACCESS, pretechnical journalism, GUEST, and other selected programs in the Division of Educational Outreach. The HELP/Success Center also sponsors the first year seminar, IUCC 192—Individual, University, and Society, and provides several other University-wide services dealing with scholastic standards, University withdrawals, and absence letters to faculty.

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 parents are particularly invited to attend Preview Summer Orientation and Registration Program, a one-and-a-half day orientation program held during summer. Transfer students are invited to attend the Next Step Orientation Program. Students receive orientation information soon after they are admitted.

Advising Services

The HELP/Success Center 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 HELP/Success advisers knowledgeable about all the academic options at Colorado State, students will be able to explore and choose majors. For students interested in controlled majors (with special admission requirements), advisers will 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 the development of strategies to improve academic success or gain admission to Colorado State University, and students considering dropping classes or withdrawing from the University.

Colorado State University Honorary 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.

All University

Golden Key
Hesperia
National Society of Collegiate Scholars
Phi Beta Kappa
Phi Kappa Phi
Sigma Xi

Agricultural Sciences

Alpha Zeta
Gamma Sigma Delta – *Agriculture 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*

OFFICE OF HOUSING AND FOOD SERVICES

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

Residence Halls

David A. McKelfresh, 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.

Reservation

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

First Year Experience: This program is for students interested in developing knowledge and skills to enhance their learning throughout their college careers. Students will take courses to help develop a deeper understanding of their own learning processes, communications, group dynamics, and human relations within a diverse and sustainable learning community.

Global Opportunities: This program is for students interested in living in a dynamic community of international and domestic students. Global Opportunities is designed to bring people together from different cultures to learn from each other. Political science, foreign language, history, and international business students are especially encouraged to apply. This option is also excellent preparation for domestic students planning to study abroad, go to Semester at Sea, join the Peace Corps, or travel to a foreign country.

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 leave 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.

Natural Resources: The outdoors is the laboratory for Natural Resources majors. This floor offers exciting programs and activities designed to increase student knowledge of the outdoors. The Natural Resources Club and other student clubs are active in the hall and seek residents who want to gain experience planning activities.

Opportunity Knocks: This floor is for sophomore and junior men and women. Opportunities are provided for career exploration, connection with alumni and community leaders, assistance in finding internships, preparing for interviews and job searches, or preparing for graduate school. It will have an added focus on study abroad and other international and work experiences.

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.

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.

Special Assignment Options

Upper-Class Single Rooms: Students who live in Ellis Hall enjoy the comfort and privacy of having their own room. One-half of the rooms in Ellis Hall are guaranteed singles for upper-class students (sophomore and above). Students can enjoy Alston's Coffeeshouse, located in Ellis Hall, that offers fresh-baked pastries.

All Female Limited Visitation Floor: This floor will provide students a safe and comfortable environment free of unwanted guests. The students on this floor will be permitted guest visitation from 10 a.m. to 8 p.m., 7 days a week. All other campus policies remain the same for this floor. If requests for this environment do not fill a complete floor, there may be a limited number of suite rooms that abide by the limited visitation policy.

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. 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. Furniture options are available in all three areas. There are one-level apartments in this area which are wheelchair accessible. 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. High speed modems are available at 1500 W. Plum for a fee.

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 one- and two-bedroom furnished 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 International House. 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. 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 menu offers nutritious meals, and meeting rooms, audiovisual equipment, and other conference supplies are available.

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.

STUDENT LEGAL SERVICES

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

Student Legal Services is a group legal service providing legal advice, counsel, and representation to full fee-paying students on a variety of legal matters. Some of the more common cases involve tenant issues, traffic citations, consumer complaints, 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.

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 Community Services, KCSU-FM, campus television, the *Silver Spruce* yearbook, 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 University Bookstore, Curfman Gallery, 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. The 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 Lory Student Center 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, the Leadership Development Office is coordinated by Campus Activities Center staff.

The Campus Activities Center includes the Greek Life Office, the Information Desk/Box Office, 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 *Information Desk/Box Office* 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 Center Governing Board, Student Health Committee, and Student Fee Review Board.

KCSU-FM

KCSU, located in the Campus Media center in the Lory Student Center, is a 10,000-watt student-run and campus-oriented radio station broadcasting at 90.5 on the FM band. The station, which broadcasts continuously, offers students the opportunity to learn management, programming, news, and broadcast operations. In addition to the more than 60 paid, volunteer, and work study 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.

UNIVERSITY OMBUDSMAN OFFICE

*Office in Lory Student Center, Room 182
William E. King, Ombudsman*

The University Ombudsman Office helps ensure that students, faculty, administrative professionals, and classified staff receive fair and equitable treatment within the University system. The Ombudsman considers all sides of an issue in an objective manner, then determines how best to help bring about a nonadversarial solution at the lowest administrative level. When appropriate, the Ombudsman can facilitate communication between parties who find themselves in a dispute. Other services offered include: information and referral; consultation on conflict resolution options and approaches; mediation; presentations and training in conflict management. All contacts with the Ombudsman's office are strictly confidential.

UNIVERSITY POLICE DEPARTMENT

*Office in Green Hall
Donn Hopkins, 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
Kay Rios, 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 12,000 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 Consulting Office, 224A Weber Building. Seminars on the use of CSUNet and the University's computers are offered at the beginning of the semester.

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, and scanners.

Computer supplies, software, and manuals 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 ACNS.

For more information about ACNS, a free copy of *VECTOR*, a bimonthly newsletter published by ACNS, is available at the Consulting Office 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 guest parking permits, academic and service-oriented brochures, and campus maps, as well as directions to various campus locations and to specific departments for additional information. 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 Educational Outreach

Offices in Spruce Hall, Old Fort Collins High School, and downtown Denver

The Division of Educational Outreach 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. 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 through the Colorado State University Network for Learning (CSUN) in a self-paced, independent learning format. Through the use of a course syllabus, textbooks, video, and additional reference materials, students can complete courses without the limitations of time and place associated with classroom instruction. Learning assignments are submitted by mail, and examinations are taken under the supervision of an authorized proctor at a time and location convenient to the student.

The Colorado State University Network for Learning (CSUN) offers credit courses toward graduate degrees via videotape, correspondence, online, or computer technology. Courses are available in several disciplines including agricultural sciences, business, computer science, engineering, fire science, human resource development, liberal arts, statistics, and statistics. Courses utilizing videotapes are only delivered to students using U.S. and Canadian addresses. Over 1,000 students have earned degrees via CSUN's Distance Degree Program with no on-campus residency requirement.

Advising Services for students continuing their studies is available through the University's HELP/Success Center. 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., human resource development, and communications management. A new master's degree in construction management is scheduled to begin Fall 2001. 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 Educational Outreach staffs offices at Spruce Hall on the main campus and at Old Fort Collins High School, 1400 Remington, in Fort Collins, and the Denver Center. It also maintains a community computer lab at 3665 JFK Parkway, Building #1, Suite 204, in Fort Collins and offers

programs at Rocky Mountain Village in Loveland. For more information on any of the Division programs, call (970) 491-5288, or toll free (877)491-4336. In Denver, call (303) 573-6318.

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 Television 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; eight video classrooms; development of computer-based (including Web-based) instructional materials; and other technological systems. A videotape library of over 3,600 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 Orientation and initiatives, a course on college teaching, individual consultation, the Student Course Survey Program teaching discussion groups, faculty exchange programs, 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 free 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.

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, Natural Sciences, 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

William R. Wilcox, Assistant State Forester

The Colorado State Forest Service (CSFS) assists other state agencies and private landowners in forest stewardship, community forestry, fire protection, and conservation education. The CSFS is located on campus with 18 district and 10 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 facilities in 56 of Colorado's 63 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. A current focus on statewide critical issues includes: addressing growth decisions, biotechnology issues, community commitment to families and youth, and workforce/labor force issues. Ongoing program teams focus on the following six high-priority areas:

Engaging Communities in Transition: In an effort to help communities facing transitions, CSUCE has developed a plan of work that encourages Extension staff, citizen-leaders, and agency partners to focus on rural economic diversification; land-use planning and management; and local capacity-building to promote teamwork, community spirit, and cohesion. The Communities in Transition partnership is community-centered and multijurisdictional to allow neighboring towns and counties with share common challenges and aspirations to benefit from collaborative work.

Enhancing Families and Communities: CSUCE has developed specific strategies to help individuals and families improve decision-making skills that lead to self-sufficiency, economic well-being, workforce preparation, and evaluation of home-based business opportunities to generate income. Individuals also learn how to communicate more effectively, reduce anger and resolve conflicts, which will help them care for themselves and other family members. The aging of the population also is an area of educational emphasis.

Improving Nutrition, Food Safety, and Health: Nutrition, diet, human health, and the relationships among them continue to be of concern to Coloradans. In an effort to address these issues, CSUCE's nutrition, food safety, and health team has developed programs to improve consumers' ability to make healthy choices; improve nutritional status, reduce risks of food-borne illness and health-related diseases, and manage food resources.

Growing Horticulture in Colorado: In recent years, Coloradans concerned about the environment have focused much attention on "keeping growth green." However, plant species that grow in other states don't always adapt to Colorado's high-altitude growing environment and limited water supply. The Growing Horticulture in Colorado plan of work focuses on strengthening partnerships with public and private horticultural organizations, using new technology to train industry professionals, and improving the consistency and quality of training materials available to Extension educators.

Strengthening Youth Development: The 4-H youth development plan of work focuses on four key strategies: to provide nonformal, educational, science-based curricula that promote science literacy and the application of science technology to everyday life; to prepare youth for employment by demonstrating workforce competencies and skills; to enhance the ability of communities to improve the well-being of youth and families through strong leadership and volunteer development; and to increase the resiliency and life skills of youth and families to help them become contributing members of society.

Sustaining Agriculture and the Environment: As a result of Colorado's population explosion since 1980, land is under increasing pressure from urban development, and rural land is being lost to housing, business, transportation, and other pressures. In addition, agriculture is faced with economic and environmental challenges that threaten its long-term sustainability and economic significance. CSUCE has developed a plan of work to help sustain agricultural systems that are profitable, protect the state's diverse natural resource base, and deal with drought and other emergency responses.

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
Interdisciplinary Studies Programs
International Programs
Life Sciences, Center for
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

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

College of Agricultural Sciences

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

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

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

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

College/Department	Environmental Program Focus
Horticulture (B.S., M.S., Ph.D.)	Water, land, and soil management; ecology; plant, landscape, and ecosystem management; natural resources management; environmental design and planning
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
<i>College of Applied Human Sciences</i>	
Manufacturing Technology and Construction Management (B.S., M.S.)	Air and climate
<i>College of Engineering</i>	
Atmospheric Science (M.S., Ph.D.)	Air and climate; global warming; ecology and ecosystem management; pollution control
Chemical and Bioresource Engineering (B.S., M.S., Ph.D.)	Water, land, and soil management; irrigation engineering; non-point source pollution control; groundwater hydrology; water quality management, bioremediation; natural resources management
Civil Engineering (B.S., M.S., Ph.D.)	Water resources; land and soil management; air and climate; 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
<i>College of Liberal Arts</i>	
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/Department	Environmental Program Focus
<i>College of Natural Resources</i>	
Earth Resources (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
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 Sciences (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 resources management; biodiversity; conservation biology
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
Rangeland Ecosystem Science (B.S., M.S., Ph.D.)	Climate; risk management; policy analysis; global warming; ecology and ecosystem management; natural resource management; biodiversity; riparian systems
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
<i>College of Natural Sciences</i>	
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
<i>College of Veterinary Medicine and Biomedical Sciences</i>	
Clinical Sciences (M.S., Ph.D.)	Veterinary health management; zoological medicine
Environmental Health (B.S., M.S., Ph.D.)	Toxicology; epidemiology; industrial hygiene/occupational safety; public health; risk assessment
Microbiology (B.S., M.S., Ph.D.)	Human and veterinary health; ecosystem function
Pathology (Ph.D.)	Causes and mechanisms of disease processes

College/Department**Environmental Program Focus**Physiology
(M.S., Ph.D.)

Environmental biology

Radiological Health Sciences
(M.S., Ph.D.)

Radiation protection/health physics; radioecology; radiobiology

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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Required Courses			
ETCC 200	Ethnicity in America	3	3F
ET 292	Ethnic Studies Research Methods and Writing	3	
TOTAL		6	
Specific Option Courses (see specific option for list of courses)			12

African American Studies Option

Select a four course sequence 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	Africa and African Diaspora	3	

ET E	239/ 239	Introduction to Chicano Literature	3	
ETCC	240	Native American Cultural Expressions	3	3B
ETCC HYCC	250/ 250	African American History, 1619-1865 ³	3	3D
ETCC HYCC	251/ 251	African American History Since 1865 ³	3	3D
ETCC HYCC	252/ 252	Asian American History	3	3D
ETCC	253	Chicana/o History and Culture ⁴	3	3D or 3E

Asian American Studies Option

Select a four course sequence from the following:

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	

ET	254	La Chicana in Society	3	
ETCC HYCC	255/ 255	Native American History ²	3	3D
ETCC	256	Americans in a Changing World ¹	3	3B or 3E
ET	260	The Asian Diaspora-Cultures and Communities ⁵	3	
ET	261	Latina/o Populations in the U.S. ⁴	3	

Chicana/o/Latina/o Studies Option

Select a four course sequence from the following:

ET 253	Chicana/o History and Culture	3	
ET 261	Latina/o Populations in the U.S.	3	
ET 332	Contemporary Chicana/o/Latina/o Issues	3	
ET 430	Chicana/o/Latina/o Creative Expression	3	
ET 432	Chicana/o/Latina/o Routes to Empowerment	3	

ET	304	Race Formation in the United States ¹	3	
ET	305	Ethnicity, Class, and Gender in the U.S. ¹	3	
ET	310	African-American Studies ³	3	
ET	312	African-American Situation ³	3	
ET JT	316/ 316	Multiculturalism and the Media	3	
ET AP	318/ 318	Peoples and Cultures of the Southwest	3	

Ethnicity Studies Option

Select a four course sequence 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	

ET	320	Ethnicity and Film-Asian-American Experience ⁵	3	
ET	324	Asian-Pacific Americans and the Law ⁵	3	
ET	332	Contemporary Chicana/o/Latina/o Issues ⁴	3	
ET	340	Native American Perspectives on Conquest ^{1,2}	3	

Native American Studies Option

Select a four course sequence from the following:

ETCC/ HYCC	255/ 255	Native American History	3	3D
ET	340	Native American Perspectives on Conquest	3	
ET	344	Native American Ceremony and the Sacred	3	
ET AP	414/ 414	Development in Indian Country	3	
ET S	444/ 444	Federal Indian Law and Policy	3	

ET	344	Native American Ceremony and the Sacred ^{1,2}	3	
ET	410	African-American Periods and Personalities ³	3	
ET	412	Africa and African Diaspora ³	3	
ET AP	414/ 414	Development in Indian Country ²	3	
ET	420	Asian/Pacific American Families/Communities ⁵	3	
ET	424	Asian/Pacific American Literature and Culture ⁵	3	

Secondary Option Courses 6

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 E	234/ 234	Native American Literature	3

ET	430	Chicana/o/Latina/o Creative Expression ⁴	3	
ET	432	Chicana/o/Latina/o Routes to Empowerment ⁴	3	
ET E	438/ 438	Contemporary Native American Literature	3	
ET AP	442/ 442	Ethnographic Field School (AP/APCC 100, ET/ETCC 200 or written consent of instructor)	3	
ET S	444/ 444	Federal Indian Law and Policy ^{1,2}	3	

ET	492	Seminar ^{1,5}	3		HY	472	American Southwest	3	
ET	495	Independent Study	Var		L	309	Contemporary Chinese Literature and the Arts	3	
<hr/>									
B. Non-CASAE Courses									
AP	310	Peoples and Cultures of Africa (AP/APCC 100)	3		L	336	Introduction to Spanish-American Civilization (L/L CC 201S or L 208S)	3	
AP	311	Art of Africa (AP/APCC 100)	3		L	449	Spanish-American Literature (L/L CC 300S, L 310S)	3	
AP	319	Latin American Peasantries (AP/APCC 100)	3		MU	230	Music of Black Americans	3	
AP	331	Peoples of Latin America	3		MU	309	Jazz Ensemble (written consent of instructor)	3	
AP	350	Archaeology of North America (AP/APCC 140)	3		MU	332	History of Jazz	3	
AP	351	Archaeology of Europe and Asia (AP/APCC 140)	3		PL	106	Wisdom of the East-Oriental Philosophy	3	
AP	412	Indians of North America	3		PL	309	Ideas in Oriental Art and Literature	3	
AP	413	North American Indians Today (AP/APCC 100)	3		PL	349	Philosophy of Tao and Zen	3	
AR	112	History of Asian Art	3		PL	360	Topics in Oriental Philosophy (sophomore standing or higher or written consent of instructor)	3	
AR	113	Native Art Survey	3		PL	369	Mind and Body in Eastern Thought (sophomore standing or higher or written consent of instructor)	3	
AR	208/208	Native American Art and Material Culture	3		PL	371	Contemporary Eastern Religious Thought	3	
AR	311	Art of Africa (AR/ARCC 100 or AR 111 or AR 113)	3		PL	379	Mysticism East and West (PL 106 or PL 171 or PL 172 or PL 270)	3	
AR	312	History of Pre-Columbian Art	3		PO	331	Politics and Society Along Mexican Border	3	
AR	316	Art of the Pacific (AR/ARCC 100 or AR 111 or AR 113)	3		PO	413	U.S. Civil Rights and Liberties (PO/POCC 101)	3	
AR	318	Native American Art (AR 110; AR/ARCC 100 or AR 111 or AR 112)	3		PO	444	Comparative African Politics (PO/POCC 241)	3	
AUCC	200	Self/Community in American Culture, 1600-1877	3	3D	PO	445	Comparative Asian Politics (PO/POCC 241)	3	
AUCC	201	Self/Community in American Culture Since 1877	3	3D, 3F	PO	446	Politics of South America (PO/POCC 241)	3	
E	356	Asian Literature	3		PO	447	Politics in Mexico, Central America, Caribbean (PO/POCC 241)	3	
ECCC	212	Racial Inequality and Discrimination	3	3F	PO	447	Politics in Mexico, Central America, Caribbean (PO/POCC 241)	3	
HYCC	120	Asian Civilizations I	3	3D or 3E	S CC	205	Contemporary Race-Ethnic Relations	3	3E
HYCC	220	Asian Civilizations II	3	3D or 3E	S	330	Social Stratification (S/S CC 100 or S/S CC 105)	3	
HY	264	The War in Vietnam	3		S	366	Peoples and Institutions of Latin America (S/S CC 100 or S/S CC 105)	3	
HYCC	270	Colonial Latin America	3	3D or 3E	SPCC	192	Introduction to Intercultural Communication	3	1, 3E
HYCC	271	Latin American Since Independence	3	3D or 3E	SP	306	Co-Cultural Communication	3	
HY	340	China Until the Manchus	3		PROGRAM TOTAL = 24 credits				
HY	341	China Since the Manchus	3		¹ May not be used as a secondary option course by students in the ethnicity studies option.				
HY	350	Mexico	3		² May not be used as a secondary option course by students in the Native American studies option.				
HY	352	Caribbean Civilizations (HY/HYCC 101 or HY/HYCC 171 or HY/HYCC 270 or HY/HYCC 271)	3		³ May not be used as a secondary option course by students in the African American studies option.				
HY	370	Civil War Era (HY/HYCC 150)	3		⁴ May not be used as a secondary option course by students in the Chicana/o/Latina/o studies option.				
HY	372	Reconstruction and the New South (HY/HYCC 150)	3		⁵ May not be used as a secondary option course by students in the Asian American studies option.				
HY	420	History of Spain	3						
HY	469	United States Immigration History	3						

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.

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

Core Courses (6 credits required)

Select one course from each section

Section I

HYCC	273	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	274	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	311	Peoples and Cultures of the Pacific (AP/APCC 100)	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	216	The Islamic World	3	3D or 3E
HYCC ETCC	252/ 252	Asian-American History	3	3D
HY	302	Ancient Civilizations-Near East	3	
HY	340	China Until the Manchus	3	
HY	341	China Since the Manchus	3	
HY	348	The Modern Middle East	3	

HY	404	Ancient Israel	3	
HY	453	Pacific Wars, 1937-1975	3	
IE	271	India	3	
L	106J	First-Year Japanese Review (placement exam or instructor placement)	4	
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	306J	Third-Year Japanese II (L 304J or placement exam)	3	
L	309	Contemporary Chinese Literature and the Arts	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	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	
PO	445	Comparative Asian Politics (PO/POCC 241)	3	

Supporting Field Courses (0-6 credits)

May be taken from courses approved by Advisory Board.

¹ Between Fall Semester 2000 and Fall Semester 2002, students may use courses numbered L CC 200 or L CC 201 to satisfy the category 2B requirement of the All-University Core Curriculum (AUCC).

Biomedical Engineering Interdisciplinary Studies Program

Office in Engineering Building, Room A 101
Susan P. James, Director

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 student 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).

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
CORE COURSES			
AY 300/ PY 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	
BE 470	Biomedical Engineering (AY 300/PS 300)	3	
BE 486A-B	Biomedical Clinical Practicum (AY 300/PS 300 and BE 470; or written consent of instructor)	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

CB 331	Momentum Transfer and Mechanical Separations (CB 201, M 340; CB 202 or ME 237)	3	
CB 406	Introduction to Transport Phenomena (C 474, CB 332)	3	
CB 430	Process Control and Instrumentation (CB 332, CB 341, CB 420)	3	
CE 260	Engineering Mechanics-Statics (M/M CC 160, PH/PHCC 141)	3	
CE 261	Engineering Mechanics-Dynamics (CE 260; CB 103/CBCC 192 or CE 108 or ME 108/MECC 192)	3	
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	
EE 415	Fundamentals of Digital Image Processing (EE 303/ST 303, EE 312)	3	
ME 307	Mechatronics and Measurement Systems (CE 261, EE 204, M 340, ME 250)	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 337 or concurrent reg.)	3	
PH 245	Introduction to Electronics (PH/PHCC 142, M/M CC 161)	3	
	TOTAL	3-7	

Science and Other Non-Engineering Courses

Select at least one course from the following:²

AY 325	Cellular Neurobiology (AY 300/PS 300 or BY 310)	3	
AY 345	Functional Neuroanatomy (AY 300/PS 300)	4	
AY 365	Nerve and Muscle-Toxins, Trauma, and Disease (AY 300/PS 300 or BY 310)	3	
BC 351	Principles of Biochemistry (C 245 or C 343 or concurrent reg. in C 343)	4	
BY 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
BY 310	Cell Biology (1 semester of organic chemistry or concurrent reg.; 2 semester 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 341	Organic Chemistry I (C 113)	3	
C 343	Organic Chemistry II (C 341)	3	
C 344	Organic Chemistry Laboratory (C 114; C 343 or concurrent reg.)	2	
EX 303	Anatomical Kinesiology (AY 300/PS 300)	3	
EX 403	Physiology of Exercise (AY 300/PS 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	
MB 300	General Microbiology (C 245 or C 341 or concurrent reg.; BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	3	
OT 320	Biomechanical Bases for OT Practice (AY 301, OT 301, OT 302)	5	
PS 420	Cardiopulmonary Physiology (AY 300/PS 300)	3	
PS 430	Endocrinology (AY 300/PS 300)	3	

PY	456	Sensation and Perception (PY 454A or B)	3	
PY	457	Sensation and Perception Laboratory (PY 250A or B; PY 456 or concurrent reg.)	2	
STCC	309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
TOTAL			3-7	

Animal Research/Bioethics/Entrepreneurship Courses

Select at least one from the following:

BN	420	New Venture Creation (BN 340 or written consent of instructor)	3	
BN	440	New Venture Management (BN 420 or written consent of instructor)	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 minimum

¹ 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).

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
CORE COURSES			
BE	586A-B	Biomedical Clinical Practicum (ME 570; AY 300/PS 300 or PS 500 or written consent of instructor)	4
ME	570	Bioengineering (ME 307, ME 324)	3
PS	500	Mammalian Physiology I (6 credits of biological science, 1 physiology course, and 1 biochemistry course)	4
TOTAL			11

ELECTIVE COURSES (minimum of 10 credits)

Engineering Courses

Select at least one of the following:¹

CB	723	Bioseparation Processes (CB 504)	3
ME	571	Biomechanics (ME 570)	3
ME	573	Structure and Function of Biomaterials (ME 331)	3
TOTAL			3-6

Science and Other Non-Engineering Courses

Select at least one of the following:²

AY	550	Electron Microscopy-TEM, SEM, and X-ray (PH/PHCC 110)	3
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	Functional Neurobiology (NB 501 or PS 500; or AY 325 with written consent of instructor)	3
PS	560	Theory and Practice of Animal Biotechnology (1 semester of biochemistry or written consent of instructor)	3
PS	620	Cardiovascular Physiology (PS 500)	3
PS	631	Mechanisms of Hormone Action (PS 430 or PS 501)	2
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)	3
ST	512	Design and Data Analysis for Researchers II (ST 511)	3
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 Assistant Dean for Graduate and 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 Assistant Dean for Graduate and Undergraduate Education, College of Veterinary Medicine and Biomedical Sciences.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Students must select a minimum of 21 credits from a combination of core and elective courses.			
Biochemistry Core		4-6	
BC 351	Principles of Biochemistry (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 lab)	1	
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	
BC 403	Comprehensive Biochemistry II (BC 401)	3	
BC 404	Comprehensive Biochemistry Laboratory (BC 401 or concurrent reg.; C 246 or C 344; NS 204)	2	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Microbiology Core		7	
MB 300	General Microbiology (C 245 or C 341 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 432	Aquatic Microbiology (MB 301 or MB 302)	4	
MB 436	Industrial Microbiology (MB 301 or MB 302)	4	

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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	
CB 331	Momentum Transfer and Mechanical Separations (CB 201, M 340; CB 202 or ME 237)	3	
CB 333	Momentum and Heat Transfer Laboratory (CB 332)	2	
CB 442/ EV 442	Rate-Controlled Separations (CB 331 or CE 300, M 340)	3	
CB 443/ EV 443	Mass Transfer and Separation Laboratory (CB 341 or CB 442/EV 442 or concurrent reg.)	2	

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

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Core Curriculum			
BY 220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155)	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 (BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	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 343)	3	
EN 453	Population Ecology (M/M CC 155, one previous course in ecology)	3	
F 311	Forest Ecology (BY 200)	3	
FW 474	Wildlife Ecology (BY 220, ST/STCC 301 or ST/STCC 307 or EH/EHCC 307)	3	
NR 352	Principles of Wilderness Management (NR 120A or B)	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)	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
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)	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		3	
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		3	
SW 371C	Social Work with Adult Offenders	3	
	Internship	3	
OR		3	
	Independent Study	3	
TOTAL		18	
Supporting Courses			
AP 315	Psychology Anthropology (AP/APCC 100, PY/PYCC 100)	3	
AP 413	North American Indians Today (AP/APCC 100)	3	
AP 479	Forensic Anthropological Methods (AP 372)	3	
HD 311	Adolescent/Early Adult Development in Context (HD/HDCC 101)	3	
HD 403	Families and the Legal Environment	3	
PO 305	Judicial Politics (PO/POCC 101)	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.

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.

RS	300	Principles of Range Management (BY 103 or BZ/BZCC 120)	3
SC	378	Environmental Soil Science (SC 240)	3
TOTAL			6

Liberal Arts Electives

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

AP	330	Human Ecology (AP/APCC 100, AP 150/APCC 120 or BY 220 or BZ/BZCC 101) ¹	3
E	403	Nature Writing (one course in literature or CO/COCC 301A-D or E 311A-C)	3
EC	340/ EA 340	Introduction to Economics of Natural Resources (EA/EACC 202 or EC/ECCC 202)	3
HY	464	American Environmental History	3
JT	461	Writing about Science, Health, and Environment (JT 310, one upper-division writing course; 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)	3
		OR	
PO	362	Global Environmental Politics (PO/POCC 232 or PO/POCC 241)	3
S	460	Technology, Society, and Environment (S/S CC 100 or S/S CC 105)	3
TOTAL			9

Electives from Other Colleges

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

CB	462	Environmental Law (CO/COCC 150)	3
EACC	202	Agricultural/Natural Resource Economics	3 3C
EACC 240/ ECCC 240		Issues in Environmental Economics	3 3F

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
E	403	Nature Writing (one course in literature or CO/COCC 301A-D or E 311A-C)	3
EC	340/ EA 340	Introduction to Economics of Natural Resources (EA/EACC 202 or EC/ECCC 202)	3
HY	464	American Environmental History	3
JT	461	Writing about Science, Health, and Environment (JT 310, one upper-division writing course; 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)	3
		OR	
PO	362	Global Environmental Politics (PO/POCC 232 or PO/POCC 241)	3
S	460	Technology, Society, and Environment (S/S CC 100 or S/S CC 105)	3
TOTAL			9

Environmental Science

A. Select one course from the following:

EH	220	Environmental Health (BC 103 or BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 104 or BZ/BZCC 110 or BZ/BZCC 120)	3
GR	210	Physical Geography	3
NR	120A	Environmental Conservation	3
NR	120B	Environmental Conservation (participation in Honors Program)	4

B. Select a second course from the A list OR select one course from the B list below OR select another science course in consultation with adviser. Courses in B must have a strong environmental focus.

A CC IECC	116/ 116	Plants and Civilization	3	3E
AT	350	Introduction to Weather and Climate	2	
		AND		
AT	351	Introduction to Weather and Climate Laboratory (AT 350 or concurrent reg.)	1	
CE	413	Environmental River Mechanics (CE 300 or ER 416)	3	
ENCC	102	Insects, Science, and Society	3	3A
ERCC	130	Earth System Science	3	3A
ER	272	Oceanography I	3	
ERCC	304	Principles of Watershed Management	3	3A
FW	100	Wildlife Fundamentals (concurrent reg. in FWCC 192)	2	
GR	100	Introduction to Geography	3	

EA EC	340/ 340	Introduction to Economics of Natural Resources (EA/EACC 202 or EC/ECCC 202)	3	
EA	342	Economic Analysis-Water Resource Development (EA/EACC 202 or EC/ECCC 202)	3	
EA EC	346/ 346	Economics of Outdoor Recreation (EA/EACC 202 or EC/ECCC 202)	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 (BY 103 or BZ/BZCC 120; M/M CC 121)	5	
NRCC	320	Natural Resources History and Policy	3	3D and 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 athletic performance. Students enrolling 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 exercise and sport science and food science and human nutrition. Students apply for this program after their first semester at Colorado State. Six students per year are accepted into the program.

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

<u>Course</u>		<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Core Curriculum				
STCC	301	Introduction to Statistical Methods ¹ (M/M CC 121)	3	
EX	560/ FN 560	Exercise and Nutrition (EX 403, FN 350, undergraduate biochemistry course)	3	
EX	600	Research Methods (EX 453)	3	
EX	603	Advanced Topics in Exercise Physiology (EX 403)	3	
EX	692	Seminar	2	
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	
PS	500	Mammalian Physiology I (6 credits of biological science, 1 physiology course, and 1 biochemistry course)	4	
OR				
PS	501	Mammalian Physiology II (6 credits of biological science, 1 physiology course, and 1 biochemistry course)	4	
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.

Gerontology Interdisciplinary Studies Program

Office in Gifford Building, Room 102B

Jan Rastall, Director

Department of Human Development and Family Studies

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 Department of Human Development and Family Studies.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Core Requirements			
HD 301	Perspectives in Gerontology (HD/HDCC 101 or PY/PYCC 100 or S/S CC 100 or written consent of instructor)	3	
HD 312	Adult Development-Middle Age and Aging (HD/HDCC 101 or PY/PYCC 100 or S/S CC 100)	4	
HD 354	Biological Aspects of Aging (BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110)	3	
SW 371F	Social Work with Social Gerontology	3	
	TOTAL	13	
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	
ID 460	Housing and Design for Special Populations (ID 275)	3	
OT 355	Handicapped Individual in Society (PY/PYCC 100 or S/S CC 100)	3	
PL 366	Philosophy of Aging	3	
PY 296	Group Study	1-3	
PY 496	Group Study	1-3	
	TOTAL	5-8	

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

PROGRAM TOTAL = 21-22 credits

Integrated Ranch Management Interdisciplinary Studies Program

Office in Animal Reproduction and Biotechnology
Laboratory, Room 127
Brian Hains, Coordinator

The Integrated Ranch Management Interdisciplinary Studies Program offers students majoring in agricultural and resource economics, animal sciences, or rangeland ecosystem science an opportunity for specialized coursework for training in integrated resource management. The core curriculum with courses in each department is supplemented with three new courses focused on integration of the information provided in the disciplinary courses and developing skills in systems analysis. This interdisciplinary studies program is aimed at providing training for students interested in careers involving the businesses associated with land and animal management.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
SOPHOMORE			
A 224/ NR 224	Integrated Ranch Management I (A/A CC 120 or first-year seminar)	3	
BY 220	Fundamentals of Ecology (1 course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155)	3	
RS 300	Principles of Range Management (BY 102 or BZ/BZCC 120)	3	
RS 320/ SC 320	Forage and Range Management (1 course in biological sciences)	3	
SC 240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
	TOTAL	12-13	
JUNIOR			
A 324/ NR 324	Integrated Ranch Management II (A 224/NR 224)	3	
AN 300E	Topics in Animal Science-Family Ranching	1	
EA 305	Farm and Ranch Records and Analysis (EA/EACC 202 or EC/ECCC 202)	3	
EA 310	Agricultural Marketing (EC/ECCC 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 483/ NR 483	U.S. Travel-Integrated Ranch Management III (A 324/NR 324)	2	
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 Programs offer 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 will be on the study of the structures, components, and processes of development (economic, environmental, sociocultural, 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Core Courses			
IE 492	International Development Seminar	3	
Select six credits from the following:			
AP 200	Cultures and the Global System	3	
EC 460	Economic Development (EC 304)	3	
GR 100	Introduction to Geography	3	
IECC 270A/ 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
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 311	Peoples and Cultures of the Pacific (AP/APCC 100)	3	
AP 329	Cultural Change (AP/APCC 100)	3	
AP 331	Peoples of Latin America	3	
AP 333	Food and Culture	3	
AP 340	Medical Anthropology (AP/APCC 100)	3	
AP 421	Comparative Social Organization (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 320 or BN 305)	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 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	
ET 414/ AP 414	Development in Indian Country	3	
GR 320	Cultural Geography (GR 100)	3	
HY 446	World Since 1914	3	
IECC 116/ A CC 116	Plants and Civilization	3	3E
IE 270C	World Interdependence-Current Global Issues	3	
IE 271	India	3	
IN 300	Approaches to International Studies (9 credits from AUCC categories 3C, 3D, 3E, and/or 3F; 1 year of a foreign language)	3	
IN 492A-B	Seminar (A) HYCC 273, HYCC 274, IN 300; B) HYCC 270, HYCC 271, 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	3D or 3E
PO 331	Politics and Society Along Mexican Border	3	
PO 431	International Law (PO/POCC 232)	3	
PO 433	International Organization (PO/POCC 232)	3	
PO 444	Comparative African Politics (PO/POCC 241)	3	
PO 445	Comparative Asian Politics (PO/POCC 241)	3	
PO 446	Politics of South America (PO/POCC 241)	3	
PO 447	Politics in Mexico, Central America, Caribbean (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	3
		Internship	1-3
		TOTAL	12

PROGRAM TOTAL = 21 credits

Graduate

For admission to the interdisciplinary program, candidates should 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 Board. The Board oversees the program, keeping students informed of curricular changes, and providing advisers as needed.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Core Courses			
IE 692	International Development Seminar	3	
Select one course from the following:			
EA 566/ S 566	Contemporary Issues of Developing Countries (2 or more courses in sociology and/or economics)	3	
EA 660	Economics of Agricultural Development (EA 460)	3	
IE 470	Women and Development	3	
IE 550/ PL 550	Ethics and International Development (written consent of instructor)	3	
NR 525	World Natural Resources (written consent of instructor)	3	
PO 541	Political Economy of Change and Development (3 upper-division credits in comparative politics with grade of B or better)	3	
	TOTAL	6	

Supporting Courses

Students will take at least six credits from the following courses or additional courses approved by the International Development Board. Core courses not taken to meet the three-credit core requirement can be used as supportive coursework.

AM	530	International Trade in Textiles and Apparel (AM 270, DM 120)	3
AN	570	World Animal Agriculture (AN 100)	3
AP	421	Comparative Social Organization (AP/APCC 100)	3
AP	529A	Anthropology and Development (9 credits in anthropology or written consent of instructor)	3
AP	529B	Modernization and Culture Change (9 credits in anthropology or written consent of instructor)	3
BF	675	International Finance	3
BG	675	International Business (9 credits of business and/or economics)	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
CB	533	Water Control and Measurement	3
CE	524/ ER 524	Modeling Watershed Hydrology (CE 322/EV 322 or ER 416, ST 304 or ST/STCC 309)	4
CE	544	Water Resources Planning (CE 322/EV 322)	3
CE	578	Infrastructure Engineering and Management (10 credits of engineering, economics, public administration or planning courses)	3
CE	639/ S 639	Technology Assessment and Social Forecasting (CE 544)	3
DM	518	Consumer Issues-Global Perspective	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	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
ER	510	Watershed Management in Developing Countries (CE 322/EV 322 or ER 304)	2

ER	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
GS	670	Interdisciplinary Agricultural Development (written consent of instructor)	3
JT	412	International Mass Communication	3
NR	550	Farming Systems Research and Development (written consent of instructor)	3
PO	433	International Organization (PO/POCC 232)	3
PO	444	Comparative African Politics (PO/POCC 241)	3
PO	445	Comparative Asian Politics (PO/POCC 241)	3
PO	446	Politics of South America (PO/POCC 241)	3
PO	447	Politics in Mexico, Central America, Caribbean (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	541	Political Economy of Change and Development (3 upper-division credits in comparative politics with grade of B or better)	3
PO	670	Politics of Growth and the Environment (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
		Internship	1-3
		Independent Study	1-3
		TOTAL	<u>6</u>

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 Courses			
AP 319	Latin American Peasantries (AP/APCC 100)	3	
AP 331	Peoples of Latin America	3	
AP 332	Peoples of the Caribbean	3	
AR 312	History of Pre-Columbian Art	3	
HYCC 270	Colonial Latin America	3	3D or 3E
HYCC 271	Latin America Since Independence	3	3D or 3E
HY 350	Mexico	3	

HY	352	Caribbean Civilization (HY/HYCC 101 or HY/HYCC 171 or HY/HYCC 270 or HY/HYCC 271)	3	
IN	492B	Seminar-Latin America (HY/HYCC 270, HY/HYCC 271, IN 300)	3	
JT	412	International Mass Communication	3	
L	336	Introduction to Spanish-American Civilization (L/L CC 201S or L 208S)	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	
PO	331	Politics and Society Along Mexican Border	3	
PO	446	Politics of South America (PO/POCC 241)	3	
PO	447	Politics in Mexico, Central America, Caribbean (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)	3	3E

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, 316 MRB Building, (970) 491-5602 or email bmbugrad@colostate.edu.

Course	Title (Prerequisite)	Cr	AUCC
Mathematics Core		11	
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 125; 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	
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 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 341	Organic Chemistry I (C 113)	3	

C	343	Organic Chemistry II (C 341)	3	
C	344	Organic Chemistry Laboratory (C 114; C 343 or concurrent reg.)	2	
Biology Core			8-9	
BY	310	Cell Biology (one semester of organic chemistry or concurrent reg.; two semesters of introductory biology)	4	
OR				
NS	202	Molecular Biosciences-Cellular Biochemistry (BY/LSCC 102; C/C CC 111, C/C CC 112 or concurrent reg.)	4	
AND				
NS	204	Cellular Biochemistry Laboratory (C/C CC 112, NS 202 or concurrent reg.)	1	
LSCC	102	Attributes of Living Systems (high school chemistry)	4	3A
Biochemistry Core			8	
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	
BC	403	Comprehensive Biochemistry II (BC 401)	3	
BC	404	Comprehensive Biochemistry Laboratory (BC 401 or concurrent reg.; C 246 or C 344; NS 204)	2	
Microbiology Core			7	
MB	300	General Microbiology (C 245 or C 341 or concurrent reg.; BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	3	
MB	342	Immunology (MB 300)	4	
Molecular Genetics Core			7-8	
BC	463	Molecular Genetics (NS 201; BC 401 or concurrent reg. or BC 351)	3	
OR				
MB	450	Microbial Genetics (MB 300; BC 351 or BC 401 or concurrent reg.)	3	
BZ	350	Molecular and General Genetics (BY/LSCC 102, one course in statistics)	4	
OR				
NS	201	Molecular Biosciences-Genetic Mechanisms (BY/LSCC 102; C/C CC 111, C/C CC 112 or concurrent reg.)	4	
AND				
NS	203	Genetic Mechanisms Laboratory (C/C CC 112, NS 201 or concurrent reg.)	1	
OR				
SC	330	Principles of Genetics (BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	3	
AND				
SC	331	Genetics Laboratory (SC 330 or concurrent reg.)	1	
Seminar				
BC	493	Senior Seminar (BC 401 or concurrent reg.)	1	
Elective			3-4	

<i>Select one course from the following:</i>				
BZ	402	Chromosomes of Eukaryotes (BY 310)	4	
BZ	403	Comparative Endocrinology (BY 310)	3	
BZ	433	Behavioral Genetics (one course in genetics)	3	
BZ	478	Molecular and Developmental Evolution (BZ 220, M/M CC 155, ST/STCC 301 or ST/STCC 307 or EH/EHCC 307)	3	
MB	420	Medical and Molecular Virology (MB 342, BC 351 or BC 401 or concurrent reg.)	4	
MB	442	Microbial Physiology (MB 300; BC 351 or BC 401)	4	
Advanced Laboratory			4	
BC	406A-C	Investigative Biochemistry (BC 404)	2	
BC	408	Techniques in Structural Biology (BC 404, C 471 or C 474)	2	
BC	495	Independent Study (minimum GPA of 3.0 and consent of laboratory mentor)	Var.	
BZ	495	Independent Study	Var.	
MB	302	General Microbiology Laboratory (MB 300 or concurrent reg.)	2	
MB	343	Immunology Laboratory (MB 301 or MB 302; MB 342 or concurrent reg.)	2	
MB	425	Virology and Cell Culture Laboratory (MB 301 or MB 302; MB 420 or concurrent reg.)	2	
MB	495	Independent Study (MB 300)	Var.	
PROGRAM TOTAL = 76-79 credits				

Molecular, Cellular and Integrative Neurosciences Interdisciplinary Graduate Program

Office in Anatomy-Zoology Building, Room W 334
Gary E. Pickard, Director

This interdisciplinary graduate research and education program has over 20 faculty participants from the Departments of Anatomy and Neurobiology, Biochemistry and Molecular Biology, Biology, Computer Science, Microbiology, Physiology 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, 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>	<u>AUCC</u>				
NB 501	Cellular and Molecular Neurophysiology (1 college-level course in each: biology, biochemistry, physics, calculus)	2		AP 310	Peoples and Cultures of Africa (AP/APCC 100)		3
				AP 322	Religion in Society		3
				AP 324	Folk Religion		3
NB 502	Techniques in Neuroscience I (1 college-level course with laboratory in each: biology, biochemistry, physics, and written consent of instructor)	2		AP 340	Medical Anthropology (AP/APCC 100)		3
				AR 411	History of Medieval Art (AR 110)		3
NB 503	Developmental Neurobiology (1 college-level course in each: biology, biochemistry, physics, calculus)	3		AR 496H	Group Study-Art History ¹		3
				E 160	Mythical and Biblical Backgrounds		3
NB 504	Techniques in Neuroscience II (1 college-level course with laboratory in each: biology, biochemistry, physics, and written consent of instructor)	2		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
NB 505	Neuronal Circuits, Systems and Behavior (AY 325 or NB 501 or PS 500)	3		E 463	Milton (E 160, E 341, and one other upper-division E prefix course)		3
NB 793	Neuroscience Seminar (2 semesters)	2		ET 344	Native-American Ceremony and the Sacred		3
NB 795	Independent Study	Var.		HYCC 120	Asian Civilizations I		3 3D or 3E
NB 796A-C	Group Study in Neurosciences (2 semesters)	2		HYCC 216	The Islamic World		3 3D or 3E
				HYCC 230	Medieval Europe		3 3D or 3E

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 106	World Literatures to 1500		3 3E
PL 172	Religions of the West			PL 106	Wisdom of the East-Oriental Philosophy		3
				PL 270	Issues in the Study of Religion		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 Human (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 369	Mind and Body in Eastern Thought (sophomore standing or higher or written consent of instructor)		3
				PL 370	Contemporary Western Religious Thought (PL 106 or PL 171 or PL 172 or PL 270)		3

PL	371	Contemporary Eastern Religious Thought	3
PL	372	Meaning and Truth in Religion (PL 106 or PL 171 or PL 172 or PL 270)	3
PL	375	Science and Religion (PL 106 or PL 171 or PL 172 or PL 270)	3
PL	379	Mysticism East and West (PL 106 or PL 171 or PL 172 or PL 270)	3
PL	463	Seminar in Religious Studies	3
PL	497	Group Study	1-9
PY	492	Seminar ² (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

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

² 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 (PO/POCC 241)	3	
Elective Courses (12 credits minimum) No more than 9 credits can be taken from one department.			
EC 370	Comparative Economics 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
HY	423	Eastern Europe Since 1918	3
HY	435	Germany Since World War I	3
HY	440	Imperial Russia	3
HY	442	The Soviet Union	3
L		Any 200-level or above German course	3
L		Any 200-level or above Russian course	3
L	450G	Selected Literary Movements and Periods-German (L/L CC 300G, L 310G)	3
L	454G	Topic Studies-German (L/L CC 300G, L 310G)	3
POCC	241	Comparative Government and Politics	3 3C or 3E
PO	421	Modern Political Theories	3
PO	437	American Security Policy	3

Colloquia, seminars, independent study, group study, and study abroad courses as appropriate.

Water Resources Interdisciplinary Studies Program

*Office in 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 ¹	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155)	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	

ERCC	304 ²	Principles of Watershed Management	3	3A
GR	342	Geography of Water Resources	3	
S	461	Sociology of Water Resources (S/S CC 100 or S/S CC 105)	3	
		Elective	3	
		TOTAL	21	

ELECTIVE COURSES

AT	350	Introduction to Weather and Climate	2	
BZ	315	Marine Ecology (BY 103 or BZ/BZCC 111 and BZ/BZCC 120, C 245)	3	
BZ	321	Aquatic Vascular Plants (BZ 223 or BZ 325 or written consent of instructor)	3	
CB	405	Nonpoint Source Pollution (one course in soil science, hydrology, or fluid mechanics)	3	
CB	462	Environmental Law (CO/COCC 150)	3	
CE	322/	Basic Hydrology (CE 300 or ER 416 or CB 331, ST/STCC 301 or ST/STCC 309 or CE 308; or written consent of instructor)	3	
EV	322			
CE	413	Environmental River Mechanics (CE 300 or ER 416)	3	
CE	423	Groundwater Engineering (CE 300 or ER 416 or CB 331)	3	
EA	340/	Introduction to Economics of Natural Resources (EA/EACC 202 or EC/ECCC 202)	3	
EC	340			
EA	346/	Economics of Outdoor Recreation (EA/EACC 202 or EC/ECCC 202)	3	
EC	346			
EA	375	Agricultural Law	3	
ER	416	Land Use Hydrology (SC 240, ST/STCC 201)	3	
ER	417	Watershed Measurements (concurrent reg. in ER 416)	2	
ER	418	Land Use and Water Quality (C/C CC 107, ER 416)	3	
GR	210	Physical Geography	3	
PO	361	U.S. Environmental Politics and Policy (PO/POCC 101)	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	

¹ BZ 440 (BY 103 or BZ/BZCC 120; C 245 or concurrent reg.) or EH 446 (C 245 or C 343) or MB 300 (C 245 or C 341 or concurrent reg.; BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120) may be substituted for BY 220.

² CE 322/EV 322 or ER 416 may be substituted for ERCC 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 Studies Program is an interdisciplinary program of inquiry within the University curriculum designed to examine the position of women in culture and society, and integrate a new understanding of women in traditional academic fields. This new context embraces interests, history, talents, creative activities, subjective experience, economic status, and social and biological roles.

The Women's Studies Program prepares individuals for 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.

The program's objectives are: to enable students to explore academic disciplines from a feminist perspective; to 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 women to acquire knowledge and skills necessary for physical, social, and emotional well-being; to encourage innovative teaching and research; and to promote equality of the sexes.

Students who wish to pursue a certificate in women's studies must declare their intent with the Office of Women's Programs and Studies.

Undergraduate Program

<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	472A	Select one of the following courses: ¹ Seminar in Women's Studies- Humanities (enrolled in Women's Interdisciplinary Studies Program or written consent of instructor)	3
WS	472B	Seminar in Women's Studies-Social Sciences (enrolled in Women's Interdisciplinary Studies Program or written consent of instructor)	3
WS	472C	Seminar in Women's Studies-Natural Sciences (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 of one upper-division women's studies course.

Students will complete 12 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 Study Board.

Course	Title (Prerequisite)	Cr	AUCC
Core Courses			
WS 692	Seminar in Women's Studies (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 ¹ (approval of Women's Studies Program Board)	3-6	
TOTAL		6-9	

Supporting Courses

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

INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

Cell and Molecular Biology

*Office in Molecular and Radiological Biosciences,
Room 308*

Michael H. Fox, Chairman

The graduate degree program in cell and molecular biology is a cooperative effort among 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 Aylesworth Laurel Hall NE, Room 315
Alicia Skinner Cook, Interim Vice Provost for
International Programs Jerome Bookin-Weiner, Executive
Director*

International Programs has many dimensions at Colorado State University. The Office of International Programs includes International Education, International Student Services, Study Abroad, and International Research and Development.

International Education

*Office in Aylesworth Laurel Hall NE, Room 315
Martha Denney, Director*

Colorado State encourages students and faculty to gain knowledge for living and working in an increasingly internationalized environment, an increasingly interdependent world. This can be accomplished by participating in relevant international experiences on campus or abroad, learning about other cultures and issues of world importance, and committing part of their academic program to international studies.

Opportunities for international education exist in every college in the University. The Office of International Programs is the coordinating center for bringing awareness of these opportunities to students and faculty.

Undergraduate students are offered a spectrum of opportunities to explore world cultures through the

international Asian, International Development, Latin American, and Russian, Eastern, and Central European Interdisciplinary Studies Programs, exchange programs, summer programs, study abroad, the Peace Corps, international internships, and weekly international seminars.

Prospective graduate students in the Colleges of Agricultural Sciences and Natural Resources and the Department of English may join the Peace Corps Master's International program. Master's degree studies and Peace Corps service proceed in tandem. Interested students should apply simultaneously for admission to the Graduate School at Colorado State University and to the Peace Corps approximately six months in advance of the semester of anticipated enrollment.

International Education Courses

Interdisciplinary courses are offered regularly under the international education (IE) prefix by faculty from a variety of departments. The classes offer students the chance to expand their knowledge of selected topics through broad-based, internationally focused courses.

Various competitive scholarships are available for international graduate study, including Fulbright, Marshall, Rhodes, and Rotary International fellowships. Application deadlines for these fellowships are usually in the fall the year before the student goes abroad. Students 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.

Interdisciplinary Studies Programs

Undergraduates may enrich their understanding of regional cultures through the area studies for Asian, Latin American, and Russian, Eastern, and Central European Interdisciplinary Studies Programs. All offer certification in a regional specialty that complements a degree program. The International Development Interdisciplinary Studies Programs offer graduate and undergraduate certificate options to students who wish to focus on issues related to the development of third world countries, or to specific populations. A capstone seminar is offered (IE 492, IE 692) to provide a venue for discussion and for a holistic view of development issues. For further information, refer to University Interdisciplinary Studies Programs in this section.

Study Abroad

*Office in Laurel Hall
Mona Miller, Director*

Colorado State University encourages its students to undertake a semester, summer, or full academic year of study outside the United States to broaden their perspectives and increase their understanding of other cultures. Direct exchange programs and agreements with foreign universities allow qualified students to attend universities virtually worldwide. Credit is normally transferred back to Colorado State as part of a student's overall program. Students who want to include study abroad or participate in exchange programs should plan for them by discussions with the Study Abroad advisers in the Office of International Programs. Advance planning helps assure that study abroad programs will not prolong the period of time needed to get a degree. Deadlines for most programs are in October for the spring semester and March for the fall semester.

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.

Various competitive scholarships are available for international graduate study, including Fulbright, Marshall, Rhodes, and Rotary International fellowships. Application deadlines for these fellowships are usually in the fall the year before the student goes abroad. Students 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.

International Research and Development

*Office in Laurel Hall NE, Room 315
Jerome Bookin-Weiner, Executive Director*

The University contracts for research and development projects in foreign countries, primarily developing nations. Federal agencies such as USAID and nonfederal organizations such as multilateral banks are the major sources of funding. Faculty develop proposals and serve in foreign countries on both short- and long-term assignments. Past activities have featured water resources and agriculture. However, the current focus of international research and development is changing towards environmental issues, business management, health, and education. The Director of International Research and Development solicits funding for projects and coordinates the many units that participate in their implementation.

International Training

Office in Laurel Hall

Colorado State University 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-country. Although short courses are not part of a formal degree program, many are available for 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. 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 Services

*Office in Laurel Hall
Mark Hallett, Director*

International Student Services provides immigration documentation and advising to international students and scholars. It also provides other support services such as pre-arrival information, on-campus orientation, assistance in housing, advising on problems arising from living in the United States, and serves as liaison to academic departments, other campus offices, and sponsoring agencies and embassies. Additional services are provided to agency-sponsored students.

International students are provided with a special orientation program before the start of classes each semester. This program deals with academic matters, immigration requirements, immunization and health insurance policies, and cultural adjustment to the University and the Fort Collins community. Accordingly, new international students are required to report to campus at an earlier date, and because of the importance of orientation, attendance is required.

International Student Services provides an international component to the co-curricular activities of the University through such events as International Week, International Leadership Conference, and other multicultural experiences. It facilitates the cross-cultural interactions of international students and U.S. students and community members, both on and off campus, and supports many community outreach programs.

CENTER FOR LIFE SCIENCES

*Office in Aylesworth Hall NE, Room 100A
Thomas A. Gorell, Director*

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 Center for Life Sciences serves as a resource for prospective and current students with interests in the life sciences and contributes to the success of these students by providing quality academic advising and promoting and supporting undergraduate research. Through its outreach activities, the Center also provides a wide range of services to K-12 students, teachers, and school districts throughout the state.

Open Option Advising Program

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

Human Health Professions Advising

Colorado State does not offer a specific premed or “pre-health” major 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.

Undergraduate 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. At the Center for Life Sciences, 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 offered through the Center for Life Sciences 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 the pre-veterinary and biomedical sciences open option programs 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 the Center’s pre-vet adviser to be sure that their courses also satisfy admission requirements for the professional veterinary programs. The pre-vet adviser also assists students in completing the application process and preparing for admissions interviews.

Undergraduate Research

The Center for Life Sciences administers the Hughes Undergraduate Research Scholars program. The HURS program provides an opportunity for motivated students to work with a faculty member and research team in a laboratory or field setting. A limited number of scholarships are available for highly qualified applicants.

Student Clubs

Offices for student health and pre-vet clubs are located in the Center for Life Sciences. Staff members serve as advisers for the PreMedica, Pre-Vet, Pre-Dental, and Pre-Physical Therapy clubs and provide assistance and support for club activities.

DIVISION OF ARMED FORCES SERVICES

Reserve Officers’ Training Corps

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 years. 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 \$200 a month, tax free, during 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 per year, and an allowance of \$200 per month, tax free, during the 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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
<hr/>			
<i>Select one course from the following:</i>			
AS	250	Aerospace Studies	3
MS	110	Military Skills I	2
MS	121	Military Skills II	2
MS	210	Contemporary Management	2
MS	221	Principles Dynamics of Military Operations	2
<hr/>			
TOTAL			6-7
UPPER DIVISION			
AS	301	Air Force Leadership Studies I	3
AS	302	Air Force Leadership Studies II	3
AS	401	National Security Affairs/Active Duty I	3
AS	402	National Security Affairs/Active Duty II	3
MS	401/	The American Military Experience	3
HY	401		
<hr/>			
TOTAL			15

PROGRAM TOTAL = 21-22 credits

Introductory Flight Training

Qualified cadets, selected for pilot training, participate in an Introductory Flight Training program following graduation and commissioning. This program provides instruction in principles of flight and Federal Aviation Regulations (FARs), and flying training at Air Force expense.

Active Duty Obligation

There is no active duty obligation for enrolling in either the freshman or sophomore AFROTC courses. Students who complete the Air Force ROTC program and receive a commission, incur a 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 Mark Taylor, 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 eight years in the reserve component (Army Reserve or Army National Guard).

The successful ROTC cadet may choose one of 21 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			
<hr/>			
<i>Select 8 credits from the following:</i>			
MS	110	Military Skills I	2
MS	121	Military Skills II	2
MS	210	Contemporary Management	2
MS	221	Principles	2
MS	250	Dynamics of Military Operations	2-8
MS	295	Basic Camp Leader Internship ^{1,2} Independent Study Credit awarded for prior military service ³	1-2 2-8
<hr/>			
TOTAL			8
UPPER DIVISION			
<hr/>			
<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 8
MS	386	Advanced Camp Practicum ⁴ (MS 320)	1-3 3
MS	395	Independent Study	
MS	401/	The American Military Experience	3
HY	401		
MS	420	Role and Ethics of the Officer (MS 320, MS 401/HY 401)	
MS	492	Seminar	2
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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 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 laboratory is open to all students who have successfully completed the necessary prerequisites. However, commissioning credit is granted to students who are fully qualified for contracting and who have taken the military oath of enlistment.

Scholarship recipients and advanced course students are required to complete a Professional Military Education component. The Professional Military Education component consists of two essential parts—a baccalaureate degree and at least one undergraduate course from each of five designated fields of study. Cadets must take a course in written communication, military history, human behavior, computer literacy, and math reasoning. They are encouraged to take a course in national security affairs and management. However, cadets may substitute approved alternative courses for any of these requirements.

Two-Year Program

A two-year program is also available for students who have not taken the first two years of ROTC. This program requires the student to attend a summer camp at Fort Knox, Kentucky, between the sophomore and junior years. This five-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 students average over \$4,000 annually in scholarship assistance. Scholarships go for 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 students 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 program of excellence that offers superb educational and co-curricular opportunities for academically talented and highly motivated students. Hallmarks of the program include an integrated program of studies characterized by small seminar-style courses, one-on-one interactions with faculty and peers, individualized advising, an optional residential opportunity, first priority registration for classes (after the first semester), co-curricular activities, mentoring opportunities including undergraduate research, assistance on applications for prestigious post-graduate awards, and special recognition as a graduating senior. The Honors experience emphasizes educational and cultural enrichment rather than academic acceleration and “hard” courses. Honors students receive the personal attention that is typically connected with a small college and the benefits associated with the resources and diversity of a Carnegie Research I University.

Main Features

The University Honors Program at Colorado State is the program of choice for academically talented students who want a superb education. An Honors education at Colorado State offers the best of both worlds—small enough to provide individual attention and large enough to offer a spectacular diversity of people, perspectives, and programs. Individual

attention is fostered in the Honors Program by small classes, the residential living and learning community provided by Newsom Hall, first priority registration for classes (after the first semester), one-on-one advising by faculty and peers, co-curricular activities, mentoring opportunities including undergraduate research, assistance on applications for prestigious post-graduate awards, and special recognition as a graduating senior.

1. *University Honors Core Curriculum*

The objective of the curriculum is to provide and 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 disciplinary courses develops successful habits of the mind and provides opportunities to live life to the fullest. The four Honors seminars begin with the first year seminar and culminate with the senior seminar and the senior thesis project. 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 teacher-scholars.

2. *Graduation as a University Honors Scholar*

Students who complete the Honors 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 create an Honors class that represents high academic achievement, diversity of life experiences, and great promise for contributing to the Honors and University communities. Approximately 200 first-year students enroll in the Honors Program each year.

4. *The Honors Living and Learning Community*

The 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 the home to the Honors office, the Honors classroom that is used for the first year seminar, faculty firesides, invited lectures, and study sessions, and a wide variety of co-curricular activities. A state-of-the-art computer lab is located directly across from the Honors Program offices.

Honors Core Curriculum

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LOWER DIVISION			
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 (Enrolled in the University Honors Program and approval of the Honors Director)	3	
TOTAL		<u>6</u>	
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.

Grade	Grade points per credit
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)	**
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.

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

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.
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.

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.

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.

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 appeal committee's decision is the final decision of the University. Written summaries of the hearing and decision, together with a rationale for that decision, shall be provided to the student and the instructor who assigned the grade and shall be retained in the department office for a period of one year.

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 HELP/Success Center, 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 by the HELP/Success Center until a copy of the orders is received. The HELP/Success Center 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. It will be the responsibility of the HELP/Success Center personnel to track these students and to keep the Office of Records and Registration notified of the status of these students since the time period in which the incomplete grade may remain on the record may vary from the normal University time limits for resolution of incompletes.

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 W-drop 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.

SCHOLASTIC STANDARDS

HELP/Success Center

Offices in Aylesworth Hall, NE, Second and Third Floors

Paul Shang, 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 HELP/ Success Center. 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 Educational Outreach 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 Educational Outreach 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 the University. Students who have been academically dismissed will not be readmitted to Colorado State until a CUM GPA of 2.0 or higher is achieved by virtue of course work completed during the Colorado State summer session or through the Division of Educational Outreach. At any time that the CUM GPA is raised to 2.0 or higher, the student may apply for readmission to the University in regular academic standing.

Students may apply for readmission to the University provided that they have enrolled at another accredited institution and accumulated more than nine semester credits with a CUM GPA of 2.0 or higher in all courses completed since dismissal. Upon transferring back to Colorado State, students will have two semesters following re-enrollment to raise their CUM GPA earned at Colorado State to 2.0 or higher or face academic dismissal for a second time. Transfer credits are not computed within the CUM GPA earned at Colorado State.

Students who have raised their 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 of the University.

Appeal of Academic Dismissal

Students have the privilege to appeal academic dismissal. A written appeal may be submitted to the HELP/Success Center for consideration by the Scholastic Standards and Awards

Committee. All appeals must be submitted to the HELP/Success Center in accordance with the Center's 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 Educational Outreach 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 HELP/Success Center 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 by students using touch tone telephones. 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.

Registration Restrictions

Since portions of registration are completed by mail it is essential that students maintain a current mailing address with Enrollment Services. Deadlines for registrations and payments of tuition, fees, and other charges must be met to ensure registrations are confirmed. Therefore, students must respond to correspondence from the University in a timely manner. This may require authorization for others to act in the student's behalf when they will be unavailable to receive their mail for a period of time.

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 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. Repeating a course on a pass/fail basis for which a previous traditional grade was assigned will not alter the effect of the previous grade on the GPA. 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 the HELP/ Success Center. 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 submit a change of address form to Enrollment Services for any change of current address.

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 involving a formal selection process, or those having established course requirements or internal limits on changes.

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 controlled majors that have formal selection processes limiting admission to those majors can be obtained from the HELP/Success Center.

Withdrawal from Colorado State

Withdrawal (to drop *all* courses and leave the University) is different from dropping one or more classes. See also, Schedule Change and Drop Periods in this section. If the first day of the semester has not yet begun, students may cancel their course schedule on the phone registration system. Students who are planning to drop all courses and leave the University for any reason during a term *must* contact the HELP/ Success Center (491-7095) prior to their departure. Unless this procedure is followed, students are not eligible for an adjustment (if appropriate) of tuition and fees even if withdrawal is within the authorized period. Students leaving the University without officially withdrawing receive failing grades in all courses.

Normally a withdrawal is not permitted during the last two weeks of the semester. See also, Tuition and Fees Adjustments in the Tuition, Fees, Expenses, and Adjustments section of this catalog.

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 the HELP/Success Center (491-7095).

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 Educational Outreach 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 Graduate Dean.

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	3
B. Additional Communication	3
C. Mathematics	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.	

Students are advised to see if their preferred program of study has particular recommendations for satisfying 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 192	Orientation to Agricultural Systems	3
BCC 192	Biochemistry Freshman Seminar	2
BGCC 192	First-Year Seminar in Business	3
BZCC 192	First-Year Seminar in Life Sciences	2
C CC 192	Introductory Seminar in Chemistry	2
CBCC 192	Strategies of Engineering Design	3
CECC 192	Civil Engineering Principles II	3
COCC 192	Academic Writing	3
EDCC 192	Learning and Community 3	
EECC 192	Electrical Engineering Fundamentals	3
ERCC 192	First-Year Seminar in Earth Resources	2
F CC 192	Forestry Inquiries	2
FWCC 192	Wildlife Inquiries	2
HPCC 192A	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 ²	3
LBCC 192	College of Liberal Arts First-Year Seminar	3
M CC 192	First-Year Seminar in Mathematical Sciences ³	1
MBCC 192	Microbiology First-Year Seminar	2
MECC 192	Introduction to Mechanical Engineering	2
MUCC 192	Introduction to Music History and Literature	3
NRCC 192	Natural Resources Freshman Seminar	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 ⁴	3
POCC 192B	Seminar-State and Local Government and Politics ⁴	3
POCC 192C	Seminar-International Relations ⁵	3
POCC 192D	Seminar-Comparative Government and Politics ⁶	3

PSCC 192	First Year Seminar in Physiology	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 ²	3
STCC 192	First-Year Seminar in Mathematical Sciences ³	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 3E. Course can count for both categories.

³ Both M CC 192 and STCC 192 must be taken to fulfill the first-year seminar requirement.

⁴ Must be counted in category 1. May also count for category 3C or category 3F, but not both.

⁵ Must be counted in category 1. May also count for category 3C or category 3D, but not both.

⁶ 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. 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
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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 F2000 and F2002, students may satisfy this option if they take and complete L CC 200, L CC 201, or L CC 300, or if they reach an equivalent level of competence as measured in an examination procedure.)

C. Mathematics. 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

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.

CBCC 104	Strategies of Engineering Problem Solving	3
CECC 208	Civil Engineering Analysis I	3
COCC 300	Writing Arguments ¹	3
CSCC 151	C++ for Scientists and Engineers	4
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
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 I Laboratory	1
ENCC 102	Insects, Science, and Society	3
ERCC 130	Earth System Science	3
ERCC 140	Physical Geology	4
ERCC 304	Principles of Watershed Management	3
H CC 100	Horticultural Science	4
LSCC 102	Attributes of Living Systems	4
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

¹ At least one course must have a laboratory component.

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 275	Introduction to British Literature ³	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
L CC 250	Language, Literature, Culture in Translation ²	3
MUCC 100	Music Appreciation	3
MUCC 111	Music Theory Fundamentals	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.

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 101	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
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 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 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 141	Humans in Prehistory ¹	3
AUCC 200	Self/Community in American Culture, 1600-1877	3
AUCC 201	Self/Community in American Culture Since 1877 ²	3
DMCC 263	Historical Perspectives of Material Culture	3
E CC 270	Introduction to American Literature ³	3
E CC 275	Introduction to British 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 216	The Islamic World 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 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
HYCC 270	Colonial Latin America ⁴	3
HYCC 271	Latin America Since Independence ⁴	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 if it is taught as a first-year seminar. This course is currently not being offered

as a first-year seminar.

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 216	The Islamic World 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 Civilization ²	3
HYCC 270	Colonial Latin America ²	3
HYCC 271	Latin America Since Independence 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
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 and Ethnic Relations	3
SACC 482V	Study Abroad	
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 201	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
HYCC 150	U.S. History to 1876 ²	3
HYCC 151	U.S. History Since 1876 ²	3
JTCC 100	Introduction to Mass Media ³	3
NRCC 320	Natural Resources History and Policy ²	3
PLCC 103	Moral and Social Problems	3
POCC 101	American Government and Politics ³	3
POCC 103	State and Local Government and Politics ³	3
POCC 192A	Seminar-American Government and Politics ⁴	3
POCC 192B	Seminar-State and Local Government and Politics ⁴	3
S CC 100	General Sociology ³	3
S CC 105	Social Problems ³	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 3C.

⁴ 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.

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
PSCC 110	Human Health and Environmental Perspectives	3
PSCC 120	Human Health and Disease	2
PSCC 122	Drugs and the Human Body	2
PSCC 124	Sexuality and Health	3
PYCC 228	Psychology of Human Sexuality	3

Some guidelines for the All-University Core Curriculum

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

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.

Graduation Requirements

Administration Annex, Room 100

The following are general graduation requirements and regulations which 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 form 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 complete intent-to-graduate forms and file contracts for graduation in the Degree and Transfer Evaluation Office for the minor programs 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 Semester 2002, students with continued enrollment from Spring Semester 2000 and newly admitted transfer or readmitted students are admitted under the University Studies Program (USP) and must complete those requirements unless they make 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* at www.colostate.edu/Catalog.

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 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 college dean and 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

All policies and procedures concerning granting of undergraduate credit are described in detail in the brochure, *University Credit*, available from the Degree and Transfer Evaluation Office. The evaluation of 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 automatically granted for scores of four or five on the Advanced Placement Tests in United States government, United States history, art, biology, chemistry, computer science, economics, English, European history, French, German, Latin, mathematics (calculus AB, BC), music, physics, psychology, Spanish, and statistics. Credit is granted in certain subjects for scores of three. Scores of one and two are not granted credit.

See the brochure, *University Credit*, 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. Students scoring 500 or higher will be awarded a minimum of three semester credits for each examination or a maximum of 30 semester credits for all five examinations. Credit granted will be based on the following test scores:

General Examinations

500-574 = 3 semester credits

575-649 = 4 semester credits

650-724 = 5 semester credits

725-800 = 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 on a specific Subject Examination in the year they take the test, will be granted credit in the amount allowed for the Colorado State equivalent course. 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 brochure, *University Credit*, 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 *University Credit* brochure 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 Degree and Transfer Evaluation Office, Room 100, Administration Annex, or 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, a thesis/project, and achieve at least a 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.

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 the HELP/Success Center 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 are encouraged to declare a major by the time they earn 45 credits.

UNDERGRADUATE DEGREES

The following is a list of majors offered by Colorado State. 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

*Language, Literature,
and Culture Studies*

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

Bioagricultural

Sciences

Biochemistry

Biological Science

Bioresource and

Agricultural

Engineering

Botany

Business Administration

Chemical Engineering

Chemistry

Civil 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

Industrial Technology

Management

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

Doctor of Philosophy (Ph.D.)

<i>Agricultural and Resource Economics</i>	<i>Fishery and Wildlife Biology</i>
<i>Anatomy</i>	<i>Food Science and Nutrition</i>
<i>Animal Sciences</i>	<i>Forest Sciences</i>
<i>Atmospheric Science</i>	<i>Horticulture</i>
<i>Biochemistry</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>Physiology</i>
<i>Civil Engineering</i>	<i>Plant Pathology and Weed Science</i>
<i>Clinical Sciences</i>	<i>Political Science</i>
<i>Computer Science</i>	<i>Psychology</i>
<i>Earth Resources</i>	<i>Radiological Health Sciences</i>
<i>Ecology</i>	<i>Rangeland Ecosystem Science</i>
<i>Economics</i>	<i>Recreation Resources</i>
<i>Education and Human Resource Studies</i>	<i>Sociology</i>
<i>Electrical Engineering</i>	<i>Soil and Crop Sciences</i>
<i>Entomology</i>	<i>Statistics</i>
<i>Environmental Health</i>	<i>Zoology</i>

Master of Arts (M.A.)

<i>Anthropology</i>	<i>History</i>
<i>Design and Merchandising</i>	<i>Philosophy</i>
<i>Economics</i>	<i>Political Science</i>
<i>English</i>	<i>Sociology</i>
<i>Foreign Languages and Literatures</i>	<i>Speech Communication</i>

Master of Science (M.S.)

<i>Agricultural and Resource Economics</i>	<i>Human Development and Family Studies</i>
<i>Anatomy</i>	<i>Manufacturing Technology and Construction Management</i>
<i>Animal Sciences</i>	<i>Mathematics</i>
<i>Atmospheric Science</i>	<i>Mechanical Engineering</i>
<i>Biochemistry</i>	<i>Microbiology</i>
<i>Bioresource and Agricultural Engineering</i>	<i>Occupational Therapy</i>
<i>Botany</i>	<i>Physics</i>
<i>Business Administration</i>	<i>Physiology</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>Geology</i>	
<i>Health and Exercise Science</i>	
<i>Horticulture</i>	

Professional Degrees

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

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

Apparel Design
Coaching
Construction Management
Industrial Technology Management
Merchandising
Nutrition

College of Business

None

College of Engineering

Environmental Engineering

College of Liberal Arts

Anthropology
Art History
Dance
Economics
English
French

General Philosophy

German
History
Japanese
Media Studies
Music
Musical Theatre
Political Science
Religious Studies
Russian
Sociology
Spanish
Studio Art
Theatre-Acting/Directing
Theatre-Design/Technical Theatre

College of Natural Resources

Fishery Biology
Forestry
Geology
International Ecotourism
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

Anatomy and Neurobiology
Microbiology

College of Agricultural Sciences

*Office in Shepardson Building, Room 121
Professor Lee E. Sommers, Interim Dean
Professor James C. Heird, Associate Dean*

UNDERGRADUATE MAJORS

*Agricultural Business
Agricultural Economics
Agricultural Education
Animal Science
Bioagricultural Sciences
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, usually during the junior year, 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 agricultural students. Students interested in study abroad should contact the Office of International Education, Laurel Hall.

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

Do you wish to share your passion for agriculture with others? Do you enjoy motivating others? Are you up for the challenge of being a role model and possibly influencing young people's

lives or careers? If you answered "yes" to any of these questions, then a major in Agricultural Education may be for you.

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 three concentrations in the major—agricultural education, agricultural extension education, and applied information technology.

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 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: 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

Associate 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
A CC 192	Orientation to Agricultural Systems	3	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 120A-B or placement in M/M CC 121 or higher)	4	3A
COCC 150	College Composition (Composition Placement Exam)	3	2A
<hr/>			
M CC 120A-B	Select three credits from the following 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
<hr/>			
OR			
M CC 130	Math in the Social Sciences (Math Placement Exam)	3	2C
<hr/>			
PLCC 110	Logic and Critical Thinking	3	2D
SC 100	General Crops	4	

Historical perspectives ¹	3	3D
TOTAL	30	

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
TOTAL		29	

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 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	
EDCC 430	Diversity and Communication (ED 310/EDCC 275; admission to Teacher Licensure Program)	3	3E
MC 151	Introduction to Manufacturing and Construction	3	
VE 420	Agricultural Experience and Adult Education	3	
	Agriculture electives	8	
TOTAL		31	

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-Methods and Assessment (admission to Teacher Licensure Program)	1	

ED	493B	Seminar-Assessment of Learning (ED 450, VE 425, concurrent reg. in ED 485A or B or VE 485)	1	4B
A	330/ PL 330	Agricultural Ethics	3	
OR				
PL	305E	Philosophical Issues in the Professions-Animal Science	3	
VE	425	Methods/Materials in Agricultural Education (admission to Teacher Licensure Program; concurrent reg. in ED 450, ED 486J, VE 492)	4	
VE	485	Student Teaching (ED 450, VE 425)	12	4A, 4C
VE	492	Seminar (ED 450, VE 425; concurrent reg. in ED 485A or B or VE 485)	2	4C
TOTAL			30	

PROGRAM TOTAL = 120 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.

Agricultural Extension Education Concentration and Applied Information Technology Concentration

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

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 192	Orientation to Agricultural Systems	3	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)	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 or M/M CC 120 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	6		
TOTAL			32	

SOPHOMORE

A 140	Technology in Agriculture	3		
C CC 107	Fundamentals of Chemistry (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
<hr/>				
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	
<hr/>				
		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.

Applied Information Technology Concentration

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
A CC 192	Orientation to Agricultural Systems	3	1
AN 100	Animal Sciences	3	
BY 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
C CC 107	Fundamentals of Chemistry (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)	3	2A
LSCC 102	Attributes of Living Systems	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
SC 100	General Crops	4	
STCC 201	General Statistics (M/M CC 120A-B)	3	2D
	Health and wellness ¹	2	3G
TOTAL			34
SOPHOMORE			
A 140	Technology in Agriculture	3	
A 300	Issues in Agriculture	2	
EACC 202	Agricultural and Resource Economics	3	3C
EA 205	Farm and Ranch Management (EA/EACC 202 or EC/ECCC 202)	3	
EN 202	Applied and General Entomology	2	
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	Farm and Ranch Records and Analysis (EA/EACC 202 or EC/ECCC 202)	3	
EA 310	Agricultural Marketing (EA/EACC 202 or EC/ECCC 202)	3	
NRCC 220	Natural Resource Ecology and Measurements (BY 103 or BZ/BZCC 120; 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	5	
TOTAL			30

SENIOR			
A 346	Principles of Cooperative Extension	3	
A 487	Internship	4	4A, 4B
A 492A	Seminar-Agricultural Extension Education	1	4C
CB 204/ EV 204	Agricultural and Environmental Measurements (PH/PHCC 110 or PH/PHCC 141)	3	
CB 464	Soil and Water and Engineering (CB 331 or CE 300 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 360/ CB 360	Geographic Information Systems in Agriculture (CS 110)	3	
	Global and cultural awareness ⁴	3	3E
TOTAL			27

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 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.

DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS

Office in Clark Building, Room B 320
Professor S. Lee Gray, Chair

Major in Agricultural Business

Did you grow up on a farm or ranch, or wish that you had? Are you interested in operating an agricultural business? Do you like the idea of supplying necessary agricultural products to farmers and ranchers? Would you enjoy assisting farmers and ranchers with their business finances? Does buying and selling crops or livestock sound interesting? If you answered “yes” to any of these questions, you should consider a 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 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 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 192	Orientation to Agricultural Systems	3	1
<i>Select one course from the following:</i>			
AN 100	Animal Sciences	3	
FT 110	Introduction to Food Science and Technology (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
OR			
BZCC 120	Principles of Plant Biology	4	3A
C CC 103	Chemistry in Context	3	3A
COCC 150	College Composition (Composition Placement Exam)	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		30-31	

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 sciences 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	
BK 362	Professional Selling (BK 300 or BK 305)	3	
EA 310	Agricultural Marketing (EA/EACC 202 or EC/ECCC 202)	3	
EA 335/ EC 335	Introduction to Econometrics (EC/ECCC 204, 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

<i>Select one course from the following:</i>			
EA 305	Farm and Ranch Records and Analysis (EA/EACC 202 or EC/ECCC 202)	3	
EA 308	Agricultural Finance (EA/EACC 202 or EC/ECCC 202)	3	
EA 405	Agricultural Production Management (EA/EACC 202 or EC/ECCC 202)	3	4A, 4C
EA 375	Agricultural Law ⁴	3	
OR			
EA 415	International Agricultural Trade ⁴ (EC/ECCC 204)	3	
EA 412	Agricultural Commodities Marketing (EA 310)	3	
EA 428	Agricultural Business Management II	3	4A, 4C
EA 460	Economics of World Agriculture ⁴ (EA/EACC 202 or EC/ECCC 202)	3	4B
OR			
EA 478	Agricultural Policy ⁴ (EA/EACC 202 or EC/ECCC 202 or EA/EACC 240 or EC/ECCC 240)	3	4A, 4B, 4C
	Agriculture sciences electives ²	3	
	EA/EC electives ⁵	6	
	Electives	6	
	TOTAL	30	

PROGRAM TOTAL = 120-121 credits¹ Select from the list of courses in category 3G of the All-University Core Curriculum (AUCC).² Select from the courses in A, AN, EA, EN, FT, H, LA, PD, SC, W, 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 If both EA 460 and EA 478 are taken, EA 478 may substitute for either EA 375 or EA 415.⁵ Select 6 credits from EA and/or EC courses.**Major in Agricultural Economics**

How will humanity feed a growing population? How do agricultural markets function? What role does agribusiness play in markets at home and abroad? Can environmental costs be measured and mitigated? How will the world's scarce natural resources be allocated? These are a few of the issues that agricultural and resource economists deal with every day.

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 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 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 192	Orientation to Agricultural Systems	3	1
<i>Select one of the following courses:</i>			
AN 100	Animal Sciences	3	
FT 110	Introduction to Food Sciences and Technology (high school chemistry)	3	
H CC 100	Horticultural Science (high school biology)	4	3A
SC 100	General Crops	3	
<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
OR			
BZCC 120	Principles of Plant Biology	4	3A
C CC 103	Chemistry in Context ¹	3	3A
COCC 150	College Composition (Composition Placement Exam)	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		30-31

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	
<i>Select one pair of the following:</i>			
EA 305	Farm and Ranch Records and Analysis (EA/EACC 202 or EC/ECCC 202)	3	
EA 308	Agricultural Finance (EA/EACC 202 or EC/ECCC 202)	3	
OR			
EA 405	Agricultural Production Management (EA/EACC 202 or EC/ECCC 202)	3	4A, 4C
EA 409	Farm and Ranch Appraisal (EA 205 or EA 305)	3	
<i>Select two of the following:</i>			
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 II	3	4A, 4C
EA 335/ EC 335	Introduction to Econometrics (EC/ECCC 204; 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 electives ⁴	3	
	Electives	3	
	TOTAL		30

SENIOR			
EA	340/	Introduction to Economics of Natural Resources (EA/EACC 202 or EC/ECCC 202)	3
EC	340		
OR			
EA	342	Economic Analysis-Water Resource Development (EA/EACC 202 or EC/ECCC 202)	3
EA	415	International Agricultural Trade (EC/ECCC 204)	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
		Agricultural electives ⁴	6
		EA, EC electives ⁵	6
		Electives	2-3
		TOTAL	29-30

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, EA, EN, FT, H, LA, PD, SC, W, FNCC 150, NR 120A-B, NR 260, or NRCC 320. A maximum of three EA credits may be used as agricultural electives.

⁵ Select six 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
A	140	Technology in Agriculture	3
A CC	192	Orientation to Agricultural Systems	3 1
<i>Select one of the following courses:</i>			
AN	100	Animal Sciences	3
FT	110	Introduction to Food Science and Technology (high school chemistry)	3
H CC	100	Horticultural Science (high school biology)	4 3A
SC	100	General Crops	3
<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
OR			
BZCC	120	Principles of Plant Biology	4 3A
C CC	103	Chemistry in Context	3 3A

COCC	150	College Composition (Composition Placement Exam)	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	30-31	

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	205	Farm and Ranch Management (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	305	Farm and Ranch Records and Analysis (EA/EACC 202 or EC/ECCC 202)	3	
EA	335/	Introduction to Econometrics (EC/ECCC 204; 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				
EA	308	Agricultural Finance (EA/EACC 202 or EC/ECCC 202)	3	
<i>Select two of the following:</i>				
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 II	3	
EA	375	Agricultural Law	3	
OR				
EA	415	International Agricultural Trade (EC/ECCC 204)	3	
EA	460	Economics of World Agriculture ⁴ (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) ⁴	3	4A, 4B, 4C
EA	405	Agricultural Production Management (EA/EACC 202 or EC/ECCC 202)	3	4A, 4C
		Agricultural economics or economics ⁵	3	
		Agricultural science electives ³	6	
		Electives	3	
		TOTAL	30	

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, EA, EN, FT, H, LA, PD, SC, W, FNCC 150, NR 120A-B, NR 260, or NRCC 320. A maximum of three EA credits may be used as agricultural science electives.
⁴ If both EA 460 and EA 478 are taken, EA 478 may be substituted for either EA 375 or EA 415.
⁵ 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	192	Orientation to Agricultural Systems	3 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
OR			
BZCC	120	Principles of Plant Biology	4 3A

COCC	150	College Composition (Composition Placement Exam)	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 Functions (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	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
		Foundations and perspectives ⁴	12	3B-3F
		Agriculture, forestry, or natural science elective ³	3	
		Electives	3	
		TOTAL	30	

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, 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				
EA	342	Select two courses from the following: Economic Analysis-Water Resource Development (EA/EACC 202 or EC/ECCC 202)	3	
EA	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.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
EACC 202	Agricultural and Resource Economics	3	3C
UPPER DIVISION			
EA*	Agricultural economics	15	
	Additional course ¹	3	
	TOTAL	18	

PROGRAM TOTAL = 21 credits without prerequisites

*Additional course work may be required because of prerequisites.

¹To 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

Do you like working with animals? Would you enjoy the challenge of creating better animal agricultural systems to meet the needs of the world's population? Are you interested in nutrition, genetics, and reproductive sciences? Would you like to create new and better animal products for consumers? An animal science major may help you transform your interests into a career.

Animal scientists study farm animals and develop ways of improving livestock production and processing. They study and do research in the following areas: genetics and breeding systems, reproductive physiology, nutrition, animal health management, muscle biology and meat science, and animal behavior. Animal scientists work in a variety of careers. They may inspect and grade livestock food products, purchase livestock, or work in technical sales or marketing. They may work as extension agents or consultants and advise agricultural producers on how to upgrade animal-housing facilities properly for lower mortality rates. Students have a choice of two concentrations that focus on different career objectives—the industry concentration and the science concentration.

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

- Manual dexterity
- Self-motivation
- Interest in a variety of work environments

Potential Occupations

An animal science degree prepares students for a variety of career opportunities in animal health, feed and nutrition companies, seed stock organizations, food processing and distribution firms, livestock production, agricultural policy organizations, livestock marketing associations, animal facilities design, and for graduate or professional school. 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.

Some examples include: animal nutrition specialist; breeding specialist; cell biologist; animal health care specialist; feed lot consultant; livestock marketing; herd manager; livestock publications writer; market agency staff/manager; meat inspector; livestock and poultry production operator; import/export specialist; embryo transfer technician; animal behavior specialist; veterinary supplies sales representative; research scientist.

Industry Concentration

The industry concentration emphasizes economics, business, and management associated with animal and poultry industries as well as basic sciences. This concentration prepares students to work in animal related industries, livestock production, county extension work, livestock marketing, and farm, ranch, or feedlot management.

Animal science majors in the industry concentration have an opportunity to complete a second major in agricultural business by taking just a few extra 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 192	Orientation to Agricultural Systems	3	1
AN 100	Animal Sciences	3	
<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
OR			
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A

C CC 107	Fundamentals of Chemistry (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)	3	2A
EACC 202	Agricultural and Resource Economics	3	3C
OR			
ECCC 202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	3	3C
	Health and wellness ¹	2	3G
	Historical perspectives ²	3	3D
	Mathematics ³	3	2C
	TOTAL	29	

SOPHOMORE

AN 250	Live Animal and Carcass Evaluation	3	
AN 286	Livestock Practicum (AN 100 or concurrent reg.)	2	
AY 230/ PS 230	Animal Anatomy and Physiology (BY/LSCC 102, C/C CC 107)	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 (AY 230/PS 230)	3	4B
AN 320	Principles of Animal Nutrition (AN 286)	3	4B
AN 330	Principles of Animal Breeding (three credits in statistics)	3	4A, 4B
RS 320/ SC 320	Forage and Range Management (one course in biological sciences)	3	
VS 300	Prevention and Control of Livestock Diseases	3	
	Advanced courses ¹⁰	5-6	
	Agricultural economics, economics, or business ¹¹	9	
	TOTAL	29-30	

SENIOR

<i>Select one of the following courses:</i>			
AN 372	Sheep Production (AN 250, AN 310, AN 320, AN 330)	3	4C
AN 376	Dairy Farm Operations (AN 310, AN 320, AN 330)	3	4C
AN 474	Swine Production (AN 250, AN 310, AN 320, AN 330)	3	4C
AN 476	Beef Feedlot Management (AN 320)	3	4C
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 credits¹ 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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A CC 192	Orientation to Agricultural Systems	3	1
AN 100	Animal Sciences	3	
<i>Select from the following sets of courses:</i>			
C CC 107	Fundamentals of Chemistry (M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
AND			
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
AND			
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
AND			
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	
AND			
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam)	3	2A
EACC 202	Agricultural and Resource Economics	3	3C
OR			
ECCC 202	Principles of Microeconomics (M/M CC 118 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	Numeric 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		31-35	

SOPHOMORE

AN 250	Live Animal and Carcass Evaluation	3	
AN 286	Livestock Practicum (AN 100 or concurrent reg.)	2	
AY 230/ PS 230	Animal Anatomy and Physiology (BY/LSCC 102, C/C CC 107)	3	
AY 231	Gross Anatomy-Domestic Animals (AY 230/PS 230 or concurrent reg.)	2	
BY 103	Biology of Organisms (BY/LSCC 102)	4	

Select from the following sets of courses:

C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
AND			
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 341	Organic Chemistry I (C 113)	3	
AND			
C 343	Organic Chemistry II (C 341)	3	
AND			
C 344	Organic Chemistry Laboratory (C 114; C 343 or concurrent reg.)	2	
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		32-35	

JUNIOR

AN 310	Animal Reproduction (AY 230/PS 230)	3	4B
AN 320	Principles of Animal Nutrition (AN 286)	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

Advanced courses ⁷	5-7
Applied courses ⁸	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 (C 245 or C 341 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	
Advanced science ⁹			3-4	
Electives			9-19	
TOTAL			21-30	

PROGRAM TOTAL = 120 credits

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

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

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

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

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

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

⁷ Select two courses from the departmental approved list.

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

⁹ Pick one course from the departmental approved list.

Major in Equine Science

Do you enjoy the horse industry? Have you ever wondered how embryo transfer actually occurs? Do the processes that allow horses to run, grow, thrive, and reproduce intrigue you?

Have you thought about a career in equine veterinary medicine? If you are curious about the equine industry or about equine sciences, this might be the major for you.

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. The remainder 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 your 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 192	Orientation to Agricultural Systems	3	1
AN 100	Animal Sciences	3	
BZCC 110	<i>Select from the following:</i> 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
C CC 107	Fundamentals of Chemistry (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)	3	2A
EACC 202	Agricultural and Resource Economics	3	3C
ECCC 202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	3	3C
	Health and wellness ¹	3	3G
	Historical perspectives ²	3	3D
	Mathematics ³	3	2C
	TOTAL	30	
SOPHOMORE			
AN 240	Equine Management	3	
AN 245	Equine Evaluation	3	
AN 286	Livestock Practicums (AN 100 or concurrent reg.)	2	
AY PS 230/230	Animal Anatomy and Physiology (BY/LSCC 102, C/C CC 107)	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 (AY 230/PS 230)	3	4B
AN 320	Principles of Animal Nutrition (AN 286)	3	4B
AN 330	Principles of Animal Breeding (three credits in statistics)	3	4A, 4B
AN 346	Equine Disease Management (AY 230/PS 230)	3	
RS SC 320/320	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	21	
	TOTAL	29	

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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A CC 192	Orientation to Agricultural Systems	3	1
AN 100	Animal Sciences	3	
<i>Select one the following sets of courses:</i>			
C CC 107	Fundamentals of Chemistry (M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
AND			
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 M/M CC 124 or higher)	4	3A
AND			
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
AND			
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	
AND			
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	
COCC 150	College Composition (Composition Placement Exam)	3	2A
EACC 202	Agricultural and Resource Economics	3	3C
OR			
ECCC 202	Principles of Microeconomics (M/M CC 118 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	Numeric 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		28-32	

SOPHOMORE

AN 240	Equine Management	3	
AN 245	Equine Evaluation	3	
AN 286	Livestock Practicums (AN 100 or concurrent reg.)	2	
AY PS 230/230	Animal Anatomy and Physiology (BY/LSCC 102, C/C CC 107)	3	
AY 231	Gross Anatomy-Domestic Animals (AY 230/PS 230 or concurrent reg.)	2	
BY 103	Biology of Organisms (BY/LSCC 102)	4	
<i>Select from the following:</i>			
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
AND			
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 341	Organic Chemistry I (C 113)	3	
AND			
C 343	Organic Chemistry II (C 341)	3	
AND			
C 344	Organic Chemistry Laboratory (C 114; C 343 or concurrent reg.)	2	
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		32-35	
JUNIOR			
AN 310	Animal Reproduction (AY 230/PS 230)	3	4B
AN 320	Principles of Animal Nutrition (AN 286)	3	4B
AN 330	Principles of Animal Breeding (three credits of statistics)	3	4A, 4B
AN 346	Equine Disease Management (AY 230/PS 230)	3	
AN 422	Animal Metabolism (C 245, C 246 or C 343, C 344)	3	
OR			
BC 351	Principles of Biochemistry (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

DEPARTMENT OF BIOAGRICULTURAL SCIENCES AND PEST MANAGEMENT

Office in Plant Sciences Building, Room C 120
Professor Thomas O. Holtzer, Head

Major in Bioagricultural Sciences

Are you interested in biology? Do you like bugs? Often wonder about how to protect plants from diseases, weeds, and insects? Would you like to help others in growing better crops, or assist in having more healthy forests? How about being involved in research to control or eliminate harmful pests in specific areas, and developing products that are not harmful to the natural environment? Would you like to know how to change the genetics of a plant to prevent it from acquiring a disease? If you can answer “yes” to any of these questions, then you may want to consider a major in bioagricultural sciences.

Bioagricultural scientists study how to control or eliminate the presence of insects, plant pathogens, and weeds in field and horticultural crops, landscape plants, forests, livestock, or households without damaging the environment. Graduates will have expertise in several of the following areas related to pests, pathogens, and their hosts: management, behavior, physiology, taxonomy, biodiversity, ecology, population dynamics, molecular biology, biotechnology, traditional and biological control methods, resistance to pesticides, and the balance of treatments that leads to sustainable, safe, and cost effective control. The curriculum combines biology courses with agricultural sciences and includes coursework in genetics, evolution, chemistry, economics, statistics, and computer applications. Three concentrations are offered within the major—agricultural biotechnology, plant health, and entomology.

Characteristics and Skills

- A strong interest in the biological and other natural sciences
- A strong interest in agriculture
- Analytical ability
- Ability to work independently or in a team
- Enjoy working outdoors as well as indoors
- Strong oral and written communication skills
- Organizational skills
- Ability and desire to understand basic business principles

		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 (C 245 or C 341 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	
		Advanced science ⁸	3-4	
		Electives ⁹	1-10	
		TOTAL	18-26	

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 one course 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*.

Potential Occupations

An expanding population and a public increasingly focused on health and food safety will result in growing opportunities for agricultural scientists. Further research is necessary as insects and diseases continue to adapt to pesticides. The practice of “sustainable agriculture” is necessary in order to reduce the use of harmful chemicals and do little damage to the natural environment. Products developed using biotechnology methods will assist in these challenges. 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.

Some examples include: agricultural producer; biological control specialist; chemical ecologist; college teacher; entomologist; entomology technician; environmental specialist; extension agent; field consultant; forest resource manager; government specialist on pesticides; greenhouse disease/pest specialist; insect behavior researcher; international consultant; nematology technician; pest control applicator; plant pathologist or physiologist; research scientist; science teacher; technical representative for chemical company; toxicologist; university or government researcher; urban plant disease specialist; weed scientist.

Major in Bioagricultural Sciences

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 major in bioagricultural sciences or the agricultural biotechnology or entomology concentrations.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select at least three credits from the following:</i>			
A 140	Technology in Agriculture	3	
CS 110	Personal Computing	4	
CSCC 151	C++ for Scientists and Engineers (M/M CC 124, M/M CC 126)	4	2D
LI 301	Research in the Information Age	1	
PLCC 110	Logic and Critical Thinking	3	2D
PL 210	Introduction to Formal Logic (sophomore standing or higher or written consent of instructor)	3	
A CC 192	Orientation to Agricultural Systems	3	1
<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
BY 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	

COCC 150	College Composition (Composition Placement Exam)	3	2A
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
	Foundations and perspectives ¹	6	3B-3F
	Health and wellness ²	2	3G
	TOTAL	28-29	

SOPHOMORE

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 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 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
JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2
M CC 155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	
SPCC 200	Public Speaking	3	2B1
	Bioagricultural sciences electives ³	3	
	Foundations and perspectives ¹	9	3B-3F
	TOTAL	31	

JUNIOR

<i>Select one course from the following:</i>			
A CC 116/	IECC 116	3	3E
A CC 270/	IECC 270A	3	3E
A 300	World Interdependence-Population and Food	2	
A 330/	Issues in Agriculture	3	
PL 330	Agricultural Ethics	3	3C
EACC 202	Agricultural and Resource Economics	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 registration)	1	
BY 220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155)	3	
OR			
NR 120A	Environmental Conservation	3	

PHCC	110	Descriptive Physics	3	3A
		Bioagricultural science electives ³	12	
		Electives	6	
		TOTAL	31-32	
SENIOR				
BI	402A-F	Plant Health Practica (two courses in plant pathology, entomology, or weed science)	3	
BI	450	Advanced Topics in Plant Health (senior standing or written consent of instructor)	3	4B
BI	451	Integrated Pest Management (EN 302 or PD 361 or W 308 or 10 credits of biology)	3	4A
BI	460	Plant Health Capstone (senior standing)	1	4C
SC	330	Principles of Genetics (BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	3	
SC	331	Genetics Laboratory (SC 330 or concurrent reg.)	1	
<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/	Introduction to Biostatistics	3	2D
EHCC	307	Introduction to Biostatistics (M/M CC 121)	3	2D
STCC	311	Statistics for Behavioral Sciences I (M/M CC 121)	3	2D
<i>Select one course from the following:</i>				
		Bioagricultural science electives ³	4	
		Electives	8	
		TOTAL	29	

PROGRAM TOTAL = 120 credits

¹ Select one course each from categories 3B-3F of the All-University Core Curriculum (AUCC).

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

³ A total of 19 credits will be selected from a list provided by the department. At least 6 credits must be from BI, EN, PD, W. Selection must be approved by an adviser.

Agricultural Biotechnology Concentration

Agricultural biotechnology is an interdisciplinary approach designed for students interested in cellular and molecular processes, or the commercial production of agriculturally related products. The core curriculum in biological sciences may be combined with a specialization in a specific agricultural science, or with courses that provide a broader perspective. This concentration offers an excellent foundation for continuing with graduate work or careers involving scientific research and applications in agriculture.

		<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN					
<i>Select at least three credits from the following:</i>					
A	140		Technology in Agriculture	3	
CS	110		Personal Computing	4	
CSCC	151		C++ for Scientists and Engineers (M/M CC 124, M/M CC 126)	4	2D
LI	301		Research in the Information Age	1	
PLCC	110		Logic and Critical Thinking	3	2D
PL	210		Introduction to Formal Logic (sophomore standing or higher or written consent of instructor)	3	
A CC	192		Orientation to Agricultural Systems	3	1
<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
BY	103		Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
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
COCC	150		College Composition (Composition Placement Exam)	3	2A
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
			Foundations and perspectives ¹	3	3B-3F
			Health and wellness ²	2	3G
			TOTAL	30	
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	
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	
<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
JTCC	300		Professional and Technical Communication (CO/COCC 150)	3	2B2

M CC	155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	
SPCC	200	Public Speaking	3	2B1
		Foundations and perspectives ¹	9	3B-3F
		TOTAL	28	
JUNIOR				
BY	310	Cell Biology (1 semester of organic chemistry or concurrent reg.; 2 semesters of introductory biology)	4	
BY	220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155)	3	
		OR		
NR	120A	Environmental Conservation	3	
MB	300	General Microbiology (C 245 or C 341 or concurrent reg.; BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	3	
PHCC	110	Descriptive Physics	3	
SC	330	Principles of Genetics (BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	3	
SC	331	Genetics Laboratory (SC 330 or concurrent reg.)	1	
		<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
STCC	311	Statistics for Behavioral Sciences I (M 121)	3	2D
		Agricultural and biological sciences ³	6	
		Foundations and perspectives ¹	0-3	3B-3F
		Electives ⁴	3-6	
		TOTAL	32	
SENIOR				
		<i>Select one of the following sets of courses:</i>		
BC	351	Principles of Biochemistry (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	
		OR		
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	
BC	403	Comprehensive Biochemistry II (BC 401)	3	
BC	404	Comprehensive Biochemistry Laboratory (BC 401 or concurrent reg.; C 246 or C 344; NS 204)	2	
BC	463	Molecular Genetics (NS 201; BC 401 or concurrent reg. or BC 351)	3	
BI	460	Plant Health Capstone (senior standing)	1	4C
		Agricultural and biological sciences ³	12	
		Electives ⁴	9	
		TOTAL	30	
PROGRAM TOTAL = 120 credits				

¹Select one course each from categories 3B-3F of the All-University Core Curriculum (AUCC). The course selected for category 3F should also be listed in category 3C or 3D.

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

³Select from the following list. Select one course each for AUCC category 4A and 4B.

Course	Title (Prerequisite)	Cr	AUCC
Agricultural and Biological Sciences			
AN 430	Applied Animal Breeding (AN 330)	2	
BC 406A	Investigative Biochemistry-Protein Biochemistry (BC 404)	2	
BC 406B	Investigative Biochemistry-Molecular Genetics (BC 404)	2	
BC 406C	Investigative Biochemistry-Cellular Biochemistry (BC 404)	2	
BI 200	Principles of Plant Health	3	
BI 402A-F	Practica in Plant Health (2 classes in plant pathology, entomology, or weed science)	3	4A, 4B
BI 450	Advanced Topics in Plant Health (senior standing or written consent of instructor)	3	4A, 4B
BI 451	Integrated Pest Management (EN 302 or PD 361 or W 308 or 10 credits of biology)	3	4A, 4B
BY 311	Developmental Biology (BY 310 or written consent of instructor)	4	
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 402	Chromosomes of Eukaryotes (BY 310)	4	
BZ 433	Behavioral Genetics (one course in genetics)	3	
BZ 440	Plant Physiology (BY 103 or BZ/BZCC 120; C 245 or concurrent reg.)	3	
BZ 441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
BZ 455	Human Heredity and Birth Defects (BY 103 or BZ/BZCC 111)	3	
EN 302	Applied and General Entomology	2	
EN 303A	Entomology Laboratory-General (EN 302 or concurrent reg.)	2	
EN 303B	Entomology Laboratory-Horticultural (EN 302 or concurrent reg.)	1	
EN 303C	Entomology Laboratory-Agricultural (EN 302 or concurrent reg.)	1	
EN 462/ MB 462/ BZ 462	Parasitology and Vector Biology (BY 103 or BZ/BZCC 110; MB 301 or MB 302 or BZ 212)	5	
H CC 100	Horticultural Science (high school biology)	4	3A
H 460/ SC 460	Plant Breeding (SC 330)	3	
H 461/ SC 461	Plant Breeding Laboratory (H 460/SC 460 or concurrent reg.)	1	
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 450	Microbial Genetics (MB 300; BC 351 or BC 401 or concurrent reg.)	3	
PD 361	Elements of Plant Pathology (BY/LSCC 102 or BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100)	3	
SC 100	General Crops	4	
SC 430	Applications of Plant Biotechnology (SC 330)	2	
W 308	Biology and Control of Weeds (BY 103 or BZ/BZCC 120; C/C CC 107 or C/C CC 111)	4	4B

⁴Courses must be approved by adviser.

Entomology Concentration

Entomology focuses on and provides a broad knowledge of the biology and control of insects. Entomologists conduct research and develop new strategies and technologies to control or eliminate pests in infested areas and prevent the spread of harmful pests to new areas, while always considering the method's compatibility with the environment. Graduates are prepared for technical, research, and regulatory positions with the federal and state governments, high school and college teaching, insecticide manufacturers and

processors, or their own businesses as beekeepers, pest control operators, or entomological consultants. Students have access to well-equipped laboratories and an insect collection of 800,000 specimens.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select a minimum of three credits from the following:</i>			
A 140	Technology in Agriculture	3	
CS 110	Personal Computing	4	
CSCC 151	C++ for Scientists and Engineers (M/M CC 124, M/M CC 126)	4	2D
LI 301	Research in the Information Age	1	
PLCC 110	Logic and Critical Thinking	3	2D
PL 210	Introduction to Formal Logic (sophomore standing or higher or written consent of instructor)	3	
A CC 192	Orientation to Agricultural Systems	3	1
BI 200	Principles of Plant Health	3	
<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
BY 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
COCC 150	College Composition (Composition Placement Exam)	3	2A
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
	Foundations and perspectives ¹	3	3B-3F
	Health and wellness ²	2	3G
	TOTAL	28-29	
SOPHOMORE			
<i>Select one of the following courses:</i>			
A CC 116/IECC 116	Plants and Civilizations	3	3E
A CC 270/IECC 270A	World Interdependence-Population and Food	3	3E
A 300	Issues in Agriculture	2	
A 330/PL 330	Agricultural Ethics	3	
EACC 202	Agricultural and Resource Economics	3	3C
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 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 from 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
JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2
M CC 155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	2C
SPCC 200	Public Speaking	3	2B1
	Foundations and perspectives ¹	9	3B-3F
	TOTAL	30-31	
JUNIOR			
BY 220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155)	3	
OR			
NR 120A	Environmental Conservation	3	
BZ 212	Animal Biology-Invertebrates (BY 103 or BZ/BZCC 111)	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	
EN 302	Applied and General Entomology	2	
EN 303A	General Entomology Laboratory (EN 302 or concurrent reg.)	2	
EN 303B	Horticultural Entomology Laboratory (EN 302 or concurrent reg.)	1	
OR			
EN 303C	Agricultural Entomology Laboratory (EN 302 or concurrent reg.)	1	
PHCC 110	Descriptive Physics	3	
SC 330	Principles of Genetics (BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	3	
SC 331	Genetics Laboratory (SC 330 or concurrent reg.)	1	
	Departmental electives ³	4	
	Electives ⁴	1-3	
	TOTAL	29-31	
SENIOR			
BC 351	Principles of Biochemistry (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.; two credits of college chemistry laboratory)	1	
BI 460	Plant Health Capstone (senior standing)	1	4C

<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/	Introduction to Biostatistics (M/M CC 121)	3	2D
EHCC	307			
STCC	311	Statistics-Behavioral Sciences I (M/M CC 121)	3	2D
Departmental electives ³			8	
Electives ⁴			14	
TOTAL			31	

PROGRAM TOTAL = 120 credits

¹ Select from courses in categories 3B, 3C, 3D, 3E, and 3F in the All-University Core Curriculum (AUCC). The course selected for 3F must also be listed in category 3C or 3D.

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

³ A minimum of 12 credits must be taken from the following list of departmental electives. Select one course for AUCC category 4A.

Course	Title (Prerequisite)	Cr	AUCC
Departmental Electives			
BI 310	Fundamentals of Pesticides (introductory biological science or introductory chemistry)	2	
BI 402A-F	Plant Health Practica (two classes in plant pathology, entomology, or weed science)	3	4A
BI 450	Advanced Plant Health (senior standing or written consent of instructor)	3	4A
BI 451	Integrated Pest Management (EN 302 or PD 361 or W 308 or 10 credits of biology)	3	4A
BI 487	Internship	Var.	
EN 423	Evolution and Classification-Insects (EN 303A or B or C)	4	4A
EN 424/	Principles of Systematic Zoology (BY 103 or BZ/BZCC 111)	3	4A
BZ 424			
EN 445	Aquatic Insects (BY 103 or BZ/BZCC 111)	4	
EN 462/	Parasitology and Vector Biology (BY 103 or BZ/BZCC 110; MB 301 or MB 302 or BZ 212)	5	
BZ 462/			
MB 462	Elements of Plant Pathology (BY/LSCC 102 or BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100)	3	
PD 361			
W 308	Biology and Control of Weeds (BY 103 or BZ/BZCC 120; C/C CC 107 or C/C CC 111)	4	4B

⁵ Electives must be approved by adviser.

Plant Health Concentration

Plant health combines the study of weeds, insects and plant diseases. The science option focuses on biological sciences and prepares students for careers in research, industry or graduate work. For those interested in pursuing a master's in business administration or business positions in industry, the business management option is available.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select at least three credits from the following courses:</i>			
A 140	Technology in Agriculture	3	
CS 110	Personal Computing	4	
CSCC 151	C++ for Scientists and Engineers (M/M CC 124, M/M CC 126)	4	2D
LI 301	Research in the Information Age	1	
PLCC 110	Logic and Critical Thinking	3	2D
PL 210	Introduction to Formal Logic (sophomore standing or higher or written consent of instructor)	3	
A CC 192	Orientation to Agricultural Systems	3	1
BI 200	Principles of Plant Health	3	
<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
BY 103	Biology of Organisms-Animals and Plants (LSCC 102)	4	
COCC 150	College Composition (Composition Placement Exam)	3	2A
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		23	

SOPHOMORE

<i>Select one of the following:</i>			
COCC 300	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
SC 240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
SPCC 200	Public Speaking	3	2B1
	Foundations and perspectives ²	12	3B-3F
TOTAL		22	

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BI 310	Fundamentals of Pesticides (introductory biological science or introductory chemistry)	2	
EN 302	Applied and General Entomology	2	

EN	303A	General Entomology Laboratory (EN 302 or concurrent reg.)	2	
EN	303B	Horticultural Entomology Laboratory (EN 302 or concurrent reg.)	1	
OR				
EN	303C	Agricultural Entomology Laboratory (EN 302 or concurrent reg.)	1	
<i>Select one of the following:</i>				
F	210	Dendrology (BZ/BZCC 120)	3	
H	221	Landscape Plants	4	
H	322	Herbaceous Plants (one course in botany or biological science or horticulture)	3	
PD	361	Elements of Plant Pathology (BY/LSCC 102 or BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100)	3	
<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
STCC	311	Statistics for Behavioral Sciences I (M/M CC 121)	3	2D
W	308	Biology and Control of Weeds (BY 103 or BZ/BZCC 120; C/C CC 107 or C/C CC 111)	4	4A, 4B
TOTAL			20-21	
SENIOR				
<i>Select one course from the following:</i>				
A CC	116/ IECC 116	Plants and Civilization	3	3E
A CC	270/ IECC 270A	World Interdependence-Population and Food	3	3E
A	300	Issues in Agriculture	2	
A	330/ PL 330	Agricultural Ethics	3	
EACC	202	Agricultural and Resource Economics ³	3	3C
BI	402A-F	Plant Health Practica (two classes in plant pathology, entomology, or weed science)	3	
BI	450	Advanced Topics in Plant Health (senior standing or written consent of instructor)	3	4B
BI	451	Integrated Pest Management (EN 302 or PD 361 or W 308 or 10 credits of biology)	3	4A
BI	460	Plant Health Capstone (senior standing)	1	4C
BY	220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155)	3	
OR				
NR	120A	Environmental Conservation	3	
TOTAL			15-16	
CORE TOTAL = 81 credits⁴				

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

² Select one course from each of the AUCC categories 3B to 3F. The course selected for 3F should also be listed in category 3C or 3D.

³ EACC 202 is required for the business management option in the freshman year. Those students must select another course here.

⁴ In addition, students must select one of the following options: business management or science.

Business Management Option

In addition to the plant health concentration courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
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
TOTAL		5	
SOPHOMORE			
<i>Select one of the following pairs of courses:</i>			
C CC 107	Fundamentals of Chemistry (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
Agricultural management electives ¹		3-4	
Business electives ²		3	
TOTAL		11-12	
JUNIOR			
Plant health electives ³		4	
Electives ⁴		4	
TOTAL		8	
SENIOR			
Business electives ²		9	
Plant health electives ⁵		3	
Electives ⁴		1-4	
TOTAL		13-16	
PROGRAM TOTAL = 120 credits			

¹ Select from the following list:

Course	Title (Prerequisite)	Cr	AUCC
Agricultural Management Electives			
H CC 100	Horticultural Science (high school biology)	4	3A
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 464	Arboriculture and Urban Plant Management (H/H CC 100, SC 240)	3	
RS 300	Principles of Range Management (BY 103 or BZ/BZCC 120)	3	
SC 100	General Crops	4	
SC 320/ RS 320	Forage and Range Management (one course in biological sciences)	3	
SC 350	Soil Fertility Management (SC 240)	3	
SC 420	Crop and Soil Management Systems I (H/H CC 100 or SC 100, SC 240)	3	

² Select from the following list:

Course	Title (Prerequisite)	Cr	AUCC
Business Electives			
A 320A	Computer Applications in Agriculture-Optimization (A 140 or BD 150 or CS 110)	1	
A 320B	Computer Applications in Agriculture-Data Base (A 140 or BD 150 or CS 110)	1	
A 320C	Computer Applications in Agriculture-Communications (A 140 or BD 150 or CS 110)	1	
A 320D	Computer Applications in Agriculture-Project Management (A 140 or BD 150 or CS 110)	1	
A 320E	Computer Applications in Agriculture-Spreadsheets (A 140 or BD 150 or CS 110)	1	
BA 205	Fundamentals of Accounting	3	
BGCC 205	Fundamentals of Business Law	3	3F
BN 305	Fundamentals of Management	3	
BN 310	Human Resource Management	3	
BP 350	Employment Law and Policy	3	
EA 228	Agricultural Business Management I (EA/EACC 202 or EC/ECCC 202)	3	
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 375	Agricultural Law	3	
ECCC 204	Principles of Macroeconomics (EA/EACC 202 or EC/ECCC 202)	3	3F

³ Select from the following list:

Course	Title (Prerequisite)	Cr	AUCC
Plant Health Electives			
BI 365	Integrated Tree Health Management (BY/LSCC 102 or BZ/BZCC 120)	4	
BI 487	Internship	1	
EN 423	Evolution and Classification of Insects (EN 303A or B or C)	4	
EN 424/ BZ 424	Principles of Systematic Zoology (BY 103 or BZ/BZCC 111)	3	
EN 445	Aquatic Insects (BY 103 or BZ/BZCC 111)	4	
EN 453	Population Ecology (M/M CC 155; one previous course in ecology)	3	
EN 462/ MB 462/ BZ 462	Parasitology and Vector Biology (BY 103 or BZ/BZCC 110; MB 310 or MB 302 or BZ 212)	5	

⁴ Choice must be approved by adviser. Select enough elective credits to bring total number of credits to 120.

⁵ Select from list in note 3.

Science Option

In addition to the plant health concentration courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
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
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
TOTAL		7	

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	
M CC 155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	2C
TOTAL		8	
JUNIOR			
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	
Plant health electives ¹		3	
Electives ²		1-3	
TOTAL		9-11	

SENIOR

BZ 440	Plant Physiology (BY 103 or BZ/BZCC 120, C 245 or concurrent reg.)	3	
PHCC 110	Descriptive Physics	3	3A
SC 330	Principles of Genetics (BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	3	
SC 331	Genetics Laboratory (SC 330 or concurrent reg.)	1	
Plant health electives ³		3	
TOTAL		14	

PROGRAM TOTAL = 120 credits

¹ Select from the list below:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Plant Health Electives			
AT 350	Introduction to Weather and Climate	2	
BI 365	Integrated Tree Health Management (BY/LSCC 102 or BZ/BZCC 120)	4	
BZCC 120	Principles of Plant Biology	4	3A
BZ 223	Plant Identification (BY 103 or BZ/BZCC 120)	3	
BZ 250	Economic Biology (BY 103; or BZ/BZCC 110, BZ/BZCC 120)	3	
BZ 325	Plant Systematics (BY 103 or BZ/BZCC 120)	4	
BZ 331	Plant Anatomy (BY 103 or BZ/BZCC 120)	4	
BZ 333	Introductory Mycology (BY 103 or BZ/BZCC 120 or written consent of instructor)	4	
BZ 421	Grass Systematics (BZ 223 or BZ 325 or written consent of instructor)	3	
BZ 441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
H CC 100	Horticultural Science (high school biology)	4	3A
H 341	Turfgrass Management (H/H CC 100)	3	
H 441	Turfgrass Science (BZ/BZCC 120, H 341, SC 240)	3	
H 464	Arboriculture and Urban Plant Management (H/H CC 100, SC 240)	3	
SC 100	General Crops	4	
SC 414	Agricultural Experimental Design (ST/STCC 201 or ST/STCC 301)	3	
SC 430	Applications of Plant Biotechnology (SC 330)	3	

² Choice of electives must be approved by adviser.³ Select from list in note 1.

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			
BY 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
AND			
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
OR			
BZCC 110	Principles of Animal Biology	3	3A
AND			
BZCC 111	Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.)	1	3A
TOTAL		4-8	
UPPER DIVISION			
EN 302	Applied and General Entomology	2	
EN 303A-C	Entomology Laboratory (EN 302 or concurrent reg.)	3	

<i>Select 12-13 credits from the following:</i>			
EN 423	Evolution and Classification of Insects (EN 303A or B or C)	4	
EN 445	Aquatic Insects (BY 103 or BZ/BZCC 111)	4	
EN 451	Insect Pest Management (EN 303A or B or C)	4	
EN 462/	Parasitology and Vector Biology	5	
MB 462/	(BY 103 or BZ/BZCC 110; BZ 212		
BZ 462*	or MB 301 or MB 302)		
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 310	Fundamentals of Pesticides (introductory biological science or introductory chemistry)	2	
EN 302	Applied and General Entomology	2	
EN 303A	General Entomology Laboratory (EN 302 or concurrent reg.)	2	
EN 303B	Horticultural Entomology Laboratory (EN 302 or concurrent reg.)	1	
OR			
EN 303C	Agricultural Entomology Laboratory (EN 302 or concurrent reg.)	1	
PD 361*	Elements of Plant Pathology (BY/LSCC 102 or BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100)	3	
W 308*	Biology and Control of Weeds (BY 103 or BZ/BZCC 120; C/C CC 107 or C/C CC 111)	4	
<i>Select a minimum of 8 credits from the following:</i>			
BI 365*	Integrated Tree Health Management (BY/LSCC 102 or BZ/BZCC 120)	4	
BI 495	Independent Study	3	
<i>Select one of the following sets of courses:</i>			
BY 103	Biology of Organisms-Animals and Plants (BY/LSCC 102) ¹	4	
LSCC 102	Attributes of Living Systems (high school chemistry) ¹	4	3A
OR			
BZCC 110	Principles of Animal Biology ¹	3	3A
BZCC 111	Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.) ¹	1	3A
BZCC 120	Principles of Plant Biology ¹	4	3A
EN 423	Evolution and Classification of Insects (EN 303A or B or C)	4	
EN 445*	Aquatic Insects (BY 103 or BZ/BZCC 111)	4	
EN 451	Insect Pest Management (EN 303A or B or C)	4	
EN 462/	Parasitology and Vector Biology	5	
MB 462/	(BY 103 or BZ/BZCC 110;		
BZ 462*	MB 301 or MB 302 or BZ 212)		

PROGRAM TOTAL = 22 credits without prerequisites

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

Do you like working in yards or greenhouses growing flowers, fruits and vegetables? Have you ever thought about owning your own flower shop or nursery? Are you curious about propagating and breeding plants? What about discovering and developing new plant varieties through research? If any of these sound exciting, perhaps a major in horticulture is for you.

Horticulture is the application of scientific principles in the growing, developing, 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 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 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; ornamental plant breeder; produce buyer; soil mapper.

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 in the production, use, and marketing of cut flowers, bedding and pot plants, and foliage plants give this concentration its focus. Students are also required to take a practicum and an internship in their junior year. 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		Logical/critical thinking ⁴	3	2D
FRESHMAN					Electives	0-3	
A CC 192	Orientation to Agricultural Systems	3	1		TOTAL	29-30	
BZCC 120	Principles of Plant Biology	4	3A	JUNIOR			
<i>Select from the following courses:</i>				A 320B	Computer Applications in Agriculture-Data Base ⁵ (A 140 or BD 150 or CS 110)	1	
C CC 107	Fundamentals of Chemistry (M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A	A 320D	Computer Applications in Agriculture-Project Management ⁵ (A 140 or BD 150 or CS 110)	1	
AND				A 320E	Computer Applications in Agriculture-Spreadsheets ⁵ (A 140 or BD 150 or CS 110)	1	
C CC 108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A	EN 302	Applied and General Entomology	2	
OR				EN 303B	Horticultural Entomology Laboratory (EN 302 or concurrent reg.)	1	
C CC 111	General Chemistry I (M/M CC 121 or placement in M/M CC 124 or higher)	4	3A	H 310	Greenhouse Management	4	4B
AND				H 322	Herbaceous Plants (one course in botany, biological science, or horticulture)	3	
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A	H 486	Practicum ⁶	2	
AND				H 487	Internship ⁷	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		PD 361	Elements of Plant Pathology (BY/LSCC 102 or BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100)	3	
AND				SC 330	Principles of Genetics (BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	3	
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1		H 321	<i>Select 3-4 credits from the following:</i> Nursery Production and Management (H/H CC 100)	4	
COCC 150	College Composition (Composition Placement Exam)	3	2A	H 331	Landscape Design (H 221)	2	
H CC 100	Horticultural Science (high school biology)	4	3A	H 341	Turfgrass Management (H/H CC 100)	3	
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C	H 441	Turfgrass Science (BZ/BZCC 120, H 341, SC 240)	3	
M CC 121	College Algebra II (M/M CC 120A-B or placement)	1	2C	H 450A	Cool Season Vegetable Production (one plant science course)	1	
M CC 124	Logarithmic and Exponential Functions (M/M CC 118 or M/M CC 121 or placement)	1	2C	H 450B	Warm Season Vegetable Production (one plant science course)	1	
Arts/humanities ¹		3	3B	H 450C	Small Fruit Production (one plant science course)	1	
Global and cultural awareness ²		3	3E	H 450D	Tree Fruit Production (one plant science course)	1	
Electives		0-2		H 460/ SC 460	Plant Breeding (SC 330)	3	
TOTAL		30-32		H 464	Arboriculture and Urban Plant Management (H/H CC 100, SC 240)	3	
SOPHOMORE				H 475	Environmental Requirements of Horticultural Plants (BZ 440)	3	
<i>Select one of the following courses:</i>				Electives			
AUCC 201	Self/Community in American Culture Since 1877	3	3D, 3F	2-3			
HYCC 150	U.S. History to 1876	3	3D, 3F	TOTAL			
HYCC 151	U.S. History Since 1876	3	3D, 3F	30			
NRCC 320	Natural Resources History and Policy	3	3D, 3F	SENIOR			
BZ 223	Plant Identification (BY 103 or BZ/BZCC 120)	3		BN 305	Fundamentals of Management	3	
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4		BZ 440	Plant Physiology (BY 103 or BZ/BZCC 120; C 245 or concurrent reg.)	3	
EACC 202	Agricultural and Resource Economics	3	3C	H 412	Floriculture Crops (H 310)	4	
H 260	Plant Propagation (H/H CC 100)	4		H 454	Horticulture Crop Production and Management (H 310 or H 450A-B)	2	4C
<i>Select one of the following courses:</i>				H 486	Practicum ⁸	2	
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 to Soil Science (C/C CC 107 or C/C CC 111)	4					

JTCC	300	Professional and Technical Communication (CO/COCC 150)	3	4A
OR				
JT	301	Business Communication (CO/COCC 150)	3	4A
OR				
		Agricultural economics ⁹	3	
		Health and wellness ¹⁰	2	3G
		Horticulture electives ¹¹	3-4	
		Electives ¹²	2-6	
		TOTAL	28-31	

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 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.

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 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 products. 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 in one year.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A CC 192	Orientation to Agricultural Systems	3	1
BZCC 120	Principles of Plant Biology	4	3A
C CC 107	Fundamentals of Chemistry (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)	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 Functions (M/M CC 118 or M/M CC 121 or placement)	1	2C
	Health and wellness ¹	2	3G
	TOTAL	30	

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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	
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 (BY 103 or BZ/BZCC 120; C 245 or concurrent reg.)	3	
EN	302	Applied and General Entomology	2	
PD	361	Elements of Plant Pathology (BY/LSCC 102 or BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100)	3	
SC	330	Principles of Genetics (BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	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/	Plant Breeding (SC 330)	3	4B
SC	460			
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	6	
		TOTAL	31	

PROGRAM TOTAL = 120 credits

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

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

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

⁴ Select from the list of courses in category 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 192	Orientation to Agricultural Systems	3	1
BZCC 120	Principles of Plant Biology	4	3A
<i>Select one of the following sets of courses:</i>			
C CC 107	Fundamental of Chemistry (M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
AND			
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
AND			
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A
AND			
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	
AND			
C 114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1	

COCC 150	College Composition (Composition Placement Exam)	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	27-31	

SOPHOMORE

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
<i>Arts/humanities²</i>			
<i>Historical perspectives³</i>			
<i>Global and cultural awareness⁴</i>			
<i>U.S. public values and institutions⁵</i>			
	TOTAL	30	

JUNIOR

A 140	Technology in Agriculture	3	
OR			
CS 110	Personal Computing	4	
BZ 440	Plant Physiology (BY 103 or BZ/BZCC 120; C 245 or concurrent reg.)	3	
EN 302	Applied and General Entomology	2	
EN 303B	Horticultural Entomology Laboratory (EN 302 or concurrent reg.)	1	
H 486	Practicum	3	
OR			
H 487	Internship	3	
PD 361	Elements of Plant Pathology (BY/LSCC 102 or BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100)	3	
SC 330	Principles of Genetics (BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	3	
	TOTAL	18-19	

SENIOR

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 450A-B or H 310)	2	4A, 4C

H	460/	Plant Breeding (SC 330)	3	4B
SC	460			
H	475	Environmental Requirements of Horticultural Plants (BZ 440)	3	
W	308	Biology and Control of Weeds (BY 103 or BZ/BZCC 120; C/C CC 107 or C/C CC 111)	4	
TOTAL			14	

CORE TOTAL = 89-94 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 core curriculum, students in the production option must take the following courses:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
	Electives	3	
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	10-11	
TOTAL			15-16

PROGRAM TOTAL = 120 credits

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

Seed Science Option

In addition to the core curriculum, students in the seed science option must take the following courses:

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
BZ	223 Plant Identification (BY 103 or BZ/BZCC 120)	3	
JUNIOR			
BZ	446 Physiology of Seeds (BZ 440)	2	

Select 5 credits from the following:			
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
Electives			0-2
TOTAL			10-12
SENIOR			
H	461/	Plant Breeding Laboratory (H 460/SC 460 or concurrent reg.)	1
SC	461		
Electives ¹			12-15
TOTAL			13-16

PROGRAM TOTAL = 120 credits

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

Horticultural Science Concentration

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

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A CC	192 Orientation to Agricultural Systems	3	1
BZCC	120 Principles of Plant Biology	4	3A
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	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)	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	33	

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	2	
		TOTAL	27-28	

JUNIOR

		<i>Select from the following courses:</i>		
C	245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
		AND		
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	341	Organic Chemistry I (C 113)	3	
		AND		
C	343	Organic Chemistry II (C 341)	3	
		AND		
C	344	Organic Chemistry Laboratory (C 114; C 343 or concurrent reg.)	2	
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 (BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	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 (C 245 or C 343 or concurrent reg. in C 343)	4	
		<i>Select two credits from the following courses:</i>		
BC	352	Principles of Biochemistry Laboratory (BC 301 or BC 351 or BC 401 or concurrent reg., two credits of college chemistry laboratory)	1	
BZ	441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
SC	331	Genetics Laboratory (SC 330 or concurrent reg.)	1	

BZ	440	Plant Physiology (BY 103 or BZ/BZCC 120; C 245 or concurrent reg.)	3	
EN	302	Applied and General Entomology	2	
EN	303B	Horticultural Entomology Laboratory (EN 202 or concurrent reg.)	1	
H	454	Horticulture Crop Production and Management (H 310 or H 450 A-B)	2	4A, 4C
H	460/SC	Plant Breeding (SC 330)	3	4B
H	475	Environmental Requirements of Horticultural Plants (BZ 440)	3	
PD	361	Elements of Plant Pathology (BY/LSCC 102 or BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100)	3	
		Horticulture electives	3	
		Electives ⁸	3-4	
		TOTAL	29-30	

PROGRAM TOTAL = 120 credits

¹ The equivalent to M/M CC 120, 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

Are you artistic and visually creative? Do you enjoy drawing and design? Do you appreciate the environment, computers and travel? Does involvement in the planning of a community park or the redesign of an urban environment intrigue you? Would you like to improve local quality of life by designing a mine restoration plan, a new open space, or a new recreation area? If your answer to any of these questions is "yes," then a major in landscape architecture may be the choice for you.

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 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 examples are: landscape designer and contractor; landscape consultant; private practice business; construction supervisor; land or environmental planner; urban planner.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select one of the following courses:</i>			
A CC 192	Orientation to Agricultural Systems	3	1
BZCC 192	First-Year Seminar in Life Sciences	2	1
EDCC 192	Learning and Community	3	1
ERCC 192	First-Year Seminar in Earth Resources	2	1
NRCC 192	Natural Resources Freshman Seminar	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)	3	2A
EACC 202	Agricultural and Resource Economics	3	3C
OR			
ECCC 202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	3	3C
ERCC 140	Physical Geology	4	3A
LA 110	Introduction to Landscape Architecture	3	
LA 120	History of the Designed Landscape	3	
M CC 120A-B	College Algebra I (Math Placement Exam)	1	2C
M CC 121	College Algebra II ¹ (M/M CC 117 or 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
PYCC 100	General Psychology	3	3C
	Health and wellness ²	2	3G
	TOTAL	31-32	
SOPHOMORE			
BY 220	Fundamentals of Ecology (one course in biology, M/M CC 124 or M/M CC 141 or M/M CC 155)	3	

C CC	107	Fundamentals of Chemistry (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	
PLCC	110	Logic and Critical Thinking	3	2D
SPCC	200	Public Speaking	3	2B1
		Arts/humanities ³	3	3B
		Historical perspectives ⁴	3	3D
		Global and cultural awareness ⁵	3	3E
		TOTAL	30	

JUNIOR

LA	360	Basic Landscape Design and Construction (LA 240)	4	4A
LA	361	Digital Methods (LA 360 or concurrent reg.)	3	
LA	362	Form and Expression in Garden Design (LA 361)	4	
LA	363	Advanced Landscape Site Engineering (LA 360 or concurrent reg.)	4	
LA	444	Ecology of Landscapes (LA 360, 1 course in biology)	3	

		<i>Select one of the following courses:</i>		
LA	454	Landscape Field Studies (BZ 355, 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 (BY 103 or BZ/BZCC 120, M/M CC 121)	5	

SC	240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
		Electives	3	
		TOTAL	30	

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	
LA	445	Environmental Analysis (LA 366)	3	
PL	345	Environmental Ethics (sophomore standing or higher or written consent of instructor)	3	
		Electives	3	
		TOTAL	23	

FIFTH YEAR

BZ	223	Plant Identification (BY 103 or BZ/BZCC 120)	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 =138 credits

¹ Students placing out of M/M CC 121 are not required to show credit for this course.

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 3B in the AUCC.

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

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

Major in Landscape Horticulture

Do you enjoy working in yards and making them attractive? Do you want the healthiest grass in the neighborhood? Can you place flowers and shrubs and have them look just as you imagined? Do you like to draw? Do you enjoy starting plants from seed or propagating them? Does designing irrigation or sprinkler systems sound like fun? What about designing landscapes for homes or businesses or creating an aesthetic interior using plants? Have you always wanted to have your own nursery business or garden center, or manage the greens at a golf course or baseball field? If you answered “yes” to some of these questions, a major in landscape horticulture may be for you.

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 construction, nursery and landscape management, and turf management.

Characteristics and Skills

- Strong interest in plants and plant propagation
- Interest in designing landscapes
- Enjoy working outdoors
- Creative abilities
- Attention to detail
- Enjoy working with people
- Problem solving skills
- Strong oral communication skills

Potential Occupations

Professional management of landscapes is in high demand due to modern lifestyles. Expected growth in construction also contributes to demand in this field. Nursery and garden center

businesses are strong, and should remain so in the future. The nursery, landscape management, arboriculture and botanic garden-arboreta industries provide many different career options. Graduates typically receive positions as propagators, superintendents, managers, and salespersons. Graduates completing in turf management command some of the highest salaries in professional agriculture. Other employment opportunities in that field are industrial grounds, erosion control and highway reclamation. 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.

Some 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; interior plant maintenance; irrigation designer; landscape maintenance; 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 and develop landscape plans for residential, commercial, and small-scale public properties. Contractors coordinate and oversee projects including the installation of trees, flowers, shrubs, sod, benches, and other ornamental features. They implement construction plans at the site, which may involve grading the property, installing lighting or sprinkler systems, and building walkways, terraces, patios, decks and fountains. Contractors determine the type and amount of labor, equipment, and materials needed to complete a project and inspect work at various stages. Knowledge of local, state, and Federal environmental regulations and local building codes is essential. Courses in this concentration include design principles, graphics, grading, construction methods, and the creative use of plant materials.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A	140 Technology in Agriculture	3	
OR			
BD	150 Business Computing Concepts and Applications	3	
A CC	192 Orientation to Agricultural Systems	3	1
C CC	107 Fundamentals of Chemistry (M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
COCC	150 College Composition (Composition Placement Exam)	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	
<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 117 or 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	32

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
			Advanced writing ³	3 2B2
			Arts/humanities ⁴	3 3B

		Social/behavioral sciences ⁵	3	3C
		Electives	3	
		TOTAL	33	
SENIOR				
EN	302	Applied and General Entomology	2	
EN	303B	Horticultural Entomology Laboratory (EN 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 ⁶	3	3E
		Historical perspectives ⁷	3	3D
		U.S. public values and institutions ⁸	3	3F
		Business elective ⁹	3	
		Electives	3	
		TOTAL	30	

PROGRAM TOTAL = 128-133 credits

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

² 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.

³ Select from the list of courses in category 2B2 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 3C in the AUCC.

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

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

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

⁹ Upper-division business or agricultural business elective.

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, or landscape management firm. Nursery specialists propagate and produce trees, shrubs, groundcovers, and herbaceous perennials for the landscape industry. Nursery and landscape managers oversee general operations, 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 soils, pest management, business management, horticulture and plant materials.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
A CC 192	Orientation to Agricultural Systems	3	1
BZCC 120	Principles of Plant Biology	4	3A
C CC 107	Fundamentals of Chemistry (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)	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
	Electives	3	
	TOTAL	30	

SOPHOMORE

<i>Select one of the following courses:</i>			
AUCC 201	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 (BY 103 or BZ/BZCC 120)	3	
H 221	Landscape Plants	4	
H 260	Plant Propagation (H/H CC 100)	4	
<i>Select one of the following courses:</i>			
L CC 105	First-Year Language I	5	2B3 ²
L CC 107	First-Year Language II (L/L CC 105 or L 106)	5	2B3 ²
SPCC 200	Public Speaking	3	2B1
SC 240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
SPCC 207	Rhetoric and Argumentation	3	2D
	Arts/humanities ³	3	3B
	Global and cultural awareness ⁴	3	3E
	TOTAL	30-32	

JUNIOR

<i>Select three credits from the following:</i>			
A	140	Technology in Agriculture	3
A	320A	Computer Applications in Agriculture-Optimization (A 140 or BD 150 or CS 110)	1
A	320B	Computer Applications in Agriculture-Data Base (A 140 or BD 150 or CS 110)	1
A	320C	Computer Applications in Agriculture-Communications (A 140 or BD 150 or CS 110)	1
A	320D	Computer Applications in Agriculture-Project Management (A 140 or BD 150 or CS 110)	1
A	320E	Computer Applications in Agriculture-Spreadsheets (A 140 or BD 150 or CS 110)	1
A	320F	Computer Applications in Agriculture-Presentation Technology (A 140 or BD 150 or CS 110)	1
C	245	Fundamentals of Chemistry (C/C CC 107 or C 113)	4
EN	302	Applied General Entomology	2
EN	303B	Horticultural Entomology Laboratory (EN 302 or concurrent reg.)	1
H	310	Greenhouse Management	4 4B
H	321	Nursery Production and Management (H/H CC 100)	4 4A
H	322	Herbaceous Plants (one course in botany or biological science or horticulture)	3
H	331	Landscape Design (H 221)	2
H	341	Turfgrass Management (H/H CC 100)	3
H	487	Internship ⁵	3
TOTAL			29
SENIOR			
BZ	440	Plant Physiology (BY 103 or BZ/BZCC 120; C 245 or concurrent reg.)	3
EA	328	Small Agribusiness Management (EA/EACC 202 or EC/ECCC 202)	3
H	464	Arboriculture and Urban Plant Management (H/H CC 100, SC 240)	3 4C
H	465	Landscape Estimating (3 credits of mathematics)	3
PD	361	Elements of Plant Pathology (BY/LSCC 102 or BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100)	3
W	308	Biology and Control of Weeds (BY 103 or BZ/BZCC 120; C/C CC 107 or C/C CC 111)	4
Electives			10-12
TOTAL			29-31

PROGRAM TOTAL =120 credits

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

² 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.

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 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 192	Orientation to Agricultural Systems	3	1
BZCC 120	Principles of Plant Biology	4	3A
C CC 107	Fundamentals of Chemistry Laboratory (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)	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 (MM 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			30
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	
<hr/>				
<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
<hr/>				
		Arts/humanities ⁴	3	3B
		Logical/critical thinking ⁵	3	2D
TOTAL			30-33	

JUNIOR

<hr/>				
<i>Select one course from the following:</i>				
AUCC	201	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
<hr/>				
BZ	440	Plant Physiology (BY 103 or BZ/BZCC 120; 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	
PD	361	Elements of Plant Pathology (BY/LSCC 102 or BZ/BZCC 104 or BY/BZCC 120 and H/H CC 100)	3	
SC	350	Soil Fertility Management (SC 240)	3	
		Electives	8	
TOTAL			30	

SENIOR

BN	305	Fundamentals of Management	3	
EN	302	Applied and General Entomology	2	
EN	303B	Horticultural Entomology Laboratory (EN 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	
W	308	Biology and Control of Weeds (BY 103 or BZ/BZCC 120; C/C CC 107 or C/C CC 111)	4	4B
		Electives ⁶	8-11	
TOTAL			27-30	

PROGRAM TOTAL = 120 credits¹ 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 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.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

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>	
LOWER DIVISION				
H CC 100	Horticultural Sciences (high school biology)	4	3A	
H 260	Plant Propagation (H/H CC 100)	4		
TOTAL		8		
UPPER DIVISION				
H 310	Greenhouse Management	4		
H 460/ SC 460*	Plant Breeding (SC 330)	3		
<hr/>				
<i>Select two courses from the following for a minimum of six credits:</i>				
H 412	Floriculture Crops (H 310)	4		
H 450A-D	Horticulture Food Crops (one plant science course)	1-4		
H 454	Horticulture Crop Production and Management (H 450A-B or H 310)	2		
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.

Minor in Landscape Horticulture

Course	Title (Prerequisite)	Cr	AUCC
UPPER 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	

Select a minimum of seven credits (five must be upper division) from the following:			
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	
H 465	Landscape Estimating (3 credits of mathematics)	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

Are you interested in how the plants we eat grow, and how to grow them bigger, better, safer and cleaner? Would you like to understand the composition of soil and how it relates to plant or crop growth? Would you like to know more about conserving our soil and water? Do you enjoy the sciences? Would you like to solve problems concerning agriculture? Are you interested in how to make crops more resistant to pests and drought? Are you concerned about our environment? Are you interested in international agriculture?

If you answered “yes” to any of the above, you may want to consider a major in soil and crop sciences.

Soil and crop science, the study of field crops and soils, is the foundation science 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, 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. Five 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 your 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
A CC 192	Orientation to Agricultural Systems	3	1
C CC 107	Fundamentals of Chemistry (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)	3	2A
	EACC or ECCCE 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	30	
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	0-4	
	TOTAL	26-30	
JUNIOR			
JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2
SC 330	Principles of Genetics (BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	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

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
BZ 440	Plant Physiology (BY 103 or BZ/BZCC 120; C 245 or concurrent reg.)	3	
BZ 441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
ERCC 140	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 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 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
A CC 192	Orientation to Agricultural Systems ¹	3	1
BZCC 120	Principles of Plant Biology	4	3A

<i>Select one of the following sets of courses:</i>					BZ	441	Plant Physiology (BZ 440 or concurrent reg.)	2
C CC	107	Fundamentals of Chemistry (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
C CC	108	Fundamentals of Chemistry Laboratory (C/C CC 107 or concurrent reg.)	1	3A	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					JTCC	300	Professional and Technical Communication (CO/COCC 150)	3 2B2
C CC	111	General Chemistry I (M/M CC 121 or placement in M/M CC 124 or higher)	4	3A	SC	330	Principles of Genetics (BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	3
C CC	112	General Chemistry Laboratory I (C/C CC 111 or concurrent registration)	1	3A	SC	350	Soil Fertility Management (SC 240)	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		SC	351	Soil Fertility Laboratory (SC 350 or concurrent reg.)	1
C	114	General Chemistry Laboratory II (C/C CC 112; C 113 or concurrent reg.)	1		SC	370	Irrigation Principles and Management (H/H CC 100 or SC 100, SC 240)	3
COCC	150	College Composition (Composition Placement Exam)	3	2A	SC	420	Crop and Soil Management Systems I (H/H CC 100 or SC 100, SC 240)	3
EACC	202	Agricultural and Resource Economics	3	3C	<i>Select one course from the following:</i>			
M CC	120A-B	College Algebra I (Math Placement Exam)	1	2C	STCC	201	General Statistics (M/M CC 120A-B)	3 2D
M CC	121	College Algebra II (M/M CC 120A-B or placement)	1	2C	STCC	301	Introduction to Statistical Methods (M/M CC 121)	3 2D
M CC	124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C	STCC EHCC	307/ 307	Introduction to Biostatistics (M/M CC 121)	3 2D
SC	100	General Crops	4		Electives			1
		Health and wellness ²	2	3G	TOTAL			30
		Historical perspectives ³	3	3D	SENIOR			
		TOTAL	30-34		<i>Select three courses from the following:</i>			
SOPHOMORE					BZ	223	Plant Identification (BY 103 or BZ/BZCC 120)	3
BA	205	Fundamentals of Accounting	3		EN	302	Applied and General Entomology	2
OR					EN	303C	Agricultural Entomology Laboratory (EN 302 or concurrent reg.)	1
EA	205	Farm and Ranch Management (EA/EACC 202 or EC/ECCC 202)	3		PD	361	Elements of Plant Pathology (BY/LSCC 102 or BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100)	3
BY	220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155)	3		W	308	Biology and Control of Weeds (BY 103 or BZ/BZCC 120; C/C CC 107 or C/C CC 111)	4
PHCC	110	Descriptive Physics	3	3A	<i>Select three credits from the following:</i>			
SC	240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4		BZ	446	Physiology of Seeds (BZ 440)	2
SPCC	200	Public Speaking	3	2B1	SC	200	Seed Anatomy and Identification (one course in biology or SC 100 or H/H CC 100 or written consent of instructor)	1
		Agricultural economics/business ⁴	3		SC	201	Seed Development and Metabolism (one course in biology or SC 100 or H/H CC 100 or written consent of instructor)	1
		Arts/humanities ⁵	3	3B	SC	310	Agronomic Plant and Seed Identification (SC 100, H/H CC 100 or one course in biology)	2
		Global and cultural awareness ⁶	3	3E	JUNIOR			
		U.S. public values and institutions ⁷	3	3F	BZ	440	Plant Physiology (BY 103 or BZ/BZCC 120; C 245 or concurrent reg.)	3
		Elective	2					
		TOTAL	30					

<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	360/CB	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)	3
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	29-30

PROGRAM TOTAL =120-123 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.

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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A CC	192	Orientation to Agricultural Systems	3 1
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	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)	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	34	

SOPHOMORE

BY	220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155)	3	
ERCC	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	

JUNIOR

<i>Select one of 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	341	Organic Chemistry I (C 113)	3	
C	343	Organic Chemistry II (C 341)	3	
C	344	Organic Chemistry Laboratory (C 114; C 343 or concurrent reg.)	2	
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 (C 245 or C 341 or concurrent reg.; BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	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 (C 245 or C 343 or concurrent reg. in C 343)	4	
BZ	440	Plant Physiology (BY 103 or BZ/BZCC 120; 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	0-1	
		TOTAL	22-26	

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 3E in the AUCC.

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

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

⁶ Select from departmental list.

International Soil and Crop Sciences Concentration

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

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A CC 192	Orientation to Agricultural Systems	3	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 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 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)	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	0-3	
	TOTAL	30-31	

SOPHOMORE

A CC 270/IECC 270A	World Interdependence-Population and Food	3	3E
BY 220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or 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	
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 (BY 103 or BZ/BZCC 120; 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	332/	International Political Economy	3	
EC	332	(EA/EACC 202 or EC/ECCC 202 or PO/POCC 232)		
S	341	Select one of the following courses: 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 (BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	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	
STCC	201	Select one course from the following: General Statistics (M/M CC 120A-B)	3	2D
STCC	301	Introduction to Statistical Methods (M/M CC 121)	3	2D
STCC	307/	Introduction to Biostatistics		
EHCC	307	(M/M CC 121)		
		Electives	3	
		TOTAL	30	
SENIOR				
EA	460	Economics of World Agriculture (EA/EACC 202 or EC/ECCC 202)	3	
		OR		
EC	460	Economic Development (EC 304)	3	
EN	302	Select two courses from the following: Applied and General Entomology	2	
		AND		
EN	303C	Agricultural Entomology Laboratory (EN 302 or concurrent reg.)	1	
PD	361	Elements of Plant Pathology (BY/LSCC 102 or BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100)	3	
W	308	Biology and Control of Weeds (BY 103 or BZ/BZCC 120; C/C CC 107 or C/C CC 111)	4	

Select two course from the following:				
SC	304	Seed Production, Conditioning and Marketing (SC 100)	3	
SC	320/	Forage and Range Management (one course in biological sciences)	3	
RS	320	Principles of Microclimatology (BY 220 or NR 220; PH/PHCC 141)	3	
SC	322	Geographic Information Systems in Agriculture (CS 110)	3	
SC	360/	Pedology (SC 240)	4	
CB	360	Plant Breeding (SC 330)	3	
SC	440			
SC	460/			
H	460			
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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
A CC	192	Orientation to Agricultural Systems	3 1
BY	103	Biology of Organisms (BY/LSCC 102)	4
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

TOTAL	18-22
PROGRAM TOTAL = 120 credits	

¹ Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC).
² Select from the list of courses in category 3G in the AUCC.
³ Select from the list of courses in category 3D in the AUCC. 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 192	Orientation to Agricultural Systems	3	1
BZCC 120	Principles of Plant Biology	4	3A
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 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)	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 (C 245 or C 341 or concurrent reg.; BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	3	
SC 100	General Crops	4	
TOTAL		35	
SOPHOMORE			
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
ERCC 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 (BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	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	
STCC 201	Select one of the following courses: 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 (BY 103 or BZ/BZCC 120; C 245 or concurrent reg.)	3	
BZ 441	Plant Physiology Laboratory (BZ 440 or concurrent reg.)	2	
ER 454	Geomorphology (ER/ERCC 140 or ERCC 192A/ER 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	13	
		TOTAL	<u>33</u>	

PROGRAM TOTAL = 120 credits

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

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

³ 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 Sciences (C/C CC 107 or C/C CC 111)	4
UPPER DIVISION			
BZ	440*	Plant Physiology (BY 103 or BZ/BZCC 120; C 245 or concurrent reg.)	3
ER	454*	Geomorphology (ER/ERCC 140 or ERCC 192A/ER 150 or GR 210; M/M CC 155 or M/M CC 160)	4

<hr/>				
<i>Select one course from the following:</i>			3	
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)	
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
<hr/>				
TOTAL			28-29	

PROGRAM TOTAL = 32-33 credits without 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 Kevin Oltjenbruns, 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
Industrial Technology Management
Interior Design
Nutrition and Food Science
Restaurant and Resort Management
Social Work
Technology Education and Training

UNDERGRADUATE MINORS

Apparel Design
Coaching
Construction Management
Industrial Technology Management
Merchandising
Nutrition

UNDERGRADUATE PROGRAMS

The College of Applied Human Sciences comprises seven academic departments and one school, and is, above all, 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; Occupational Therapy; and Social Work. It also includes the School of Education which

offers undergraduate and post-bachelor teacher education preparation programs in 16 areas of endorsement. All of these academic units (except Occupational Therapy) offer curricula that lead to the bachelor's degree. The Department of Occupational Therapy offers a master's program only. Requirements for undergraduate majors are outlined in the departmental sections of this catalog.

Learning 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, bringing the college visibility in the larger community while fulfilling Colorado State's land-grant mission. These vital connections also provide students in the college with excellent opportunities for working internships in their fields. For all its students, the college places a strong emphasis on experiential learning opportunities that allow students to test new skills in real-world settings.

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.

The college offers the only comprehensive interdisciplinary program in *consumer and family studies* in the state of Colorado. At the undergraduate level students may complete either the consumer and family studies concentration or the consumer and family studies education concentration. Each of those concentrations draws information from the more specialized disciplines of apparel, merchandising, interior design, food science and human nutrition, and human development and family studies.

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, industrial technology management, nutritional sciences, or sports medicine.

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

The college also offers teacher preparation programs for students who wish to pursue in-depth study in human development and family studies, or technology education and training with courses leading to licensure. Additionally, the college prepares students to teach in a variety of major areas offered through other colleges in the University.

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.

INTERDEPARTMENTAL MAJOR

Major in Consumer and Family Studies

Office in Education Building, Room 227

Would you enjoy counseling individuals and families to help them prevent or solve problems that affect daily living and needs? Would you enjoy being a representative for business that manufactures or sells housewares, foods, or home furnishings? Does household product development sound interesting to you? Would you like to teach middle, secondary, or career vocational technical school? Does family and consumer science research interest you? Are you interested in a career in consumer information or advocacy? If your answer to any of these questions is “yes,” then a major in consumer and family studies may be for you.

Consumer and family studies is an interdisciplinary field providing graduates with skills to assist families and consumers with daily life challenges in interpersonal relationships, consumer issues and decisions, housing, and balancing family and work. Students study the roles of individuals within families and as consumers. Students gain

insights into those choices that impact daily personal and family well being and qualify to sit for the certification in consumer and family sciences test (CFSC).

Characteristics and Skills

- Capability to be dependable and patient
- Strong desire to help people and display compassion and empathy
- Understand clients’ and students’ emotional and educational needs
- Ability to communicate and teach effectively
- Desire to teach
- Interest in family and consumer issues

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 professional positions.

Career opportunities include, but are not limited to: consumer and family studies professional; consumer program developer; consultant; product designer; product representative; consumer information specialist; customer assurance specialist; extension educator/agent; product development specialist; Peace Corps volunteer; researcher; middle school teacher; secondary school teacher; career technical instructor; community college instructor; business/industry educator; writer/developer of informational or educational materials.

Consumer and Family Studies Concentration

The consumer and family studies concentration provides students with an education focused on consumer and family well being, growth and development of family members, and the relationship of the households to their environment. The concentration is interdisciplinary, bringing together courses in human development; family studies; consumer sciences; apparel and merchandising; housing and interior design; and nutrition and foods. Graduates work in a variety of settings in business, self employment, government, such as cooperative extension and the Peace Corps. Non-teaching and non-profit careers are also available.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
AR 101	Visual Form	3	
	OR		
DM 130	Design Appreciation	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 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)	3	2A
DM 120	Textiles	3	
FNCC 150	Survey of Human Nutrition	3	3G
HDCC 101	Individual and Family Development	3	3C
PYCC 100	General Psychology	3	3C
S CC 100	General Sociology	3	3C, 3F
	First year seminar ¹	2	1
	Mathematics ²	3	2C
	TOTAL	30-31	
SOPHOMORE			
AM 141	Apparel Production I	4	
BD 150	Business Computing Concepts and Applications	3	
	OR		
CS 110	Personal Computing	4	
BZCC 101	Humans and Other Animals	3	3A
	OR		
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
CF 179	Introduction to Consumer and Family Studies	2	
ECCC 202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	3	3C
EXCC 145	Health and Wellness	3	3G
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ³	3	3B
	Consumer and family studies ⁴	3	
	Elective	3	
	TOTAL	30-32	
JUNIOR			
AY 300/ PS 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	
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	
STCC 201		General Statistics (M/M CC 120A-B)	3	2D
		OR		
STCC 301		Introduction to Statistical Methods (M/M CC 121)	3	2D
		AM/DM elective	3	
		FN elective	3	
		Historical perspectives ⁵	3	3D
		Support career objective-elective ⁶	3	
		TOTAL	30	
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 100 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 ⁷	3	3E
		Consumer and family studies electives ⁴	12	
		Support career objective-electives ⁶	1-4	
		TOTAL	27-30	

PROGRAM TOTAL = 123 credits

¹ Select from list of courses in category 1 in the All-University Core Curriculum (AUCC). HSCC 100 is recommended.

² Take M/M CC 120A or B and M/M CC 121 and one additional credit of math from category 2C in the AUCC.

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

⁴ Select courses with prefixes AM, DM, FN, ID, or HD. Keep in mind the requirement of 42 upper-division credits when choosing these courses.

⁵ Select from the list of courses in category 3D in the AUCC. DMCC 263, AUCC 200, or POCC 131 are recommended.

⁶ Select courses to enhance knowledge and skill in chosen career area.

⁷ Select from the list of courses in category 3E in the AUCC. AMCC 250 is suggested but not required.

Consumer and Family Studies Education Concentration

The consumer and family studies education concentration prepares students for teaching youth and adults in consumer and family studies. The curriculum includes courses in human development, family studies, consumer resource management, nutrition, and education to develop knowledge and skills to work with individuals and families. This concentration provides background for teacher licensure, to enter a variety of careers including teaching in middle and secondary schools, community colleges, career/technical schools, and technical institutes.

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 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)	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
FNCC 150	Survey of Human Nutrition	3	
HDCC 101	Individual and Family Development	3	
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	Mathematics ¹	1	2C
PYCC 100	General Psychology	3	3C
	Arts/humanities ²	3	3B
	Logical/critical thinking ³	3	2D
	TOTAL	29-31	
SOPHOMORE			
AM 101	Fashion Industries	3	
AMCC 250	Clothing, Adornment and Human Behavior	3	3E
DM 320	Finance-Personal and Family	3	
EC	Economics	3	
EXCC 145	Health and Wellness	3	3G

HD 310	Infant and Child Development in Context ((HD/HDCC 101 and PY/PYCC 100)	3	
ID 275	Interior Design I	3	
OR			
DM 130	Design Appreciation	3	
SPCC 200	Public Speaking	3	2B1
	Biological/physical sciences ⁴	3	3A
	Historical perspectives ⁵	3	3D
	TOTAL	30	
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 (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	
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	
	Consumer and family studies electives ⁶	9-10	
	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-Methods and Assessment (admission to Teacher Licensure Program)	1	
ED 493B	Seminar-Assessment of Learning (ED 450, VE 451; concurrent reg. in ED 485A or B 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 (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 2C 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 2D in the AUCC.

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

⁵ 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, Director

Are you interested in sharing your passion for a subject with others? Do you enjoy motivating people? Are you up for the challenge of being a role model and possibly influencing young people's lives or careers? If you answered "yes" to the above questions, and have a creative mind for conveying information, you may want to consider being a teacher.

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.

Students 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 Department of Social Work graduate program. Graduate programs in the School of Education include administrator of 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

Nearly one-third of all teachers in the U.S. are 48 years of age or older. The average teacher has at least 15 years of service and future retirements are expected to grow. 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 1997-98 median salary for teachers was \$39,385.

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

P-3

Endorsement Area

Early childhood education

Appropriate College Undergraduate Major

*Human Development & Family Studies

K-12

Endorsement Area

Art

*Art

Music

*Music

Secondary

Endorsement Area

English

*English

Foreign Languages
French, German, or Spanish

*Language, Literature, and Culture Studies
French, German, or Spanish Concentrations

Mathematics

*Mathematics

Science
Biology
Biology/Natural Resources
Chemistry
General
Geology
Physics

Biological Science, Chemistry, Geology, Natural Resource Management, *Natural Sciences, Physics

Social Studies

*History, *Liberal Arts, Political Science

Speech
General Speech
Theatre

Performing Arts (Theatre), *Speech Communication

*Vocational Education***

Endorsement Area

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
Administrator
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.

Early Childhood Education

The Early Childhood Education Program is a teacher licensure program jointly sponsored by the School of Education and the Department of Human Development and Family Studies. Students complete a degree program in Human Development and Family Studies along with the professional education coursework and field experience through the licensing program in the School of Education. With this teaching endorsement, an individual may teach pre-school through third grade and work in programs with children age zero to age eight. For a more detailed coursework listing for this endorsement and major, please see the Human Development and Family Studies section of this catalog or contact the School of Education in the Education Building, Room 111.

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.

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 students apply to the School of Education for student teaching placement one semester before student teaching. Additionally, students 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.

An opportunity is available to interested students 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 Director of 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. 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 fitness/performance.

Professional Licensure Requirements

The professional education requirements listed below apply to all teaching endorsement areas . Additional courses may be required by specific endorsements areas except early childhood education. (See Human Development and Family Studies curriculum listing.) Refer to individual checksheets for clarification; checksheets may be obtained in Room 111, Education Building.

Course	Title (Prerequisite)	Cr	AUCC
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
ED 331	Educational Technology (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	
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	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 (ED 450 and appropriate special methods course(s))		
ED/VE	Special methods course ²	2-4	

ED/VE Additional endorsement area courses³

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:

Course	Title (Prerequisite)	Cr	AUCC
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 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)	4	
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.

Students 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.

Students 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, usually during their final semester.

Students 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.

Students 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.

Vocational Teaching Endorsement Area Requirements

Vocational Credentialing

Individuals desiring to teach in or administer vocational programs in the state of Colorado must qualify for a vocational credential in addition to a teaching or administrative license. Those who plan to qualify as vocational teachers or administrators must meet the requirements for a vocational credential established by the Community Colleges of Colorado. Credentialing questions may be directed to the Vocational Credentialing Office, 945 Xanthia Street, Bldg. 697, Room 116, 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

Professor Duane G. Jansen, 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 (Secondary)

Professor David Whaley, Program Chair

Students 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

Students 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

Students having 2,000 hours of successful, office-related work experience can qualify for a vocational 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 (Secondary)

Professor Carole Makela, Program Chair

Students 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

Students 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

Professor Duane G. Jansen, Program Chair

Work Experience Requirement

Students 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

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 degree specializations are available in adult education and training, counseling and career development (CACREP approved), educational leadership, and human resource development.

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, superintendent, school counselor, vocational guidance specialist, job development 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 Antigone Kotsiopulos, Head

Major in Apparel and Merchandising

Are you a creative and artistic person who would like to design attractive garments that help people look their best? Have you dreamed of owning or managing a clothing store, or being a buyer for a large department store? Would you like to combine artistic, business, and modern technical skills as a player in the fashion industry? If any of your answers to these questions is “yes,” perhaps a major in apparel and merchandising is for you.

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

Students interested in teaching at the middle school or secondary level should explore the interdepartmental major in consumer and family studies and its education concentration. This allows combining apparel and merchandising or interior design interests while fulfilling the requirements for teacher licensure.

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 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.

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; fabric designer; pattern maker; buyer; customer service representative; advertiser; fashion illustrator; cost engineer; technical services; testing and development; government or private researcher; importer; showroom coordinator.

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.

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.

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; 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 Student Affiliate of International Textile and Apparel Association 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 140	Apparel Design	3	
AM 141	Apparel Production I	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)	3	2A
DM 120	Textiles	3	
DM 130	Design Appreciation	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
TOTAL		31	
SOPHOMORE			
AM 240	Computer-Aided Apparel Design	3	
AM 241	Apparel Production II (AM 141)	3	
AMCC 250	Clothing, Adornment and Human Behavior	3	3E
DMCC 263	Historical Perspectives of Material Culture	3	3D
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
	U.S. public values and institutions ⁴	3	3F
TOTAL		29	
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 140, AR 135)	3	
AM 345	Draping Design (AM 241)	3	
AM 363	Historic Costume	3	4A
	Electives	14	
TOTAL		29	
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 ¹ (AM 343, AM 446, DM 220, DM 492)	12
DM	492	Preinternship Seminar (written consent of instructor)	1
		Electives	9
		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 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 3F in the AUCC.

⁵ 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. It 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 paid merchandising internship involves 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.

Course		Title (Prerequisite)	Cr	AUCC
FRESHMAN				
AM	101	Fashion Industries	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)	3	2A
DM	130	Design Appreciation	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
----- OR				
PYCC	100	General Psychology	3	3C
S CC	100	General Sociology	3	3C
SPCC	200	Public Speaking	3	2B1
		Arts/humanities ¹	3	3B
		Mathematics ²	1	2C
		TOTAL	30	
SOPHOMORE				
AMCC	250	Clothing, Adornment and Human Behavior	3	3E
AM	270	Merchandising Processes	3	
BA	205	Fundamentals of Accounting	3	
DM	120	Textiles	3	
DMCC	263	Historical Perspectives of Material Culture	3	3D
ECCC	202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	3	3C
----- OR				
STCC	201	General Statistics (M/M CC 120A-B)	3	2D
STCC	204	Statistics for Business Students (M/M CC 120A-B)	3	2D
----- OR				
		Biological/physical sciences ³	3	3A
		Health and wellness ⁴	2	3G
		U.S. public values and institutions ⁵	3	3F
		TOTAL	29	
JUNIOR				
AM	330	Textile and Apparel Economics (DM 120; EC/ECCC 202)	3	4B
AM	366	Merchandising Promotion (AM 270 or BK 305)	3	4A
AM	371	Merchandising Systems (AM 270 or DM 360/BK 360, BA 205)	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	Retailing (BK 300 or BK 305)	3	
		AM electives ⁶	6	
		Electives	3	
		TOTAL	31	
SENIOR				
AM	450	Social-Psychological Aspects of Clothing (AM/AMCC 250 or PY/PYCC 100 or written consent of instructor)	3	
		OR		
AM	466	Retail Environment Design and Planning (AM 270; DM 130)	3	
AM	479	Merchandising Policies and Strategies (AM 270, AM 330, AM 366, AM 371 or written consent of instructor)	3	4C
DM	492	Preinternship Seminar (written consent of instructor)	1	
		AM, DM, ID elective ⁷	3	
		Industry-related electives ⁸	12	
		Electives	8	
		TOTAL	30	

PROGRAM TOTAL = 120 credits

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

² M/M CC 124 or higher

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

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

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

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

⁷ Choose any course with an AM, DM, or ID prefix.

⁸ Choose from departmental list of approved courses.

Minors in Apparel Design or Merchandising

A minor in apparel design or merchandising provides students in other majors an opportunity to expand knowledge of textiles, apparel design and production, and merchandising. The minors may be of special interest to students majoring in areas such as art and business. The perspectives gleaned by students selecting an apparel design or merchandising minor both enhance understanding in the student's major program of study and expand career opportunities available to the student.

Minor in Apparel Design

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LOWER DIVISION			
AM	140	Apparel Design	3
AM	141	Apparel Production I	4

DM	120	Textiles	3
<i>Select a minimum of one course from the following:</i>			
AM	101	Fashion Industries	3
AM	240	Computer-Aided Apparel Design	3
AM	241	Apparel Production II (AM 141)	3
TOTAL			13

UPPER DIVISION

<i>Select nine credits from the following:</i>			
AM	341*	Computer-Aided Apparel Production (AM 240, AM 241)	3
AM	342	Computer-Aided Textile Design (AM 240)	3
AM	343*	Fashion Illustration (AM 140, AR 135)	3
AM	363	Historic Costume	3
AM	460	Historic Textiles	3

PROGRAM TOTAL = 22 credits without prerequisites

*Additional course work may be required because of prerequisites.

Minor in Merchandising

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LOWER DIVISION			
AM	101	Fashion Industries	3
AM	270*	Merchandising (EC/ECCC 202)	3
DM	120	Textiles	3
TOTAL			9

UPPER DIVISION

AM	330*	Textile and Apparel Economics (DM 120 and EC/ECCC 202)	3
		OR	
AM	366	Merchandising Promotion (AM 270 or BK 305)	3
AM	371*	Merchandising Systems (AM 270 or DM 360/BK 360, BA 205)	4
AM*		Elective ¹	3
DM	360/ BK	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

Are you a person who believes that people's surroundings significantly affect their quality of life? Would you enjoy designing indoor environments that are both aesthetic and functional? Are you a hands-on person who likes to see a project through from the drawing table to the finished work? Would you like to use the elements and principles to create comfortable space? Do you like to work with people to improve their interior environments? Is designing barrier-free

interior spaces important to you? If your answers to any of these questions are “yes,” then a major in interior design may be for you.

The Colorado State interior design program is based on the philosophy that interior design is important to the quality of human life. The program emphasizes the understanding and exploration of the conceptual aspects of the design process. Students learn competency in fundamental design, design analysis, space planning and programming, and the design of interior space. Additionally, students will understand conceptual aspects of the design process and develop necessary technical, theoretical, and psychological skills required of an interior designer. Assessment of student progress includes a second semester portfolio evaluation, and a senior year portfolio review, Senior Show, and comprehensive examination.

By limiting enrollment through selective advancement at the sophomore level through portfolio review, individual attention in advanced course work is increased. Students are also provided opportunities to work with actual clients in a classroom setting while developing graphic, written and oral communication, and problem solving skills. The Colorado State interior design program is the only Foundation for Interior Design Education and Research (FIDER)-accredited, four-year program in Colorado.

The Interior Design core curriculum includes: design analysis; design of interior space; assessment of client needs; space planning and design; construction/building systems and codes; business principles of interior design; computer-aided design, animation, and multimedia; graphic visualization; history of interiors; barrier-free design; and interior environmental issues.

Through this curriculum students will gain a conceptual understanding of the design process and gain the skills required as an interior designer. The Department of Design and Merchandising has excellent teaching facilities, including, interior design studios, resource rooms, computer labs, merchandising simulations, software evaluation, data analysis, and word processing.

Characteristics And Skills

- Creative, ability to visualize
- Strong sense of space, light, and color
- Like to work with construction materials
- Belief in the importance of interior environments
- Interest in design
- Like to work with people
- Client oriented
- Strong communications skills

Potential Occupations

The professional interior designer is one who is qualified by education, experience and testing to identify, research, and creatively solve problems relative to the function and quality of human built environments. 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 examples include, but are not limited to: interior designer; consultant; color specialist; lighting specialist; restoration specialist; special needs consultant; writer; draftsman; sales representative.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
AR 101	Visual Form	3	
AR 135	Introduction to Drawing	3	
OR			
ID 166	Design Sketching	3	
BD 150	Business Computing Concepts and Applications	3	
COCC 150	College Composition (Composition Placement Exam)	3	2A
DM 130	Design Appreciation	3	
HSCC 192	Applied Human Sciences First Year Seminar	2	1
ID 175	Small-Scale Interiors (DM 130 or concurrent reg.)	3	
MC 131	Graphic Communications/CAD	3	
MC 151	Introduction to Manufacturing and Construction	3	
	Additional communication ¹	3	2B
	Health and wellness ²	2	3G
	TOTAL	31	
SOPHOMORE			
ARCC 100	Introduction to the Visual Arts	3	3B
DM 120	Textiles	3	
DM 220	Professional Communications and Ethics	3	
DMCC 263	Historical Perspectives of Material Culture	3	3D
ID 266	Design Communications I (MC 131)	3	
ID 296AV	Group Study-Space Planning and Application (acceptance into professional ID program)	3	
ID 296BV	Group Study-Design Application (acceptance into professional ID program)	3	
MC 231	Architectural Plan Reading (MC 131, MC 151)	2	

MC	235	Construction Graphics (MC 131, MC 231 or concurrent reg.)	2	
PYCC	100	General Psychology	3	3C
		Mathematics ³	3	2C
		TOTAL	31	
JUNIOR				
ID	320	Computer-Aided Design (formal admission to junior-level courses)	3	
ID	330	Color and Light (ID 275)	3	
ID	340	Interior Materials and Market Study (formal admission to junior-level courses)	3	
ID	357	History of International Interiors (AR/ARCC 100)	3	
ID	375	Interior Design II (formal admission to junior-level courses)	3	4A
ID	376	Interior Design III (ID 320, ID 330, ID 375)	3	
ID	460	Housing and Design for Special Populations (ID 275)	3	
		Biological/physical sciences ⁴	7	3A
		Logical/critical thinking ⁵	3	2D
		TOTAL	31	
SENIOR				
ID	430	Environmental Technologies (ID 375 or senior status in restaurant/resort management or written consent of instructor)	3	
ID	440	Professional Practice for Interior Designers (ID 375)	2	
ID	457	History of American Interiors (AR/ARCC 100)	3	
ID	475	Interior Design IV (ID 340, ID 357, ID 366, ID 376)	3	4B
ID	476	Comprehensive Design Project and Portfolio (ID 320, ID 457, ID 475)	3	4C
ID	496AV/ ID 496BV	Group Study (written consent of instructor)	3	
PY	316	Environmental Psychology (PY/PYCC 100)	3	
		Global and cultural awareness ⁶	3	3E
		U.S. public values and institutions ⁷	3	3F
		Elective ⁸	1	
		TOTAL	27	

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 3G 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 3A in the AUCC. Courses must have two different prefixes and one must have a laboratory component.

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

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

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

⁸ Electives may include DM 492, Preinternship Seminar (1 credit), and DM 487D, Internship.

Graduate Program in Design and Merchandising

The department offers a graduate program leading to the master of arts or the master of science degree in design, merchandising, and consumer sciences. Students have the choice of four specializations—apparel and textiles, interior design, merchandising, and an individualized program within the general requirements of the department and Graduate School. For more information about the specializations 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 Arthur Campfield, Head

Major in Nutrition and Food Science

Are you curious about the linkage between nutrition and health? Does helping people increase their well-being and health through improved nutrition appeal to you? Would you like to do nutritional research, education or counseling? Would you enjoy working in institutional or commercial food service or in the food industry? If any of your answers to these questions is “yes,” then a major in nutrition and food science may be the one for you.

Public interest in the relationship among nutrition, health and fitness is at a high level and increasing. The nutrition and food science major involves integration of the biological, physical, medical, and social sciences and their application to the improvement of human nutrition and fitness and improved quality of life. The major is both science and human service oriented.

Nutrition and food science graduates gain a scientific understanding of the principles of human nutrition, the role of nutrition in the prevention and management of disease, delivery of nutritional care, and the principles of nutrition assessment and food preparation. Additionally, graduates know the techniques of interviewing, counseling, information management, and effective communications.

Four concentrations are available in this major: dietetics; food science, nutrition and fitness; and nutritional sciences.

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
- Possess organizational and management skills

Potential Occupations

Participation in community outreach, internships, volunteer activities, or cooperative education opportunities is highly recommended to enhance your 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 at the middle school or secondary level should explore the interdepartmental major in consumer and family studies and its education concentration. This allows combining nutrition and food science interests while fulfilling the requirements for teacher licensure.

Dietetics Concentration

The dietetics concentration 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. The concentration is designed to prepare students for a dietetic internship and a professional career in medical nutrition therapy or nutrition counseling. The program meets American Dietetic Association (ADA) requirements.

Course		Title (Prerequisite)	Cr	AUCC
FRESHMAN				
BD	150	Business Computing Concepts and Applications	3	
		OR		
CS	110	Personal Computing	4	
BZCC	110	<i>Select from the following courses:</i> Principles of Animal Biology	3	3A
		AND		
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
		<i>Select one set of the following courses:</i>		
C CC	107	Fundamentals of Chemistry (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	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
ECCC	101	Economics of Social Issues	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 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

PYCC	100	General Psychology	3	3C		
S CC	100	General Sociology	3	3C, 3F		
TOTAL			32-36			
SOPHOMORE						
AY	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			
PS	300					
OR						
BZ	310/	Fundamentals of Physiology (BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110; C 245 or concurrent reg.)	3			
PS	310					
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			
MB	300	General Microbiology (C 245 or C 341 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			
OT	215	Medical Terminology	1			
PS	302	Laboratory in Principles of Physiology (AY 300/PS 300 or BZ 310/PS 310 or concurrent reg.)	2			
		Foundations and perspectives ¹	9	3B, 3D, 3E		
TOTAL			33-34			
JUNIOR						
BC	351	Principles of Biochemistry (C 245 or C 343 or concurrent reg. in C 343)	4			
BN	305	Fundamentals of Management	3			
COCC	300	<i>Select one of the following courses:</i> 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	350	Human Nutrition (AY 300/PS 300 or BZ 310/PS 310, C 245)	3			
FN	360	Nutrition Assessment (C 246 or C 344, FN 350)	3			
FN	386	Practicum in Food Service Management	2			
FN	496A-I	Group Study (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			29	
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 301 or BC 351)	4	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 301 or BC 351)	3			
FN	492	Seminar in Dietetics and Nutrition (minimum of 12 credits in FN courses and senior standing)	3	4C		
FN	496A-I	Group Study (FN 350)	1			
FT	447	Food Chemistry (C 245; BC 351 or concurrent reg.)	2			
		Electives			1	
TOTAL			26			

PROGRAM TOTAL = 120-125 credits

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

Food Science Concentration

The food science concentration provides students with a scientific understanding of the chemical and physical properties of food, food microbiology, food engineering and manufacturing principles, and the sensory analysis and quality control of food systems. The coursework is strongly science based with a focus on the technical areas of the food industry. This concentration is approved by the Institute of Food Technologists (IFT), making students eligible for IFT scholarships. This concentration is well suited for students wanting to enter the technical areas of the food industry or attend graduate school in food science.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select 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
OR			
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 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	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
FNCC	150	Survey of Human Nutrition	3	3G
FT	110	Introduction to Food Science and Technology (high school chemistry)	3	
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
PYCC	100	General Psychology	3	3C
S CC	100	General Sociology	3	3C, 3F
TOTAL			29-32	
SOPHOMORE				
AY PS	300/300	Principles of Human Anatomy and Physiology (C/C CC 103 or C/C CC 107 or C/C CC 111; LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110)	4	
OR				
BZ PS	310/310	Fundamentals of Physiology (LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110; C 245 or concurrent reg.)	3	
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 reg.)	1	
ECCC	101	Economics of Social Issues	3	3C
FN	350	Human Nutrition (AY 300/PS 300 or BZ 310/ PS 310; C 245)	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
Professional requirements ¹			3	
Foundations and perspectives ²			9	3B, 3D, 3E
TOTAL			32-34	
JUNIOR				
FT	369	Food Processing (C 245, MB 300, PH/PHCC 121)	3	
FT	447	Food Chemistry (C 245; BC 301 or BC 351 or concurrent reg.)	2	4B
FT	448	Food Chemistry Laboratory (FT 447 or concurrent reg.)	1	4A
MB	300	General Microbiology (C 245 or C 341 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	
Professional requirements ¹			6	
Upper division FN ³			6	
Electives			6	
TOTAL			29	
SENIOR				
FN	492	Seminar in Dietetics and Nutrition (minimum of 12 credits in FN courses and senior standing)	3	4C
<i>Select a minimum of two courses from the following:</i>				
FT	230	Alcoholic Beverage Technology and Control (C/C CC 103 or C/C CC 107)	2	
AN	360	Principles of Meat Science (C/C CC 107 or C/C CC 111)	3	
FT	400	Food Safety (six credits in biology or chemistry)	3	
AN	460	Meat Processing (AN 360)	3	
FT	420	Quality Assessment of Food Products (FT 110; MB 300)	3	
FT	449	Food Analysis (FT 447)	3	
MB	334	Food Microbiology (MB 301 or MB 302)	4	
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
Professional requirements ¹			6	
Upper division FN ³			3	
TOTAL			30-31	

PROGRAM TOTAL = 120-125 credits

¹ Select a minimum of 15 credits from the following (*Institute of Food Technologists accredited program courses): BA 205, BC 351, *BH 306, BN 305, *M/M CC 125, *M/M CC 126, *M/M CC 141 OR M/M CC 155, *PH/PHCC 121.

² Select one course from each category (3B, 3D, 3E) in the All-University Core Curriculum (AUCC).

³ Select 300-level or above FN courses.

Nutrition and Fitness Concentration

The nutrition and fitness concentration 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 concentration 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 4 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
OR			
LSCC 102	Attributes of Living System (high school chemistry)	4	3A
<i>Select one set of courses from the following:</i>			
C CC 107	Fundamentals of Chemistry (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 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
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
PYCC 100	General Psychology	3	3C
S CC 100	General Sociology	3	3C, 3F

		TOTAL	29-33
SOPHOMORE			
AY 300/ PS 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
OR			
BZ 310/ PS 310	Fundamentals of Physiology (BY 102/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110; C 245 or concurrent reg.)		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 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
PS 302	Laboratory in Principles of Physiology (AY 300/PS 300 or BZ 310/PS 310 or concurrent reg.)		2
	Foundations and perspectives ¹	9	3B, 3D, 3E
TOTAL			32-33
JUNIOR			
AY 301	Human Gross Anatomy (AY 300/PS 300)		5
BC 351	Principles of Biochemistry (C 245 or C 343 or concurrent reg. in C 343)		4
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 (AY 300/PS 300)		4
FN 350	Human Nutrition (AY 300/PS 300 or BZ 310/PS 310; C 245)		3
FN 360	Nutrition Assessment (C 246 or C 344; FN 350)		3
MB 300	General Microbiology (C 245 or C 341 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
PS 420	Cardiopulmonary Physiology (AY 300/PS 300)		3

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
TOTAL			33	
SENIOR				
EX	405	Exercise Testing Instrumentation (EX 403)	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 301 or BC 351)	4	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 301 or BC 351)	3	
FN	492	Seminar in Dietetics and Nutrition (minimum of 12 credits in FN courses and senior standing)	3	4C
FN	496A-I	Group Study ¹ (FN 350)	2	
FT	447	Food Chemistry (C 245; BC 301 or BC 351 or concurrent reg.)	2	
		Electives	1	
TOTAL			26	

PROGRAM TOTAL = 120-125 credits

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

² Two semesters, select any subtopic.

Nutritional Sciences Concentration

The nutritional sciences concentration 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 concentration 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			
BY	103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4
OR			
BZCC	120	Principles of Plant Biology	4 3A
<i>Select 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
OR			
LSCC	102	Attributes of Living Systems (high school chemistry)	4 3A

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	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)	3	2A
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
M CC	125	Numerical Trigonometry (M/M CC 118 or M/M CC 121 or placement)	1	2C
PYCC	100	General Psychology	3	3C
S CC	100	General Sociology	3	3C, 3F
TOTAL			32	

SOPHOMORE

AY	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
PS	300		
OR			
BZ	310/	Fundamentals of Physiology (BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110; C 245 or concurrent reg.)	3
PS	310		
C	341	Organic Chemistry I (C 113)	3
C	343	Organic Chemistry II (C 341)	3
C	344	Organic Chemistry Laboratory (C 114; C 343 or concurrent reg.)	2
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 (C 245 or C 341 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
OT	215	Medical Terminology	1
PS	302	Laboratory in Principles of Physiology (AY 300/PS 300 or PS 310/BZ 310 or concurrent reg.)	2

		Foundations and perspectives ¹	6	3B, 3D, 3E
		TOTAL	32-33	
JUNIOR				
BC	351	Principles of Biochemistry (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; 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	
FN	350	Human Nutrition (AY 300/PS 300 or PS 310/BZ 310; C 245)	3	
		<i>Select one of the following courses:</i>		
COCC	300	Writing Arguments (CO/COCC 150)	3	2B2 or 2D
JTCC	300	Professional and Technical Communication (CO/COCC 150)	3	2B2
SPCC	200	Public Speaking	3	2B1
PHCC	121	General Physics I (Corequisite: M/M CC 125)	5	3A
PHCC	122	General Physics II (PH/PHCC 121)	5	3A
		Foundations and perspectives ¹	3	3D
		TOTAL	31-32	
SENIOR				
FN	360	Nutrition Assessment (C 246 or C 344; FN 350)	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 301 or BC 351)	4	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 301 or BC 351)	3	
FN	492	Seminar in Dietetics and Nutrition (minimum of 12 credits of FN courses and senior standing)	3	4C
FN	496A-I	Group Study in Dietetics and Nutrition ² (FN 350)	2	
STCC	201	General Statistics (M/M CC 120A-B)	3	2D
		TOTAL	27	
PROGRAM TOTAL = 123 credits				

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

² Student may choose any two subtopics from FN 496A-I.

Major in Restaurant and Resort Management

Have you always wanted to run a hotel, or recreational resort? Does running a restaurant in a mountain lodge sound appealing to you? Is working in the hospitality industry your idea of a great occupation? If the answer to any of these questions is “yes,” then a degree in restaurant and resort management may be the right one for you.

Restaurant and resort management combines special 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 your practical training and development. The food service industry: includes restaurants, resorts and hotels, clubs, fast food service, food 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; dietitian; 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 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
OR			
BZCC 120	Principles of Plant Biology	4	3A
C CC 107	Fundamentals of Chemistry (M/M CC 120A-B or placement in M/M CC 121 or higher)	4	3A
COCC 150	College Composition (Composition Placement Exam)	3	2A
ECCC 202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	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 (RR 100)	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	
EC 300	Managerial Economics (EA/EACC 202 or EC/ECCC 202)	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 and Systems-Production and Purchasing (FN 310)	3	
FN 414	Food Service Systems-Operations Analysis (FN 310)	3	
FT 230	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, junior standing)	3	4B
S CC 100	General Sociology	3	3C, 3F
		Electives	3
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
		Electives, upper division	3
TOTAL			30

PROGRAM TOTAL = 120 credits

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

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 and opportunity for a nonmajor to gain a significant orientation to a food, nutrition, and health-related field.

Course	Title (Prerequisite)	Cr	AUCC
UPPER DIVISION			
AY PS	300/ 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	
BC	301* Survey of Biochemistry (C 245)	3	
OR			
BC	351* Principles of Biochemistry (C 245 or C 343 or concurrent reg. in C 343)	4	
FN	350* Human Nutrition (AY 300/PS 300 or PS 310/BZ 310, C 245)	3	
FN	360* Nutrition Assessment (C 246 or C 344, FN 350)	3	
FN	450 Diet and Disease (FN 350, BC 301 or BC 351)	4	
FN	451 Community Nutrition (FN 350)	3	
FN	459 Nutrition in the Life Cycle (FN 350)	3	
PROGRAM TOTAL = 23-24 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

Are you interested in helping individuals improve their health and fitness? Do you enjoy working with people across the lifespan? Is medicine or physical therapy in your horizon? If you answer “yes” to any of these questions, then a major in health and exercise science may be the one for you.

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; athletic trainer. 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			
BZCC 101	Select from the following: Humans and Other Animals	3	3A
BZCC 110	OR Principles of Animal Biology	3	3A
BZCC 111	AND Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.)	1	3A
LSCC 102	OR Attributes of Living Systems (high school chemistry)	4	3A
Select one pair of courses from the following:			
C CC 103	Chemistry in Context	3	3A
C CC 104	Chemistry in Context Laboratory (C/C CC 103 or concurrent reg.)	1	3A
C CC 107	OR Fundamentals of Chemistry (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
C CC 111	OR 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
COCC 150	College Composition (Composition Placement Exam)	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	24 - 26	
SOPHOMORE			
AY 300/ PS 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	
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 (AY 300/PS 300)	3	
EX 403	Physiology of Exercise (AY 300/PS 300)	4	4B
	Global and cultural awareness ⁴	3	3E
	TOTAL	10	

SENIOR

Course	Title (Prerequisite)	Cr	AUCC
STCC 201	Select one of the following: 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	4C
	TOTAL	5	

CORE TOTAL = 51-53 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, 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, 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. You will 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 300/PS 300, AY 301, EXCC 123, 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			
FNCC 150	Survey of Human Nutrition	3	3G
EX 332F	Techniques of Teaching Weight Training (corresponding lab or competency in area)	1	

PS	122	Drugs and the Human Body	2	
		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 118 or M/M CC 120A-B)	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 (Corequisite: 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)	3	4A
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 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, as well as an internship required for athletic training certification. Athletic trainers deal with the prevention, treatment, and rehabilitation of athletic injuries. This concentration was structured for three types of students: 1) those seeking pre-professional preparation in medical fields or physical therapy, 2) students planning to pursue a master's degree in exercise science, and 3) those who are going into athletic training.

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			
AY 301	Human Gross Anatomy (AY 300/PS 300)	5	
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	
PS 302	Laboratory in Principles of Physiology (AY 300/PS 300 or PS 310/BZ 310 or concurrent reg.)	2	
	TOTAL	18	
JUNIOR			
BC 301	Survey of Biochemistry (C 245)	3	
	OR		
BC 351	Principles of Biochemistry (C 245 or C 343 or concurrent reg. in C 343)	4	
	<i>Select from the following:²</i>		
BY 103	Biology of Organisms-Animals and Plants (BY 102/LSCC 102)	4	
	OR		
BZCC 110	Principles of Animal Biology	3	3A
	AND		
BZCC 111	Animal Biology Laboratory (BZCC 110 or concurrent reg.)	1	3A
	OR		
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
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	21 - 22	
SENIOR				
EX	405	Exercise Testing Instrumentation (EX 403)	2	
EX	476	Rehabilitation Exercise (EX 240, EX 303)	3	4A
EX	479	Psychology and Sport (PY/PYCC 100)	3	
FN	350	Human Nutrition (AY 300/PS 300 or PS 310/BZ 310, C 245)	3	
HDCC	101	Individual and Family Development	3	
		OR	3	
PY	320	Abnormal Psychology (PY/PYCC 100)	3	
		EX, upper division ³	3	
		Electives	6-9	
		TOTAL	23-26	

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 (AY 300/PS 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 degree. 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

Are you curious about the way human beings grow and develop? Have you ever wondered how environmental and social factors affect physical, cognitive, and emotional development? Are you interested in learning more about specific stages of human development such as infancy, childhood, adolescence, adulthood, and aging? Does the study of family dynamics or the aging process intrigue you? Have you ever thought about a career in early childhood education, in family counseling, or working with youth in various settings? Would you like to work with hospitalized children to help reduce the stress of medical treatment on them and their families? If your answer to any of these questions is "yes," then a major in human development and family studies may be for you.

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. 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. 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.

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 setting 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
BZCC 101	Humans and Other Animals	3	3A
COCC 150	College Composition (Composition Placement Exam)	3	2A
HDCC 101	Individual and Family Development	3	3C
HSCC 192	Applied Human Sciences First Year Seminar	3	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	30	
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 302	Marriage and Family Relationships (PY/PYCC 100, S/S CC 100)	3	
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	6
TOTAL	27-30

SENIOR

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.)	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. 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.

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.

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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
AY 254/ HD 254	Biological Aspects of Human Development (BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110)	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 students 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			
AY 300/ PS 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	
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

Programming for Adult/Later Life Families 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 301	Perspectives in Gerontology (HD/HDCC 101 or PY/PYCC 100 or S/S CC 100 or written consent of instructor)	3	
HD 332	Death, Dying, and Grief (HD/HDCC 101)	3	

SENIOR

AY	354/	Biological Aspects of Aging	3
HD	354	(BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110)	
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

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				
AY	254/	Biological Aspects of Human	3	
HD	254	Development (BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110)		
HD	375	Programming for Children and Families (HD 286, HD 310)	3	

SENIOR

HD	401	<i>Select one of the following:</i> Childhood Socialization (HD 310, HD 334)	3	
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 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 preparing to teach young children. A knowledge of developmental processes and family systems prepares future teachers to work in partnership with parents in educating children.

Students aspiring to careers in educating young children can complete course work necessary to enter a teacher licensure program while completing their human development and family studies degree requirements. The state of Colorado licenses teachers of young children at two levels: 0-8 years (early childhood), and preschool to sixth grade (elementary). Department advisers will assist students in meeting the

requirements for early childhood or elementary education licensure.

Requirements for teacher licensure vary from state to state. Students wishing to be licensed in states other than Colorado are advised to contact the specific state's Department of Education.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
BZCC 101	Humans and Other Animals	3	3A
COCC 150	College Composition (Composition Placement Exam)	3	2A
HDCC 101	Individual and Family Development	3	3C
HD 217	Creative Experiences for Children (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 254/AY 254	Biological Aspects of Human Development (BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110)	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 ³	3	2B
	Biological/physical sciences ⁵	4	3A
	Logical/critical thinking ⁶	3	2D
	TOTAL	31	
JUNIOR			
ED 400	Diagnostic Teaching of Reading (ED 310/EDCC 275, ED 340, HD 217, HD 310, HD 400)	3	

ED	425	Early Childhood Education I (ED 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 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-E or concurrent reg. or written consent of instructor)	3	4C
HD	493	Specialized Seminar (written consent of instructor)	1	
PY	460	Childhood Exceptionality and Psychopathology (PY/PYCC 100)	3	
		TOTAL	30	

PROGRAM TOTAL = 121 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. 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.

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 degree. Areas of emphasis include developmental processes, individual and family programming, 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 three academic programs leading to a bachelor of science degree: construction management, industrial technology management, and technology education and training.

Pre-Manufacturing Technology and Construction Management (MTCM) Program

All students 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 University Studies Program. When the student approaches completion of the Pre-MTCM program, application must be made to the major of the student's choice.

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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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	141	Applications of Energy/Transportation	2	
MC	151	Introduction to Manufacturing and Construction	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	28	
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	131	Graphic Communications/CAD	3	
MC	241	Energy Controls for Industry	3	
MC	251	Materials Testing and Processing (MC 151, PH/PHCC 111)	3	
SPCC	200	Public Speaking	3	2B1
		TOTAL	16	

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, industrial technology management, or technology education and training.

Major in Construction Management

Do you marvel at the big construction projects: buildings, bridges, airports, and roads? Have you always wondered how those big projects come together, how the materials, machines, and people are coordinated in space and time to produce those immense structures? Are you a technologist at heart, someone who would like to apply science, engineering, machines, and people to the builder's art? Would you enjoy knowing your work may endure the ages? Does effectively managing people and equipment on a large-scale intrigue you? If your answers to any of these questions are "yes," then a major in Construction Management may be the one for you.

The construction management program at Colorado State University is one of the highest ranked in the nation. Since its inception in 1946, more than 2,800 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 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). Additionally, many departmental scholarships are available. Many opportunities exist for internships and work experience in the construction industry to satisfy the six-month internship requirement.

Characteristics and Skills

- Independent, self motivated
- Athletic, prefer being physically active
- Goal oriented
- Practical, self motivated
- Enjoy working with hands and using tools and machinery
- Ability to conceptualize complex processes and relationships
- Aptitude for understanding physical relationships and processes
- Ability to work with large diverse groups of people
- Mechanical and scientific aptitude
- Strong organizational skills
- Strong communications skills
- Leadership ability

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 are currently over 5.4 million people employed in the US construction industry. Almost a million more will be hired by 2000. Placement of CM graduates in the industry is at 100 percent. Currently, average starting salaries range from \$33,000 to \$40,000.

Participation in internships, volunteer activities, and 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.

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.

MC	362	Construction Contracts (MC 231)	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, MC 365 or concurrent reg.)	3	
MC	461	Construction Project Scheduling and Cost Control (MC 365)	3	
		Technical elective ²	2	
		TOTAL	28	

SENIOR

BGCC	205	Fundamentals of Business Law	3	3F
CE	350	Soil Engineering for Nonengineers (CE 359)	3	
CE	370	Introductory Structural Engineering (CE 359, F 432)	3	
F	432	Design of Wood Structures (CE 360)	3	
MC	317	Safety Management	2	
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, MC 462 or concurrent reg.)	2	4C
MC	487A	Internship-Construction Management	6	
		Technical elective ²	2	
		TOTAL	32	

PROGRAM TOTAL = 120 credits

¹ Select from list of courses in category 2D in the All-University Core Curriculum (AUCC).

² Select from department list of approved courses.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
SOPHOMORE			
M CC 141	Calculus in Management Sciences (M/M CC 118 or M/M CC 121)	3	2C
MC 231	Architectural Plan Reading (MC 131, MC 151)	2	
MC 261	Construction Surveying (M/M CC 125)	3	
MC 363	Quality Surveying (MC 231 or concurrent reg.)	2	
MC 364	Advanced Construction Systems (MC 231 or concurrent reg. or MC 233)	3	
	Logical/critical thinking ¹	3	2D
	TOTAL	16	

JUNIOR

BA 205	Fundamentals of Accounting	3	
BN 305	Fundamentals of Management	3	
BN 473	Labor Relations and Collective Bargaining	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 118 or M/M CC 120A-B)	3	3C

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	Introduction to Manufacturing and Construction	3	
	TOTAL	6	
UPPER DIVISION			
MC 362*	Construction Contracts (MC 231)	2	
MC 363*	Quantity Surveying (MC 231 or concurrent reg.)	2	
MC 364*	Advanced Construction Systems (MC 231 or concurrent reg. or MC 233)	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

<i>Select six credits from the following:</i>			
BF	360*	Real Estate Principles (EC/ECCC 204)	3
MC	251*	Materials Testing and Processing (MC 151, PH/PHCC 111)	3
MC	361*	Mechanical and Electrical Systems (MC 241)	3
MC	464	Construction Project Administration (MC 362, MC 461 or concurrent reg.)	2

TOTAL			19

PROGRAM TOTAL = 25 credits without prerequisites

*Additional course work may be required because of prerequisites.

Major in Industrial Technology Management

Are you fascinated with technology and do you want to get into its fast changing world? Have you ever wanted to manage a large, modern, and complex operation like a high-tech manufacturing plant? Do you like working with people and making things happen? Would you like to help run an industrial operation with big customers and many employees? Do you have an invention that you would like to mass-produce? If your answer to any of these questions is “yes,” then industrial technology management may be the thing for you.

The industrial technology management major is an interdisciplinary curriculum designed for students pursuing mid-management careers in industrial technology-related positions. Students will complete coursework in product development, manufacturing processes, quality improvement, safety, and management strategies. Industrial technology management addresses the integration and management of personnel and processes related to the manufacturing, distribution, and service industries. Emphasis is placed on the development of skills that enhance organizational competitiveness through the optimal design of products, services, and systems that integrate material, technological, and environmental issues with human factors such as interpersonal communications, group dynamics, leadership skills, and ergonomics.

The program is accredited by the National Association of Industrial Technology, and affiliated with the Society of Manufacturing Engineers, the Society Plastics Engineers, the American Society of Quality.

Characteristics And Skills

- Technical skills
- Leadership ability
- Good decision making ability
- Management and organizational skills,
- Effective use of time
- Ability to motivate others

Potential Occupations

Graduates find initial employment in industrial, manufacturing, process, and quality engineering; supervision; materials management; scheduling; CAD/CAM; or technical sales. 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. Career occupations are found in the manufacturing, electronics, aerospace, and transportation industries.

Some example occupations include, but are not limited to: manufacturing supervisor; manufacturing engineer; production supervisor; manufacturing technician; production control specialist; safety engineer; risk manager.

In addition to the Pre-MTCM core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
M CC 141	Calculus in Management Science (M/M CC 118 or M/M CC 121)	3	2C
MC 210	Quality Improvement Techniques	3	
MC 233	Manufacturing Graphics (MC 131, MC 151)	3	
PYCC 100	General Psychology	3	3C
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
TOTAL		15	
JUNIOR			
BA 205	Fundamentals of Accounting	3	
BN 300	Production Fundamentals (ST/STCC 204 or ST/STCC 301)	3	
BN 471	Micro Issues in Supply Chain Management (BN 375)	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	
JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2
OR			
JT 301	Business Communication (CO/COCC 150)	3	
MC 242	Analog and Digital Electronics (MC 241)	3	
MC 310	Process Planning and Costing (MC 210)	3	
MC 342	Industrial Controls (MC 242)	3	
MC 352	Advanced Manufacturing Processes-Metals (MC 251)	3	
MC 452	CAD and Computer-Aided Manufacturing (CE 359, MC 233, MC 352)	3	
TOTAL		30	

SENIOR

BGCC	205	Fundamentals of Business Law	3	3F
BN	305	Fundamentals of Management	3	
MC	317	Safety Management	2	
MC	318	Manufacturing Facilities Planning (BN 301, JT/JTCC 300, SP/SPCC 200)	3	4A
<i>Select one of the following:</i>				
MC	353	Industrial Plastics (C/C CC 104, MC 251)	3	
MC	354	Advanced Manufacturing Processes-Woods (MC 251)	3	
MC	364	Advanced Construction Systems (MC 231 or concurrent reg. or MC 233)	3	
MC	410	Modern Manufacturing Management Strategies (BN 471, MC 310, MC 318)	3	4B
MC	442	Electronics in Manufacturing (MC 342)	3	
MC	474	Production Development and Manufacturing (MC 452)	3	4C
		Electives	8	
		TOTAL	31	

PROGRAM TOTAL = 120 credits

Minor in Industrial Technology Management

The minor in industrial technology management will benefit majors in related disciplines such as construction management, technology education and training, interior design, and programs in business and engineering. This minor will provide interdisciplinary opportunities favored by industry advisers.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LOWER DIVISION			
MC	131	Graphic Communications/CAD	3
MC	151	Introduction to Manufacturing and Construction	3
MC	210	Quality Improvement Techniques	3
MC	233	Manufacturing Graphics (MC 131, MC 151)	3
MC	241	Energy Controls for Industry	3
		TOTAL	15

UPPER DIVISION

MC	310	Process Planning and Costing (MC 210)	3
MC	317	Safety Management	2
MC	318*	Manufacturing Facilities Planning (BL 300, JT/JTCC 300, SP/SPCC 200)	3

<i>Select six credits from the following:</i>			
MC	251*	Materials Testing and Processing (MC 151, PH/PHCC 111)	3
MC	342*	Industrial Controls (MC 242)	3
MC	352*	Advanced Manufacturing Processes-Metals (MC 251)	3
MC	353*	Industrial Plastics (C/C CC 104; MC 251)	3
MC	410*	Modern Manufacturing Management Strategies (BL 471, MC 310, MC 318)	3
MC	442*	Electronics in Manufacturing (MC 342)	3
MC	452*	CAD and Computer-Aided Manufacturing (CE 359, MC 233, MC 352)	3
MC	474*	Product Development and Manufacturing (MC 352 or MC 354)	3
		TOTAL	14

PROGRAM TOTAL = 29 credits without prerequisites

Major in Technology Education and Training

Are you fascinated with technology and want to help others get into this fast changing world? Have you ever wanted to teach applied technology in an educational setting such as a high school or vocational school? Do you like working with people to help them learn better ways to make things happen? Would you like to train workers and managers how to apply the latest manufacturing technologies? Do you want to teach kids about the latest technologies and possibilities for the future? If your answer to any of these questions is “yes,” then technology education and training may be the thing for you.

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

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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 141	Applications of Energy/Transportation	2	
MC 151	Introduction to Manufacturing and Construction	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	28	
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
COCC 300	Writing Arguments (CO/COCC 150)	3	2D
	OR		
SPCC 207	Rhetoric and Argumentation	3	2D
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
MC 131	Graphic Communications/CAD	3	
MC 210	Quality Improvement Techniques	3	

MC 241	Energy Controls for Industry	3	
MC 251	Materials Testing and Processing (MC 151, PH/PHCC 111)	3	
MC 352	Advanced Manufacturing Processes-Metals (MC 251)	3	
PYCC 100	General Psychology	3	3C
SPCC 200	Public Speaking	3	2B1
	Mathematics ⁶	2	2C
	TOTAL	33	

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 (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	
MC 233	Manufacturing Graphics (MC 131, MC 151)	3	
MC 242	Analog and Digital Electronics (MC 241)	3	
MC 317	Safety Management	2	
MC 353	Industrial Plastics (C/C CC 104; MC 251)	3	
MC 354	Advanced Manufacturing Processes-Woods (MC 251)	3	
MC 474	Product Development and Manufacturing (MC 352 or MC 354)	3	4A
	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-Methods and Assessment (admission to Teacher Licensure Program)	1	
ED 493A	Seminar-Professional Relations (ED 450, VE 465, concurrent reg. in ED 485A or B or VE 485)	1	
	OR		
VE 492	Seminar (ED 450, VE 465; concurrent reg. in ED 485 A or B or VE 485)	1	
ED 493B	Seminar-Assessment of Learning (ED 450, VE 465, concurrent reg. in ED 485A or B or VE 485)	1	
MC 473	Technology Applications (MC 241, MC 251)	3	4C
VE 465	Methods and Materials in Technology Education	3	4B

Technical elective	4
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 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 2C in the AUCC.

Trade and Industry Education Option

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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 141	Applications of Energy/Transportation	2	
MC 151	Introduction to Manufacturing and Construction	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	28	
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
COCC 300	Writing Arguments (CO/COCC 150)	3	2D
	OR		
SPCC 207	Rhetoric and Argumentation	3	2D
EDCC 275	Schooling in the United States (consent of Teacher Licensure Office)	3	3F
MC 131	Graphic Communications/CAD	3	
MC 210	Quality Improvement Techniques	3	
MC 241	Energy Controls for Industry	3	
MC 242	Analog and Digital Electronics (MC 241)	3	
MC 251	Materials Testing and Processing (MC 151, PH/PHCC 111)	3	
PYCC 100	General Psychology	3	3C
SPCC 200	Public Speaking	3	2B1
	Mathematics ⁶	2	2C
	TOTAL	33	

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 233	Manufacturing Graphics (MC 131, MC 151)	3	
MC 261	Construction Surveying (M/M CC 125)	3	
MC 317	Safety Management	2	
MC 474	Product Development and Manufacturing (MC 352 or MC 354)	3	4A
	Work experience credit, upper-division		3-30
	TOTAL		18-45

SENIOR

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	
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 Learner (ED 450, VE 465; concurrent reg. in ED 485A or B or VE 485)	1	
MC 473	Technology Applications (MC 241, MC 251)	3	4C
VE 465	Methods and Materials in Technology Education	3	4B
VE 485	Student Teaching (ED 450, VE 465)	11	
VE 492	Seminar (ED 450, VE 465; concurrent reg. in ED 485A or B or VE 485)	1	
	Technical electives, upper-division		0-13
	TOTAL		28-41

PROGRAM TOTAL = 120-134 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 3E in the AUCC.

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

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

⁶ Select from list of courses in category 2C in the AUCC.

Technology Education (Non-Licensure) Concentration

Industrial and Corporate Training Option

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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 141	Applications of Energy/Transportation	2	
MC 151	Introduction to Manufacturing and Construction	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	28	
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
COCC 300	Writing Arguments (CO/COCC 150)	3	2D
OR			
SPCC 207	Rhetoric and Argumentation	3	2D
ECCC 202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	3	3C
MC 131	Graphic Communications/CAD	3	
MC 210	Quality Improvement Techniques	3	
MC 241	Energy Controls for Industry	3	
MC 251	Materials Testing and Processing (MC 151, PH/PHCC 111)	3	
PYCC 100	General Psychology	3	3C
SPCC 200	Public Speaking	3	2B1
STCC 110	Statistical Thinking: Concepts and Applications (Math Placement Exam)	3	2D
	Mathematics ⁶	2	2C
	TOTAL	33	
JUNIOR			
BA 205	Fundamentals of Accounting	3	
ECCC 204	Principles of Macroeconomics (EC/ECCC 202 or EA/EACC 202)	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	

JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B2 or 2D
MC 233	Manufacturing Graphics (MC 131, MC 151)	3	
MC 242	Analog and Digital Electronics (MC 241)	3	
MC 352	Advanced Manufacturing Processes-Metals (MC 251)	3	
MC 353	Industrial Plastics (C/C CC 104; MC 251)	3	
MC 354	Advanced Manufacturing Processes-Woods (MC 251)	3	
MC 474	Product Development and Manufacturing (MC 352 or MC 354)	3	4A
PY 316	Environmental Psychology (PY/PYCC 100)	3	
	TOTAL	31	
SENIOR			
BN 305	Fundamentals of Management	3	
BN 310	Human Resource Management	3	
BN 474	Human Resource Planning and Development (BN 310)	3	
BP 350	Employment Law and Policy	3	
MC 317	Safety Management	2	
MC 473	Technology Applications (MC 241, MC 251)	3	4C
PY 352	Psychology of Learning (PY/PYCC 100 or written consent of instructor)	3	
VE 465	Methods and Materials in Technology Education	3	4B
	Technical electives		5
	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 1 in the AUCC.

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 3D in the AUCC.

⁶ Select from list of courses in category 2C in the AUCC.

Graduate Programs in Manufacturing Technology and Construction Management

The Department of Manufacturing Technology and Construction Management offers graduate programs leading to a master of science degree. Programs are designed for students with specialized studies in technology education and training, construction management, and industrial technology management. Programs are designed to meet the individual needs of students with courses reflecting the currently accepted principles and techniques for solving problems in industry and education. A description of these programs 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 national by *U.S. News and World Report* and is recognized by Colorado State as a Program of Research and Scholarly Excellence. The department offers graduate-level education to prepare students as leaders in the field of occupational therapy. The undergraduate program is being phased out. The last undergraduate class was admitted Fall Semester 2000.

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 (BNCOT) 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.

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.

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

DEPARTMENT OF SOCIAL WORK

Office in Education Building, Room 127
Professor Ben P. Granger, Head

Major in Social Work

Do you like working with people, problem solving, and helping others? Would you like to help protect children or the elderly from neglect and abuse, or help improve their welfare? Would you enjoy organizing communities to improve the quality of life or fight for human rights? Would you like to help individuals and families cope with conflict in their lives, or problems like unemployment, illness, respite care, inadequate job skills, or unwanted pregnancy? If you answered "yes" to any of these questions, social work may be the major for you.

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 clinical social work.

The social work curriculum focuses on the practical application of social work principles, policies, and practice within a systems perspective. 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
- Creative problem solver
- 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, manage cases, 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; mental health therapist; 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 department'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)	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 105or 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

HS	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 concurrent reg.; SW 341, SW 342)	10				
SW	492	Seminar (concurrent reg. in SW 488)	3	4C			
		Social/behavioral sciences ¹²	6	3C			
		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. 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.

¹¹ Select from the list of courses in category 3B in the AUCC, or with approval of advisor, from the following departments: Anthropology, Art, Dance, English, Ethnic Studies (see department list), Honors, Language, Music, Philosophy, Speech Communication, and Theatre.

¹² Select six upper-division credits, with approval of adviser, from the following departments: Anthropology (except for APCC 120 or APCC 121), Economics, Ethnic Studies (see department list), History, Human Development, Political Science, Psychology, and Sociology.

Graduate Programs in Social Work

The department offers an MSW 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 Daniel E. Costello, Dean
Associate Professor Ajay Menon, Associate Dean*

MAJOR IN BUSINESS ADMINISTRATION WITH CONCENTRATIONS IN

*Accounting
Entrepreneurship
Finance-Real Estate
Information Systems
Marketing
Organizational Management*

The College of Business is accredited by the AACSB—the International Association for Management Education. 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).

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. 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 ability 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 a holistic approach to business education with emphasis on: 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. The College of Business requires a minimum grade point average of 2.0 in business and economics courses as a graduation requirement.

Each student selects an area of concentration in one of the following fields: accounting, entrepreneurship, 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 adequate space and resources are available within the college and 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 credits (30 credits maximum), including M CC 141 and ECCC 202 with grades of B- or above, and a 2.85 cumulative GPA at Colorado State. No extensions are allowed in Open Option-Seeking Business

beyond the semester in which 30 credits are accumulated. Students not admitted to the college *must* select a different major.

External transfer students who have completed either a minimum of 15 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 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.

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)	3	2A
ECCC 202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	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	Accounting Information Systems I	3	
BA 220	Accounting Information Systems II (BA 205 or BA 210)	3	
BG 200	Business Communications and Report Writing (CO/COCC 150)	4	
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		28	

JUNIOR⁷

BF 300	Principles of Finance (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 = 70-72 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
Professor Donald Samelson, Interim Chair

Accounting Concentration

Do you like to know where the information is and how to use it to aid business decision-making? Does data analysis and interpretation interest you? Would you like to play an important decision-making role in a business enterprise? Are you a good communicator and team worker? Are technical expertise, accuracy, and accountability important to you? If so, then a concentration in accounting may be for you.

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:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
	Electives	0-2	
SOPHOMORE			
	Electives	3	
JUNIOR			
BA 311	Intermediate Accounting I (BA 220)	3	
BA 312	Intermediate Accounting II (BA 311)	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 441	Auditing Practices (BA 421)	3	
	Electives ¹	21	
	TOTAL	27	
PROGRAM TOTAL = 120 credits			

¹ Students must take 27-29 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)	3	2A
ECCC 202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	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	Accounting Information Systems I	3	
BA 220	Accounting Information Systems II (BA 205 or BA 210)	3	
BG 200	Business Communications and Report Writing (CO/COCC 150)	4	
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	32	
JUNIOR			
BA 311	Intermediate Accounting I (BA 220)	3	
BA 312	Intermediate Accounting II (BA 311)	3	
BF 300	Principles of Finance (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 (ED 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	3	
	TOTAL	29	
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 300; BK 300 or BK 305; BN 305 or BN 320)	3	4A, 4C
ED 493B	Seminar-Assessment of Learner (concurrent reg. in ED 485A or B 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, Chairman

Information Systems Concentration

Do computers fascinate you? Would you like to be on the cutting edge of new information systems and networking technologies? Do you want to combine technical expertise with business savvy? Then computer information systems may be the business career for you.

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. In addition to the All-University Core Curriculum, coursework for a major in business administration-computer information systems includes calculus, economics, statistics, and business principles. Information systems coursework includes extensive use of state-of-the-art computer hardware and software.

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, as you will keep abreast of new developments and benefit from networking to enhance your 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; chief information officer; marketing information systems manager.

In addition to the business administration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
CSCC 153	Java Programming (M/M CC 118 or M/M CC 121)	4	2D
SOPHOMORE			
BD 220	Object-Oriented Information Design (CS/CSCC 153)	3	
BD 240	Program Design and Construction	3	
JUNIOR			
BD 320	Project Management for Information Systems (BD 240 with a grade of C or better)	3	
BD 350	Operating Systems and Networks (BD 240 with grade of C or better)	3	
BD 355	Business Database Systems (BD 240 with grade of C or better)	3	
BD 360	Systems Analysis and Design (BD 240 with a grade of C or better)	3	
	Electives	6	
	TOTAL	18	
SENIOR			
<i>Select one course from the following:</i>			
BD 410	Web Application Development (BD 355)	3	
BD 411	Enterprise Resource Planning Systems (BA 220; BF 300 or BF 305; BK 300 or BK 305; BN 305 or BN 320)	3	
BD 412	Issues and Cases in Electronic Commerce (BD 355)	3	
BD 462	Systems Development Project (BD 320, BD 360)	2	
OR			
BD 487	Internship (BD 355, BD 360)	2	
	Electives ¹	17-19	
	TOTAL	22-24	

PROGRAM TOTAL = 120 credits

¹ Students must take 23-25 credits of electives to make up 120 credits. Nine 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

Does the world of high finance intrigue you? Would you enjoy changing the look of the land? Do the complexities of ever changing market trends in finance or real estate fascinate you? Is market analysis and forecasting a challenge you would like to tackle? Do you thrill at taking risks? If so, then the realms of finance and real estate may be your calling.

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	0-2	
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.

² Students must take 24-26 credits of electives to make up 120 credits. Three of these credits must be at the 300- or 400- level.

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 Institutions and Derivatives (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	

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	
	Electives	18	
	TOTAL	27	

DEPARTMENT OF MANAGEMENT

Office in Rockwell Hall, Room 213
Professor Willie E. Hopkins, Chair

Entrepreneurship Concentration

Have you always wanted to own and operate your own business? Are you a generalist who wants a broad-based knowledge of business fundamentals? Would you rather work for a small business than for a large corporation? Are you planning graduate study in business, corporate law, or economics? If the answer to any of these questions is “yes,” then this concentration may be the right one for you.

Students in entrepreneurship acquire a fundamental understanding of what is involved in launching a new product or service idea. The entrepreneurship curriculum comprises four core courses with tracks in computer information systems, real estate, and marketing. With the aid of an adviser, entrepreneurship students can develop a meaningful course sequence and choice of electives to suit particular interests and needs. In addition to the All-University Core Curriculum and major core courses, a major in business administration-entrepreneurship includes courses in calculus, economics, statistics, and business principles.

Characteristics and Skills

- Self motivated and able to work independently
- Enjoy being in charge and making things happen
- Enjoy interpersonal interaction
- Persuasive and action-oriented
- Interested in being a generalist
- Possess strong verbal and leadership skills

Potential Occupations

Internships and volunteer experiences enhance skills and marketability. The non-specialized nature of this major applies to a few general career categories. However, depending on your interests, electives you take or the minor you select, available career choices range across a wide variety of business fields.

A few examples include, but are not limited to: small business manager; entrepreneur; or small business owner.

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	0-2	
SOPHOMORE			
	Electives	3	
JUNIOR			
<i>Select one of the following:</i>			
BD 240	Program Design and Construction	3	
BF 360	Real Estate Principles (EC/ECCC 204)	3	
BK 320	Integrated Marketing Communications (BK 300 or BK 305)	3	
<i>Select one of the following:</i>			
BD 355	Business Database Systems (BD 240 with grade of C or better)	3	
BF 367	Real Estate Law (BG/BGCC 205 or BG/BGCC 260 or HD 403)	3	
BK 330	Business Customer Relationships (BK 300 or BK 305)	3	
BK 360/ DM 360	Retailing (BK 300 or BK 305)	3	

BN	340	Entrepreneurship in the Contemporary World (BG 200)	3
		Electives	9
		TOTAL	18
SENIOR			
BA	431	Tax and Accounting Issues for Entrepreneurs (BA 220)	3
<hr/>			
		<i>Select one of the following:</i>	
BD	360	Systems Analysis and Design (BD 240 with grade of C or better)	3
BF	460	Real Estate Finance and Investment (BF 300 or BF 305, BF 360 or written consent of instructor)	3
BK	364	Product Development and Management (BK 300 or BK 305)	3
BK	440	Pricing and Financial Analysis in Marketing (BK 300 or BK 305)	3
<hr/>			
BN	420	New Venture Creation (BN 340)	3
BN	440	New Venture Management (BN 420)	3
		Electives ¹	15
		TOTAL	27

PROGRAM TOTAL = 120 credits

¹ Students must take 27-29 credits of electives to make up 120 credits. Nine to twelve of these credits must be at the 300- or 400- level.

Business Education Option

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
BD 111	Software Productivity Tool Proficiency	1	
BGCC 192	First Year Seminar in Business	3	1
COCC 150	College Composition (Composition Placement Exam)	3	2A
ECCC 202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	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	Accounting Information Systems I	3	
BA 220	Accounting Information Systems II (BA 205 or BA 210)	3	
BG 200	Business Communications and Report Writing (CO/COCC 150)	4	
BGCC 260	Legal Environment of Business	3	3F
BK 300	Marketing (EA/EACC 202 or EC/ECCC 202)	3	4B

BN	340	Entrepreneurship in the Contemporary World (BG 200)	3
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
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
		TOTAL	32
JUNIOR			
BA 431		Tax and Accounting Issues for Entrepreneurs (BA 220)	3 4A, 4B
BF 300		Principles of Finance (BA 210, EC/ECCC 204)	3
BN 420		New Venture Creation (BN 340)	3
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
ED 450		Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. in ED 486J)	4
ED 486J		Practicum-Instruction II (admission to Teacher Licensure Program)	1
VE 431		Methods/Materials in Business Education (successful completion of Phase II of Teacher Licensure Program or written consent of instructor)	4
		Global and cultural awareness ⁵	3 3E
		Group I, II, or III courses ⁶	6
		TOTAL	34
SENIOR			
BG 479		Business Policy and Administration (BF 300, BK 300, BL 300, BN 320)	3 4A, 4C
BN 301		Production Fundamentals (ST/STCC 204 or ST/STCC 301)	3
BN 320		Organization Management (BG 200)	3
BN 440		New Venture Management (BN 420)	3
ED 493B		Seminar-Assessment of Learning (ED 450, VE 431; concurrent reg. in ED 485A or B or VE 485)	1
VE 485		Student Teaching (ED 450, VE 431)	11
VE 492		Seminar (ED 450, VE 431; concurrent reg. in ED 485A or B or VE 485)	1

Group I, II, or III course ⁶	3
TOTAL	28

PROGRAM TOTAL = 124 credits

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

² Select from list of courses in category 3A of the AUCC. One course must have a laboratory component.

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

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

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

⁶ Select from the following groups of courses:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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 240 with grade of C or better) (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 30 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 240 with grade of C or better) (use this course for an information system focus)	3	
BF 367	Real Estate Law (BG/BGCC 205 or BG/BGCC 250 or HD 403)	3	
BK 360/ DM 360	Retailing (BK 300 or BK 305) (use this course if there is a possibility that you may wish to add Marketing as an endorsement)	3	

Organizational Management Concentration

Does knowing the big picture and running the show appeal to you? Are you good at motivating people? Do you like to get things done efficiently and well? If so, then organizational management may be the concentration for you.

Organizational management is about obtaining results primarily through 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:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
	Electives		0-2
SOPHOMORE			
	Electives		3
JUNIOR			
<i>Select two of the following courses:</i>			
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			
<i>Select five of the following courses:¹</i>			
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- or 400-level.

DEPARTMENT OF MARKETING

Office in Rockwell Hall, Room 111
Professor O. C. Ferrell, Chairman

Marketing Concentration

Does the fast moving world of new product development, promotion, and advertising seem interesting and exciting to you? Are you a persuasive and action oriented person? Do you want an outlet for your creative energies? If your answers are “yes,” then marketing may be the career for you.

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:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
	Electives	0-2	
SOPHOMORE			
	Electives	3	
JUNIOR			
BK 320	Integrated Marketing Communication (BK 300 or BK 305)	3	
BK 330	Business Customer Relationships (BK 300 or BK 305)	3	
BK 410	Marketing Research (BK 300 or BK 305; ST/STCC 204)	3	
	Electives	9	
	TOTAL	18	
SENIOR			
<i>Select one of the following courses:</i>			
BK 360/ DM 360	Retailing (BK 300 or BK 305)	3	
BK 361	Buyer Behavior (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 487V	Internship (marketing majors with written consent of instructor)	3	
BK 492	Seminar (BK 300 or BK 305; written consent of instructor)	3	
BK 440	Pricing and Financial Analysis in Marketing (BK 300 or BK 305)	3	
BK 479	Marketing Strategy and Management (BK 410, BK 440)	3	
	Electives ¹	18	
	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

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
BD 111	Software Productivity Tool Proficiency	1	
BGCC 192	First Year Seminar in Business	3	1
COCC 150	College Composition (Composition Placement Exam)	3	2A
ECCC 202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	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	Accounting Information Systems I	3	
BA 220	Accounting Information Systems II (BA 205 or BA 210)	3	
BG 200	Business Communications and Report Writing (CO/COCC 150)	4	
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	31	
JUNIOR			
BF 300	Principles of Finance (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	

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 (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 257, ED 340; concurrent reg. in ED 350; admission to Teacher Licensure Program)	1	
	TOTAL	32	
SENIOR			
BG 479	Business Policy and Administration (BF 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, BK 440)	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 431, VE 441; concurrent reg. in ED 485A or B 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 = 124 credits

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

² Select from list of courses in category 3A of the AUCC. One course must have a laboratory component.

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

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

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

Graduate Programs in Business

The College of Business offers graduate programs in business administration leading to the degrees of master of science (M.S.) and master of business administration (M.B.A.). The college offers an accelerated on-campus, 11-month M.B.A.

designed to compliment a non-business undergraduate degree, as well as an executive M.B.A. and an M.B.A. through distance education. A description of these programs may be found in the *Graduate and Professional Bulletin*.

College of Engineering

Office in Engineering Building, Room AR202

Professor Neal Gallagher, Dean

Professor Steven Abt, Associate Dean

Professor Johannes Gessler, Associate Dean

UNDERGRADUATE MAJORS

Bioresource and Agricultural Engineering

Chemical Engineering

Civil Engineering

Electrical Engineering

Engineering Science

Environmental Engineering

Mechanical Engineering

UNDERGRADUATE MINORS

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 and Bioresource 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 coordinated by the Associate Dean for Undergraduate Studies in the College of 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 and Bioresource 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 Undergraduate Studies 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.

The programs in bioresource and agricultural engineering, chemical engineering, civil engineering, electrical and computer engineering, engineering science, environmental engineering, and mechanical engineering 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.

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. 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

Are you interested in an interdisciplinary engineering major that is adaptable to a large variety of post-graduate professions such as medicine or law? Would you like to obtain a broad-based liberal arts education while pursuing an engineering degree? Do you want to work in aerospace or space engineering? Does combining strong backgrounds in engineering and physics appeal to you? If you answer “yes” to any of these then perhaps a major in engineering science is for you.

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. Three concentrations are possible—engineering physics, space engineering, and 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.

Engineering science is an interdisciplinary major that allows students to acquire a strong base in mathematics, the physical sciences, and engineering sciences while pursuing a broad background in the liberal arts and other areas of interest in preparation for specialized careers or graduate studies. Engineering science 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.

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 your 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 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)	3	2A
M CC 161	Calculus for Physical Scientists II (M/M CC 124 and 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; CB 103/CBCC 192 or CE 108 or ME 101/MECC 192)	3	
CE 300	Fluid Mechanics (CE 261, CE 262, ME 237)	4	
OR			
ME 342	Mechanics and Thermodynamics of Flow Processes (M 340; ME 237 or concurrent reg.)	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 (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
	U.S. public values and institutions ³	3	3F
TOTAL		16	
JUNIOR			
EE 341	Electromagnetic Fields and Devices I (M 340 or M 345)	3	
EE 342	Electromagnetic Fields and Devices II (EE 341)	3	
PH 314	Introduction to Modern Physics (PH/PHCC 142, concurrent reg. in M 261)	4	

PH	315	Modern Physics Laboratory (concurrent reg. in PH 314)	2	
TOTAL			12	
SENIOR				
EE	401	Senior Design Project I (EE 312, EE 332, and EE 342 or EE 343)	3	4A
EE	402	Senior Design Project II (EE 401)	3	4C
PH	353	Optics and Waves (M 261, PH/PHCC 142)	4	
		Mathematics ⁴	3	
		Technical electives ⁵	18-19	
		Electives	5	
TOTAL			36-37	

PROGRAM TOTAL = 136 credits

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

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

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

⁴ Mathematics elective (300 level or higher). Select course with adviser's approval.

⁵ Select courses with adviser's approval.

Space Engineering Concentration

The space engineering concentration provides students with a broad background in aerospace and space engineering. The curriculum is based on a firm foundation of engineering disciplines, applied mathematics, and computer science.

In addition to the engineering science core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC	
FRESHMAN				
CE	108	Civil Engineering Principles I	3	
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/M CC 161)	2	
		Global and cultural awareness ¹	3	3E
		Historical perspectives ²	3	3D
		U.S. public values and institutions ³	(3)	3F
TOTAL			11	
JUNIOR				
CE	360	Mechanics of Solids (CE 260 or CE 262)	3	
CE	367	Structural Analysis (CE 360)	3	
ME	304	Engineering Design (ME 250)	3	4A
ME	307	Mechatronics and Measurement Systems (CE 261, EE 204, M 340, ME 250)	4	

ME	337	Thermodynamics (M 261, ME 237)	3	
TOTAL			16	
SENIOR				
CE	408	Civil Engineering Design I (CE 309)	3	
CE	409	Civil Engineering Design II (CE 408)	3	4C
ME	344	Heat and Mass Transfer (ME 342)	3	
ME	417	Control Systems (M 340, ME 304)	3	
ME	460	Aeronautics (ME 342)	3	
PO	371	U.S. Space Policy	3	
		Mathematics, upper division	6	
		Technical electives ⁴	11-12	
		Electives	3	
TOTAL			38-39	

PROGRAM TOTAL = 136 credits

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

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

³ In categories 3C or 3D select one of the following courses: AU/AUCC 201(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 162-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

Office in Engineering Building Arcade, Room AR 102

Are you an environmentalist at heart who would like to design systems or devices to help improve environmental quality? Would you like to devise a project to clean up polluted ground water? Are restoring the health of local ecosystems or preventing pollution something you would like to do? Would you like to monitor air, land, and water quality? Could you design a project to provide safe drinking water or waste water treatment where none exists? Would you like to develop new and improved means to protect the environment or promote conservation of natural resources? If your answers to any of these questions is "yes," then a degree in environmental engineering may be the thing for you.

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 with a professional engineer mentor. 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.

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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
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 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	
CBCC 104	Strategies of Engineering Problem Solving (CB 103/CBCC 192)	3	2D
CBCC 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				
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	3 A
OR				
BZCC	120	Principles of Plant Biology	4	3A
OR				
LSCC	102	Attributes of Living Systems (high school chemistry)	4	3A
<hr/>				
C	245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	4	
CB	201	Material and Energy Balances (C/C CC 111, M/M CC 160, PH/PHCC 141, one course in computer programming)	3	
<hr/>				
CB	202	Thermodynamic Process Analysis (CB 201)	3	
OR				
ME	237	Introduction to Thermal Sciences (PH/PHCC 142)	3	
<hr/>				
CE	262	Engineering Mechanics (M/M CC 161, PH/PHCC 141)	4	
COCC	150	College Composition (Composition Placement Exam)	3	2A
ECCC	202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	3	3C
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	
<hr/>				
JUNIOR				
BY	220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155)	3	
C	471	Fundamentals of Physical Chemistry (C 113; M/M CC 161 or M/M CC 255; PH/PHCC 122 or PH/PHCC 142)	4	
CB	204/ EV 204	Agricultural and Environmental Measurements (PH/PHCC 110 or PH/PHCC 141)	3	
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CB	331	Momentum Transfer and Mechanical Separations (CB 201, M 340; CB 202 or ME 237)	3	
OR				
CE	300	Fluid Mechanics (CE 261 or CE 262, ME 237)	4	
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CB	470	Engineering Design I (CB 201 or CB 204/EV 204)	1	4C
CE	322/ EV 322	Basic Hydrology (CE 300 or ER 416 or CB 331, ST/STCC 301 or ST/STCC 309 or CE 308 or written consent of instructor)	3	
MB	300	General Microbiology (C 245 or C 341 or concurrent reg.; BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	3	
MB	301	Fundamentals of Microbiology Laboratory Techniques (MB 300 or concurrent reg.)	1	
		Additional communication ²	3	2B

Arts/humanities ³	3	3B
Engineering electives ⁴	7	
TOTAL	34-35	
<hr/>		
SENIOR		
CB 442/ EV 442	Rate-Controlled Separations (CB 331 or CE 300; M 340)	3
CB 443/ EV 443	Mass Transfer and Separation Laboratory (CB 341 or CB 442/EV 442 or concurrent reg.)	2
CB 471	Engineering Design II (CB 470)	3
CE 438	Pollution Control Engineering (C 113, CE 300 or CB 331 or ME 342)	4
EH 446	Environmental Toxicology (C 245 or C 343)	3
ME 448/ EV 448	Pollution Prevention (CB 331 or CE 300 or ME 342)	3
	Engineering electives ⁴	4
	Global and cultural awareness ⁵	3
	Historical perspectives ⁶	3
	Humanities/social sciences	3
	U.S. public values and institutions ⁷	(3)
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*	Fundamentals of Physical Chemistry (C 113; M/M CC 161 or M/M CC 255; PH/PHCC 122 or PH/PHCC 142)	4	
C 438/ EV 438*	Pollution Control Engineering ^{3,4} (C 113, CE 300 or CB 331 or ME 342)	4	
OR			
ME 448/ EV 448*	Pollution Prevention (CB 331 or CE 300 or ME 342) ⁴	3	
MB 300*	General Microbiology (C 245 or C 341 or concurrent reg.; BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	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 (C 245 or C 343 or concurrent reg. in C 343)	4	
CB 405*	Nonpoint Source Pollution (one course in soil science, hydrology, or fluid mechanics)	3	
CB 439/ CE 439*	Environmental Engineering Chemical Concepts (C 113, M 340)	3	
CB 443/ EV 443*	Mass Transfer and Separation Laboratory (CB 341 or CB 442/EV 442 or concurrent reg.)	2	
CB 462*	Environmental Law (CO/COCC 150)	3	
EH 446	Environmental Toxicology (C 245 or C 343)	3	
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 341, C 344 may be substituted for C 245, C 246.

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, or mathematics.

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 AND BIORESOURCE ENGINEERING

Office in Glover Building, Room 100

Professor Vincent G. Murphy, Interim Chair

Major in Bioresource and Agricultural Engineering

For administrative purposes, this program has been moved to the Department of Civil Engineering. Inquiries should be directed to Department of Civil Engineering, Engineering Building, Room A 203, (970) 491-5844.

Would you like to design sophisticated technological solutions to problems concerning the protection or improvement of air and water quality? Does the design of efficient irrigation or drainage systems for agriculture interest you? Does the design of machinery intended for the production, harvest, and transportation of food and fiber intrigue you? Would you enjoy becoming an ecological engineer designing appropriate systems for the safe disposal of toxic wastes? If any of your answers to these questions is “yes,” then you may want to consider a major in agricultural and bioresource engineering

The agricultural and bioresource 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 while you are a student is highly recommended to enhance your practical training and development, which goes along with your academic activities in preparing you to be an effective engineer. 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 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	
CBCC 104	Strategies of Engineering Problem Solving (CB 103/CBCC 192)	3	2D
CBCC 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			
BZCC 120	Principles of Plant Biology	4	3A
CB 204/ EV 204	Agricultural and Environmental Measurements (PH/PHCC 110 or PH/PHCC 141)	3	
CE 262	Engineering Mechanics (M/M CC 161, PH/PHCC 141)	4	
COCC 150	College Composition (Composition Placement Exam)	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
ME 237	Introduction to Thermal Sciences (PH/PHCC 142)	3	
SC 240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
	Health and wellness ¹	2	3G
TOTAL		34	

CORE TOTAL = 67 credits²

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:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
CB 360/ SC 360	Geographic Information Systems in Agriculture (CS 110)	3	
CB 405	Nonpoint Source Pollution (one course in soil science, hydrology, or fluid mechanics)	3	
CB 464	Soil and Water Engineering (CB 331 or CE 300 or SC 240)	4	
CB 466/ ME 440	Design of Off-Highway Vehicles (ME 237; CE 261 or CE 262)	4	
CB 470	Engineering Design I (CB 201 or CB 204/EV 204)	1	4C
CE 360	Mechanics of Solids (CE 260 or CE 262)	3	
ME 337	Thermodynamics (M 261, ME 237)	3	
ME 342	Mechanics and Thermodynamics of Flow Processes (M 340; ME 237 or concurrent reg.)	3	
	Additional communication ¹	3	2B
	Social/behavioral sciences ²	3	3C
	Natural resources elective ³	3	
TOTAL		33	
SENIOR			
CB 471	Engineering Design II (CB 470)	3	4A, 4C

EG	410	Systems Engineering and Optimization (M/M CC 255 or M 261)	3	
ME	338	Thermosciences Laboratory (ME 377 or concurrent reg. in ME 344)	1	
ME	344	Heat and Mass Transfer (ME 342)	3	
ME	410	Engineering Economy for Engineers (M 261)	2	
		Arts/humanities ⁴	3	3B
		Global and cultural awareness ⁵	3	3E
		Historical perspectives ⁶	3	3D
		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 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			
CB 360/ SC 360	Geographic Information Systems in Agriculture (CS 110)	3	
CB 405	Nonpoint Source Pollution (one course in soil science, hydrology, or fluid mechanics)	3	
CB 464	Soil and Water Engineering (CB 331 or CE 300 or SC 240)	4	
CB 466/ ME 440	Design of Off-Highway Vehicles (ME 237; CE 261 or CE 262)	4	
CB 470	Engineering Design I (CB 201 or CB 204/EV 204)	1	4C
CE 300	Fluid Mechanics (CE 261 or CE 262; ME 237)	4	
CE 360	Mechanics of Solids (CE 260 or CE 262)	3	
	Additional communication ¹	3	2B
	Natural resources elective ²	3	

		Social/behavioral sciences ³	3	3C
		TOTAL	31	
SENIOR				
CB	471	Engineering Design II (CB 470)	3	4A, 4C
CE	401	Hydraulic Engineering (CE 300)	3	
OR				
CE	450	Introduction to Geotechnical Engineering (CE 360)	4	
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 ²	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 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 bioresource and agricultural engineering are in the process of being implemented. 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.

Major in Chemical Engineering

Do you have a strong interest in chemistry? Would you enjoy applying engineering principles to the development of new products? Would you like to work for a large chemical, petroleum, biotechnology, aerospace, microelectronics, or food products firm devising high-tech products and processes? Would you like to research and design new ways to make products in a safe and environmentally friendly manner? If your answer to any of these questions is "yes," then you might enjoy a career as a chemical engineer.

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, natural sweeteners from cornstarch, diagnostic and therapeutic agents from controlled fermentations, 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, the opportunity exists to 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
- Inventive

- Able 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
- Able to meet deadlines
- 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 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 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, food engineer.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
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 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	
CBCC 104	Strategies of Engineering Problem Solving (CB 103/CBCC 192)	3	2D
CBCC 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 255)	5	3A
TOTAL			33

SOPHOMORE

C	341	Organic Chemistry I (C 113)	3	
C	343	Organic Chemistry II (C 341)	3	
C	344	Organic Chemistry Laboratory (C 114; C 343 or concurrent reg.)	2	
CB	201	Material and Energy Balances (C/C CC 111, M/M CC 160, PH/PHCC 141, one course in computer programming)	3	
CB	202	Thermodynamics Process Analysis (CB 201)	3	
CE	262	Engineering Mechanics (M/M CC 161, PH/PHCC 141)	4	
COCC	150	College Composition (Composition Placement Exam)	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	471	Fundamentals of Physical Chemistry (C 113; M/M CC 161 or M/M CC 255; PH/PHCC 122 or PH/PHCC 142)	4	
CB	330	Process Simulation (CB 202; concurrent reg. in M 340)	3	
CB	331	Momentum Transfer and Mechanical Separations (CB 201, M 340; CB 202 or ME 237)	3	4B
CB	332	Heat Transfer and Thermal Separations (M 340; CB 331 or CE 300 or concurrent reg.)	3	
CB	333	Momentum and Heat Transfer Laboratory (CB 332)	2	
CB	341	Equilibrium-Staged Separations (CB 202 or ME 237; one course in physical chemistry)	4	
CB	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

CB	430	Process Control and Instrumentation (CB 332, CB 341, CB 420)	4	
CB	442/	Rate-Controlled Separations (CB 331 or CE 300; M 340; one course in physical chemistry)	3	
EV	442			
CB	443/	Mass Transfer and Separations Laboratory (CB 341 or CB 442/EV 442 or concurrent reg.)	2	
EV	443			
CB	451	Chemical Engineering Design I (CB 341; CB 420; CB 442/EV 442 or concurrent reg.)	3	4C

CB	452	Chemical Engineering Design II (CB 451)	3	4A, 4C
CB	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

Major in Civil Engineering

Are you fascinated by large-scale projects? Do cities, the services they provide, how they work, how they grow, how they are physically organized, and what changes might improve the local quality of life intrigue you? Would you like to design projects to preserve and enhance environmental quality, reduce ground water pollution, remediate existing damages, or contain toxic materials? Do you want to help provide society with a safe, clean water supply, control of stormwater and treatment of waste water? Are you interested in transportation systems, energy, and other basic needs of our modern life? Does the design of bridges, buildings, tunnels, airports, highways, and other large infrastructure projects capture your interest and imagination? Do you want to help plan and implement smart growth and efficient utilization, repair, and upgrading of existing facilities? Would you like to use computers to design and help manage a large construction

project or infrastructure system? If so, a career in civil engineering might be the one for you.

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 while you are a student is highly recommended to enhance your 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.

Course	Title (Prerequisite)	Cr	AUCC
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)	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 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	
CECC 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; CB 103/CBCC 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 209; concurrent reg. in CE 300)	3	4A
CE 309	Civil Engineering Synthesis II (CE 308)	3	4B
CE 322/ EV 322	Basic Hydrology (CE 300 or ER 416 or CB 331; 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 CB 331 or ME 342)	4	
CE 467	Design of Reinforced Concrete Structures (CE 367)	3	
CSCC 151	C++ for Scientists and Engineers (M/M CC 124, M/M CC 126)	4	2D

Global and cultural awareness ⁵	3	3E
Historical perspectives ⁶	3	3D
U.S. public values and institutions ⁷	3	3F
Technical electives ⁸	5	
TOTAL	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.

Graduate Programs 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. 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 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 Civil Engineering *Graduate Studies Bulletin*.

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

Office in Engineering Building Arcade, Room AR 104
Professor Derek L. Lile, Head

Do you have a strong interest in math and the physical sciences? Does the design and operation of electrical equipment and systems, computer systems, and optoelectronic devices fascinate you? Would you like to design radar remote sensing arrays to monitor the weather and other environmental variables, or energy systems that conserve resources or utilize solar energy? Would the design of manufacturing control systems, lasers, microelectronic devices for residential and commercial use, and image and signal processors interest you? How about designing or fabricating the next generation of microprocessor chips? If your answer to any of these questions is "yes," then a major in electrical and computer engineering may be for you.

Engineering is the art of applying science to design in order to create things that benefit people. Approximately two million engineers work in the United States. Electrical and computer engineering are those branches of engineering that involve making 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 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
- Inventive
- 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 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, 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 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 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, photographic engineer, laser engineer, communications specialist, transportation engineer.

Major in Electrical Engineering

Students choose between the computer engineering, 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 all three 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, 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 in the area of their concentration.

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.

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.

Computer Engineering Concentration

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)	3	2A
CSCC 153	Java Programming (M/M CC 118 or M/M CC 121)	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 121 or placement in M/M CC 124 or higher)	4	3A
CS	200	Algorithms and Data Structures (CS/CSCC 153 or CS 154, CS 166/M 166)	4	
EE	201	Circuit Theory (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	
<hr/>				
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	
<hr/>				
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			32	
JUNIOR				
CS	370	System Architecture and Software (CS 200, CS 270, ST/STCC 301 or ST/STCC 309)	4	
ECCC	202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	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	332	Electronics Principles II (EE 331)	4	4A
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	
		Historical perspectives ¹	3	3D
TOTAL			35	
SENIOR				
EE	303/ ST 303	Introduction to Communications Principles (M 261)	3	

EE	401	Senior Design Project I ² (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 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
		Technical electives ⁷	14	
TOTAL			34	

PROGRAM TOTAL = 131 credits

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

² Project must be on computer engineering topic.

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

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

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

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

⁷ Select from departmental list of approved courses in the computer engineering area. At least 9 of the 14 credits in computer engineering electives must be Electrical and Computer Engineering courses.

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)	3	2A
CSCC 153	Java Programming (M/M CC 118 or M/M CC 121)	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 121 or placement in M/M CC 124 or higher)	4	3A
EE 201	Circuit Theory (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 ST	303/ 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 118 or M/M CC 120A-B)	3	3C
		EE 362 or EE 372 ⁴	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)	3	2A
CSCC	153	Java Programming (M/M CC 118 or M/M CC 121)	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 121 or placement in M/M CC 124 or higher)	4	3A
EE	201	Circuit Theory (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 118 or M/M CC 120A-B)	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, 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 Steven R. Abt, Interim Head*

Major in Mechanical Engineering

Does creating new designs for the auto industry, or in the fields of aeronautics and aerospace sound interesting? Would designing, analyzing, and doing research and development in a wide range of industrial and governmental enterprises be of interest to you? Does studying thermal sciences and the integration of electronic and mechanical devices interest you? Do you like putting ideas and designs to work? Would you enjoy the challenge of finding alternative energy sources, doing computer aided design, or biomedical research? If your answer to any of these questions is “yes,” then a major in mechanical engineering may be for you.

Mechanical engineers design, develop, and manufacture the machinery and instrumentation that runs factories, transportation systems, mining operations, and utilities. Examples include production machinery, ground/air/space vehicles, 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 technical electives from the energy, industrial engineering, materials, mechanics and controls, and thermal sciences areas. Participation in labs further develops design, modeling, and analysis skills. Students participate in an intercollegiate engineering competition, applying their knowledge to the solution of real world problems.

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

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. Currently the demand for mechanical engineers is high and entry level salaries are generous. 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 employment examples include, but are not limited to: design engineer, manufacturing engineer, biomedical engineer, aeronautical engineer, automotive engineer, and building systems engineer.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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	
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
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 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	
CE	260	Engineering Mechanics-Statics (M/M CC 160, PH/PHCC 141)	3	
CE	261	Engineering Mechanics-Dynamics (CE 260, CB 103/CBCC 192 or CE 108 or ME 101/MECC 192)	3	
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	
ME	237	Introduction to Thermal Sciences (PH/PHCC 142)	3	
ME	250	Computer Applications in Mechanical Engineering (M/M CC 161)	2	
STCC	309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
		Additional communications ³	3	2B
		TOTAL	36	

JUNIOR

CE	360	Mechanics of Solids (CE 260 or CE 262)	3	
CE	363	Material Properties (CE 360)	1	
ME	304	Engineering Design (ME 250)	3	4A
ME	307	Mechatronics and Measurement Systems (CE 261, EE 204, M 340, ME 250)	4	
ME	324	Dynamics of Machines (CE 261, concurrent reg. in ME 250)	4	
ME	325	Machine Design (CE 360)	3	

ME	331	Introduction to Engineering Materials (C/C CC 112, C 113, PH/PHCC 142)	4	
ME	337	Thermodynamics (M 261, ME 237)	3	
ME	338	Thermosciences Laboratory (ME 337 or concurrent reg. in ME 344)	1	
ME	342	Mechanics and Thermodynamics of Flow Processes (M 340, ME 237)	3	
ME	344	Heat and Mass Transfer (ME 342)	3	4B
		TOTAL	32	

SENIOR

ME	486A	Engineering Design Practicum I (ME 304)	3	4C
ME	486B	Engineering Design Practicum II (ME 486A)	3	4C
		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
		Technical electives ⁸	12	

TOTAL

30

PROGRAM TOTAL = 130 credits¹ 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.

Graduate Programs in Mechanical Engineering

Programs are offered leading to the degrees of master of science and doctor of philosophy. A description of these programs may be found in the *Graduate and Professional Bulletin*.

College of Liberal Arts

Office in Clark Building, Room C 138
Professor Robert W. Hoffert, Dean
Professor Ann Gill, Associate Dean
Professor Alan C. Lamborn, Associate Dean

UNDERGRADUATE MAJORS

Anthropology
Art
Economics
English
History
Language, Literature, and Culture Studies
Liberal Arts
Music
Performing Arts
Philosophy
Political Science
Sociology
Speech Communication
Technical Journalism

UNDERGRADUATE MINORS

Anthropology
Art History
Dance
Economics
English
French
General Philosophy
German
History
Japanese
Media Studies
Music
Musical Theatre
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

Knowledge of at least one other culture in some depth is invaluable to understanding our own. Students are strongly encouraged to take a semester or longer to study outside of the United States to broaden their perspectives and understanding of other cultures. Students interested in study abroad should plan, far in advance, by discussing opportunities with their adviser and with the study abroad staff in the Office of International Programs.

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 Department 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

Are you committed to a life of learning and a broad-based education? Are you interested in knowing past and contemporary cultures? Would you like exposure to a diversity of worldviews? Do you wish to develop excellent writing, speaking, thinking, and reading abilities? Would you like to study human behavior, history, and institutions in diverse societies? Have you ever wanted to explore the ways cultural forms and beliefs unite and give coherence to the American experience? Do you ever wonder about the wide variety of cultural expressions and values within American society? If your answers are "yes," then a major in liberal arts may be for you.

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 acquire a well-rounded education and develop a number of transferable skills including problem solving abilities, reading comprehension, analytical skills, and communication skills.

Characteristics and Skills

- Interest in a broad range of topics
- A creative spirit
- Ability to adapt to a variety of situations
- A desire for an interdisciplinary approach to education
- Reading and comprehension abilities
- A strong desire and an ability to learn how to learn
- Ability to integrate knowledge from several perspectives into a coherent whole
- Excellent writing and speaking skills
- Ability to think critically and logically
- A strong interest in beauty and creativity
- A capacity to study human expression, behavior, history, and institutions
- Ability to research and write on topics of interest
- A desire to know past and contemporary cultures
- A desire to understand American culture
- A desire for responsible and creative participation in society
- Knowledge of diverse cultures and viewpoints
- Leadership abilities

Potential Occupations

Graduates apply their education in jobs in the private, non-profit, and public sectors. Others enter graduate and professional schools for more specialized study. Because Liberal Arts graduates are broadly educated, communicate well, and think both logically and critically, many graduates find satisfying jobs after a period of “job moving.” 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 paid or voluntary work, internships and cooperative education opportunities is recommended to hone your skills and enhance your resume.

Depending on interests, focus, and the concentration selected, a large variety of careers can be found in the following areas, among others: public policy; artistic production; mass media; engineering; law; city planning; business; information systems; international business; journalism; publishing; education; management and administration; government; communications; museum work; entertainment; foreign service.

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 images*, which focuses on literature, music, and culture; *American institutions*, which highlights history, political institutions, and social, political, and economic conditions; *American pluralism*, which encompasses the variety of peoples and cultures that comprise American society; and *American regions*, which emphasizes a regional approach to the study of American society and culture.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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 200	Self/Community in American Culture, 1600-1877	3	3D
AUCC 201	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 200, AU/AUCC 201)	3	4A, 4B
	American pluralism 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 pluralism 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 pluralism option. Students choosing the American pluralism option will select 3 courses from other options in consultation with the program director.

¹¹Students must select one of the following options: American images, American institutions, American pluralism, 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 Images Option

In addition to the American studies concentration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
<i>Select 21 credits from the following courses (minimum of 3 prefixes):</i>			
AR	310 History of American Art (AR 212)	3	
AR	315 United States Art Since 1945 (AR 212)	3	
E	234/ Native American Literature	3	
ET	234		
E	247 Vietnam War in Fiction	3	
E CC	270 Introduction to American Literature	3	3B or 3D
E	330 Images of Women in Literature	3	
E	332 Modern Women Writers	3	
E	335 American Folklore	3	
E	337 Western Mythology	3	
E	345 American Drama	3	
E	371 American Authors to 1870 (one course in literature)	3	
E	372 American Authors Since 1870 (one course in literature)	3	
E	403 Nature Writing (one course in literature or 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/ Contemporary Native American	3	
ET	438 Literature		
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)	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	
		9	
TOTAL		30	

¹Students must select three courses from the American pluralism 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 379	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	Age of Jefferson (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	3C, 3F
POCC 103	State and Local Government and Politics	3	3C, 3F
PO 301	Political Parties and Interest Groups (PO/POCC 101)	3	
PO 304	Legislative Politics (PO/POCC 101)	3	
PO 305	Judicial Politics (PO/POCC 101)	3	
PO 306	Executive Politics (PO/POCC 101)	3	
PO 309	Urban Politics (PO/POCC 101 or PO/POCC 103)	3	
PO 351	Public Administration (PO/POCC 101)	3	
PO 361	U.S. Environmental Politics and Policy (PO/POCC 101)	3	
PO 413	U.S. Civil Rights and Liberties (PO/POCC 101)	3	
PO 423	American Political Theories (PO/POCC 101)	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	
Pluralism ¹		9	
TOTAL		30	

¹Students must select three courses from the American Pluralism option, for a total of nine credits.

American Pluralism 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	3	
AP 413	North American Indians Today (AP/APCC 100)	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 444	Federal Indian Law and Policy	3	
HYCC 250/ ETCC 250	African-American History 1619-1865	3	3D
HYCC 251/ ETCC 251	African-American History Since 1865	3	3D
HY 468	Women In America	3	
PO 413	U.S. Civil Rights and Liberties (PO/POCC 101)	3	
PO 423	American Political Theories (PO/POCC 101)	3	
S CC 100	General Sociology	3	3C, 3F
S CC 105	Social Problems	3	3C, 3F
S CC 205	Contemporary Race-Ethnic Relations	3	3E
S 332	Comparative Majority-Minority Relations (S/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 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	3	
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 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	3	
AP 413	North American Indians Today (AP/APCC 100)	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	
Pluralism ¹		9	
TOTAL		30	

¹Students must select three courses from the American Pluralism 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)	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

<i>Select one of the following:</i>			
COCC 300	Writing Arguments ⁸ (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
L CC	Foreign language ⁹	3-5	2B3
SPCC 200	Public Speaking	3	2B1
Minor/certificate courses ¹⁰		6	
Additional areas of emphasis ¹¹		3	
Biological/physical sciences ²		4	3A
Global and cultural awareness ¹²		3	3E
Health and wellness ¹³		2	3G
Logical/critical thinking ¹⁴		3	2D
Electives ¹⁵		4-6	
TOTAL		30	

JUNIOR

Minor/certificate courses ¹⁰	9
Additional areas of emphasis ¹¹	15
Electives ¹⁵	6
TOTAL	30

SENIOR

LB 492A	Seminar-Arts and Humanities	1	4C
Minor/certificate courses ¹⁰		6	
Additional areas of emphasis ^{11, 16}		12	4A, 4B
Social sciences, upper division		6	
Electives ¹⁵		5-6	
TOTAL		30-31	

PROGRAM TOTAL = 120 credits¹⁷

¹ Select one course from each of the following subsets of category 3B in the All-University Core Curriculum (AUCC): **Arts**: ARCC 100, D CC 110, MUCC 100, MUCC 111, MUCC 231, THCC 141; and **Humanities**: E CC 140, E CC 232, E CC 242, E CC 270, E CC 275, ETCC 205, ETCC 240, PLCC 100, SPCC 100, SPCC 201.

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 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.

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 following subset of courses in category 3F in the AUCC: AUCC 201 (may also count in category 3D), ECCC 204, ECCC 212, ECCC 240 or EACC 240, ETCC 200, ETCC 204, HYCC 150, HYCC 151, JTCC 100 (may also count in category 3C), NRCC 320, PLCC 103, POCC 101, POCC 103, S CC 100, S CC 105 (POCC 101, POCC 103, S CC 100, and S CC 105 may also count in category 3C).

⁸ COCC 300 is listed in both category 2B and 2D. If selected, the course can fulfill only one category, not both.

⁹ 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.

¹⁰ 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.

¹¹ Two additional areas of emphasis are required in the arts and humanities, each of which must have 15 credits and a minimum of 9 upper-division courses.

¹² 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 105. The HYCC courses, if selected here, cannot also count in category 2D.

¹³ Select from the list of courses in category 3G in the AUCC.

¹⁴ Select from the following subset of courses in category 2D in the AUCC: COCC 300 (see note 8), PLCC 110, SPCC 207, STCC 101, STCC 110, STCC 201, STCC 204, STCC 301, STCC 307 or EHCC 307, STCC 309.

¹⁵ Courses taken in fulfillment of the AUCC may, where appropriate, be double-counted in fulfilling the requirements of a minor (or a certificate) plus two additional areas of emphasis. Consequently, the actual number of free electives can vary between 17-35.

¹⁶ At least six of the upper-division arts and humanities credits taken as part of the areas of emphasis must be in courses approved for category 4A and 4B, Depth and Integration, in the areas of emphasis.

¹⁷ 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 156 credits, is administered jointly by the Colleges of Liberal Arts and Engineering. Direct inquiries to the Dean's Office of one of these colleges. Students in this concentration must fulfill the requirements for both degrees in order to graduate.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
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
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)	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; CB 103/CBCC 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	
	Additional areas of emphasis ⁷	6	
	Social sciences upper-division	3	
	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	
LB 492A	Seminar-Arts and Humanities	1	4C
	Minor or certificate ⁷	9	
	Additional areas of emphasis ⁷	9	
	Social sciences upper-division	3	
	TOTAL	29	

FIFTH YEAR

CB 470	Engineering Design I (CB 201 or CB 204/EV 204)	1	4C
CB 471	Engineering Design II (CB 470)	3	4A, 4C
	Health and wellness ⁸	2	3G
	Technical electives in engineering ⁹	24	
	TOTAL	30	

PROGRAM TOTAL = 156 credits

¹ Select one course from each of the following subsets of category 3B in the All-University Core Curriculum (AUCC): Arts: ARCC 100, D CC 110, MUCC 100, MUCC 111, MUCC 231, THCC 141; and Humanities: E CC 140, E CC 232, E CC 242, E CC 270, E CC 275, ETCC 205, ETCC 240, PLCC 100, SPCC 100, SPCC 201.

² Select from the following subset of courses in category 3E in the AUCC: APCC 200, E CC 238, E CC 245, ECCE 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 105. The HYCC courses, if selected here, cannot also count in category 2D.

³ 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.

⁴ Select from the list of courses in category 3C in the All-University Core Curriculum (AUCC) with the following prefixes: APCC, ECCE, 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 Two additional areas of emphasis within the arts and humanities must include a minimum of 18 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 can vary.

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. You will focus on *Latin American, Asian, or European Studies*. Courses are required in language, history, international studies, with other courses chose 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	20th Century Fiction	3	3E
E CC 245	World Drama	3	3E
ECCE 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 200	Self/Community in American Culture, 1600-1877	3	3D
AUCC 201	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)	3	2D
PLCC	110	Logic and Critical Thinking	3	2D
SPCC	207	Rhetoric and Argumentation	3	2D
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
STCC	307/	Introduction to Biostatistics (M/M CC 121)	3	2D
EHCC	307	(M/M CC 121)		
STCC	309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	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
		TOTAL	3	
SENIOR				
IN	492A-C	Seminar ⁷ (A) HY/HYCC 273, HY/HYCC 274, IN 300. B) HY/HYCC 270, HY/HYCC 271, IN 300. C) two courses in European history, IN 300)	3	4A, 4C
		TOTAL	3	

CORE TOTAL = 45-46 credits⁸¹ 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	23-24	
	TOTAL	26-27	
PROGRAM TOTAL = 120 credits			

¹ Chinese or Japanese.² 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.³ Three different prefixes, 6 credits minimum from each track, for a total of 21 credits. **Track I—History and Politics of Asia:** HY 264, HY 340, HY 341, HY 344, HY 345, HY 348, HY 404, HY 453, IE 271, PO 445; **Track II—The Thought and Culture of Asia:** AR 112, AR 316, E 356, L CC 250C or J, L 304J, L 305J, L 309, L 465B, L 496J, 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**

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
[F,G,I,R,S] ¹				
		Electives ³	6	
		TOTAL	9-10	

JUNIOR

<i>Select two of the following courses:</i>				
HYCC	216	The Islamic World	3	
HYCC	230	Medieval Europe	3	
HY	235	Slavic and East Central European Civilizations	3	
HY	240	History of England	3	
HY	242	History of Ireland	3	
HY	245	World War II	3	
AND				
HY	312	The Age of Enlightenment	3	
HY	316	Modern Europe, 1815-1914	3	
HY	319	Contemporary Europe	3	
HY	459	European Diplomatic History Since 1914	3	
HY	463	European Culture in the 20th Century	3	
		Track courses ⁴	18	
		Electives ³	3	
		TOTAL	27	

SENIOR

		Track courses ⁴	3
		Electives ³	24-27
		TOTAL	27-30

PROGRAM TOTAL = 120 credits¹ French, German, Italian, Russian, or Spanish.² 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.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 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 303, HY 304, HY 310, HY 318, HY 326, HY 410, HY 415, HY 416, HY 418, HY 420, HY 421, HY 422, HY 423, HY 435, 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 430, E 431, E 432, E 444, E 445, E 452, E 455, E 476, E 477, ID 357, L 310, L 313, L 335, L 345, L 355, L 413S, L 433A-B, L 434, L 437, 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**

In addition to the international studies concentration core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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	270	Colonial Latin America	3

HYCC	271	Latin America Since Independence	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	22-23
		TOTAL	25-26

PROGRAM TOTAL = 120 credits²¹ 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, 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, L 310S, L 335S, L 336, L 436, L 449, L 452S.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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
COCC	150	College Composition (Composition Placement Exam)	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 or 3D
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
		Biological/physical sciences ¹	4 3A
		First year seminar ²	2-3 1
		Health and wellness ³	2 3G
		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

<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
Minor/certificate courses ⁸			6	
Additional areas of emphasis ⁹			3	
Additional communication ¹⁰			3	2B
Biological/physical sciences ¹			3	3A
Global and cultural awareness ¹¹			3	3E
Logical/critical thinking ¹²			3	2D
Electives ¹³			6	
TOTAL			30	

JUNIOR

Minor/certificate courses ⁸			9	
Additional areas of emphasis ⁹			15	
Electives ¹³			6	
TOTAL			30	

SENIOR

LB	492B	Seminar-Social Sciences	1	4C
Minor/certificate courses ⁸			6	
Additional areas of emphasis ^{9, 14}			12	4A, 4B
Arts/humanities, upper-division			6	
Electives ¹³			5-6	
TOTAL			30-31	

PROGRAM TOTAL = 120 credits¹⁵

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 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.

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

⁶ Select from the list of courses in category 3C with the following prefixes: APCC, ECCC, JTCC, POCC, PYCC, or S CC.

⁷ Select from the following subset of courses in category 3F in the AUCC: AUCC 201 (may also count in category 3D), ECCC 204, ECCC 212, ECCC 240 or EACC 240, ETCC 200, ETCC 204, HYCC 150, HYCC 151, JTCC 100 (may also count in category 3C), NRCC 320, PLCC 103, POCC 101, POCC 103, S CC 100, S CC 105 (POCC 101, POCC 103, S CC 100, and S CC 105 may also count in category 3C).

⁸ 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 advisor 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.

⁹ Two additional areas of emphasis are required in the social sciences, each of which must have 15 credits and a minimum of 9 upper-division credits.

¹⁰ Select from the following subset of courses in category 2B in the AUCC: COCC 300 (if selected here, cannot also be counted in category 2D), COCC 301A-D, COCC 302, JTCC 300, SPCC 200, or approved language courses (L CC).

¹¹ 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.

¹² Select from the following subset of courses in category 2D in the AUCC: COCC 300 (if selected here, cannot also be counted in category 2B), PLCC 110, SPCC 207, STCC 101, STCC 110, STCC 201, STCC 204, STCC 301, STCC 307 or EHCC 307, STCC 309.

¹³ Courses taken in fulfillment of the AUCC may, where appropriate, be double-counted in fulfilling the requirements of a minor (or a certificate) plus two additional areas of emphasis. Consequently, the actual number of free electives can vary between 17-35.

¹⁴ At least six of the upper-division social science credits taken as part of the areas of emphasis must be in courses approved for category 4A and 4B, Depth and Integration, in the areas of emphasis.

¹⁵ Students must complete 120 credits, and a minimum total of 42 upper-division credits.

Social Sciences Concentration with Social Studies Licensure

The social sciences concentration with social studies licensure prepares 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)	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 118 or M/M CC 120A-B)	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 ⁵	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	
		Arts and humanities upper-division ⁵	6	
		Non-U.S. history, upper-division ⁶	6	
		Upper-division U.S. history pre-1865 ⁷	3	
		Upper-division U.S. history post- 1865 ⁸	3	
		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, ED 465, concurrent reg. in ED 485A or B)	1	
ED	493B	Seminar-Assessment of Learning (ED 450, ED 465, concurrent reg. in ED 485A or B or VE 485)	1	4B
LB	492B	Seminar-Social Sciences	1	4C
		Upper-division political science/economics ⁹	3	
		Electives	2	
		TOTAL	28	

PROGRAM TOTAL = 120 credits⁵ Students must complete six upper-division credits in the arts and humanities.⁶ Students must complete six upper-division credits in non-U.S. history.⁷ Any upper-division U.S. history pre-1876.⁸ Any upper-division U.S. history post-1876.⁹ 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, arts and humanities concentration, and a B.S. in engineering science. The program, which requires 156 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.

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

¹ Select from the list of courses in category 3A in the All-University Core Curriculum (AUCC). One of the courses must have a laboratory component.² 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.

SOPHOMORE

Select one course from Arts and one from Humanities:

Arts			
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
Humanities			
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
<hr/>			
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
		Global and cultural awareness ⁴	3 3E
		U.S. public values and institutions ⁵	3 3F
		TOTAL	34
<hr/>			
JUNIOR			
CE	260	Engineering Mechanics-Statics (M/M CC 160, PH/PHCC 141)	3
CE	261	Engineering Mechanics-Dynamics (CE 260; CB 103/CBCC 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
		Additional areas of emphasis ⁷	6
		Arts and humanities, upper-division	3
		TOTAL	34
<hr/>			
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	
LB	492B	Seminar-Social Sciences	1	4C
		Minor or certificate ⁶	9	
		Additional areas of emphasis ⁷	9	
		Arts and humanities, upper-division	3	
		TOTAL	29	
<hr/>				
FIFTH YEAR				
CB	470	Engineering Design I (CB 201 or CB 204/EV 204)	1	4C
CB	471	Engineering Design II (CB 470)	3	4A, 4C
		Technical electives in engineering ⁸	27	
		TOTAL	31	

PROGRAM TOTAL = 156 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 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.

⁵ Select from the following subset of courses in category 3F in the AUCC: AUCC 201 (may also count in category 3D), ECCC 204, ECCC 212, ECCC 240 or EACC 240, ETCC 200, ETCC 204, HYCC 150, HYCC 151, JTCC 100 (may also count in category 3C), NRCC 320, PLCC 103, POCC 101, POCC 103, S CC 100, S CC 105 (POCC 101, POCC 103, S CC 100, and S CC 105 may also count in category 3C).

⁶ 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.

⁷ Two additional areas of emphasis within the social sciences must include a minimum of 18 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 can vary.

⁸ 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 and Society	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
Professor Jeffrey L. Eighmy, Chair

Major in Anthropology

Do you wonder what forces led to the rise of agricultural or industrial societies? Would you like to understand how human biology, behavior and the natural environment have interacted to produce past or present cultures? Have you ever wondered why all human groups practice religion, have creation myths and practice marriage customs? Has the question of how human beings came to be human ever interested you? If you are curious about any of these issues, then a major in anthropology may be right for you.

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 involving 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 your 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 101	Cultures of the World	3	1, 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 141	Humans in Prehistory	3	1, 3D
COCC 150	College Composition (Composition Placement Exam)	3	2A
	Additional communication ²	3	2B
	First year seminar ³	3	1
	Health and wellness ⁴	2	3G
	Logic/critical thinking ⁵	3	2D
	Mathematics ⁶	3	2C
	U.S. public values and institutions ⁷	3	3F
	TOTAL	30	
SOPHOMORE			
	Arts and humanities ⁸	9	3B
	Biological and physical sciences ⁹	10-11	3A
	Global and cultural awareness ¹⁰	3	3E
	Social and behavioral science ¹¹	6	
	Anthropology elective ¹¹	3	
	TOTAL	31 - 32	

JUNIOR

AP 300	History of Anthropological Theory (AP/APCC 100 or AP/APCC 101 or AP/APCC 200; AP/APCC 140 or AP/APCC 141 or AP 150/APCC 120 and AP 151/APCC 121)	3	4B
<i>Select one of the following:</i>			
S 310	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	2D
STCC 307/ EHCC 307	Introduction to Biostatistics (M/M CC 121)	3	2D
STCC 311	Statistics for Behavioral Sciences I (M/M CC 121)	3	2D
	Social and behavioral sciences ¹¹	3	
	Upper-division archaeology ¹¹	3	
	Upper-division biological anthropology ¹¹	3	
	Upper-division cultural anthropology ¹¹	3	
	Anthropology electives ⁹	3	
	Electives	9	
	TOTAL	30	

SENIOR

AP 493	Contemporary Issues in Anthropology (senior standing)	3	4A, 4C
	Arts/humanities ¹¹	3	
	Social/behavioral sciences ¹¹	3	
	Anthropology elective ¹¹	3	
	Electives	16-17	
	TOTAL	28-29	

PROGRAM TOTAL = 120 credits

¹ To count as fulfilling category 1, the course must be taught in the first year seminar format (identified by the __CC 192 designation).

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

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

⁶ Select three credits, except M/M CC 133, from the courses in category 2C in the AUCC.

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

⁸ 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.

⁹ 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).

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

¹¹ See department advising manual for course selection.

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 101	Cultures of the World	3	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 141	Humans in Prehistory	3	1, 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.

¹ Course may be counted in both All-University Core Curriculum categories if the course is taught as a first-year seminar (identified by the __CC 192 designation).

Graduate Programs 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
Professor Phil Risbeck, Chair

Major in Art

Do you feel compelled to satisfy your need for self-expression by creating works of art? Does the history of human artistic expression interest you? Would you like to develop your artistic talents through structured study and practice? Are you interested in educating people in the arts? Do learning technical skills and creating artwork through a wide variety of mediums excite you? Do concepts and expressions of beauty motivate you? Then, a major in art may be the choice for you.

Visual arts comprise the study of the variety of means of visually expressing human thoughts, interests, attitudes, emotions, and ideas. Artists use several 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. 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 your interests, the electives you take or the concentration you select, 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. An established study abroad program is 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)	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 111, AR 136, AR 160, AR 170)	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	
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	

CORE 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.

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:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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 445)	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:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
AR 365	Printmaking II-Lithography (AR 136)	4	
AR 366	Printmaking III-Studio Workshop (AR 365)	4	
	Art electives ¹	12	
	TOTAL	20	

SENIOR

AR 465	Printmaking IV-Studio Workshop (AR 366)	4	4C
AR 466	Printmaking V-Studio Workshop (AR 465)	4	4C
	TOTAL	8	

PROGRAM TOTAL = 120 credits

¹ At least eight upper-division credits.

Sculpture Concentration

In addition to the art (B.F.A.) core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
AR 370	Sculpture II (AR 270)	4	
AR 371	Sculpture III (AR 270)	4	
	Art electives ¹	12	
	TOTAL	20	

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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
AR 110	History of Western Art I	3	
AR 111	History of Western Art II (AR 110)	3	
AR 135	Introduction to Drawing	3	
AR 136	Introduction to Figure Drawing (AR 135)	3	
AR 160	Foundations Painting	3	
AR 170	Foundations Sculpture	3	
COCC 150	College Composition (Composition Placement Exam)	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)	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 (ED 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 (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	
	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 (ED 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 (ED 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, ED 466, concurrent reg. in ED 485A or B)	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 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, 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
FRESHMAN			
AR 110	History of Western Art I ¹	3	
AR 111	History of Western Art II (AR 110)	3	
AR 135	Introduction to Drawing	3	
AR 160	Foundations Painting	3	
AR 170	Foundations Sculpture	3	
COCC 150	College Composition (Composition Placement Exam)	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			
<i>Select two courses from the following:</i>			
AR 112	History of Asian Art	3	
AR 113	Native Art Survey	3	
AR 230	Photo Image Making I (AR 111, AR 136, AR 160, AR 170)	3	
AR 240	Pottery I (AR 111, AR 136, AR 160, AR 170)	3	
AR 245	Metalsmithing and Jewelry I (AR 111, AR 136, AR 160, AR 170)	3	
AR 250	Fibers I (AR 111, AR 136, AR 160, AR 170)	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	
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 a total of 21 credits 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, 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)	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	

Art electives ¹³	9
Non-art electives	14-15
TOTAL	27-28

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 111, AR 136, AR 160, AR 170)	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 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	6	4A, 4B
Upper division concentration ¹²	8	
TOTAL	31	

SENIOR

		<i>Select four credits from the following in the appropriate concentration:</i>		
AR	430	Advanced Photo Image Making I (AR 331)	4	4C
AR	431	Advanced Photo Image Making II (AR 430)	4	4C
AR	435	Drawing Workshop IV (AR 336)	3	4C
AR	436	Drawing Workshop V (AR 435)	3	4C
AR	440	Pottery IV (AR 341)	4	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 445)	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

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 Choose eight upper-division credits in one area of concentration in addition to the four credit capstone course.

¹³ Select nine credits (at least four upper-division) of art electives.

Minor in Art History

The art history minor has been declared full and students wishing to declare an art minor should seek status of the minor from the Art Department.

Art history gives the student a unique visual education in arts and humanities. A culture, an age is made more pertinent and alive through visual images. Reference to visual objects contributes to understanding of the creative process for artists and laymen. A minor in art history has the potential of adding a different dimension and depth to humanistic learning.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
ARCC 100	Introduction to the Visual Arts	3	3B
	OR		
AR 110	History of Western Art I	3	
AR 111	History of Western Art II (AR 110)	3	
AR 212	History of Western Art III (AR 111)	3	
	<i>Select one course from the following:</i>		
AR 135	Introduction to Drawing	3	
AR 160	Foundations Painting	3	
AR 170	Foundations Sculpture	3	
	TOTAL	12	
UPPER DIVISION			
AR	Art history	15	
PROGRAM TOTAL = 27 credits			

Minor in Studio Art

The studio art minor has been declared full and students wishing to declare an art minor should seek status of the minor from the Art Department.

A minor in studio art provides the student with basic technical skills and aesthetic understanding in at least one of the major studio arts. Students should consult with an art department adviser to plan a course of study in one of the following fields: 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
Associate Professor Robert W. Kling, Chair

Major in Economics

Are you curious about the forces that affect our economic welfare? Would you like to help clean up the environment or deal with overpopulation and poverty? Would you enjoy

helping businesses explore new markets? Are you interested in the history of economic thought and institutions? Are you curious about different economic theories and philosophies? Would you like to apply sophisticated mathematical and statistical techniques to the analysis of economic problems? Are you interested in international trade and finance? Would you like to know the fundamentals behind government economic policies? If any of your answers are “yes,” then a major in economics may be for you.

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)	3	2A
<i>Select one of the following:</i>			
COCC 300	Writing Arguments (CO/COCC 150)	3	2B
COCC 301A-D	Writing in the Disciplines (CO/COCC 150)	3	2B
COCC 302	Writing Online (CO/COCC 150)	3	2B
JTCC 300	Professional and Technical Communication (CO/COCC 150)	3	2B
ECCC 202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	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 Civilizations, Ancient-1500	3	3D
HYCC 171	World Civilizations, 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 or M/M CC 120B or placement)	1	2C

Arts/humanities ¹	3	3B
First-year seminar ²	2-3	1
Health and wellness ³	2	3G
Electives	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

Select one course from the following:

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	
EC 379/ HY 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 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
	Biological/physical sciences ⁴	7	3A
	Electives	8	
	TOTAL	30	

JUNIOR

EC 335/ EA 335	Introduction to Econometrics (EC/ECCC 204, 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 118 or M/M CC 120A-B)	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. Three primary fields of specialization are presently emphasized: social and political economics, international and development economics, and environmental economics. Within these areas, further field specialization is available.

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 Pattie Cowell, Chair

Major in English

Do you love to read great literature? Do the insights of literary figures from different cultures and time periods interest you? Do you enjoy communicating your ideas imaginatively and effectively? Does analyzing works of prose and poetry intrigue you? Would you like to develop a career in writing, editing, or teaching? Does poetry awaken your spirit? Have you dreamed about writing a play or a novel one day? If you answered “yes” to any of these questions, then a major in English may be for you.

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 kinds 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 200	Self/Community in American Culture 1600-1877	3	3D
AUCC 201	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)	3	2A
E CC 140	The Study of Literature	3	1, ¹ 3B
E 160	Mythical and Biblical Backgrounds	3	
SPPC 200	Public Speaking	3	2B1
	Arts/humanities ²	3	3B
	First year seminar ³	2-3	1
	Health and wellness ⁴	2	3G
	Mathematics ⁵	3	2C
	Electives	1-2	
	TOTAL	29-31	
SOPHOMORE			
E 210	Beginning Creative Writing (E/E CC 140)	3	
E 240	Introduction to Poetry	3	

E CC 270	Introduction to American Literature	3	3B or 3D
OR			
E CC 275	Introduction to British Literature	3	3B or 3D
	Biological/physical sciences ⁶	7	3A
	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
COCC 301A-D	OR Writing in the Disciplines (COCC 150)	3	4A
<i>Select one of the following:</i>			
E 311A	Intermediate Creative Writing-Fiction (E 210 with grade of B or better)	3	
E 311B	Intermediate Creative Writing-Poetry (E 210 with grade 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
E 342	Shakespeare I	3	
E 343	Shakespeare II	3	
OR			
	U.S. public values and institutions ¹¹	3	3F
	Second field ¹²	3	
	English elective ¹³	3	
	Upper division English/composition ¹⁴	6	
	Electives	3	
	TOTAL	30	

SENIOR			
<i>Select one of the following:</i> ¹⁵			
E 412A	Creative Writing Workshop - Fiction (Grade B or better in E 311A)	3	
E 412B	Creative Writing Workshop - Poetry (Grade B or better in E 311B)	3	
E 412C	Creative Writing Workshop - Nonfiction (Grade of B or better in E 311A or E 311C)	3	
<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 470	Individual Author (E 341 and one other upper-division E prefix course)	3	4C
	Second field ¹²	9	
	Upper division English/composition ¹⁴	9	
	Electives	6	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

¹ To count as fulfilling category 1, the course **must** be taught in the first year seminar format (identified by the __CC 192 designation).

² Select from the list of courses in category 3B (but excluding E CCand PLCC prefix courses) 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 3G in the AUCC.

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

⁶ Select two courses, one with lab, from 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 PL 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 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.

¹³ Select any lower or upper level E prefix course.

¹⁴ 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.

¹⁵ 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)	3	2A
E 160	Mythical and Biblical Backgrounds	3	
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
	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 275	Introduction to British Literature	3	3B or 3D
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 (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 386, 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, ED 463, concurrent reg. in ED 485A or B)	1	
ED	493B	Seminar-Assessment of Learning (ED 450, ED 463, concurrent reg. in ED 485A or B 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 200, AUCC 201, 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 Major Authors capstone course (E 460, E 463, 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 200	Self/Community in American Culture, 1600-1877	3	3D
AUCC 201	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)	3	2A
E 160	Mythical and Biblical Backgrounds	3	
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	28-33	

SOPHOMORE

E	240	Introduction to Poetry	3	
E CC	270	Introduction to American Literature	3	3B or 3D
OR				
E CC	275	Introduction to British Literature	3	3B or 3D
OR				
		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			28-30	

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 language ³	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
		Foreign language ³	5	
		Upper division English/composition ¹²	15	
		Electives	5-7	
TOTAL			28-30	

PROGRAM TOTAL = 120 credits

¹ Select from the list of courses in category 3B (excluding PLCC and E CC prefix courses) in the All-University Core Curriculum (AUCC).

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

³ This requirements 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 320, 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 reinforces 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 200	Self/Community in American Culture 1600-1877	3	3D
AUCC 201	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)	3	2A
E 160	Mythical and Biblical Backgrounds	3	
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ¹	3	3B
	First year seminar ²	2-3	1
	Health and wellness ³	2	3G
	Mathematics ⁴	3	2C
	Electives	4-5	
	TOTAL	29-31	

SOPHOMORE

E	240	Introduction to Poetry	3	
E CC	270	Introduction to American Literature	3	3B or 3D
OR				
E CC	275	Introduction to British Literature	3	3B or 3D
OR				
		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	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 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	470	Individual Author (E 341 and one other upper-division E prefix course)	3	4C
OR				
		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 (but 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 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 200	Self/Community in American Culture, 1600-1877	3	3D
AUCC 201	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)	3	2A
E 160	Mythical and Biblical Backgrounds	3	
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ¹	3	3B
	First year seminar ²	2-3	1
	Health and wellness ³	2	3G
	Mathematics ⁴	3	2C
	Electives	4-5	
	TOTAL		29-31
SOPHOMORE			
E 240	Introduction to Poetry	3	
E CC 270	Introduction to American Literature	3	3B or 3D
OR			
E CC 275	Introduction to British Literature	3	3B or 3D
	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
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 ¹³	6	
	Electives	6	
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 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 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. Szaz, Chair

Major in Language, Literature, and Culture Studies

Would you like to travel overseas knowing that you can communicate effectively and comfortably? Are you aware of worldwide career opportunities for graduates with foreign language skills? Are you interested in learning about the geography, history, literature, and culture associated with the foreign language you learn? Would you like to become proficient in understanding, speaking, reading, and writing in another language? If so, a major or minor in foreign languages may be for you.

Gaining insight into a foreign culture through proficiency in its language and familiarity with its literature furthers intercultural understanding and international perspectives in a student's total program of study. It is particularly valuable in fields such as social work, international relations and political science, international business or finance, computer science, tourism, and natural sciences. The programs in foreign languages emphasize oral and written proficiency. They also develop knowledge of the culture and literature, and the critical and analytical skills necessary for an understanding of their relationships. A major in a second language focuses on broadening and deepening proficiency and integrates this knowledge with the strengths of a liberal arts curriculum. The department offers one major in languages, literatures, and cultures with concentrations in French, German, and Spanish.

Language majors accomplish:

- real and measurable functional competencies in the target language;
- a practical command of grammar and pronunciation approach that of a native speaker;
- comprehension in reading and listening;
- ability in speaking and writing in a manner acceptable to an educated native;
- a practical command of the culturally defined aspects of the language and related cultural patterns of behavior, including non-verbal communication
- 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. 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 maintain a 2.0 grade point average in all upper-division courses that carry the L or L CC prefix.

French, German, and Spanish Concentrations

Core Courses

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	3	2A
L CC 105 [F, G, S] ¹	First-Year Language I (for students with no previous study in the language)	5	2B3 ²
L CC 107 [F, G, S]	First-Year Language II (L/L CC 105 or L 106)	5	2B3 ²
	Arts/humanities ³	3	3B
	First year seminar ⁴	2-3	1
	Health and wellness ⁵	2	3G
	Historical perspectives ⁶	6	3D
	Social/behavioral sciences ⁷	3	3C
	TOTAL	29-30	
SOPHOMORE			
L CC 200 [F, G, S]	Second-Year Language I (L/L CC 107 or L 108 or placement exam)	3	2B3
L CC 201 [F, G, S]	Second-Year Language II (L/L CC 200 or placement exam)	3	2B3
	Additional communication ⁸	3	2B
	Global and cultural awareness ⁹	3	3E
	Logical/critical thinking ¹⁰	3	2D
	Mathematics ¹¹	3	2C
	Biological/physical sciences ¹²	7	3A
	U.S. public values and institutions ¹²	3	3F
	TOTAL	28	
JUNIOR			
L CC 300 [F, G, S]	Reading and Writing for Communication (L/L CC 201 or L 208)	3	2B3
L 310 [F, G, S]	Approaches to Literature (L/L CC 201 or L 208)	3	
L 335 [F, G, S]	Issues in Culture (L/L CC 201 or L 208)	3	
	TOTAL	9	
SENIOR			
L 400 [F, G, S]	Advanced Communication Skills (L/L CC 300)	3	
L 433A	<i>French students, select one:</i> Advanced French/Francophone Culture Representations (L 335F)	3	4A
L 433B	OR Advanced French/Francophone Culture Center and Margins (L 335F)	3	4A
L 434	Advanced German Culture ¹⁴ (L 335G)	3	4A

<i>Spanish students, select one:</i>				
L	436	Advanced Latin American Culture (L 335S)	3	4A
OR				
L	437	Advanced Spanish Culture (L 335S)	3	4A
L	492	Language, Literature and Society (L 310 and two 400-level courses; senior status)	3	4B, 4C
TOTAL			9	

CORE TOTAL = 75-76 credits¹⁵

¹ French, German, or Spanish.

² 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.

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

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

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

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

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

⁸ Select from the list of approved courses in the department.

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

¹⁰ Select from the list of courses in category 2D in the AUCC.

¹¹ Select from the list of courses in category 2C in the AUCC.

¹² Select from the list of courses in category 3A in the AUCC.

¹³ Select from the list of courses in category 3F in the AUCC.

¹⁴ Requirement for German students only.

¹⁵ In order to complete the degree, each student must also complete one of the following options: language, literature, and culture or language, literature, culture, and second language.

Language, Literature and Culture Option

In addition to the French, German, or Spanish concentration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
<i>French students, select three of the following courses:</i>			
L	301F	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
L	355F	20th-Century French Literature (L 310F)	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	460F	French/Francophone Women Writers (L/L CC 300F, L 310F)	3

<i>German students, 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	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	

<i>Spanish students, select two of the following courses:</i>				
L	301S	Oral Communication-Spanish (L/L CC 201S)	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	345S	Business Spanish (L/L CC 300S)	3	
L	413	Advanced Spanish Translation/ Interpreting (L 313S or written consent of instructor)	3	
L	436	Advanced Latin American Culture (L 335S)	3	
L	437	Advanced Spanish Culture (L 335S)	3	
L	442	Social Manifestations of Hispanic Poetry (L/L CC 300S, L 310S)	3	
L	443	Spanish Theatre (L/L CC 300S, L 310S)	3	
L	445	Women Writers of the Hispanic Worlds (L/L CC 300S, L 310S)	3	
L	450S	Selected Spanish 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	

Electives 12-15

TOTAL 21

SENIOR

400-level French¹ 3

OR

400-level German² 3

OR

400-level Spanish³ 6

Electives, upper-division⁴ 3

Electives⁵ 14-18

TOTAL 23-24

PROGRAM TOTAL = 120 credits

¹ For French students, select one 400-level French course from the list above.

² For German students, select one 400-level German course from the list above.

³ For Spanish students, select two 400-level Spanish courses from the list above.

⁴ 400-level course, English speaking FLL course in student's concentration (L 465A-C) or non-Foreign Languages and Literatures course with adviser's approval.

⁵ Select enough elective credits to bring total credits to 120.

Language, Literature, Culture, and a Second Language Option

In addition to the French, German, or Spanish concentration core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
JUNIOR			
<i>French students, select two of the following courses:</i>			
L 301F	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	
L 355F	20th-Century French Literature (L 310F)	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	
<i>German students, select two 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 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	

<i>Spanish students, select two of the following courses:</i>			
L 301S	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 345S	Business Spanish (L/L CC 300S)	3	
L 413	Advanced Spanish Translation/ Interpreting (L 313S or written consent of instructor)	3	
L 450S	Selected Spanish 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		21	
SENIOR			
400-level French ¹		3	
OR			
400-level German ²		3	
OR			
400-level Spanish ³		3	
Second language courses ⁴		8-12	
Electives ⁵		8-13	
		23-24	

PROGRAM TOTAL = 120 credits

¹ For French students, select one 400-level French course from the list above.

² For German students, select one 400-level German course from the list above.

³ For Spanish students, select one 400-level Spanish course from the list above.

⁴ Lower and/or upper-division second language courses.

⁵ Select enough elective credits to bring total credits to 120.

Teaching Endorsement

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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	

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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 (L/L CC 201 or L 208)	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 (ED 310/EDCC 275; 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)	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)	3	

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, ED 462, concurrent reg. in ED 485A or B)	1	
ED	493B	Seminar-Assessment of Learning (ED 460, ED 462, concurrent reg. in ED 485A or B 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.

All majors and minors in the department must maintain a 2.0 grade point average in all upper-division courses that carry the L or L CC prefix.

Minor in French

Minimum of 21 credits of 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 of 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 of 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 leading to the M.A. degree in foreign languages and literatures or a joint M.A. degree in foreign languages and literatures and the teaching of English as a foreign language should consult the *Graduate and Professional Bulletin*.

DEPARTMENT OF HISTORY

Office in Clark Building, Room B 357
Professor Ruth M. Alexander, Chair

Major in History

Are you interested in understanding and interpreting past human events? Would you like to learn how and why important political and economic decisions were made? Are you interested in the histories of other cultures? Would you like to write a history of your community? Are you interested in genealogy, archiving, teaching, or curating a museum? These are a few of the things that historians do.

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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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
OR			
HYCC 150	U.S. History to 1876	3	3F
OR			
HYCC 151	U.S. History Since 1876	3	3F
OR			
	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 Civilization 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
Additional communication⁶		
		3 2B
Logic/critical thinking⁷		
		3 2D
Social/behavioral sciences⁸		
		3 3C
Language and quantitative options⁹		
		6-11
History electives¹⁰		
		6
Electives		
		1-7
TOTAL		25-36

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.

¹⁴ Select one upper-division U.S. history course.

¹⁵ Select three upper-division history courses.

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. L/L CC 200 or placement into L CC 201 or higher may be used to fulfill the AUCC Additional Communication requirement (category 2B3).

Quantitative Option

In addition to the liberal arts concentration courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
SOPHOMORE			
<i>Select 4-8 credits from the following:</i>			
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 or M/M CC 121)	4	2D
CS 154	C++ to Java Programming Module (college-level C++ course)	2	
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)	2	
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	

STCC 101	Activity Based Statistics (Math Placement Exam)	3	2D
OR			
STCC 110	Statistical Thinking: Concepts and Applications (Math Placement Exam)	3	2D
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)	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
SOPHOMORE			
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 118 or M/M CC 120A-B)	3	3C
ECCC 204	Principles of Macroeconomics (EA/EACC 202 or EC/ECCC 202)	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 Civilization 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
<hr/>			
HYCC 150	U.S. History to 1876	3	3F
HYCC 151	U.S. History Since 1876	3	3F
GR 100	Introduction to Geography	3	
GR 320	Cultural Geography (GR 100)	3	
POCC 101	American Government and Politics	3	3E, 3F
POCC 103	State and Local Government and Politics	3	3E, 3F
	Arts/humanities ⁷	3	3B
	History elective ⁸	3	
	TOTAL	33	
<hr/>			
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 (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	
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
<hr/>			
<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, ED 465, concurrent reg. in ED 485A or B)	1	
ED 493B	Seminar-Assessment of Learning (ED 450, ED 465, concurrent reg. in ED 485A or B or VE 485)	1	
HY 492	Capstone Seminar (HY 301; senior status or written consent of instructor)	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

Do you enjoy writing? Are current news events, important social issues, or the exploration of new developments in art, travel, entertainment, science, technology, and business some topics that you would like to write about? Do investigating and reporting the real stories behind the scenes intrigue you? Does the fast moving world of advertising and promotion of the latest products, interesting places or new ideas sound exciting to you? Would you like to use modern techniques and the tools of video communications and television news production to inform people about what is happening around the world? If you answer "yes" to any of these questions then a major in technical journalism may be just for you.

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, KCSU Radio, and the *Silver Spruce* year book. 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 Technical Journalism is one of a relatively small number of departments recognized nationally by the Accrediting Council for Education in Journalism and Mass Communications

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

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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	23-24	
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 and Society	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 = 88-89 credits¹⁵

- ¹ 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.
- ² Select a total of seven credits from category 3A in the All-University Core Curriculum (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, S CC, or PLCC.
- 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, ETCC, ECCC, HYCC, PLCC, POCC, or PYCC. 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 3F.
- 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:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
POCC 101	American Government and Politics	3	3C, 3F
POCC 103	State and Local Government and Politics	3	3C, 3F
	TOTAL	6	
JUNIOR			
<i>Select two of the following courses:</i>			
JT 326	Online Journalism (JT 211)	3	
JT 335	Digital Photojournalism	3	
JT 361	Writing for Specialized Magazines (JT 210)	3	
JT 372	Web Design and Management (JT 211)	3	
JT 460	Publication Management	3	
JT 461	Writing about Science, Health, and Environment (JT 211)	3	
JT 487	Internship	3	

JT	310	Copy Editing and Production (JT 210)	4	
JT	320	Reporting (JT 210)	3	
<hr/>				
<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)	3	
<hr/>				
Electives			9-14	
TOTAL			25-30	

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			
<hr/>			
<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 118 or M/M CC 120A-B)	3	3C
TOTAL			3
<hr/>			
JUNIOR			
BK	305 Fundamentals of Marketing (EC/ECCC 101 or EC/ECCC 202 or EA/EACC 202)	3	
BN	305 Fundamentals of Management	3	
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<i>Select one of the following:</i>			
JT	320 Reporting (JT 210)	3	
JT	326 Online Journalism (JT 211)	3	
JT	361 Writing for Specialized Magazines (JT 210)	3	
JT	372 Web Design and Management (JT 211)	3	
JT	461 Writing about Science, Health, and Environment (JT 210)	3	
<hr/>			
JT	310 Copy Editing and Production (JT 210)	4	
JT	350 Public Relations	3	
JT	351 Public Relations Practices (JT 210, JT 350)	3	
Electives			7
TOTAL			26

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			
<hr/>			
<i>Select three credits from the following:</i>			
JT	326 Online Journalism (JT 211)	3	
JT	335 Digital Photojournalism	3	
JT	342 Writing for Specialized Electronic Media (JT 210)	3	
JT	350 Public Relations	3	
JT	372 Web Design and Management (JT 211)	3	
JT	460 Publication Management	3	
JT	487 Internship	3	
<hr/>			
JT	310 Copy Editing and Production (JT 210)	4	
JT	361 Writing for Specialized Magazines (JT 210)	3	
Electives			13
TOTAL			23
<hr/>			
SENIOR			
JT	461 Writing about Science, Health, and Environment (JT 210)	3	
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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:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
JUNIOR			
<i>Select one of the following:</i>			
JT 326	Online Journalism (JT 210)	3	
JT 341	Broadcast News (JT 210)	3	
JT 342	Writing for Specialized Electronic Media (JT 210)	3	
JT 340	Videotape Editing	3	
JT 345	Electronic Field Production (JT 340)	3	
	Electives	13-14	
	TOTAL	22-23	
SENIOR			
JT 372	Web Design and Management (JT 211)	3	
OR			
JT 435	Documentary Video Production (JT 345)	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 Eric Prince, 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 handicapped 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.)

Music Education Concentration

Do you love music? Would you like to achieve greater depth and skill in your musical understanding and performance? Do you enjoy working with young people? Would you enjoy teaching vocal, instrumental and general music in elementary or secondary schools? Colorado State's accredited music education program may be the thing for you.

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)	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	2	
	Historical perspectives ¹	3	3D
	Logical/critical thinking ²	3	2D
	Mathematics ³	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	
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	2	
PYCC 100	General Psychology	3	3C
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ⁴	3	3B
	Biological/physical sciences ⁵	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 (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	
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	2	
	Health and wellness ⁶	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, ED 475 and ED 476 or ED 477, concurrent reg. in ED 485A or B)	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
		Biological/physical sciences ⁵	4 3A
		Global and cultural awareness ⁷	3 3E
TOTAL			30

PROGRAM TOTAL = 127 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 2D in the AUCC.

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

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

⁵ Select from list of courses in category 3A in the AUCC. One course must have a laboratory component.

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

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

Music Therapy Concentration

Are you looking for a practical application of your music skills? Does helping people to use music to control chronic pain, ease childbirth, employ relaxation techniques, or stimulate infant children appeal to you? Would you enjoy using music in preventative health care or as a means to mainstream individuals with disabilities? How would you use music as therapy in a special education program to help children succeed? Do you like working with the elderly to help improve their quality of life? If your answer to any of these questions is “yes,” then major in music therapy may be for you.

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)	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 153	Piano Class IV (MU 152)	2	
MU 217	Music Theory III (MU 118)	4	
MU 218	Music Theory IV (MU 217)	4	
MU 250	Music Therapy Practice	2	
MU 252G	Instrumental Techniques- <i>Percussion</i>	1	
MU 272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2	
OT 215	Medical Terminology	1	
PLCC 100	Appreciation of Philosophy	3	3B
SPCC 200	Public Speaking	3	2B1

Ensemble ²	2	
Health and wellness ⁴	2	3G
Historical perspectives ⁵	3	3D, 3F
TOTAL	33	

JUNIOR

AY 300/ PS 300	Principles of Human Anatomy and Physiology (C/C CC 103 or C/C CC 107 or C/C CC 111; BY 102/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110)	4	
AY 345	Functional Neuroanatomy (AY 300/PS 300)	4	
MU 157	Voice Class I	2	
MU 335	Music History II (MU 118; MU/MUCC 100 or MU 131/MUCC 192)	3	4A, 4B
MU 342	Psychology of Music (PY/PYCC 100)	3	
MU 440	Music Therapy Methods I (MU 241, AY 300/PS 300)	3	
MU 443	Music Therapy Methods II (admission to professional curriculum)	3	
MU 472A-V	Applied 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 ⁶	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	
MU 445	Improvisation Techniques in Music Therapy (admission to professional curriculum)	2	
MU 486A	Practicum-Music Therapy ² (piano proficiency)	5	4C
MU 487	Internship (completion of all course work in the music therapy curriculum)	1	
PY 452	Cognitive Psychology (PY/PYCC 100 or written consent of instructor)	3	
PY 454A	OR Physiological Psychology (PY/PYCC 100 or written consent of instructor)	3	
STCC 201	General Statistics (M/M CC 120A-B)	3	2D
	Global and cultural awareness ⁷	3	3E
	Music electives	2	
	TOTAL	27	

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 201, HYCC 150, HYCC 151, or NRCC 320.⁶ Ensemble (1 semester).⁷ Select from the list of courses in category 3E in the AUCC.

Performance Concentration

Would you like to pursue a professional career as a music performer or private music teacher? Do you have a desire to create or express yourself through music? Do you wish to develop and expand your musical talents? Do you aim to achieve a high degree of proficiency in your musical understanding and performance? Is it your desire to pursue a career as professional soloist or as a musician in a musical venue such as an orchestra, a choir, a military band, or vocal group? If so, perhaps a major in music performance is what you are looking for.

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, composition, 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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			24-28	

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)	2	
		Biological/physical sciences ¹⁷	7	3A
		Global and cultural awareness ¹⁸	3	3E
		Music electives	3	
TOTAL			23	

CORE TOTAL = 90-94 credits¹⁹¹Two semesters.**Composition 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	
	Electives		4
TOTAL			6

SOPHOMORE

MU 252A-G	Instrumental Techniques ²	4	
MU 272A-V	Applied Music Instruction ¹ (concurrent reg. in any music ensemble)	2-4	
MU 272F	Applied Music Instruction- Composition (concurrent reg. in any music ensemble) ³	2	
	Electives		1-3
TOTAL			11

JUNIOR

MU 252A-G	Instrumental Techniques ²	3	
	Electives		3
TOTAL			6

SENIOR

MU 311	Counterpoint I ⁴ (MU 217)	2	
OR			
MU 312	Counterpoint II ⁴ (MU 217)	2	
	Electives		3
TOTAL			5

PROGRAM TOTAL = 120 credits¹Two semesters; major instrument or voice; MU 272F not allowed.²Select two sections each semester from MU 252A-G.³Two semesters.⁴Select course not taken in the junior year.**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	<u>7</u>
	TOTAL	11

JUNIOR

	Electives	<u>4</u>
	TOTAL	4

SENIOR

	Electives	<u>7</u>
	TOTAL	7

PROGRAM TOTAL = 120 credits¹Two 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	<u>2-4</u>	
	TOTAL	6	
SOPHOMORE			
MU 272H	Applied Music Instruction-Organ ¹ (concurrent reg. in any music ensemble)	4	
	Foreign language ¹	<u>10</u>	
	TOTAL	14	
JUNIOR			
	Electives	<u>4</u>	
	TOTAL	4	
SENIOR			
MU 437	History and Structure of the Organ (MU 472H)	2	
MU 468	Organ Literature	<u>2</u>	
	TOTAL	4	

PROGRAM TOTAL = 120 credits¹Two 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	<u>2-4</u>	
	TOTAL	6	
SOPHOMORE			
MU 272I	Applied Music Instruction-Piano ¹ (concurrent reg. in any music ensemble)	4	
	Foreign language ¹	<u>10</u>	
	TOTAL	14	
JUNIOR			
	Electives	<u>3</u>	
	TOTAL	3	
SENIOR			
MU 465	Keyboard Literature	2	
	Electives	<u>3</u>	
	TOTAL	5	

PROGRAM TOTAL = 120 credits¹Two 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	<u>4</u>	
	TOTAL	6	
SOPHOMORE			
MU 272I	Applied Music Instruction-Piano ¹ (concurrent reg. in any music ensemble)	4	
	Foreign language ¹	<u>10</u>	
	TOTAL	14	
JUNIOR			
MU 495G	Independent Study-Pedagogy	<u>3</u>	
PY 260	Child Psychology (PY/PYCC 100)	<u>3</u>	
OR			
PY 465	Adolescent Psychology (PY/PYCC 100)	<u>3</u>	
	TOTAL	6	

SENIOR

MU	465	Keyboard Literature	2
MU	495G	Independent Study-Pedagogy	3
		Electives	3
		TOTAL	8

PROGRAM TOTAL = 120 credits¹Two 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	4
		TOTAL	6

PROGRAM TOTAL = 120 credits¹Two 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
		TOTAL	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 = 120 credits¹Two semesters.**Major in Music (B.A.)**

Do you have a desire to create or express yourself through music? Do you want to develop and expand your musical talents? Would you like to combine your musical talents with another career area? If you answered "yes" to any of these questions, you may want to consider a B.A. in Music.

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 your 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 your own music retail business. Couple journalism with music and write for a music magazine. Link communication with your musical background and be a disc jockey or radio announcer. Or, attend law school and use your music background to become a music copyright lawyer. Use your creativity and consider your other talents as well.

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.

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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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 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
	Arts/humanities ⁷	3	3B
	Biological/physical sciences ⁸	3	3A
	Historical perspectives ⁹	3	3D
	Option ⁶	6	
	Music theory, upper-division	2	
	U.S. public values and institutions ¹⁰	3	3F
	Music electives ¹¹	3	
	Electives ¹²	3-6	
	TOTAL	32-35	
SENIOR			
MU 471	Recital (written consent of instructor)	1	4C
	OR		
MU 499	Thesis (Music major only)	1	4C
	Biological/physical sciences ¹³	4	3A

Global and cultural awareness ¹⁴	3	3E
Option ⁶	9	
Social/behavioral sciences ¹⁵	3	3C
Music electives ¹¹	6	
Electives	3	
TOTAL	29	

PROGRAM TOTAL = 120 credits¹ 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 3A in the AUCC. This course must have a laboratory component.¹⁴ Select from the list of courses in category 3E in the AUCC.¹⁵ 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LOWER DIVISION			
MUCC100	Music Appreciation	3	3B
	OR		
MUCC192	Introduction to Music History and Literature	3	1
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 MU 131/MUCC 192)	3	

MU 335	Music History II (MU 118; MU/MUCC 100 or MU 131/MUCC 192)	3	
MU*	Music	6	
	TOTAL	12	

PROGRAM TOTAL = 23 credits without prerequisites

*Additional course work may be required because of prerequisites.

Minor in Musical Theatre

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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Students with majors other than dance, theatre, or music will take the following courses:

LOWER DIVISION

D 121A*	Dance Techniques II-Modern (D 120A)	2	
D 220A	Dance Techniques III-Modern (D 121A)	2	
D 226	Dance Choreography I (D 121A or B or C)	2	
MU 272Q	Applied Music Instruction-Voice (concurrent reg. in any music ensemble) (2 semesters)	4	
THCC 141	Introduction to Theatre	3	3B
TH 151	Acting I	3	
	TOTAL	16	

UPPER DIVISION

D 326*	Dance Choreography II (D 221A or B or C)	2	
MU 472Q	Applied Music Instruction-Voice (MU 272A-V; concurrent reg. in any music ensemble; successful completion of upper-division qualifying exam) (2 semesters)	4	
TH 351	Acting II (TH 151)	3	
	<i>Select one course from the following:</i>		
D 491	Workshop	3	
D 495	Independent Study	3	
MU 495A-H	Independent Study	3	
TH 495	Independent Study	3	
	TOTAL	12	

PROGRAM TOTAL = 28 credits without prerequisites

Students with majors in dance, theatre, or music must earn all 28-29 credits in the 2 cognate disciplines outside the major. Music majors will choose the theatre and dance groups; theatre majors will choose the music and dance groups; dance majors will choose the music and theatre groups.

DANCE GROUP - LOWER DIVISION

D 121A*	Dance Techniques II-Modern (D 120A)	2	
D 220A	Dance Techniques III-Modern (D 121A)	2	
D 226	Dance Choreography I (D 121A or B or C)	2	
	TOTAL	6	

DANCE GROUP - UPPER DIVISION

D	320A*	Dance Techniques V-Modern (D 221A)	2	
D	325*	Dance Production (TH 161)	3	
D	326*	Dance Choreography II (D 221A or B or C)	2	
D	496	Group Study	2	
		TOTAL	<u>9</u>	

GROUP TOTAL = 15 credits without prerequisites**MUSIC GROUP - LOWER DIVISION**

MUCC192		Introduction to Music History and Literature	3	1
MU	272Q*	Applied Music Instruction-Voice (concurrent reg. in any music ensemble) (2 semesters)	4	
		TOTAL	<u>7</u>	

MUSIC GROUP - UPPER DIVISION

MU	401	Opera Theatre (written consent of instructor)	3	
MU	472Q	Applied Music Instruction-Voice (MU 272A-V; concurrent reg. in any music ensemble; successful completion of upper-division qualifying exam) (2 semesters)	4	
		TOTAL	<u>7</u>	

GROUP TOTAL = 14 credits without prerequisites**THEATRE GROUP - LOWER DIVISION**

TH	151	Acting I	3	
TH	255	Directing I (TH 151)	3	
		OR		
TH	495	Independent Study	3	
		<i>Select one course from the following:</i>		
TH	161*	Technical Theatre I (TH 160)	3	
TH	265	Design I (TH 161)	3	
TH	363*	Costume and Makeup II (TH 263)	3	
		TOTAL	<u>9</u>	

THEATRE GROUP - UPPER DIVISION

TH	351	Acting II (TH 151)	3	
TH*		Theatre	2	
		TOTAL	<u>5</u>	

GROUP TOTAL = 14 credits without prerequisites

*Additional course work may be required because of prerequisites.

Graduate Programs in Music

Programs leading to the degree of master of music are available in composition, conducting (choral or orchestral), music education, music history and literature, performance, and theory. 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*

Do you have the talent and a desire to perform? Do the grace, beauty, and power of the human form inspire you? Does the challenge and satisfaction of dance motivate you? Have you ever wanted to be part of a live dance production as a choreographer, performer, artistic director, producer, designer, or a member of a dance production crew? Do you aspire to choreograph, perform, and produce your own style of dance? Have you ever wanted to become a member of a touring dance company or work in the television, film, or music video industry? Are you interested in owning your own dance studio or teaching dance in the public schools or at a university or college? Then a major in performing arts with a concentration in dance may be the right choice for you.

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			
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)	3	2A
D 496	Group Study ¹	2	
EXCC 123	Fitness and Wellness	2	3G
LBCC 192	College of Liberal Arts First-Year Seminar	3	1
M CC 130	Math in the Social Sciences (Math Placement Exam)	3	2C
MU 150	Piano Class I	2	
	OR		
MU 157	Voice Class I	2	
TH 151	Acting I	3	

TH 160	Graphic Expression for the Theatre	2	
	Dance techniques-ballet ²	4	
	Dance techniques-jazz or modern ²	4	
	TOTAL	32	
SOPHOMORE			
BZCC 101	Humans and Other Animals	3	3A
D 226	Dance Choreography I (D 121A or B or C)	2	
D 326	Dance Choreography II (D 221A or B or C)	2	
D 496	Group Study ¹	2	
MUCC 100	Music Appreciation	3	3B
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	4	
	Dance techniques-jazz or modern ²	4	
	Historical perspectives ³	3	3D
	TOTAL	32	
JUNIOR			
AY 300/ PS 300	Principles of Human Anatomy and Physiology (C/C CC 103 or C/C CC 107 or C/C CC 111; BY 102/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110)	4	
AY 301	Human Gross Anatomy (AY 300/PS 300)	5	
D 325	Dance Production (TH 161)	3	
D 427	Dance History I	3	4A
D 496	Group Study ¹	2	
PLCC 110	Logic and Critical Thinking	3	2D
	OR		
SPCC 207	Rhetoric and Argumentation	3	2D
	Dance techniques-ballet ²	4	
	Dance techniques-jazz or modern ²	4	
	TOTAL	28	
SENIOR			
D 428	Dance History II	3	4B
D 471	Dance Concert (D 321A-C, D 330, D 325, D 326, written consent of faculty)	3	4C
D 486V	Practicum ¹	6	
D 496	Group Study ¹	2	
TH 263	Costume and Makeup I (TH 160)	3	
	Dance techniques-ballet ²	4	
	Dance techniques-jazz or modern ²	4	
	Global and cultural awareness ⁴	3	3E
	TOTAL	28	
PROGRAM TOTAL = 120 credits			

¹ One course each semester.

² Select appropriate level course (one each semester).

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

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

Minor in Dance

Students in related disciplines may enhance their professional competence by completing this minor.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
D	121A-C* Dance Techniques II (D 120A-C)	6	
D	220A-C Dance Techniques III (D 121A-C)	6	
D	226 Dance Choreography I (D 121A or B or C)	2	
TH	161* Technical Theatre I (TH 160)	3	
TOTAL		17	
UPPER DIVISION			
D	325 Dance Production (TH 161)	3	
D	427 ¹ Dance History I	3	
OR			
D	428 ¹ Dance History II	3	
<i>Select six credits from the following:</i>			
D	320A-C* Dance Techniques V (D 221A-C)	6	
D	321A-C Dance Techniques VI (D 320A-C)	6	
D	326* Dance Choreography II (D 221A or B or C)	2	
D	330 Dance Repertory (written consent of dance faculty)	2	
D	420A-C Dance Techniques VII (D 321A-C)	6	
D	421A-C Dance Techniques VIII (D 420A-C)	6	
TOTAL		12	

PROGRAM TOTAL = 29 credits without prerequisites

¹ Course not selected to meet upper-division requirement may be used as part of the six-credit requirement.

*Additional course work may be required because of prerequisites.

Theatre Concentration

Office in Johnson Hall, Room 220

Associate Professor Laura Jones, Director

Are you a natural performer? Does the challenge of acting in a live production motivate and excite you? Have you ever wanted to be a producer, director, performer, set designer, or a member of a stage production crew? Do you aspire to write, produce, or perform your own play? Then a major in performing arts with a concentration in theatre may be the right choice for you.

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 Exam)	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	2	
TH 161	Technical Theatre I (TH 160)	3	
TH 286	Practicum	2	
	Allied arts ³	3	
	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	30	
SOPHOMORE			
TH 255	Directing I (TH 151)	3	
TH 263	Costume and Makeup I (TH 160)	3	
TH 265	Design I (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 486	Practicum (TH 286)	2	
	Additional communication ¹²	3	2B
	Directed study ¹³	6	

Upper division focus ¹⁴	6
Electives	7
TOTAL	30

SENIOR

TH 486	Practicum (TH 286)	1	
TH 499	Thesis ¹⁵ (TH 341, TH 342)	3	4C
	Directed study ¹³	6	
	Upper division focus ¹⁴	3	
	Electives	18	
	TOTAL	31	

PROGRAM TOTAL = 120 credits

¹ New majors who have passed 45 or more credit hours.

² Entering freshmen or new majors who have passed less than 45 credit hours.

³ Choose two courses from two different prefixes from the following list: ARCC 100, AR 110, AR 111, D CC 110, MUCC 100, PFCC 110.

⁴ Select from list of approved courses in category 3A of the All-University Core Curriculum (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 Select from list of approved courses in category 2B of the AUCC.

¹³ Students must complete a second major, minor, or an adviser approved upper division 12 credit area of study.

¹⁴ Choose three courses from the following list: D 325, TH 351, TH 355, TH 361, TH 363, TH 365.

¹⁵ 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 160	Graphic Expression for the Theatre	2	
TH 161	Technical Theatre I (TH 160)	3	
TH 263	Costume and Makeup I (TH 160)	3	
TH 265	Design I (TH 161)	3	
	TOTAL	14	
UPPER DIVISION			
TH 341	History of Theatre I	3	
TH 342	History of Theatre II	3	
----- <i>Select two courses from the following:</i>			
D 325	Dance Production (TH 161)	3	
TH 361	Technical Theatre II (TH 161)	3	
TH 363	Costume and Makeup II (TH 263)	3	
TH 365	Design II (TH 265)	3	
	TOTAL	12	

PROGRAM TOTAL = 26 credits			

DEPARTMENT OF PHILOSOPHY

Office in Eddy Hall, Room 243
Professor Ronald G. Williams, Chair

Major in Philosophy

Are you interested in the study of the truths underlying knowledge, morality, and existence? Are you looking for a system of principles for guidance in practical affairs? Would you like to study a particular branch of knowledge such as metaphysics, ethics, or social philosophy? Would you like to enhance your abilities to reason clearly, to distinguish between good and bad arguments, to think through complicated questions, and to use logic in situations that are influenced by emotions? Then a major in philosophy may be what you are looking for.

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)	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:

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

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
<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			
<i>Select one course from the following:</i>			
PL	300	Ancient Greek Philosophy (PL 205 or PL 206 or PL 210)	3
PL	301	17th and 18th Century European Philosophy (PL 206 or PL 210 or PL 300)	3
<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
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
Associate Professor G. Wayne Peak, Chair

Major in Political Science

Are you fascinated by the fast moving political events shaping our lives? Would you like to understand how government works and how people and events influence it? Would you like to influence public policy? Do you wonder how public policies shape human behavior and influence the course of history? Does becoming involved in international relations intrigue you? Are you interested in comparing the U.S. political system to others around the world? Are you concerned about individual rights and how to protect them? If your answers are "yes," then political science may be the right major for you.

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 complimented 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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	3	2A
<i>Select one of the following pairs:</i>			
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
OR			
HYCC 250/ ETCC 250	African-American History, 1619-1865	3	3D
HYCC 251/ ETCC 250	African-American History Since 1865	3	3D
OR			
HYCC 270	Colonial Latin America	3	3D
HYCC 271	Latin America Since Independence	3	3D or 3E
OR			
HYCC 120	Asian Civilizations I	3	3D or 3E
HYCC 220	Asian Civilizations II	3	3D or 3E
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
	Mathematics ⁵	3	2C
	TOTAL	29-30	
SOPHOMORE			
<i>Select from the following:</i>			
ECCC 101	Economics of Social Issues	3	3C
OR			
ECCC 202	Principles of Microeconomics ⁶ (M/M CC 118 or M/M CC 120A-B)	3	3C
AND			
ECCC 204	Principles of Macroeconomics ⁶ (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 ⁷	3	2B
	Arts/humanities ⁸	3	
	Biological/physical sciences ⁹	3	3A
	Logical/critical thinking ¹⁰	3	2D
	Social science ¹¹	3	
	Electives	6	
	TOTAL	30-33	
JUNIOR			
	Political science, upper-division ¹²	12	4A, 4B

Support option ¹³	6-12
Electives	6-12
TOTAL	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 ¹²	9	4A, 4B
	Support option ¹³	6-9	
	Electives ¹⁴	6-13	
	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 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 3A in the AUCC.

⁵ Select from the list of courses in category 2C in the AUCC except M/M CC 133.

⁶ EC/ECCC 202 and EC/ECCC 204 should be taken by students who plan to take advanced courses in economics.

⁷ Select from the list of courses in categories 2B1, 2B2, or 2B3 in the AUCC.

⁸ Any non-studio course from art, dance, English, foreign language, journalism, psychology, or sociology not used to meet AUCC or other departmental requirements.

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

¹⁰ Select from the list of courses in category 2D in the AUCC.

¹¹ Any course from anthropology, economics, journalism, psychology, or sociology not used to meet AUCC or other departmental requirements.

¹² At least one upper-division course must be completed in each of the following sub-fields: American politics and public law, comparative politics, international relations, political theory, and public policy and administration. PO 320 must be completed by students choosing the Methods 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.

¹³ Choose from among the following support options:

(1) Foreign Language Option—a minimum of 4 courses totaling at least 12 credits in a single foreign language including at least 1 upper-division course.

(2) Methods Option—3 credits in one of the following: PL 120, PL 327, PL 415, or PL 425 and 6 credits in any combination of statistics courses numbered ST 220 or higher and/or mathematics courses numbered M 160 or higher and 3 credits in one of the following: AP 441, EC 335/EA 335, PY 370/371, S 310, or S 311 and 3 credits in any of the above courses not already used, or any computer science course numbered CS/CSCC 151 or higher, or PLCC 110, PL 112, PL 210, or PL 410 and PO 320, which may also be counted toward meeting upper-division political science requirement.

(3) A minor, second major, or certificate program.

(4) An approved program proposed by student containing at least 21 credits including a minimum of 12 upper-division credits.

¹⁴ 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LOWER DIVISION			
POCC 101	American Government and Politics	3	3C, 3F
POCC 103	Select two courses from the following: State and Local Government and Politics	3	3C, 3F
POCC 232	International Relations	3	3C or 3D
POCC 241	Comparative Government and Politics	3	3C or 3E
TOTAL		9	

UPPER DIVISION

Twelve credits in political science courses with at least three credits in political theory and in at least one additional subfield of political science. Credits earned in PO 486 and PO 495 may not be used to satisfy this upper-division credit requirement.

PROGRAM TOTAL = 21 credits

Graduate Programs in Political Science

The department offers graduate programs in political science leading to the master of arts and doctor of philosophy degrees. A 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

Would you like to know how organizations such as business corporations, religious communities, and governments function and evolve? Have you ever wondered how the roles of families, communities, and cultures have changed over time or differed from place to place? Would you like to know how other societies work and what we can learn from their successes and failures? Do you wonder why humans practice religion, engage in crime, and play at sport? Would you like to know how you could contribute to the solution of a pressing social problem? If your answers to these questions are “yes,” then a major in sociology may be right for you.

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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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 Functions (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
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

<i>Select one of the following:</i>			
COCC 300	Writing Arguments (CO/COCC 150)	3	2B2 or 2D
CSCC 153	Java Programming (M/M CC 118 or M/M CC 121)	4	2D
PLCC 110	Logic and Critical Thinking	3	2D
SPCC 207	Rhetoric and Argumentation	3	2D
	Additional communication ⁶	3	2B
	Biological/physical sciences ⁷	3-4	3A
	Global and cultural awareness ⁸	3	3E
	Historical perspectives ⁹	3	3D
	Social/behavioral sciences ⁵	6	
	Electives	9	
	TOTAL		30-32

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	
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)	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 359	Criminal Justice Ethics (S 253)	3	
S 487	Internship (S 301 or S 302; S 310, S 311, S 313)	3	
	Electives ¹⁰		0-18
	TOTAL		25-30

PROGRAM TOTAL = 120 credits

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

² Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

³ Select from the list of courses in category 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 enough elective credits to bring program total to 120 credits. A minimum of 42 upper-division credits is required as well.

General Sociology Concentration

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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 Functions (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			
<i>Select one of the following:</i>			
COCC 300	Writing Arguments (CO/COCC 150)	3	2B2 or 2D
CSCC 153	Java Programming (M/M CC 118 or M/M CC 121)	4	2D
PLCC 110	Logic and Critical Thinking	3	2D
SPCC 207	Rhetoric and Argumentation	3	2D
	Additional communication ⁷	3	2B
	Biological/physical sciences ²	3-4	3A
	Global and cultural awareness ⁸	3	3E
	Historical perspectives ⁹	3	3D
	Social/behavioral sciences ¹⁰	6	
	Sociology electives ⁶	6	
	Electives	3	
	TOTAL	30-32	
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 ¹⁰	6	
	Upper division sociology	3	
	Electives	0-12	
	TOTAL	31	
SENIOR			
S 403	Capstone Seminar (S 310, S 311; S 301 or S 302; S 313)	3	4C
	Upper division sociology	3	
	Electives ¹¹	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 a department list of approved courses.

¹¹ 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	
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
Associate Professor Dennis Phillips, Chair

Major in Speech Communication

Are you a good communicator? Do you like to write and speak your mind effectively and with a creative flare? Would you enjoy working with a variety of communications media to inform people about events, products, and ideas? Would you like to be prepared for a variety of jobs in mass media, business, and government? If your answers are “yes,” then a major in speech communication may be the one for you.

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 and is a valuable second major for students in other disciplines. 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. Students are encouraged to pursue a minor, a second major, or fluency in a second language.

The Department’s goals for undergraduate majors also 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
- Writing copy that triggers a response
- Writing effective promotional materials
- Speaking clearly and persuasively
- Operating cameras, recorder, and other audio, visual and audiovisual equipment
- Using communication techniques, including listening, to deal different kinds of people, both in groups and individually.
- Effectively using design elements, such as such as paper, color, computer graphics, and photos to arrange layouts that capture attention and convey a lasting impression.
- Using sight, sound, motion, and words to create powerful and exciting images.

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 assistant, production assistant; associate director, television schedule coordinator; photographer, camera operator; sound controller; sound effects technician; 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; program director; 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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 in 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

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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)	3	
SP 347	Video Communication (SP/SPCC 100)	3	
SP 349	Freedom of Speech	3	
SP 354	History and Appreciation of Film	3	
SP 355	Evaluating Contemporary Film (SP 354)	3	
SP 447	Rhetoric of Documentary Film (SP 354)	3	
SP 449	Television-Radio Programming and Management	3	
SP 454	Law and Policy of Communication Technologies 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	
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 505	Ethnography of Communication	3	
SP 510	Theories of Interpersonal Communication	3	
SP 527	Communication in Organizations	3	
SP 530	Communication in 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	Evaluation 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)	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
SPCC 201	Rhetoric in Western Thought	3	3B
SPCC 207	Rhetoric and Argumentation	3	2D
	Global and cultural awareness ⁵	3	3E
TOTAL		21	
JUNIOR			
COCC 301A-D	Writing in the Disciplines (CO/COCC 150)	3	2B2
E 402	Teaching Composition (CO/COCC 301A-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 (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	
ED	463	Methods in Teaching Language Arts (admission to Teacher Licensure Program)	4	
		English elective ⁶	3	
		TOTAL	24	
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, ED 463, concurrent reg. in ED 485A or B)	1	
ED	493B	Seminar-Assessment of Learning (ED 450, ED 463, concurrent reg. in ED 485A or B or VE 485)	1	
SP	450	Capstone Seminar	2	4C
		TOTAL	20	

CORE TOTAL = 95 credits⁷

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 Three credit elective with E prefix.

⁷ In order to fulfill the 120 credit graduation requirement, one of the following options, speech or theatre, must also be completed.

Speech Option

In addition to the speech communication teacher licensure core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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				
SP	411	Contemporary Speeches on American Issues	3	4A, 4B
		Speech electives ¹	6	
		TOTAL	9	

PROGRAM TOTAL = 120 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

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
SOPHOMORE			
TH 151	Acting I	3	
TH 160	Graphic Expression for the Theatre	2	
TH 255	Directing I (TH 151)	3	
	TOTAL	8	
JUNIOR			
TH 286	Practicum	2	
TH 341	History of Theatre I	3	4A, 4B
OR			
TH 342	History of Theatre II	3	4A, 4B
	Theatre electives ¹	3	
	TOTAL	8	
SENIOR			
	Theatre electives ¹	9	
	TOTAL	9	

PROGRAM TOTAL = 120 credits

¹ Any course with TH prefix.

Media Studies Minor

The Departments of Speech Communication and Journalism and Technical Communication offer a minor in media studies. See the Interdepartmental Minor in Media Studies under the College of Liberal Arts listing in this section of the catalog.

Graduate Programs in Speech Communication

The program of study leads to a master of arts degree. Students pursue course work in rhetorical, communication, and media theory. Students choose other course work in rhetorical and media criticism; intercultural, interpersonal, and organizational communication; U.S. and British 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
Professor R. Dennis Child, Associate Dean
Associate Professor Joyce Berry, Assistant 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
International Ecotourism
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, some with specialized concentrations or designated areas of further study. Undergraduate majors in

all five 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.

Freshman 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 contact the Office of International Programs, Laurel Hall.

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 Sciences. 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 EARTH RESOURCES

Office in Natural Resources Building, Room 322
Professor Judith Hannah, Head

Major in Geology

Do the processes of the earth's formation and change fascinate you? Are you intrigued by the wealth of natural history embedded within the earth's crust? Does mapping of geologic structures interest you? Would you like to work for a natural resource company exploring for valuable mineral resources and analyzing their quantity and quality? Would you like to do seismic surveys for power plants, buildings, or highways? Would a career in geology teaching or research in schools, colleges, and private or national laboratories inspire you? If your answer to any of these questions is "yes," and if you have a strong aptitude for mathematics, chemistry, and/or geology, you should consider a major in geology where you can use all of your skills to help solve resource evaluation and environmental problems.

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, education, or graduate training in specialized areas of geology or related fields, such as oceanography and geophysical 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 earth resources students complete coursework in math, the physical and biological sciences, communications, and the liberal arts. Two concentrations are offered—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/attention 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
- Physical stamina

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.

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 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 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)	3	2A
<i>Select one of the following :</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
CSCC 151	C++ for Scientists and Engineers (M/M CC 124, M/M CC 126)	4	2D
ERCC 140	Physical Geology	4	
ER 150	Physical Geology for Scientists and Engineers	4	
ER 154	Historical and Analytical Geology (ER/ERCC 130 or ER/ERCC 140 or ERCC 192A/ER 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			
ER 232	Mineralogy (ER/ERCC 140 or ERCC 192A/ER 150; C/C CC 111 and M/M CC 124 or concurrent reg., concurrent reg. in ER 332; or written consent of instructor)	3	
ER 332	Optical Mineralogy (ER 232 or concurrent reg. or written consent of instructor)	2	
ER 364	Igneous and Metamorphic Petrology (ER 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				
ER	344	Stratigraphy and Sedimentology (ER 154)	4	4A
ER	372	Structural Geology (ER 154, M/M CC 125, concurrent reg. PH/PHCC 141)	4	4B
ER	376	Geologic Field Methods (ER 344, ER 372 or concurrent reg.)	3	4A, 4C
ER	454	Geomorphology (ER/ERCC 140 or /ERCC 192A/ER 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				
ER	436	Geology Summer Field Course (ER 364, ER 376)	6	4C
SENIOR				
		<i>Select a total of 4 credits from the following:</i>		
BZCC	110	Principles of Animal Biology	3	3A
		AND		
BZCC	111	Animal Biology Laboratory (BZ/BZCC 110 or concurrent reg.)	1	3A
		OR		
BZCC	120	Principles of Plant Biology	4	3A
		OR		
LSCC	102	Attributes of Living Systems (high school chemistry)	4	3A
ER	366	Sedimentary Petrology and Geochemistry (C 113, ER 154, ER 364)	4	4A, 4B
ER	446	Environmental Geology (ER 454 or concurrent reg.)	3	
ER	452	Hydrogeology (ER/ERCC 140 or ERCC 192A/ER 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 I 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.

	<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN				
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	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)	3	2A
CSCC	151	C++ for Scientists and Engineers (M/M CC 124, M/M CC 126)	4	2D
ERCC	140	Physical Geology	4	
		OR		
ER	150	Physical Geology for Scientists and Engineers	4	
ER	154	Historical and Analytical Geology (ER/ERCC 130 or ER/ERCC 140 or ERCC 192A/ER 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				
ER	232	Mineralogy (ER/ERCC 140 or ERCC 192A/ER 150; C/C CC 111 and M/M CC 124 or concurrent reg., concurrent reg. in ER 332; or written consent of instructor)	3	

ER	332	Optical Mineralogy (ER 232 or concurrent reg. or written consent of instructor)	2	
ER	364	Igneous and Metamorphic Petrology (ER 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	

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 ER 342. Written adviser approval required.
¹⁰ Select upper-division science or engineering course, excluding geology, from departmental advising list.

JUNIOR

COCC	300	Writing Arguments (CO/COCC 150)	3	2B2
		OR		
JTCC	300	Professional and Technical Communication (CO/COCC 150)	3	2B2
ER	344	Stratigraphy and Sedimentology (ER 154)	4	4A
ER	372	Structural Geology (ER 154, M/M CC 125, concurrent reg. in PH/PHCC 141)	4	4B
ER	376	Geologic Field Methods (ER 344, ER 372 or concurrent reg.)	3	4A, 4C
ER	454	Geomorphology (ER/ERCC 140 or ERCC 192A/ER 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

ER	436	Geology Summer Field Course (ER 364, ER 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
		OR		
BZCC	120	Principles of Plant Biology	4	3A
		OR		
LSCC	102	Attributes of Living Systems (high school chemistry)	4	3A
ER	366	Sedimentary Petrology and Geochemistry (C 113, ER 154, ER 364)	4	4A, 4B
		Geology electives ⁹	6	

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 tailored to the natural science major in the College of Natural Sciences. The geology minor adviser can provide advice on the selection of minor electives.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
Required:			
ERCC 140	Physical Geology	4	3A
OR			
ER 150	Physical Geology for Scientists and Engineers	4	
ER 154	Historical and Analytical Geology (ER/ERCC 130 or ER/ERCC 140 or ERCC 192A/ER 150)	4	
TOTAL		8	
Recommended:			
ER 232*	Mineralogy ¹ (ER/ERCC 140 or ERCC 192A/ER 150; C/C CC 111 and M/M CC 124 or concurrent reg.; concurrent reg. in ER 332; or written consent of instructor)	3	
UPPER DIVISION			
<i>Select 10 credits from the following:</i>			
ER 332	Optical Mineralogy (ER 232 or concurrent reg.; or written consent of instructor)	2	
ER 342	Paleontology (ER 154)	3	
ER 344	Stratigraphy and Sedimentology (ER 154)	4	
ER 364	Igneous and Metamorphic Petrology (ER 232)	4	
ER 372*	Structural Geology (ER 154, M/M CC 125, concurrent reg. in PH/PHCC 141)	4	
ER 376	Geologic Field Methods (ER 344; ER 372 or concurrent reg.)	3	
ER 446*	Environmental Geology (ER 454 or concurrent reg.)	3	
ER 452*	Hydrogeology (ER/ERCC 140 or ERCC 192A/ER 150 or GR 210; PH/PHCC 141; M/M CC 161 or M/M CC 255 or written consent of instructor)	4	
ER 454*	Geomorphology (ER/ERCC 140 or ERCC 192A/ER 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

¹ If ER 232 is not taken, any one additional geology credit, upper or lower division, may be applied to the program minimum total of 21 credits.

² Additional upper division credits may come from the above list or from any other upper division geology course.

*Additional course work may be required because of prerequisites.

Major in Watershed Science

Do the natural processes involving water and its contribution to natural and human systems interest you? Do the global spread of ground water pollution and the decreasing availability of clean groundwater supplies concern you? Would you like to contribute your expertise to programs or policies that aim to preserve local or regional water quality, track the migration or intensification of ground water pollution, or prevent or mitigate ground water contamination? Are you interested in the sustainable management of land and water resources? Do you wish to study the interactions among land, land uses, and water? If you answer “yes” to any of these questions, then a major in watershed science may be right for you.

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 through out 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 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.

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	SC	240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4
FRESHMAN							
BY 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4		SPCC	200	Public Speaking	3 2B1
BZCC 104	OR Basic Concepts of Plant Life	3	3A	STCC	301	Introduction to Statistical Methods (M/M CC 121)	3 2D
C CC 111	General Chemistry I (M/M CC 121 or placement in M/M CC 124 or higher)	4	3A			Global and cultural awareness ⁵	3 3E
C CC 112	General Chemistry Laboratory I (C/C CC 111 or concurrent reg.)	1	3A			Historical perspectives ⁶	3 3D
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				U.S. public values and institutions ⁷	(3) 3F
COCC 150	College Composition (Composition Placement Exam)	3	2A			TOTAL	31-33
ER 150	Physical Geology for Scientists and Engineers	4		JUNIOR			
GR 210	OR Physical Geography ¹	3		CE	322/	Basic Hydrology (CE 300 or ER 416 or CB 331, ST/STCC 301 or ST/STCC 309 or CE 308; or written consent of instructor) ¹	3
M CC 124	Logarithmic and Exponential Function (M/M CC 118 or M/M CC 121 or placement)	1	2C	EV	322		
M CC 125	Numerical Trigonometry (M/M CC 118 or M/M CC 121 or placement)	1	2C	ER	416	Land Use Hydrology (SC 240, ST/STCC 201) ¹	3 4B
M CC 126	Analytical Trigonometry (M/M CC 125 or placement)	1	2C	ER	417	Watershed Measurements (concurrent reg. in ER 416) ¹	2
M CC 155	Calculus for Biological Scientists I (M/MCC 124, M/M CC 125)	4	2C	ER	418	Land Use and Water Quality (C/C CC 107, ER 416) ¹	3
M CC 160	OR Calculus or Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124)	4	2C	ER	419	Water Quality Laboratory for Wildland Managers (concurrent reg. in ER 418)	2
	First year seminar ²	2	1	ER	420	Watershed Field Practicum (concurrent reg. in ER 416 and ER 417 or written consent of instructor)	2
	Health and wellness ³	2	3G	ER	474	Snow Hydrology (ER 416 or CE 322/EV 322)	3
	Social/behavioral sciences ⁴	3	3C	SC	322	Principles or Microclimatology (BY 220 or NR 220; PH/PHCC 141)	3
	TOTAL	31-33				Arts/humanities ⁸	3 3B
						Electives ⁹	5
						TOTAL	29
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)	3		SENIOR			
BY 320	Ecology (one course in biology, M/M CC 155)	3		ER	440	Watershed Problem Analysis (CE 322/EV 322, ER 416)	3 4A, 4B, 4C
NR 220	Natural Resources Ecology and Measurements (BY 103 or BZ/BZCC 120; M/M CC 121)	5		ER	452	Hydrogeology (ER/ERCC 140 or ERCC 192A/ER 150 or GR 210; PH/PHCC 141; M/M CC 161 or M/M CC 255; or written consent of instructor)	4
COCC 301A-D	Writing in the Disciplines (CO/COCC 150)	3	2B2	ER	454	Geomorphology (ER/ERCC 140 or ERCC 192A/ER 150 or GR 210; M/M CC 155 or M/M CC 160)	4
JTCC 300	OR Professional and Technical Communication (CO/COCC 150)	3	2B2	ER	465	<i>Select one of the following courses:</i> Eolian and Fluvial Transport Processes (PH/PHCC 141 or written consent of instructor)	4
M CC 161	Calculus for Physical Scientists II (M/M CC 124, M/M CC 160)	4	2C	SC	440	Pedology (SC 240)	3
M CC 255	OR Calculus for Biological Scientists II (M/M CC 155; concurrent reg. in M/M CC 126)	4	2C	SC	442	Forest and Range Soils (SC 240)	3
PHCC 141	Physics for Scientists and Engineers I (M/M CC 126; M/M CC 155 or M/M CC 160)	5	3A	GR	342	Geography of Water Resources ¹	3
				SC	470	Soil Physics (SC 240)	3
				SC	471	Soil Physics Laboratory (SC 470 or concurrent reg.)	1
						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.

Minor in Watershed Science

The minor in watershed science provides an opportunity to obtain a background in watershed science to complement other majors. While it has sufficient flexibility to be applied to a variety of subject areas, the minor is especially tailored to those majors within the College of Natural Resources. Advice on the selection of minor electives is available in the department.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
ER 150	Physical Geology for Scientists and Engineers	4	
OR			
GR 210	Physical Geography	3	
UPPER DIVISION			
ER 416*	Land Use Hydrology (SC 240, ST/STCC 201)	3	
ER 418*	Land Use and Water Quality (C/C CC 107, ER 416)	3	
ER 454*	Geomorphology (ER/ERCC 140 or ERCC 192A/ER 150 or GR 210; M/M CC 155 or M/M CC 160)	4	
<i>Select at least 7-9 credits from the following:</i>			
CB 405	Nonpoint Source Pollution (one course in soil science, hydrology, or fluid mechanics)	3	
CE 423	Groundwater Engineering (CE 300 or ER 416 or CB 331)	3	
ER 417	Watershed Measurements (concurrent reg. in ER 416)	2	
ER 419	Water Quality Laboratory for Wildland Managers (concurrent reg. in ER 418)	2	
ER 452*	Hydrogeology (ER/ERCC 140 or ERCC 192A/ER 150 or GR 210; PH/PHCC 141; M/M CC 160 or M/M CC 255 or written consent of instructor)	4	
ER 465*	Eolian and Fluvial Transport Processes (PH/PHCC 141 or written consent of instructor)	4	
ER 474	Snow Hydrology (ER 416 or CE 322/EV 322)	3	
ER 492	Seminar	2	
GR 342	Geography of Water Resources	3	
TOTAL		17-19	

PROGRAM TOTAL = 21-22 credits without prerequisites

*Additional course work may be required because of prerequisites.

Graduate Programs in Earth Resources

The Department of Earth Resources offers graduate programs leading to the master of science and doctor of philosophy degrees. A description of these programs may be found in the *Graduate and Professional Bulletin*.

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

Do fish biology, fish behavior, and aquatic ecology fascinate you? Do you love to be outdoors and fishing? Would you like to work in a fishery? Are you looking for a way to apply your interest in biology to practical natural resource and environmental management problems? Would you like to work with professionals from a variety of disciplines to help protect fisheries and restore aquatic habitats? Do you wish to work in a program to rehabilitate endangered fish species? Would you like to be involved in ecological research and the implementation of ecosystem restoration policies and programs? These are some of the things fishery biologists do.

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 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 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 with physical things and 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 of a variety of concepts to obtain an holistic perspective

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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
BY 103	Biology of Organisms-Animals and Plants (BY 102/LSCC 102)	4	
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 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
<hr/>			
FW 100	Select three or four credits: ¹ Wildlife Fundamentals (concurrent reg. in FWCC 192)	2	
AND			
FWCC 192	Wildlife Inquiries (FW 100 or concurrent reg.)	2	1
OR			
FW 200	Wildlife Conservation (M/M CC 118 or M/M CC 121)	3	
<hr/>			
LSCC 102	Attributes of Living Systems (high school chemistry)	4	
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
M CC 155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	2C
	Health and wellness ²	2	3G
	TOTAL	31 - 32	
<hr/>			
SOPHOMORE			
<hr/>			
BY 220	Fundamentals of Ecology (one course in biology, M/M CC 124 or M/M CC 141 or M/M CC 155)	3	
OR			
BY 320	Ecology (one course in biology; M/M CC 155)	3	
<hr/>			
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 103 or BZ/BZCC 120; M/M CC 121)	5	
PHCC	110	Descriptive Physics	3	3A
SPCC	200	Public Speaking	3	2B1
		Arts/humanities ³	3	3B
		Global and cultural awareness ⁴	3	3E
		Social/behavioral sciences ⁵	3	3C
		TOTAL	31	

JUNIOR

<i>Select one of the following:</i>				
BZ	212	Animal Biology-Invertebrates (BY 103 or BZ/BZCC 111)	4	
BZ	214	Animal Biology-Vertebrates (BY 103 or BZ/BZCC 111)	4	
BZ	329	Herpetology (BZ 214)	3	
BZ	330	Mammalogy (BY 103 or BZ/BZCC 111)	3	
BZ	335	Ornithology (BY 103 or BZ/BZCC 111)	3	
FW	300	Ichthyology (BY 103 or BZ/BZCC 111)	2	
FW	301A	Ichthyology Laboratory-Fish Biology (FW 300 or concurrent reg.)	1	
FW	360	Principles of Vertebrate Management (BY 220; M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
NR	260	Introduction to Natural Resource Analysis	2	
NRCC	320	Natural Resources History and Policy	3	3D, 3F
STCC EHCC	307/ 307	Introduction to Biostatistics (M/M CC 121)	3	2D
		Suborganismal elective ⁶	9-11	
		Electives	0-3	
		TOTAL	26-32	

SENIOR

<i>Select from the following:</i>				
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	
OR				
BZ	474	Limnology (BY 220 or BZ 470)	3	
OR				
EN	445	Aquatic Insects (BY 103 or BZ/BZCC 111)	4	
FW	370	Design of Wildlife Projects (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307)	2	
FW	400	Fish Ecology (BY 220, FW 300, FW 370)	3	
OR				
FW	402	Fish Culture (FW 204, FW 300; FW 301A or B)	4	

FW	401	Fishery Science (FW 300; ST/STCC 301 or ST/STCC 307 or EH/EHCC 307; NR 260 or CS 110; M/M CC 141 or M/M CC 155)	3	4A, 4B
NR	420	Integrated Ecosystem Management	4	4C
		Ecosystem management elective ⁷	6	
		Electives		6-8
		TOTAL	27-28	

PROGRAM TOTAL = 120 credits

¹ 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.

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 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 3C in the AUCC.

⁶ Choose 3 courses from the following list: BY 310, BY 311, SC 330 or BZ 346, MB 300, BZ 405 or BZ 401.

⁷ 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: ERCC 304 or F 311 or RS 331.

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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LOWER DIVISION			
<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
BY 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
BY 220*	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155)	3	
OR			
BY 320*	Ecology (one course in biology; M/M CC 155)	3	
	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; 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)	2	
	TOTAL	2-3	
UPPER DIVISION			
FW 300	Ichthyology (BY 103 or BZ/BZCC 111)	2	

FW	301A	Ichthyology Laboratory-Fish Biology (FW 300 or concurrent reg.)	1

FW	400	Select two courses from the following: 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; NR 260 or CS 110; M/M CC 141 or M/M CC 155)	3
FW	402	Fish Culture (FW 204, FW 300; FW 301A or B)	4

		Adviser-approved aquatic course	3-4
TOTAL			12-14

PROGRAM TOTAL = 21-28 credits without prerequisites

*Additional course work may be required because of prerequisites.

Major in Wildlife Biology

Associate Professor Ken Wilson, in charge

Do you love to be outdoors in natural settings? Are you fascinated by wildlife. Do you wish to learn how wildlife conservation and restoration can be accomplished? Are you looking for a way to apply your interest in biology to practical natural resource and environmental management problems? Would you like to work with professionals from a variety of disciplines to help protect wildlife and restore habitat? Do you wish to work in a program to rehabilitate endangered wildlife species? Would you like to be involved in ecological research and the implementation of ecosystem restoration policies and programs? These are some of the things wildlife biologists do.

A wildlife biology degree prepares students for careers in conservation, ecology, management, research, or graduate studies. The Colorado State 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 with physical things and 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 or independently
- Able to write and speak accurately and clearly
- Interest in data and policy analysis
- Able to integrate knowledge of a variety of concepts to obtain an holistic perspective

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. Foreign 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 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. 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.

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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BY 103	Biology of Organisms (BY/LSCC 102)	4	
BY 220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155)	3	
OR			
BY 320	Ecology (one course in biology; M/M CC 155)	3	
COCC 150	College Composition (Composition Placement Exam)	3	2A
<i>Select three or four credits:¹</i>			
FW 100	Wildlife Fundamentals (concurrent reg. in FWCC 192)	2	
AND			
FWCC 192	Wildlife Inquiries (FW 100 or concurrent reg.)	2	1
OR			
FW 200	Wildlife Conservation (M/M CC 118 or M/M CC 121)	3	
LSCC 102	Attributes of Living Systems (high school chemistry)	4	
M CC 124	Logarithmic and Exponential Functions (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
M CC 155	Calculus for Biological Scientists I (M/M CC 124, M/M CC 125)	4	2C
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ²	3	3B
	Health and wellness ³	2	3G
	TOTAL	32-33	
SOPHOMORE			
BZ 223	Plant Identification (BY 103 or BZ/BZCC 120)	3	
C CC 107	Fundamentals of Chemistry (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
C 245	Fundamentals of Organic Chemistry (C/C CC 107 or C 113)	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
FW 360	Principles of Vertebrate Management (BY 220; M/M CC 141 or M/M CC 155 or M/M CC 160)	3	

NR 220	Natural Resources Ecology and Measurements (BY 103 or BZ/BZCC 120 and M/M CC 121)	5	
NR 260	Introduction to Natural Resource Analysis	2	
PHCC 121	General Physics I (concurrent reg. in M/M CC 125)	5	3A
SC 240	Introductory Soil Science (C/C CC 107 or C/C CC 111)	4	
	Social/behavioral sciences ⁴	3	3C
	TOTAL	37	
JUNIOR			
BZ 330	Mammalogy (BY 103 or BZ/BZCC 111)	3	
BZ 335	Ornithology (BY 103 or BZ/BZCC 111)	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/ ECCC 240	Issues in Environmental Economics	3	3F
ECCC 202	Principles or Microeconomics (M/M CC 118 or M/M CC 120A-B)	3	3C
FW 370	Design of Wildlife Projects (ST/STCC 301 or ST/STCC 307 or EH/EHCC 307)	2	
FW 371	Wildlife Data Collection and Analysis (NR 220 and NR 260 and ST/STCC 301 or ST/STCC 307 or EH/EHCC 307)	4	
FW 375	Field Wildlife Studies (BY 220)	2	
NRCC 320	Natural Resources History and Policy	3	3D, 3F
	Botany elective ⁵	3	
	TOTAL	26	
SENIOR			
FW 300	Ichthyology (BY 103 or BZ/BZCC 111)	2	
FW 301B	Ichthyology Laboratory-Fish Biology (FW 300 or concurrent reg.)	1	
NR 400	Public Relations in Natural Resources (NR/NRCC 320)	3	4A, 4B
NR 420	Integrated Ecosystem Management	4	4C
	Animal biology electives ⁶	5	
	Global and cultural awareness ⁷	3	3E
	Wildlife electives ⁸	3	
	Electives	4-5	
	TOTAL	24-25	

PROGRAM TOTAL = 120 credits

¹ 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.

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 3G in the AUCC.

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

⁵ Choose one course from the following list: F 210, F 311, RS 331 or any 200- 300- or 400- level botany course.

⁶ Select five credits from the following list of courses: AY 230/PS 230, BY 310 and BY 311, BZ 212, BZ 300, BZ 301, BZ 310/PS 310, BZ 346, BZ 350, BZ 329, BZ 401, BZ 405, BZ 471 and BZ 472, EN 302 and EN 303, FW 400, MB 300, NR 367, SC 330.

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

⁸ Select one course from the following list: FW 377, FW 420, FW 468, FW 469, FW 555, FW 565, NR 300.

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 SCIENCES

Office in Forestry Building, Room 131
Professor Susan G. Stafford, Head

Major in Forestry

Professor David R. Betters, in charge

Do you like to spend time in the woods, feeling at home among the trees? Are you concerned how the health of our forests affects your own life? Would you like to help preserve, protect, and maintain forests for future generations' use and enjoyment? Have you ever wondered how valuable forest products can be harvested in a beneficial and environmentally sustainable manner? Would you like to manage a forest to preserve or restore its long-term viability, improve wildlife habitat, or maintain regional air and water quality? Do you wish to know how fire might be employed as a forest management tool? Are you interested in the ecology of forests and the biology of trees? Would you like to have a hand in dealing with today's most critical natural resource and environmental problems? If your answer to any of these questions is "yes," then a major in forestry may be right for you.

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 Sciences 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 your 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 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)	3	2A
F CC 192	Forestry Inquiries	2	1
F 210	Dendrology (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)	3	
ECCC 202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	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)	3	
F 321	Forestry 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
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 Frederick W. Smith, 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 (BY 103 or BZ/BZCC 120; 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 (BY 103 or BZ/BZCC 120; 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 (BY/LSCC 102 or BZ/BZCC 120)	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	20	
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 adviser.

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	9-11	
SOPHOMORE			
F 224	Wildland Fire Measurements (F/F CC 192)	1	
F 230	Forestry Field Measurements	2	
F 331	Wood Products in Society	3	
NR 220	Natural Resources Ecology and Measurements (BY 103 or BZ/BZCC 120; M/M CC 121)	5	
STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
	Arts/humanities ²	3	3B
	TOTAL	17	
JUNIOR			
AT 350	Introduction to Weather and Climate	2	
COCC 300	Writing Arguments (CO/COCC 150)	3	2B2
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	6	
	TOTAL	16	
SENIOR			
BI 365	Integrated Tree Health Management (BY/LSCC 102 or BZ/BZCC 120)	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	25-27	

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 David R. Betters, in charge

Forest management is a traditional forestry concentration designed to instill an understanding of the basic principles of forestry. 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 (BY 103 or BZ/BZCC 120; M/M CC 121)	5	
STCC 201	General Statistics (M/M CC 120 A-B)	3	2D
	Arts/humanities ¹	3	3B

		Global and cultural awareness ²	3	3E
		TOTAL	19	
JUNIOR				
F	330	Timber Harvesting and the Environment (F 230 or F 321)	3	
JTCC	300	Professional and Technical Communication (CO/COCC 150)	3	2B2
NR	323	Remote Sensing of Natural Resources	3	
		Field experience ³	0	
		Electives	6	
		TOTAL	15	

SENIOR				
BI	365	Integrated Tree Health Management (BY 102/LSCC 102 or BZ/BZCC 120)	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:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
M CC 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	Fundamental of Business Law	3	3F
BI	365	Integrated Tree Health Management (BY 102/LSCC 102 or BZ/BZCC 120)	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

How will the nation's natural resources be managed in the future? What will the nation's forests and range landscapes look like in the future? Can water quality and wildlife habitat be protected as use of public lands increases? What is ecosystem management? How can computers be used to map and manage natural resources? How can economic and ecological tradeoffs among different resource uses be balanced? These are just some of the questions natural resource managers might think about.

Students in natural resources management obtain broad exposure to natural resource topics and issues. Graduates can work with traditional national and international resource organizations. The major's broad curriculum is ideal for pursuing fields in land use planning, computer technology, real estate management, youth agency administration, natural resource communications, mining reclamation, business, and law. Students can, with their adviser's assistance, tailor course work to specific interests. Courses in forest and rangeland biology, forest and natural resource management, wildlife management, watershed management, and recreation resources provide the broad overview that is unique to this major. Students also choose a minor in a related topic or an interdisciplinary study program from among the dozens offered at Colorado State, including spatial information systems, conservation biology, water resources, environmental affairs, to mention a few. The choice of minor or interdisciplinary study allows the student to gain greater depth of understanding in an area of particular interest, and may greatly influence employment opportunities. Between the sophomore and junior year, students attend a four-week summer field course in ecological investigation and resource management at Colorado State's Pingree Park mountain campus. The program promotes student internships with private and public organizations to enhance students' learning experiences.

Characteristics And Skills

- A strong interest in natural resources and resource management issues
- Able to integrate knowledge of a variety of concepts to obtain an holistic perspective
- A desire to know forest tree characteristics and their significance
- A desire to understand wildlife, range and water management principles
- Interest in policy formation and implementation
- Able to work in multidisciplinary teams as well as independently
- Able to write and speak accurately and clearly
- Able to deal with the public
- Organizational and decision making skills
- A desire to learn computer-based applications
- Interest in data and policy analysis
- Well organized and able to pay attention to detail
- Adaptable to changing conditions and environments
- Enjoys hands-on work

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 year 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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 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 120 A-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 Science (M/M CC 118 or M/M CC 121)	3	2C
NRCC 192	Natural Resources Freshman Seminar	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)	3	

COCC	150	College Composition (Composition Placement Exam)	3	2A
ECCC	202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	3	3C
ERCC	140	Physical Geology	4	3A
F	210	Dendrology (BZ/BZCC 120)	3	
NR	220	Natural Resources Ecology and Measurements (BY 103 or BZ/BZCC 120; 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
<i>Select three of the following courses:</i>				
ERCC	304	Principles of Watershed Management	3	3A
FW	360	Principles of Vertebrate Management (BY 220; 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 (BY 103 or BZ/BZCC 120)	3	
F	311	Forest Ecology (BY 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 Electives	3	3D, 3F
TOTAL			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 credits¹ 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.**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*	Dendrology (BZ/BZCC 120)	3	
UPPER DIVISION			
BI 365*	Integrated Tree Health Management (BY/LSCC 102 or BZ/BZCC 120)	4	
OR			
F 424*	Forest Fire Management (F 224 or written consent of instructor)	3	
F 311*	Forest Ecology (BY 220)	3	
F 321*	Forest Biometry (NR 220; ST/STCC 201 or ST/STCC 301)	3	
F 325*	Silviculture (F 230, F 311, NR 220)	3	
F 330	Timber Harvesting and the Environment (F 230 or F 321)	3	
F 421*	Timber Management (F 230, F 321, F 322, F 325)	4	
NR 323	Remote Sensing of Natural Resources	3	
TOTAL			22-23

PROGRAM TOTAL = 25-26 credits without prerequisites

*Additional course work may be required because of prerequisites.

Minor in Spatial Information Management

Course	Title (Prerequisite)	Cr	AUCC
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 or CS 154, CS 166/M 166)	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.

Graduate Programs in Forest Sciences

The department offers graduate programs leading to master of forestry, master of science, and doctor of philosophy 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

Do you want to run a tourism or outdoor recreation business? Would you enjoy educating the public about natural or cultural history, the environment, or outdoor recreational opportunities? Would you like to manage public lands and waters to provide people with quality outdoor recreation experiences? Would you like to introduce people to wilderness recreation and preservation opportunities? Does a career in the growing field of ecotourism intrigue you? If your answer to any of these questions is “yes,” then a major in natural resource recreation and tourism may be the ticket for you.

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. Three concentrations are offered: interpretation, 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 interpretation concentration: 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 affairs specialist; park ranger. Examples of opportunities available to graduates in natural resource tourism 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.

Natural Resource Recreation and Tourism Core

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	3	2A
NRCC 192	Natural Resources Freshman Seminar	2	1
RR 100	Foundations of Recreation and Tourism	3	
	Health and wellness ¹	2	3G
	TOTAL	10	
SOPHOMORE			
RR 231	Principles Parks/Protected Area Management	3	
RR 261	Principles of Interpretation (RR 100)	3	
RR 270	Principles of Natural Resource Tourism (RR 100)	3	
	TOTAL	9	
JUNIOR			
NRCC 320	Natural Resources History and Policy	3	3D, 3F
NR 387	Internship I	1	
RR 376	Recreation Measurements (RR 100, ST/STCC 201)	3	
	TOTAL	7	
SENIOR			
RR 487	Internship	5	
	TOTAL	5	
CORE TOTAL = 31 credits²			

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

² In order to fulfill the 120 credit graduation requirement, one of the following concentrations—interpretation, natural resource tourism, or parks and protected area management—must also be completed.

Interpretation Concentration

Interpretation develops expertise in communicating to the public and creating and managing educational programs related to natural environments. This concentration is oriented to public agencies, non-profit organizations, and private enterprises that aim to increase public awareness and education on environmental/natural resource management issues, and to enhance the quality of people's recreational experiences. The curriculum includes a mixture of natural resource, recreation, natural science, social science, planning, management, education, communications, and business courses to provide balanced knowledge and skills appropriate for careers in interpretation.

In addition to the natural resource recreation and tourism core courses, the following must be completed:

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
<i>Select one of the following courses:</i>			
APCC 100	Introductory Cultural Anthropology	3	3C
PYCC 100	General Psychology	3	3C
S CC 100	General Sociology	3	3C, 3F
E CC 140	The Study of Literature	3	3B
OR			
THCC 141	Introduction to Theatre	3	3B
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 sciences ¹	7	3A
	TOTAL	16	
SOPHOMORE			
BY 220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155)	3	
NR 220	Natural Resources Ecology and Measurements (BY 103 or BZ/BZCC 120; M/M CC 121)	5	
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
	Guided science elective ²	2	
	History elective ²	3	
	Natural science elective ²	3	
	Social science elective ²	3	
	TOTAL	25	
JUNIOR			
NR 365	Environmental Education (BY 220)	3	4B
RR 330	Social Aspects of Natural Resource Management	3	
RR 363	Outdoor Recreation Programming (RR 100)	3	
RR 371	Techniques in Interpretation (RR 261)	3	4A
RR 375	Budgeting and Revenue Resources (RR 100)	3	
	Global and cultural awareness ³	3	3E
	Speech elective ²	3	
	Writing elective ²	3	
	TOTAL	24	
SENIOR			
NR 400	Public Relations in Natural Resources (NR/NRCC 320)	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	461	Interpretive Planning (RR 261)	3	4C
RR	471	Starting and Managing Tourism Enterprise (RR 100)	3	
		Design/art elective ²	3	
		Psychology elective ²	3	
		Specialization electives ²	6	
		TOTAL	24	

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 departmental list of approved courses.

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

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.

In addition to the natural resource recreation and tourism core courses, the following must be completed:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
ECCC 202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	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
SPPC 200	Public Speaking	3	2B1
	Arts/humanities ¹	3	3B
	Biological/physical sciences ²	7	3A
	TOTAL	19	

SOPHOMORE

BA	205	Fundamentals of Accounting	3	
BGCC	205	Fundamentals of Business Law	3	3F
<i>Select one of the following:</i>				
COCC	300	Writing Arguments (CO/COCC 150)	3	2B2
JTCC	300	Professional and Technical Communication (CO/COCC 150)	3	2B2
JT	301	Business Communication (CO/COCC 150)	3	
RM	101	Hospitality Industry	3	
STCC	201	General Statistics (M/M CC 120A-B)	3	2D
		Guided elective ³	3	
		TOTAL	18	

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	
		Global and cultural awareness ⁴	3	3E
		Guided electives ³	6	
		Electives	3	
		TOTAL	24	

SENIOR

RR	330	Social Aspects of Natural Resource Management	3	
RR	363	Outdoor Recreation Programming (RR 100)	3	
RR	375	Budgeting and Revenue Resources (RR 100)	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 100)	3	
		Guided electives ³	10	
		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 from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

³ Select from departmental list of approved courses.

⁴ Select from the list of courses in category 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.

In addition to the natural resource recreation and tourism core courses, the following must be completed:

M CC 120A-B is considered a review course; credit in this course may not be used toward a degree in the parks and protected area management concentration in the major in natural resource recreation and tourism.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
<i>Select 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
OR			
BZCC 120	Principles of Plant Biology	4	3A
ECCC 202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	3	3C
ERCC 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
PYCC 100	General Psychology	3	3C
SPCC 200	Public Speaking	3	2B1
	Arts/humanities ¹	3	3B
	TOTAL	21	
SOPHOMORE			
BY 220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155)	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
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 (BY 103 or BZ/BZCC 120; M/M CC 121)	5	
STCC 201	General Statistics (M/M CC 120A-B)	3	2D
	Global and cultural awareness ²	3	3E
	TOTAL	20	
JUNIOR			

FW 360	Principles of Vertebrate Management (BY 220; M/M CC 141 and M/M CC 124 or M/M CC 155 or M/M CC 160)	3	
NR 322	Introduction to Geographic Information Systems	4	
OR			
NR 323	Remote Sensing of Natural Resources	3	
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 100)	3	
RR 375	Budgeting and Revenue Resources (RR 100)	3	
	Guided electives ³	4	
	TOTAL	22-23	

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 100, RR 330)	3	
	Guided electives ⁴	9-10	
	TOTAL	25-26	

PROGRAM TOTAL = 120 credits

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

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

³ Select from departmental list of approved courses.

Minor in International Ecotourism

Ecotourism is an exploding industry in developing nations around the world. These courses will provide skills and experiences in developing a tourism industry while protecting a country's cultural and natural resources. A foreign language and international internship provides a rich, multicultural opportunity.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
L	Foreign language	6	
RR 270*	Principles of Natural Resource Tourism (RR 100)	3	
	TOTAL	9	
UPPER DIVISION			
NR 460*	Wilderness Management (BY 220, NR 300, RR 431 or written consent of instructor)	3	

RR	320	International Issues-Recreation and Tourism	3
RR	470	Tourism Impacts (RR 270)	3
RR	487	Internship ¹	3
		TOTAL	12

PROGRAM TOTAL = 21 credits without prerequisites

¹ At least six weeks must be spent abroad.

*Additional course work may be required because of prerequisites.

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 Educational Outreach and will require separate payment and enrollment procedures. Contact the Division for more information. Students must be enrolled in a degree program to complete a minor.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
UPPER DIVISION			
RR 450	Wilderness Philosophy and Ethic Development	3	
RR 451	National Wilderness Preservation System (RR 450)	3	
RR 452	Management of the Wilderness 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*.

DEPARTMENT OF RANGELAND ECOSYSTEM SCIENCE

Office in Natural Resources Building, Room 240E
Professor R. Dennis Child, Head

Major in Rangeland Ecology

Do you feel more at home working in the prairie than in the mountain forests or on the sea? Are you an ecologist at heart who would like to help ensure that the nation's rangelands are managed to promote sustainable ecosystems? Do you wish to help restore a degraded wetland to reduce erosion, enhance wildlife habitat, and improve water quality? Would you like to manage large rangelands for a federal, state, or private land agency? If your answer to any of these questions is "yes," then a major in rangeland ecology is for you!

The Department of Rangeland Ecosystem Science offers a single 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 meets 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 range 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

- Strong analytical ability
- Likes 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 accurately and clearly
- Interest in data and policy analysis
- Able to integrate knowledge of a variety of concepts to obtain an holistic perspective

Potential Occupations

Range scientists are trained to manage lands that produce herbage for all grazing animals, for aesthetic values, and for watershed enhancement. Knowledgeable in ecosystem structure, range 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. Range 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 range scientists is expected to increase by 33 percent in the next decade. In the U.S. most range scientists work for the Federal and state governments while private industry, colleges and universities, and international agencies are increasingly employing range scientists.

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.

Examples of career opportunities include, but are not limited to: restoration ecologist; rangeland scientist; range management specialist; soil conservationist; soil scientist; rangeland conservationist; rangeland 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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 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)	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	Natural Resources Freshman Seminar	2	1
	Arts/humanities ³	3	3B
	Health and wellness ⁴	2	3G
	TOTAL	33	
SUMMER SESSION			
NR 220	Natural Resources Ecology and Measurements (BY 103 or BZ/BZCC 120; M/M CC 121)	5	
SOPHOMORE			
BZ 223	Plant Identification (BY 103 or BZ/BZCC 120)	3	
ERCC 304	Principles of Watershed Management	3	3A
F 210	Dendrology (BZ/BZCC 120)	3	
FW 360	Principles of Vertebrate Management (BY 220, M/M CC 141 or M/M CC 155 or M/M CC 160)	3	
RS 300	Principles of Range Management (BY 103 or BZ/BZCC 120)	3	
SC 240	Introductory Soil Science (C/C CC107 or C/C CC 111)	4	
SPCC 200	Public Speaking	3	2B1
STCC 307	Introduction to Biostatistics ⁵ (M/M CC 121)	3	2D
EHCC 307			
	TOTAL	25	
JUNIOR			
F 311	Forest Ecology (BY 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	
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	352	Range Animal-Habitat Interactions (BY 220, RS 300 or RS 320/SC 320)	3	4B
RS	420	Grass Taxonomy (BZ 223 or written consent of instructor)	3	
		Global and cultural awareness ⁶	3	3E
		TOTAL	28	

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, RS 300)	2	4A
RS	471	Range 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	2	
		TOTAL	29	

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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
A CC 192	Orientation to Agricultural Systems	3	1
BY 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
BY 220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC 155)	3	
C CC 107	Fundamentals of Chemistry (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)	3	2A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
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 (BY 103 or BZ/BZCC 120)	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 Ranch Management I (A/A CC 192 or first year seminar)	3	
RS 300	Principles of Range Management (BY 103 or BZ/BZCC 120)	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/EHCC 307	Introduction to Biostatistics ⁴ (M/M CC 121)	3	2D
	Elective	2	
	TOTAL	31	
JUNIOR			
BZ 440	Plant Physiology (BY 103 or BZ/BZCC 120; C 245 or concurrent reg.)	3	
ERCC 304	Principles of Watershed Management	3	3A

FW	360	Principles of Vertebrate Management (BY 220; 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	324/A	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	452	Range Animal-Habitat Interactions (NR 367, RS 300 or RS 320/SC 320)	2	4B
RS	420	Grass Taxonomy (BZ 223 or written consent of instructor)	3	
S	341	Sociology of Rural Life (S/S CC 100 or S/S CC 105)	3	
		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	Farm and Ranch Records and 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	483/A	US Travel-Integrated Ranch Management (NR 324/A 324)	2	
RS	400	Rangeland Improvements (RS 300 or RS 320/SC 320)	2	
RS	470	Rangeland Economics and Analysis (EA/EACC 202, 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 awareness ⁶	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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
BY 103	Biology of Organisms-Animals and Plants (BY 102/LSCC 102)	4	
BY 220	Fundamentals of Ecology (one course in biology, M/M CC 124 or M/M CC 141 or M/M CC 155) ¹	3	
C CC 107	Fundamentals of Chemistry (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)	3	2A
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) ¹	3	2C
NRCC 192	Natural Resources Freshman Seminar	2	1
	Health and wellness ²	2	3G
	TOTAL	29	
SUMMER SESSION			
NR 220	Natural Resources Ecology and Measurements (BY 103 or BZ/BZCC 120; M/M CC 121)	5	
SOPHOMORE			
BZ 223	Plant Identification (BY 103 or BZ/BZCC 120)	3	
EACC 202	Agricultural and Resource Economics ³	3	
RS 300	Principles of Range Management (BY 103 or BZ/BZCC 120)	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/EHCC 307	Introduction to Biostatistics ⁴ (M/M CC 121)	3	2D
	Social/behavioral sciences ⁵	3	3C
	TOTAL	25	
JUNIOR			
BZ 440	Plant Physiology (BY 103 or BZ/BZCC 120; C 245 or concurrent reg..)	3	
ER 416	Land Use Hydrology (SC 240, ST/STCC 201)	3	

FW	360	Principles of Vertebrate Management (BY 220; 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	
		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	
ER	418	Land Use and Water Quality (C/C CC 107, ER 416)	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, 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	
		Global and cultural awareness ⁷	3	3E
		TOTAL	32	

PROGRAM TOTAL = 120 credits

¹ M CC 120, M CC 121, and M CC 124 are considered review courses; credits in these courses may not be used toward completion of a degree in rangeland ecology, but are enforced prerequisites for M CC 141 and BY 220.

² Select from 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/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 range 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 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
BY 220	Fundamentals of Ecology (one course in biology; M/M CC 124 or M/M CC 141 or M/M CC155)	3	
C CC 107	Fundamentals of Chemistry (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)	3	2A
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
M CC 155	Calculus for Biological Scientists I ¹ (M/M CC 124, M/M CC 125)	4	2C
NRCC 192	Natural Resources Freshman Seminar	2	1
	Health and wellness ²	2	3G
	TOTAL	30	
SUMMER SESSION			
NR 220	Natural Resources Ecology and Measurements (BY 103 or BZ/BZCC 120; M/M CC121)	5	
SOPHOMORE			
BZ 223	Plant Identification (BY 103 or BZ/BZCC 120)	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 (BY 103 or BZ/BZCC 120)	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/ EHCC 307	Introduction to Biostatistics ⁴ (M/M CC 121)	3	2D
	Global and cultural awareness ⁵	3	3E
	TOTAL	30	
JUNIOR			
AT 350	Introduction to Weather and Climate	2	
AT 351	Introduction to Weather and Climate Laboratory (AT 350 or concurrent reg.)	1	

BZ	440	Plant Physiology (BY 103 or BZ/BZCC 120; C 245 or concurrent reg.)	3	
ERCC	304	Principles of Watershed Management	3	3A
FW	360	Principles of Vertebrate Management (BY 220; 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
		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 (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	3	

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/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.

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)	3	
BZ 223*	Plant Identification (BY 103 or BZ/BZCC 120)	3	
F 210*	Dendrology (BZ/BZCC 120)	3	
NR 220*	Natural Resources Ecology and Measurements (BY 103 or BZ/BZCC 120; 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 (BY 103 or BZ/BZCC 120)	3	
OR			
RS 320/ SC 320*	Forage and Range Management (one course in biological sciences)	3	
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, 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.

Graduate Programs in Rangeland Ecosystem Science

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 John C. Raich, Dean
Professor Thomas W. Sneider, 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 Hughes Undergraduate Biosciences Center for the Life Sciences, (970) 491-3658.

Freshman Open Option

Office in Statistics Building, Room 117

Students who have not decided on a major but whose interests, aptitudes, and high school academic preparation in mathematics and the natural sciences clearly point to a major in this college may enroll as Natural Sciences Open Option. This option extends through the two semesters of the freshman year. Students may declare a departmental or interdepartmental major 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.

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

Do you like science? Would you enjoy teaching science classes for high school or junior high/middle school students? Do you like to know how things work? Are quantitative explanations more satisfying to you than generalities? Do you have a strong interest in mathematics and the physical sciences? Would you prefer a broad scientific education rather than a specialized one? If your answer to any of these questions is "yes," then a major in natural sciences may be for you.

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 graduate 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 will provide you with 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.

Your program will include science courses in your 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 will help you schedule classroom visits and practica. Your experience will culminate 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
BY 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
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 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 (BY 103 or BZ/BZCC 110 and BZ/BZCC 111 or BZ/BZCC 120)	3	
<hr/>				
BZ	350	<i>Select one of the following:</i> Molecular and General Genetics (BY/LSCC 102, one course in statistics)	4	
BZ	455	Human Heredity and Birth Defects (BY 103 or BZ/BZCC 111)	3	
SC	330	Principles of Genetics (BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	3	
<hr/>				
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	
<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/>				
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 AND	3	3A
AACC	101	Astronomy Laboratory (AA/AACC 100 or concurrent reg.)	1	3A
OR				
ERCC	140	Physical Geology	4	1
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 (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	

EDCC	430	Diversity and Communication (ED 310/EDCC 275; admission to Teacher Licensure Program)	3	3E
		Additional communication ⁴	3	2B
		Historical perspectives ⁵	3	3D
		Social/behavioral sciences ⁶	3	3C
		TOTAL	32	
SENIOR				
BC	351	Principles of Biochemistry (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	4A
ED	486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
ED	493A	Seminar-Professional Relations (ED 450, ED 460, concurrent reg. in ED 485A or B)	1	4C
ED	493B	Seminar-Assessment of Learning (ED 450, ED 460, concurrent reg. in ED 485A or B or VE 485)	1	4B
		Health and wellness ⁷	2	3G
		TOTAL	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 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	Fundamental of Chemistry (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
ERCC 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 ²	3	3B
	First-year seminar ³	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)	3	
<hr/>			
<i>Select four to five credits from the following:</i>			
BZ 212	Animal Biology-Invertebrates (BY 103 or BZ/BZCC 111)	4	
BZ 214	Animal Biology-Vertebrates (BY 103 or BZ/BZCC 111)	4	
EN 302	Applied and General Entomology	3	
AND			
EN 303A	General Entomology Laboratory (EN 302 or concurrent reg.)	2	
<hr/>			
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	32-34	

JUNIOR

BC 351	Principles of Biochemistry (C 245 or C 343 or concurrent reg. in C 343)	4	
BZ 220	Introduction to Evolution (BY 103 or BZ/BZCC 110 and BZ/BZCC 111 or BZ/BZCC 120)	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 (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	
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
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
ED 493A	Seminar-Professional Relations (ED 450, ED 460, concurrent reg. in ED 485A or B)	1	4C
ED 493B	Seminar-Assessment of Learning (ED 450, ED 460, concurrent reg. in ED 485A or B or VE 485)	1	4B
MB 300	General Microbiology (C 245 or C 341 or concurrent reg.; BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	3	
	Health and wellness ⁸	2	2G
	Electives	0-2	
	TOTAL	27-29	

PROGRAM TOTAL = 120-122 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 the following: EACC 240 or ECCC 240, ERCC 304, FW 360, GR 210, NR 220, RR 100, RS 300.⁵ 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.

		TOTAL	30
SOPHOMORE			
C	261	Fundamentals of Inorganic Chemistry (C 113)	3
C	341	Organic Chemistry I (C 113)	3
C	343	Organic Chemistry II (C 341)	3
C	344	Organic Chemistry Laboratory (C 114; C 343 or concurrent reg.)	2
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
OR			
ERCC	140	Physical Geology	4 3A
C	331	Quantitative Analysis (C 113)	3
C	332	Quantitative Analysis Laboratory (C 114; C 331 or concurrent reg.)	2
OR			
C	334	Quantitative Analysis Laboratory (C 114; C 331 or concurrent reg.)	1
C	471	Fundamentals of Physical Chemistry (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 (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
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

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
BY 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
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 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

SENIOR			
Course	Title (Prerequisite)	Cr	AUCC
BC 301	Survey of Biochemistry (C 245)	3	
	OR		
BC 351	Principles of Biochemistry (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
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
ED 493A	Seminar-Professional Relations (ED 450, ED 460, concurrent reg. in ED 485A or B)	1	4C
ED 493B	Seminar-Assessment of Learning (ED 450, ED 460, concurrent reg. in ED 485A or B 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
BY 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
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 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

ERCC 140	Physical Geology	4	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
	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 (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	
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	

Social/behavioral science ³	3	3C
Written communication ⁴	3	2A
TOTAL	31-32	

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 Sciences (admission to Teacher Licensure Program)	4	
ED 485B	Student Teaching-Secondary (ED 450, ED 460)	11	4A
ED 486J	Practicum-Instruction II (admission to Teacher Licensure Program)	1	
ED 493A	Seminar-Professional Relations (ED 450, ED 460, concurrent reg. in ED 485A or B)	1	4C
ED 493B	Seminar-Assessment of Learning (ED 450, ED 460, concurrent reg. in ED 485A or B 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.

SOPHOMORE

BZCC 110	Principles of Animal Biology	3	3A
	AND		
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
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	
ER 232	Mineralogy (ER/ERCC 140 or ERCC 192A/ER 150, C/C CC 111, M/M CC 124 or concurrent reg.; concurrent reg. in ER 332; or written consent of instructor)	3	
ER 454	Geomorphology (ER/ERCC 140 or ERCC 192A/ER 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
	ER elective (select from list in junior year)	3-4	
TOTAL		29-30	

JUNIOR

BY 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
	OR		
BZCC 120	Principles of Plant Biology	4	3A
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 (ED 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

Geology Education Concentration

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
AACC 100	Introduction to Astronomy	3	3A
	OR		
ER 272	Oceanography I	3	
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
ERCC 140	Physical Geology	4	
	OR		
ER 150	Physical Geology for Scientists and Engineers	4	
ER 154	Historical and Analytic Geology (ER/ERCC 130 or ER/ERCC 140 or ERCC 192A/ER 150)	4	
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
	Arts/humanities ¹	3	3B
	First year seminar ²	2-3	1

Arts/humanities ⁴	3	3B
Historical perspectives ⁵	3	3D
Electives	5	
TOTAL	30	

SENIOR

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	
ED 450	Instruction II-Standards and Assessment (ED 350, ED 386; concurrent reg. in ED 486J)	4	
ED 460	Methods and Materials in Teaching Sciences (admission to Teacher Licensure Program)	4	
ED 485B	Student Teaching-Secondary (ED 450, ED 460)	11	4A
ED 486J	Practicum-Methods and Assessment (admission to Teacher Licensure Program)	1	
ED 493A	Seminar-Professional Relations (ED 450, ED 460, concurrent reg. in ED 485A or B)	1	4C
ED 493B	Seminar-Assessment of Learning (ED 450, ED 460, concurrent reg. in ED 485A or B 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.

Physical Science Concentration

The physical science concentration begins with two semesters each of calculus, chemistry, and physics, plus a semester of biological science. You then complete the major by earning two minors selected from biochemistry, chemistry, computer science, geology, mathematics, or physics. Completion of the double minor gives you an unusual breadth in the physical sciences. Some of our 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. You can also add the certification requirements for secondary education to this concentration.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
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
COCC 150	College Composition (Composition Placement Exam)	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	
<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

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
	Logical/critical thinking ⁴	3	2D
	Minor ³	6	
	TOTAL	31	
JUNIOR			
	Arts/humanities ⁵	3	3B
	Biological/physical sciences ⁶	3	3A
	Global and cultural awareness ⁷	3	3E
	Health and wellness ⁸	2	3G
	Historical perspectives ⁹	3	3D
	Minor ³	15	
	Social/behavioral sciences ¹⁰	3	3C
	U.S. public values and institutions ¹¹	(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.

DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOLOGY

*Office in Molecular and Radiological Biosciences Building,
Room 316*

Professor Norman P. Curthoys, Chair

Major in Biochemistry

Has the chemical composition of living things always been fascinating to you? Do you love molecules? Would you like to have a role in the detection, diagnosis, and treatment of disease? Are you curious about gene expression and cellular replication? Would you like to design laboratory equipment or processes? Are you interested in solving the structure of important cellular components? What about how our bodies synthesize vitamins and minerals? Have you ever thought about a career in biotechnology? If you answered “yes” to any of these questions, then maybe a biochemistry major is for you.

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, your studies will include macromolecular structure and function; cellular biochemistry; metabolism; gene expression, structure, replication, and repair; cell organization, communication, growth, aging, and death. You will also be 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 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
BY 103	Biology of Organisms (BY/LSCC 102)	4	
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 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)	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
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	

	Category 3 course ¹	3	3B-3F
	TOTAL	33	
SOPHOMORE			
C 341	Organic Chemistry I (C 113)	3	
C 343	Organic Chemistry II (C 341)	3	
C 344	Organic Chemistry Laboratory (C 114; C 343 or concurrent reg.)	2	
NS 201	Molecular Biosciences-Genetic Mechanism (BY/LSCC 102, C/C CC 111, C/C CC 112 or concurrent reg.)	4	

NS	202	Molecular Biosciences-Cellular Biochemistry (BY/LSCC 102, C/C CC 111, C/C CC 112 or concurrent reg.)	4	
NS	203	Genetic Mechanisms Laboratory (C/C CC 112; NS 201 or concurrent reg.)	1	
NS	204	Cellular Biochemistry Laboratory (C/C CC 112; NS 202 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 Scientist 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

		Additional communication ²	3	2B
		Health and wellness ³	2	3G
		TOTAL	33	
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; NS 204)	2	4B
C	331	Quantitative Analysis (C 113)	3	
C	334	Quantitative Analysis Laboratory (C 114; C 331 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

		Bioscience elective ⁴	3-4	
		Category 3 courses ¹	6	3B-3F
		Electives	3	
		TOTAL	27-28	

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	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 (NS 201; BC 401 or concurrent reg. or BC 351)	3	4C
BC	465	Molecular Regulation-Cell Function (NS 202; BC 403 or concurrent reg. or BC 351)	3	
BC	493	Senior Seminar (BC 401 or concurrent reg.)	1	4C
C	471	Fundamentals of Physical Chemistry (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	
		TOTAL	26-27	

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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LOWER DIVISION			
NS 201*	Molecular Biosciences-Genetic Mechanisms (BY/LSCC 102; C/C CC 111, C/C CC 112 or concurrent reg.)	4	
NS 202*	Molecular Biosciences-Cellular Biochemistry (BY/LSCC 102; C/C CC 111, C/C CC 112 or concurrent reg.)	4	
NS 204*	Cellular Biochemistry Laboratory (C/C CC 112, NS 202 or concurrent reg.)	1	
	TOTAL	9	

UPPER DIVISION

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
BC	403	Comprehensive Biochemistry II (BC 401)	3
BC	404*	Comprehensive Biochemistry Laboratory (BC 401 or concurrent reg.; C 246 or C 344; NS 204)	2
BC	463	Molecular Genetics (NS 201; BC 401 or concurrent reg. or BC 351)	3
OR			
BC	465	Molecular Regulation of Cell Function (NS 202; BC 403 or concurrent reg. or BC 351)	3
BC	493	Senior Seminar (BC 401 or concurrent reg.)	1
TOTAL			12

PROGRAM TOTAL = 21 credits without prerequisites

*Additional work may be required because of prerequisites.

Graduate Programs in Biochemistry

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 Joan M. Herbers, Chair

Major in Biological Science

Are microscopic bacteria and viruses a curiosity to you? Do you enjoy learning about organ systems and cells in humans and animals? Would you like to have a role in the detection, diagnosis and treatment of diseases? Have you wondered about the effects of a forest fire and how new growth occurs?

Do you enjoy doing research? Do you have a passion for biological sciences you want to share with others? Do you want to go further in your education and pursue a health care profession, such as a chiropractor or pharmacist, or even medical school? If you answered “yes” to any of these questions, you may want to consider biological science as a major.

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. As a biology major, you will 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. You will 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. As you can see, 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 your particular career goal. (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 you 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 your 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 your 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
<i>Select one of the following sets of courses:</i>			
BZCC 110	Principles of Animal Biology	3	3A
BZCC 111	Animal Biology Laboratory (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
BY 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 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)	3	2A
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
	Additional communication ²	3	2B
	Arts/humanities ³	3	3B
	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 103 or BZ/BZCC 110 and BZ/BZCC 111 or BZ/BZCC 120)	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	341	Organic Chemistry I (C 113)	3
C	343	Organic Chemistry II (C 341)	3
C	344	Organic Chemistry Laboratory (C 114; C 343 or concurrent reg.)	2
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
OR			
		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
<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
OR			
		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 (C 245 or C 343 or concurrent reg. in C 343)	4
OR			
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
AND			
BC	403	Comprehensive Biochemistry II (BC 401)	3
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
		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

Are you a plant lover? Would you like to ponder the mysteries of photosynthesis, plant growth, and genetic transfer? Do water plants, algae, or fungi hold a special fascination for you? Would you like to know more about plant ecology and evolution? Are you curious about the relationships of grasses in plant ecosystems? If your answer to any of these questions is "yes," then botany may be the major for you.

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 your 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
Select one set of courses from the following:			
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
BY 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 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)	3	2A
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
	Additional communication ²	3	2B
	Arts /humanities ³	3	3B
	TOTAL	32	
SOPHOMORE			
BZ 220	Introduction to Evolution (BY 103 or BZCC 110 and BZCC 111 or BZCC 120)	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	341	Organic Chemistry I (C 113)	3
C	343	Organic Chemistry II (C 341)	3
C	344	Organic Chemistry Laboratory (C 114; C 343 or concurrent reg.)	2
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
ERCC	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/>			
		Arts/humanities ³	3 3B
		Health and wellness ⁴	2 3G
		Historical perspectives ⁵	3 3D
		Social/behavioral sciences ⁶	3 3C
		TOTAL	27-32
JUNIOR			
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
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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)	
<hr/>			
		Global and cultural awareness ⁷	3 3E
		U.S. public values and institutions ⁸	(3) 3F
		Electives	7
		TOTAL	28
SENIOR			
BC	351	Principles of Biochemistry (C 245 or C 343 or concurrent reg. in C 343)	4
OR			
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
AND			
BC	403	Comprehensive Biochemistry II (BC 401)	3
BZ	325	Plant Systematics (BY 103 or BZ/BZCC 120)	4
BZ	331	Plant Anatomy (BY 103 or BZ/BZCC 120)	4

<i>Select at least two courses from the following:</i>			
BZ	332	Introductory Phycology (BY/LSCC 102 or BY 103 or BZ/BZCC 120)	4
BZ	333	Introductory Mycology (BY 103 or BZ/BZCC 120 or written consent of instructor)	4
BZ	338	Comparative Morphology of Vascular Plants (BY 103 or BZ/BZCC 120)	4
BZ	440	Plant Physiology (BY 103 or BZ/BZCC 120; 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
BY 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

Have you dreamed of working with animals in a zoo? Are you curious about the habits of animals or how they adapt to their environment? Would you like to do research with animals or train animals? What about working in a lab assisting with the detection, diagnosis and treatment of diseases? Is becoming a veterinarian something you have dreamed of? If you answered “yes” to any of these questions, you may want to consider majoring 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 your 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 set of courses from the following:</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
BY 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 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)	3	2A
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
	Additional communication ²	3	2B
	Social/behavioral sciences ³	3	3C
	TOTAL	32	
SOPHOMORE			
BZ 212	Animal Biology-Invertebrates (BY 103 or BZ/BZCC 111)	4	
BZ 214	Animal Biology-Vertebrates (BY 103 or BZ/BZCC 111)	4	
BZ 220	Introduction to Evolution (BY 103 or BZ/BZCC 110 and BZ/BZCC 111 or BZ/BZCC 120)	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 341	Organic Chemistry I (C 113)	3	
C 343	Organic Chemistry II (C 341)	3	
C 344	Organic Chemistry Laboratory (C 114; C 343 or concurrent reg.)	2	
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

	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			
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	6	
	TOTAL	29	
SENIOR			
BC 351	Principles of Biochemistry (C 245 or C 343 or concurrent reg. in C 343)	4	
OR			
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	
AND			
BC 403	Comprehensive Biochemistry II (BC 401)	3	
BY 320	Ecology (one course in biology, M/M CC 155)	3	4C
	Arts/humanities ⁴	3	3B
	Upper-division zoology courses ⁹	10	
	Electives ¹⁰	4-9	
	TOTAL	26-19	
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 16 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
LOWER DIVISION			
BY 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
BZ 212	Animal Biology-Invertebrates (BY 103 or BZ/BZCC 111)	4	
BZ 214	Animal Biology-Vertebrates (BY 103 or BZ/BZCC 111)	4	
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
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 a master of science degree and a doctor of philosophy degree 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

Are you naturally curious about what makes up the everyday things you see? Did you ever wonder about the composition of the substances that produce colors in clothes, paints, paper, rocks, and glass? Have you ever wondered what chemicals might reside in your food or drinking water and how they might affect you? Would you like to research and develop new products and manufacturing processes that are environmentally friendly? Does monitoring the composition of air, water, and soil to maintain or improve environmental quality interest you? Are you fascinated by the vast possibilities that lie in biotechnology and pharmaceutical

research, food product development, medicine, and toxic substance management? If your answer to any of these questions is "yes," then a major in chemistry may be right for you.

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.

Additionally, students are encouraged to participate in undergraduate research. Those students whose career goals involve the health professions or secondary teaching generally take advanced coursework in biology or education. 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.

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 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)	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 341	Organic Chemistry I (C 113)	3	
C 343	Organic Chemistry II (C 341)	3	
C 344	Organic Chemistry Laboratory (C 114; C 343 or concurrent reg.)	2	
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; C 331 or concurrent reg.)	2	
C 335	Introduction to Analytical Chemistry (C 113 with grade of C or better)	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 476)	2	4C

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.

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 three additional chemistry courses in inorganic chemistry and instrumental analysis.

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 343, C 344)	2 4B
C	478	Physical Chemistry Laboratory (C 471 or C 474; C 332 or C 334 or CB 333)	2
	U.S. public values and institutions ²	3	3F
	Electives	5	
	TOTAL	12	

SENIOR			

<i>Select one of the following:</i>			
BC	301	Survey of Biochemistry (C 245)	3
BC	351	Principles of Biochemistry (C 245 or C 343 or concurrent reg. in C 343)	4
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

C	431	Instrumental Analysis (C 332 or C 334; C 471 or C 476 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 301, 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 476 or concurrent reg.)	4
	OR		
C	478	Physical Chemistry Laboratory (C 471 or C 474; and C 332 or C 344 or CB 333)	2

C	440	Advanced Organic Chemistry Laboratory (C 343, 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 chemistry courses required for the minor in chemistry.

Course	Title (Prerequisite)	Cr	AUCC
LOWER DIVISION			
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	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; C 331 or concurrent reg.)	2
	OR		
C	334	Quantitative Analysis Laboratory (C 114; C 331 or concurrent reg.)	1

C	341	Organic Chemistry I (C 113)	3
C	343	Organic Chemistry II (C 341)	3
C	344	Organic Chemistry Laboratory (C 114; C 343 or concurrent reg.)	2

C	471*	Fundamentals of Physical Chemistry (C 113; M/M CC 161 or M/M CC 255; PH/PHCC 122 or PH/PHCC 142)	4

C	474*	OR 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
Professor Stephen B. Seidman, Chair

Major in Computer Science

Do you really enjoy using computers? Would you like to program computers not just use them? Could you spend hours developing code and have the patience to find every bug? Would the creation of computer operating systems, networks, or commercial applications from scratch interest you? Would you like to become a software engineer, database designer, or graphics software developer? If the answer to these questions is "yes," then a major in computer science at Colorado State University might be for you.

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, programming languages, 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
- 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 choose from among several job offers 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	3	2A
CSCC 153	Java Programming (M/M CC 118 or M/M CC 121)	4	2D
CS 166/ M 166	Discrete Structures (CS/CSCC 151 or CS/CSCC 153 or CS 154, M/M CC 124)	4	
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent registration in M/M CC 124) ¹	4	2C
M CC 161	Calculus for Physical Scientists II (M/M CC 124 and M/M CC 160)	4	2C

M CC 192	Select two credits from the following: 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	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 or CS 154, CS 166/M 166)	4	
CS 253	Problem Solving with C++ (CS 270)	4	
CS 270	Computer Organization (CS 166/M 166, concurrent reg. in CS 200, M/M CC 124)	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, CS 200, M/M CC 161, M 229)	4	
CS 314	Software Development Methods (CS 253)	4	
CS 370	System Architecture and Software (CS 200, CS 270, ST/STCC 301 or ST/STCC 309)	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			
<i>Select one course from the following:</i>			
CS 410	Introduction to Computer Graphics (CS 314, M 229)	4	4A
CS 440	Introduction to Artificial Intelligence (CS 253, CS 301)	4	4A
CS 451	Operating Systems (CS 370)	4	4A
CS 475	Parallel Programming (CS 370)	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, ERCC 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, ER 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)	3	2A
CSCC 153	Java Programming (M/M CC 118 or M/M CC 121)	4	2D
CS 166/ M 166	Discrete Structures (CS/CSCC 151 or CS/CSCC 153 or CS 154, M/M CC 124)	4	
M CC 160	Calculus for Physical Scientists I (M/M CC 126; concurrent reg. in M/M CC 124) ¹	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 or CS 154, CS 155/M 166)	4	
CS	253	Problem Solving with C++ (CS 270)	4	
CS	270	Computer Organization (CS 166/M 166, concurrent reg. in CS 200, M/M CC 124)	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, CS 200, M/M CC 161, M 229)	4	
CS	314	Software Development Methods (CS 253)	4	
CS	370	System Architecture and Software (CS 200, CS 270, ST/STCC 301 or ST/STCC 309)	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, M 229)	4	4A
CS	440	Introduction to Artificial Intelligence (CS 253, CS 301)	4	4A
CS	451	Operating Systems (CS 370)	4	4A
CS	475	Parallel Programming (CS 370)	4	4A

<i>Select two of the following courses:</i>				
CS	414	Object-Oriented Design (CS 314)	4	
CS	420	Introduction to Analysis of Algorithms (CS 301)	4	
CS	430	Database Systems (CS 370)	4	
CS	453	Introduction to Compiler Construction (CS 253, CS 301)	4	
CS	457	Computer Networks and the Internet (CS 370)	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, ERCC 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, AT 440, C 113, C 114, CE 260, ER 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 or M/M CC 121)	4	2D
OR			
CS 154*	C++ to Java Programming Module (college-level C++ course)	2	
CS 166/ M 166*	Discrete Structures (CS/CSCC 151 or CS/CSCC 153 or CS 154, M/M CC 124)	4	
CS 200	Algorithms and Data Structures (CS/CSCC 153 or CS 154, CS 166/M 166)	4	
CS 270*	Computer Organization (CS 166/M 166, concurrent reg. in CS 200, M/M CC 124)	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 Rick Miranda, Chair

Major in Mathematics

Do you enjoy the challenges of solving mathematical puzzles and analyzing complex formulas? Do people typically ask you to help solve mathematical problems because you are good with numbers? Are you good at organizing and analyzing information? Does the idea of calculating odds and probabilities fascinate you? Would you like to apply mathematics and mathematical modeling to the solution of engineering, planning, or risk management problems? Do you want to teach mathematics to junior high, high school, or college students? If you answer “yes” to any of these questions, then you may want to consider a 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 field of study valued for its precision of thought and elegance, and it is an important source of techniques and methods increasingly applied to a variety of problems in a wide array of disciplines. For example, mathematical modeling and simulation is used to provide answers, faster and less expensively, than with tests performed on scale models.

The undergraduate program provides a liberal arts and practical education toward the ends of education and employment. 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 ability to combine knowledge and skills in productive ways. Core subjects include three semesters of calculus, matrices and linear equations, advanced calculus of one 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
- Ability to think logically and quantitatively
- Methodical and accurate in nature
- Strong problem solving ability
- Strong reasoning and abstract thinking ability
- Ability to concentrate for extended periods of time
- Inquisitive and curious nature
- Innovative
- Analytical thinker
- Flexible, patient, and persevering
- Good communications skills
- Ability to work independently or in a team
- Abstract thinking and reasoning ability
- Fast in working with numbers

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 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.

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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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 or 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	Accounting Information Systems I	3	
CSCC 151	C++ for Scientists and Engineers (M/M CC 124, M/M CC 126)	4	2D
	OR		
CSCC 153	Java Programming (M/M CC 118 or M/M CC 121)	4	2D
ECCC 202	Principles of Microeconomics (M/M CC 118 or M/M CC 120A-B)	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 335/ EA 335		Introduction to Econometrics (EC/ECCC 204, 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 121 or two years high school algebra; 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; therefore, it is recommended that students supplement their core program in the chosen area that their skills will be used, such as engineering, public health, finance, electronics, geology, etc. Course requirements emphasize mathematical foundations, applicable mathematics,

and application of mathematics to other areas. Students receive training in numerical analysis, mathematical modeling and computing, as well as a solid preparation for further study.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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 or 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 151	C++ for Scientists and Engineers (M/M CC 124, M/M CC 126)	4	2D
CS 166/ M 166	Discrete Structures (CS/CSCC 151 or CS/CSCC 153 or CS 154; 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 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
	<i>Select from the following:</i>		
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 321	Elementary Probabilistic-Stochastic Modeling (M/M CC 155 or M/M CC 160; knowledge of a computer language)	3	
STCC 309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
	TOTAL	31-32	
JUNIOR			
CS 154	C++ to Java Programming Module (College-level C++ course)	2	

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
	TOTAL	31	

SENIOR

M 317	Advanced Calculus of One Variable (M/M CC 161)	4	4B
	<i>Select one of the following pairs of courses:</i>		
M 332	Methods of Applied Mathematics II (M 340 or M 345)	3	
M 417	Advanced Analysis (M 261, M 317, M 369)	3	
	OR		
M 366	Introduction to Abstract Algebra (M/M CC 161)	3	
M 460	Information Integrity and Security (M 369; M 301 or M 366)	3	
M 435	Capstone in Applied Mathematics (M 331, M 345, M 369; CS/CSCC 153 or CS 154)	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 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)	3	2A
<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 or M/M CC 121)	4	2D
CS 166/M 166	Discrete Structures (CS/CSCC 151 or CS/CSCC 153 or CS 154; M/M CC 124)	4	
OR			
M 301	Introduction to Combinational 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 or CS 154; CS 166/M 166)	4	
M 332	Methods of Applied Mathematics II (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 Integrity and Security (M 369; M 301 or M 366)	3	
M 435	Capstone in Applied Mathematics (M 331, M 345, M 369, CS/CSCC 153 or CS 154)	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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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	3	3C
TOTAL	29	

SOPHOMORE

CSCC 151	C++ for Scientists and Engineers (M/M CC 124, M/M CC 126)	4	2D
OR			
CSCC 153	Java Programming (M/M CC 118 or M/M CC 121)	4	2D
M 261	Calculus for Physical Scientists II (M/M CC 161)	4	
M 369	Linear Algebra (M/M CC 161, M 229)	3	4A
STCC 309	Statistics for Engineers and Scientists (M/M CC 161 or M/M CC 255)	3	2D
	Biological/physical sciences ⁷	10	3A
	Global and cultural awareness ⁸	3	3E
	U.S. public values and institutions ⁹	3	3F
TOTAL		30	

JUNIOR

M 366	Introduction to Abstract Algebra (M/M CC 161)	3	
	Biological/physical sciences ⁷	5	3A
	Mathematical sciences ¹⁰	7	
	Electives ¹¹	15	
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 ¹² (M 261, M 317 and M 369)	3	
M 419	Introduction to Complex Variables (M 261)	3	
M 460	Information Integrity and Security (M 369; M 301 or M 366)	3	
M 466	Groups, Rings, and Fields ¹² (M 366, M 369)	3	
M 417	Advanced Analysis (M 261, M 317 and M 369)	3	4C
OR			
M 466	Groups, Rings, and Fields (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 193 and STCC 193 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 From AUCC category 3A, select two courses with labs or one course with a lab and two other courses. Select additional courses from AUCC category 3A to total at least ten

credits. Must include at least two different prefixes.

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

⁹ Select from the list of courses in category 3F 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 Course selected here must be different from the course chosen for category 4C (Capstone).

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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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	
	Additional communication ¹	3-5	2B
	Arts/humanities ²	3	3B
	First year seminar ³	2-3	1
	Health and wellness ⁴	2-3	3G
	Historical perspectives ⁵	3	3D
	Social/behavioral sciences ⁶	3	3C
TOTAL		29-33	

SOPHOMORE

CSCC 151	C++ for Scientists and Engineers (M/M CC 124, M/M CC 126)	4	2D
OR			
CSCC 153	Java Programming (M/M CC 118 or M/M CC 121)	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

Select one of the following sets of courses (9-10 credits):			
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	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 (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
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, ED 464, concurrent reg. in ED 485A or B)	1
ED	493B	Seminar-Assessment of Learning (ED 450, ED 464, concurrent reg. in ED 485A or B 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/M CC 161)	3	
		Global and cultural awareness ⁸	3	3E
		Natural sciences ⁹	3-4	
		Electives	2-7	
TOTAL			28-32	

PROGRAM TOTAL = 120-121 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 ST 420, ST 430, or upper-division mathematics courses except M 315 and those ending in -80 to -99.

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

⁹ 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.

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
COCC 150	College Composition (Composition Placement Exam)	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 151	C++ for Scientists and Engineers (M/M CC 124, M/M CC 126)	4	2D
OR			
CSCC 153	Java Programming (M/M CC 118 or M/M CC 121)	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	
<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
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	
<i>Select one of following:</i>			
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 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
<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*		9	
Upper-division computer science, mathematics, or statistics*		3	
Electives in computer science, mathematics, or statistics*		Var.	

PROGRAM TOTAL = 21 credits minimum without prerequisites

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.

*Additional course work may be required because of prerequisites.

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

Are you interested in the description and explanation of natural phenomena? Are you good in mathematics and hope to put it to a practical use? Would you like to help unlock secrets to life and existence? Do the what, when, how and why of heat, light, sound, gravity, windstorms, volcanoes and energy intrigue you? Would you like to design devices to aid communications, medicine, aerospace, resource conservation or environmental preservation? Do radioactive elements and particle physics fascinate you as matter is transformed to energy and energy to matter? If your response to any of these questions is “yes,” then you should consider a 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 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.

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)	3	2A
CSCC 151	C++ for Scientists and Engineers (M/M CC 124, M/M CC 126)	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 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
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 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 (PH/PHCC 142, M/M CC 161)	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 (PH/PHCC 141, M 340)	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 (PH/PHCC 142, M 261)	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 (PH 314, M 340)	3	4A, 4B
PH 492	Seminar	1	4C
	Electives	6	
	TOTAL	12	

PROGRAM TOTAL = 102 credits¹⁰

NOTE: Majors must achieve a minimum grade of C- in each specific course listed in the Core Program with prefixes PH, M, C, CO, CS, or JT. Majors must also achieve a minimum grade of C- in the biological science 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.

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

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
SENIOR			
PH 452	Introductory Quantum Mechanics II (PH 451) ¹	3	4B

PH 462	Statistical Physics (M 340, PH 314, PH 361) ¹	3	4B
	Technical electives ¹	12	
	TOTAL	18	

PROGRAM TOTAL = 120 credits

¹Majors 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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
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 (PH/PHCC 141, M 340)	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 (PH 314, M 340)	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

Are you interested in the workings of the human mind? Do you wish to understand human behavior? Do the processes of development, perception, learning, motivation and thinking intrigue you? Would you like to better understand how psychology relates to the physiological and social functioning of animals and humans? Do you wish to work as a counselor helping people to deal with difficult issues in their lives or to achieve personal goals? Are you interested in a major that qualifies you for a wide range of occupations?

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.

- Students can graduate with a combination of courses and experiences to qualify for semiprofessional jobs in psychological settings or closely related fields.
- 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 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)	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 (concurrent reg. in PY/PYCC 100)	2	1
S CC 100	General Sociology	3	3C, 3F
		TOTAL	30
SOPHOMORE			
			2-3
PY 250	Health and wellness ¹	4	3G
SPCC 200	Experimental Psychology (PY/PYCC 100)	3	2B1
			3
			3B
			3
			3E
			3
			3D
			3
			3C
			9
		TOTAL	30-31
JUNIOR			
AY 300/ PS 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	
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 (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 (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
<i>Psychology elective</i> ⁵			
			0-3
<i>Social/behavioral sciences</i> ⁶			
			3 3C
<i>Electives</i>			
			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 ²	3 3B
		Electives	9
		TOTAL	27

PROGRAM TOTAL = 120-121 credits

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

² Select from the list of courses in category 3B in the AUCC. Courses in multiple categories will not count for more than one requirement.

³ Select from the list of courses in category 3E in the AUCC. Courses in multiple categories will not count for more than one requirement.

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 PYCC 228, Psychology of Human Sexuality, will fulfill this elective category and AUCC category 3G, Health and Wellness.

⁶ 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.

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.

<u>Course</u>	<u>Title (Prerequisite)</u>	<u>Cr</u>	<u>AUCC</u>
Students in the biological and social sciences who are interested in applications of statistical methods should take ST 220 and STCC 301 (or STCC 307/EHCC 307 or STCC 311). Students in the physical sciences who are interested in applications of statistical methods should take ST 220 and STCC 309. Students interested in statistical theory should take ST 420 and ST 430.			
ST	220*	Elementary Probabilistic Modeling (knowledge of computer language)	2
OR			
ST	420*	Probability and Mathematical Statistics I (M/M CC 255 or M 261)	3
<i>Select one of the following courses:</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
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
<i>Select one of the following courses:</i>			
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	430	Probability and Mathematical Statistics II (ST 420)	3
ST	460	Applied Multivariate Analysis (ST 304)	3
Electives*			6-7
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 James L. Voss, Dean
Professor Carol D. Blair, Associate Dean
Professor Robert L. Jones, Associate Dean
Assistant Professor Sherry McConnell, Associate Dean
Professor Terry Nett, Associate Dean

UNDERGRADUATE MAJORS

Environmental Health
Microbiology

UNDERGRADUATE MINORS

Anatomy and Neurobiology
Microbiology

COLLEGE PROGRAMS

Biomedical Sciences Open Option
Doctor of Veterinary Medicine
Preprofessional Program in 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 degree 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 seven 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 curriculum. (Refer to the freshman/sophomore years in these programs for an example of a typical course of study that students would follow.)

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 in one year beyond the Open Option program.

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 Medical Examiners, 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 Anatomy and Neurobiology, Environmental Health, Microbiology, Pathology, Physiology, and Radiological Health Sciences.

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 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*. The full course of study requires a minimum of six years: at least two years in a preprofessional program, and, after acceptance, four years in the professional program.

Preprofessional Curriculum

Students may take their preprofessional training at any accredited institution; however, courses must be substantially equivalent in subject content and level to those required at Colorado State. Specific inquiries regarding equivalent or substitute courses should be directed to the Office of the Dean or to the Preveterinary Advising Office.

While Colorado State students in a degree program will take a higher number of credits, the minimum course requirements for admission to the professional 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.

Additional courses which are not required, but highly recommended are cell biology, developmental biology, microbiology, nutrition, and computer science. These courses will enhance the student's preparation for the professional program.

The preveterinary requirement is a minimum of 68 semester credits. Most students may find it beneficial to extend the requirements over a period of three years. Exceptional, highly motivated students may be able to complete all requirements within two years.

Specific courses offered at Colorado State which currently fulfill these requirements are listed in the following sample curriculum:

Course	Title (Prerequisite)	Cr	AUCC
FRESHMAN			
BY 103	Biology of Organisms-Animals and Plants (BY/LSCC 102)	4	
	OR		
BZCC 120	Principles of Plant Biology	4	3A
	<i>Select 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
	OR		
LSCC 102	Attributes of Living Systems (high school chemistry)	4	3A
	<i>Select from the following sets of courses:</i>		
C CC 107	Fundamentals of Chemistry (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 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)	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 (C 245 or C 343 or concurrent reg. in C 343)	4	
BZ 346	<i>Select one of the following courses:</i> 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 (BY 103 or BZ/BZCC 111)	3	
MB 450	Microbial Genetics (MB 300; BC 351 or BC 401 or concurrent reg.)	3	
SC 330	Principles of Genetics (BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	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 341	Organic Chemistry I (C 113)	3	
C 343	Organic Chemistry II (C 341)	3	
C 344	Organic Chemistry Laboratory (C 114; C 343 or concurrent reg.)	2	

PHCC 121	General Physics I (concurrent reg. in M/M CC 125)	5	3A
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STCC 301	Introduction to Statistical Methods (M/M CC 121)	3	2D
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OR

STCC 307/ EHCC 307	Introduction to Biostatistics (M/M CC 121)	3	2D
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	Additional communication ⁵	3	2B
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	Global and cultural awareness ⁶	3	3E
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	Health and wellness ⁷	2-3	3G
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	U.S. public values and institutions ⁸	3	3F
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	TOTAL	31-36	
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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 ANATOMY AND NEUROBIOLOGY

Office in Anatomy-Zoology Building, Room W 103
Professor L. Ray Whalen, Interim Chairman

The department offers undergraduate instruction in the neurosciences, anatomy of the human body, microscopic anatomy, cell structure, and mammalian anatomy and physiology. The department offers an undergraduate minor but no undergraduate major is offered.

Minor in Anatomy and Neurobiology

The minor in anatomy and neurobiology provides students with a useful complement to majors in biological science, zoology, health and exercise science, animal science, and other biomedical sciences. 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			
AY 230/ PS 230*	Animal Anatomy and Physiology (BY/LSCC 102, C/C CC 107)	3	
AND			
AY 231	Gross Anatomy of Domestic Animals (AY 230/PS 230 or concurrent reg.)	2	
OR			
AY 300/ PS 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	
AY 301	Human Gross Anatomy ¹ (AY 300/PS 300)	5	
OR			
AY 331	Histology ¹ (AY 230/PS 230 or AY 300/PS 300)	4	
AY 325	Cellular Neurobiology ¹ (AY 300/PS 300 or BY 310)	3	
OR			
AY 345	Functional Neuroanatomy ¹ (AY 300/PS 300)	4	
	TOTAL	11-14	

ELECTIVE COURSES

AY 200/ PS 200	Concepts in Human Anatomy and Physiology (concurrent reg. in AY 300/PS 300)	1	
AY 301	Human Gross Anatomy (AY 300/PS 300)	5	
AY 325	Cellular Neurobiology (AY 300/PS 300 or BY 310)	3	
AY 331	Histology (AY 230/PS 230 or AY 300/PS 300)	4	

AY	345	Functional Neuroanatomy (AY 300/PS 300)	4
AY	365	Nerve and Muscle-Toxins, Trauma, and Disease (AY 300/PS 300 or BY 310)	3
AY	384	Supervised College Teaching	Var.
AY	495	Independent Study	Var.
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 Anatomy

Graduate programs lead to the master of science and doctor of philosophy degrees in anatomy. 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 Anthony P. Knight, 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, 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 HEALTH

*Office in Environmental Health Building, Room 122
Professor John S. Reif, Head*

Major in Environmental Health

Do you like studying about how people interact with their environment? Would it be interesting to focus on maximizing people's health, comfort and productivity? Are you looking for the challenge of a science career? Would the study of communicable disease transmission, toxic chemical exposure, or air and water quality management interest you? If so, you may want to consider environmental health as a career.

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.

<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
COCC 150	College Composition (Composition Placement Exam)	3	2A
EHCC 110/ PSCC 110	Human Health and Environmental Perspective (high school biology)	3	3G
EH 220	Environmental Health (BC 103 or BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 104 or BZ/BZCC 110 or BZ/BZCC 120 or concurrent reg.)	3	
EH 230	Environmental Health Field Methods (EH 220, high school chemistry)	2	
KACC192	Key Academic Community Seminar (concurrent reg. in companion courses)	3	1
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 (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 307/ STCC 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

AY	300/	Principles of Human Anatomy and	4	
PS	300	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)		
C	341	Organic Chemistry I (C 113)	3	
C	343	Organic Chemistry II (C 341)	3	
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 (AY 300/PS 300, EH 230)	3	
EH	492	Environmental Health Seminar	1	
MB	300	General Microbiology (C 245 or C 341 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	
R	300	Introduction to Radiation Biology (BY/LSCC 102, PH/PHCC 121)	3	
TOTAL			28	

SENIOR

BC	351	Principles of Biochemistry (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	
EH	410	Environmental Health Waste Management (C 343, EH 230)	3	4B
EH	430	Human Disease and the Environment (EH 320, EH 446)	3	
EH	446	Environmental Toxicology (C 245 or C 343)	3	
EH	460	Environmental Health Program Management (EH 320, EH 350)	2	
EH	487V	Internship-Environmental Health	7	4C
		Program electives ⁶	2-7	
		Electives ⁷	0-5	
TOTAL			30	

PROGRAM TOTAL = 121 credits¹ 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 At least two courses must be related to major and approved by an EH key advisor.⁷ To complete the seven total elective credits for the program of study, select course(s) of interest.**Graduate Programs in Environmental Health**

The department offers the master of science and doctor of philosophy degrees in environmental health. Areas of emphasis include epidemiology, occupational health, and environmental toxicology. A description of these programs may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF MICROBIOLOGY

Office in Microbiology Building, Room B 116
Professor Ralph E. Smith, Interim Head

Major in Microbiology

Does unlocking life's secrets excite you? Do you wish to understand how microbes affect human health? Have you ever wondered how microorganisms can be used to clean up pollution and toxic wastes? Would you like to study the human immune system, or help develop vaccines against infectious disease? Does the possibility of finding life on other planets interest you? Do you wonder how microorganisms can be used to improve foods and beverages, develop new medicines, or enhance farm crops? If your answers are "yes," then a major in microbiology may be the choice for you.

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 your interests, the electives you take, and the minor you select, 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 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)	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	341	Organic Chemistry I (C 113)	3	
C	343	Organic Chemistry II (C 341)	3	
C	344	Organic Chemistry Laboratory (C 114; C 343 or concurrent reg.)	2	
MB	300	General Microbiology (C 245 or C 341 or concurrent reg.; BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	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
TOTAL			33	
JUNIOR				
<i>Select one of the following sets of courses:</i>				
BC	351	Principles of Biochemistry (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	
OR				
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	
BC	403	Comprehensive Biochemistry II (BC 401)	3	
BC	404	Comprehensive Biochemistry Laboratory (BC 401 or concurrent reg.; C 246 or C 344; NS 204)	2	

MB	351	Medical Microbiology (MB 342)	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
<hr/>				
		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 Microbiology Department 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.

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

MB	300*	General Microbiology (C 245 or C 341 or concurrent reg.; BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120)	3
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MB	302	General Microbiology Laboratory (MB 300 or concurrent reg.)	2
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MB	342	Immunology (MB 300)	4
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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>			
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MB	351	Medical Microbiology (MB 342)	3
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MB	420	Medical and Molecular Virology (MB 342; BC 351 or BC 401 or concurrent reg.)	4
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MB	443*	Microbial Physiology (MB 300; BC 351 or BC 401)	4
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MB	450*	Microbial Genetics (MB 300; BC 351 or BC 401 or concurrent reg.)	3
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Select four to six credits, including one laboratory course, from the following:

MB	275	Microcomputing Applications in Microbiology	2
MB	334	Food Microbiology (MB 301 or MB 302)	4
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
MB	450*	Microbial Genetics (MB 300; BC 351 or BC 401 or concurrent reg.)	3
MB	462/	Parasitology and Vector Biology (BY	5
BZ	462/	103 or BZ/BZCC 110; MB 301 or	
EN	462*	MB 302 or BZ 212)	
MB	498	Research (MB 301 or MB 302)	Var.

PROGRAM TOTAL = 21 credits without prerequisites

*Additional course work may be required because of prerequisites.

Graduate Programs in Microbiology

Programs leading to 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 PATHOLOGY

Office in Pathology Building, Room 110
Professor Edward A. Hoover, Interim Head

The instructional program of the Department of Pathology serves the veterinary medicine and the graduate biomedical curricula. Emphasis is placed on the causes and mechanisms of disease processes. No undergraduate major is offered.

Graduate Program in Pathology

A program leading to the doctor of philosophy degree is offered. A description of this program may be found in the *Graduate and Professional Bulletin*.

DEPARTMENT OF PHYSIOLOGY

Office in Physiology Building, Room 229
Professor Alan Tucker, Head

Instructional programs in the Department of Physiology serve a number of undergraduate majors, the veterinary medicine curriculum, and graduate students enrolled in a variety of disciplines on campus. No undergraduate major is offered.

Graduate Programs in Physiology

The department offers programs leading to M.S. and Ph.D. degrees. A description of these programs may be found in the *Graduate and Professional Bulletin*. Interested students are encouraged to contact the Department of Physiology for more information, including applications.

DEPARTMENT OF RADIOLOGICAL HEALTH SCIENCES

Office in Molecular and Radiological Biosciences Building, Room 308
Professor F. Ward Whicker, Head

No undergraduate major is offered by the department.

Graduate Programs in Radiological Health Sciences

Programs leading to 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*.

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
| | | |

+*FW 469 04(2-2-1). Conservation in Management of Large

5 6
| |

Mammals. F. Prerequisite: FW 360, ST/STCC 301 or ST/STCC 307 or EH/EHCC 307, BZ 330. Special fee, \$47. – 7

Ecology and management of large wild mammals with emphasis on North American Species both hunted and nonhunted.

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 2001 and alternate years thereafter.
- * Offered in 2002 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, *i.e.*, CO 150 is now COCC 150.

Adult Education AD
Aerospace Studies (Air Force ROTC) AS
Agricultural and Resource Economics EA
Agricultural Engineering (see Chemical and Bioresource Engineering) CB

Agriculture A
Agronomy (see Soil and Crop Sciences) SC
American Studies AU
Anatomy and Neurobiology AY
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 BY
Biomedical Engineering BE
Biotechnology BH
Botany/Zoology BZ
Business Accounting BA
Business Finance and Real Estate BF
Business General BG
Business Industrial Relations BP
Business Information Systems BD
Business Management BN
Business Management Science BQ
Business Marketing BK
Business Production and Operations Management BL
Cell and Molecular Biology CM
Chemical and Bioresource Engineering CB
Chemistry C
Civil Engineering CE
Clinical Sciences VS
Composition CO
Computer Science CS
Consumer and Family Studies CF
Consumer Sciences and Housing HC
Dance D
Design and Merchandising DM
Earth Resources ER
Ecology EY
Economics EC
Education ED
Electrical Engineering EE
Engineering EG
Engineering Science ES
English E
Entomology EN
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 Earth Resources)	ER
Graduate School	GS
Higher Education	HE
History	HY
Home Economics (see Consumer and Family Studies) ..	CF
Honors	HP
Horticulture	H
Housing and Consumer Sciences	HC
Human Development and Family Studies	HD
Human Services	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 Sciences	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 Exercise Science, Health and) ..	EX
Physics	PH
Physiology	PS
Plant Disease	PD
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
Weed Science	W
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. 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, Practicums; -87, Internships; -90, -91, Work-shops; -92, -93, Seminars; -94, -95, Independent Studies; -96, -97, Group Studies; -98, Research; and -99, Thesis or Dissertation.

6. PREREQUISITES

The class schedule for each term is the best source for determining current prerequisites.

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.

7. COURSE FEES

Certain courses carry a special fee which is assessed at the time a student registers for courses. Since the costs are determined annually, course fees may vary from the stated charge in this section. Refer to the class schedule each term to determine current fees.

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 in this section of the catalog.

AGRICULTURE COURSES

College of Agricultural Sciences

A CC 116/IECC 116 03(3-0-0). Plants and Civilizations. 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.

A CC 192 03(1-0-2). Orientation to Agricultural Systems. F.

Freshman inquiry course in agriculture. Information and skills necessary to succeed in majors in the agricultural sciences. Introduction to interdisciplinary systems thinking.

A 224/NR 224 03(2-0-1). Integrated Ranch Management I. F. Prerequisite: A/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 240A-B 02(0-2-1). Basic Agricultural Skills. F, S. Special fee, \$20 per subtopic.

Livestock and crop skill practices and their economic importance. Laboratory practice aimed at skills needed in successful enterprise production. A) Basic agricultural skills I. B) Basic agricultural skills II.

A 244A-E 02(1-2-0). Topics in Agricultural Mechanics. F, S, SS. Offered only off-campus.

A) Basic agricultural mechanics skills. B) Fundamental agricultural welding. C) Farm carpentry. D) Agricultural utility systems. E) Small gas engine repair and maintenance.

A CC 270/IECC 270A 03(3-0-0). World Interdependence-Population and Food. S. Credit not allowed for both A/A CC 270 and IE/IECC 270A.

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. Also offered online.

Scientific, technical, cultural, and social issues facing agriculture, and their interrelationships.

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. C) Communications. D) Project management. E) Spreadsheets. F) Presentation technology.

A 324/NR 324 03(2-0-1). Integrated Ranch Management II. S. Prerequisite: A 224/NR 224. Credit not allowed for both A 324 and NR 324.

Application of enterprise planning analysis for use in ranch resource management. Continued emphasis on interdisciplinary systems analysis.

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. Also offered as correspondence course.

Traditional and contemporary delivery systems of Cooperative Extension emphasizing structures of nonformal education.

A 387A-B Var [1-12]. Internship.

A) Agricultural extension education. B) General.

A 465 03. Pesticide Management. F, S, SS. Offered as correspondence course only.

Reasons for and safe correct pesticide use.

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.

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.

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.

A 475 03(3-0-0). Space Agricultural Science. S. Prerequisite: Combined total of 25 credits of basic and/or applied sciences.

Agricultural sciences in space applications, focusing on plant and animal growth in closed environments.

A 483/NR 483 02(0-2-1). U.S. Travel-Integrated Ranch Management. S. Prerequisite: A 324/NR 324. Credit not allowed for both A 483 and NR 483.

Evaluation of integrated ranch management decision alternatives in conjunction with professional resource managers.

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-E Var [1-12]. Group Study.

B) Agricultural ambassadors. C) Agricultural education. D) Agricultural extension education. E) General.

***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. Also offered as correspondence course.

Methods, techniques, and procedures in planning, implementation, and delivery of Cooperative Extension programs.

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 692 01(0-0-1). Seminar.****A 695 Var. Independent Study.****A 698 Var. Research.**

ASTRONOMY COURSES*Department of Physics**College of Natural Sciences*

AACC 100 03(3-0-0). Introduction to Astronomy. 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. 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.

^o301 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.

^o302 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/M CC 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.

Development, organization, and trends of domestic and foreign fashion industries.

AM 140 03(0-6-0). Apparel Design. F. Special fee, \$30.

Analysis and design of apparel including skill development in technical drawing and rendering using traditional media.

AM 141 04(2-4-0). Apparel Production I. S. Special fee, \$15.

Analysis of apparel and garment components in areas of pattern development, construction, and quality standards.

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 II. F. Prerequisite: AM 141. Special fee, \$15.

Production processes of sewn textile products, flat pattern, pattern grading, marker making, and writing specifications.

AMCC 250 03(3-0-0). Clothing, Adornment and Human Behavior. S.

Psychological, sociological and cultural factors influencing clothing and adornment.

AM 265 03(3-0-0). Product Evaluation. F.

Evaluation of products and distribution channels.

AM 270 03(3-0-0). Merchandising Processes. F, S, SS. Also offered as an on-line course.

Forecasting, planning, evaluating, and presenting merchandise lines to meet target market demands.

AM 290 Var. Workshop.

AM 321 03(3-0-0). Advanced Textiles. S. Prerequisite: C/C CC 104, 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. Special fee, \$35.

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 140, AR 135.

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. Special fee, \$35.

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 366 03(3-0-0). Merchandising Promotion. S. Prerequisite: AM 270 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. Prerequisite: AM 270 or DM 360/BK 360, BA 205.

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 446 03(1-4-0). Apparel Design and Production. F. Prerequisite: AM 240, AM 341. Special fee, \$15.

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 or PY/PYCC 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. Prerequisite: AM 270, AM 330, AM 366, AM 371, or written consent of instructor.

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 521 04(1-4-1). Advanced Textile Analysis. F. Prerequisite: AM 321.

Intensive investigation of selected fiber and fabric properties using standard testing procedures and analysis techniques.

***AM 525 03(1-2-1). Application of Textile Technology to Design.** S. Prerequisite: AM 321 or AM 421.

Advanced study of textile technology in apparel, merchandising and interior design; recent advances in the field.

***AM 530 03(3-0-0). International Trade in Textiles and Apparel.** F. Prerequisite: AM 270, DM 120.

Economic analysis of textile and apparel industries focusing on consumption and international trade.

***AM 550 04(4-0-0). Sociocultural Concepts of Clothing.** F. Prerequisite: AM 450.

Clothing as communication and projection of personality. Review of research.

AM 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.

AM 590A-B Var. Workshop.

A) Merchandising. B) Apparel.

AN 243A-B 02(0-4-0). Intermediate Equitation. F, S. Prerequisite: AN 143A-B or equivalent skills. Special fee, \$450 per subtopic.

Trail obstacles, caveletti control, basic dressage. A) Western. B) English.

+AN 245 03(2-2-0). Equine Evaluation. S. Special fee, \$10.

System development for analyzing a horse's conformation and its relationship to performance.

AN 250 03(1-4-0). Live Animal and Carcass Evaluation. F, S. Special fee, \$20.

Growth, development, and value-determining characteristics of market animals.

+AN 286 02(1-2-0). Livestock Practicums. Prerequisite: AN 100 or concurrent registration. Special fee, \$20.

Livestock breeds and terminology; classification of feedstuffs; livestock handling and care; basic animal management techniques, hands-on experience.

AN 300A-T. Topics in Animal Sciences. F, S. Prerequisite: AN 100. Credit not allowed for both AN 300B and EN 300.

A) Livestock handling 01(1-0-0). B) /EN 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). I) Zoo nutrition 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). O) Nutrient management of animal waste 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: AY 230/PS 230.

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. Special fee, \$100.

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: AN 286.

Understanding of nutrients and nutrient function required to support animal life through all physiological states.

AN 322 02(2-0-0). Basic Nutrition for Pets. SS. Also offered as correspondence course.

Nutrients, nutrient requirements, feeding practices, food sources and management for companion animals (dogs, cats, birds, fish, reptiles, etc.).

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. Special fee, \$450.

Practical training skills using a yearling or two year old: in-hand, restraint, ground driving, longeing, first rides, stable management.

ANIMAL SCIENCE COURSES

Department of Animal Sciences

College of Agricultural Sciences

AN 100 03(3-0-0). Animal Sciences. F, S.

Principles of growth, muscle biology, anatomy, endocrinology, genetics, behavior, health, and management applied to the production of livestock.

AN 143A-B 02(0-4-0). Elementary Equitation. F, S, SS. Special fee, \$350 per subtopic.

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. Special fee, \$350.

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 240 03(2-2-0). Equine Management. F.

Equine industry, breeds, selection, form to function, care and management, soundness, health, reproduction, feeding and facilities.

AN 341 03(0-6-0). Horse Training Laboratory II. S. Prerequisite: AN 340. Special fee, \$450.

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. Special fee, \$450 per subtopic.

Emphasis on individual work: A) Western. B) Dressage. C) Jumping. D) Training techniques.

AN 346 03(3-0-0). Equine Disease Management. F. Prerequisite: AY 230/PS 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. B) Special fee, \$50. C) Special fee, \$10.

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-B 02(2-0-0). Applied Animal Nutrition. F, S. Prerequisite: AN 320.

Digestive physiology and nutritional requirements. A) Ruminants. B) Nonruminants.

AN 422 03(3-0-0). Animal Metabolism. F. Prerequisite: C 245, C 246 or C 343, 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.

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. Special fee, \$25.

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). Systems Analysis in Animal Science. S. Prerequisite: AN 375.

Use of systems analysis and computers in multidisciplinary approach to solving of animal science and related problems.

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: PS 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/STCC 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 BC 301 or FN 350. Anatomical, biochemical, histological, and physical factors associated with transformation of muscle into meat.

AN 699 Var. Thesis.

°AN 710 03(2-2-0). Growth and Body Composition. SS. Prerequisite: PS 501.

Growth, development of animals; chemical composition; application to meat production and fatness. Techniques for in-vivo estimation.

°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. F, S. Human societies and their cultural settings; variation in beliefs, social customs, and technologies; human differences in anthropological terms.

APCC 101 03(1-0-2) Cultures of the World. F, S.

Interactive introduction to a broad variety of cultures using anthropological methods of investigation.

APCC 120 03(3-0-0). Human Origins and Variation. 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.

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. F, S, SS.

Origins of human society from the Stone Age to urban civilization using architecture, art, tools, and other material remains.

APCC 141 03(1-0-2) Humans in Prehistory.

Contemporary methods used by archaeologists; prehistoric human cultural developments world wide.

APCC 200 03(3-0-0). Cultures and the Global System. F, S.

Analyze diversity, cultural responses, and adaptations of smaller-scale societies to emerging global trends.

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 300 03(3-0-0). History of Anthropological Theory.** F.

Prerequisite: AP/APCC 100 or APCC 101 or AP/APCC 200; AP/APCC 140 and APCC 141 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 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). Peoples and Cultures of India.** F.

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. Prerequisite: AP/APCC 100. Credit not allowed for both

AP 318 and ET 318.

Analyze development of cultures of the American Southwest including migration, political incorporation, socioeconomic, and cultural development.

***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 in Society. F.

Major anthropological theories of religion 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.

^oAP 329 03(3-0-0). Cultural Change. F. Prerequisite:

AP/APCC 100.

Cultural change and evolution emphasizing colonial origins of underdevelopment.

***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.

^oAP 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.

Cultural variations based on 1) ethnicity, class, and gender identities; 2) colonial legacies; and 3) contemporary economic pressures.

AP 333 03(3-0-0). Food and Culture. F.

Foods and foodways around the world; social roles, religious taboos, traditional technologies, ethnicity, and cuisines.

AP 334 03(3-0-0) Comparative Narrative Traditions. S.

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 BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110.

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(3-0-0). Human Biological Variation.** S. Prerequisite: AP 150/APCC 120 or BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110.

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(3-0-0). Evolution of Human Adaptation. F. Prerequisite: AP/150/APCC 120 or BZ/BZCC 110 or BY/LSCC 102.

Unique characteristics of humans, including bipedalism, dentition, birth, and growth and development.

AP 412 03(3-0-0). Indians of North America. F, S.

Native American peoples, their origins, languages, and cultural variation across the continent.

AP 413 03(3-0-0). North American Indians Today. F, S.

Contemporary cultural and social issues of American Indians on reservations and in urban centers in the United States and Canada.

^oAP 414/^oET 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.

^oAP 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.

^oAP 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, AP/APCC 140.

Ecology of recent hunter-gatherers is reviewed as basis to develop and evaluate archaeological models of prehistoric foraging peoples.

^oAP 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 455 03(3-0-0). 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. Special fee, \$50 per credit.

Directed fieldwork in local archaeology, site survey, and excavation; recovery, preservation, cataloging, analysis of artifactual and skeletal materials.

^oAP 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 BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110.

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 03(1-0-2). Contemporary Issues in Anthropology. S. Prerequisite: Senior standing.

Linkage between anthropological subfields and how professional anthropologists approach issues..

AP 495 Var [1-3]. Independent Study.

AP 496 Var [1-3]. Group Study.

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 529A-B 03(0-0-3). Anthropology and Development. F. Prerequisite: Nine credits in anthropology or written consent of instructor.

A) Anthropology and development. B) Development and culture change.

°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 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 545 03(0-0-3). Method and Theory in Biological Anthropology. F. Prerequisite: Six credits in biological anthropology.

Method, theory in biological anthropology focusing on syntheses and interpretations of human biology, variation, adaptability and evolution.

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: Nine credits in anthropology 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 660 Var [2-10]. Field Archaeology. F, SS. Prerequisite: AP 460 or two seasons field experience. Special fee, \$50 per credit.

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. F, S, SS.

Exploration of the development of visual arts.

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. Special fee, \$11.

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. Special fee, \$30.

Human form as basis for self-expression through various drawing media.

AR 160 03(0-6-0). Foundations Painting. F, S. Special fee, \$7.

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. Special fee, \$12. 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. Special fee, \$30. 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. Special fee, \$30.

Drawing using models and various still life material.

AR 240 03(0-6-0). Pottery I. F, S, SS. Special fee, \$33. Prerequisite: AR 111, AR 136, AR 160, and AR 170.

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. Special fee, \$50.

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. Special fee, \$35. Prerequisite: AR 111, AR 136, AR 160, and AR 170.

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. Special fee, \$5.

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. Special fee, \$10.

Basic oil painting procedures, techniques, and concepts.

AR 265 03(0-6-0). Printmaking I-Intaglio and Relief. F, S. Prerequisite: AR 111, AR 136, AR 160, and AR 170. Special fee, \$55.

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. Special fee, \$35.

Introduction to sculptural techniques and concepts.

AR 295A-L Var [1-4]. Independent Study.

A) Painting. B) Printmaking. C) Sculpture. Special fee, \$12 per credit. D) Fibers. E) Metalsmithing and jewelry. Special fee, \$18.75 per credit. 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. Special fee, \$40.

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. Special fee, \$40.

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.** S.

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-B 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.

Exploration of studio techniques in Italy. A) Drawing. B) Photo image making.

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: ED 310/EDCC 275, admission to Teacher Licensure Program. Special fee, \$35.

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. Special fee, \$55.

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. Special fee, \$65.

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. Special fee, \$30.

Independent as well as common drawing experiences.

AR 336 03(0-6-0). Drawing Workshop III. F, S. Prerequisite: AR 335 or AR 365. Special fee, \$30.

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. Special fee, \$50.

Beginning wheel throwing; investigation of the expressive potential of throwing technique.

AR 341 04(0-8-0). Pottery III. S. Prerequisite: AR 340. Special fee, \$62.

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. Special fee, \$60.

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. Special fee, \$65.

Forging and enameling techniques on nonferrous and ferrous metals; stone setting.

AR 350 04(0-8-0). Fibers II. F. Prerequisite: AR 250. Special fee, \$70.

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. Special fee, \$50.

Studio work investigating expressive potential of fibers and fabric.

AR 355 04(0-8-0). Typography and Design Systems. F. Prerequisite: AR 255. Special fee, \$5.

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. Special fee, \$5.

Problems emphasizing media, experimental techniques, and compositions.

AR 360 04(0-8-0). Painting II. F. Prerequisite: AR 260. Special fee, \$15.

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. Special fee, \$35.

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. Special fee, \$65.

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. Special fee, \$65.

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. Special fee, \$60.

Additive, subtractive, and related techniques.

AR 371 04(0-8-0). Sculpture III. S. Prerequisite: AR 270. Special fee, \$65.

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. Special fee, \$40.

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. Special fee, \$45.

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. Special fee, \$45.

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. Special fee, \$30.

Further definition of philosophical and artistic direction.

AR 436 03(0-6-0). Drawing Workshop V. F, S. Prerequisite: AR 435. Special fee, \$30.

Capstone course leading to a unified body of finished drawings.

AR 440 04(0-8-0). Pottery IV. F. Prerequisite: AR 341. Special fee, \$62.

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. Special fee, \$62.

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. Special fee, \$60.

Chasing and repousse techniques in two- and three-dimension; inlay, engraving, and etching techniques.

AR 446 04(0-8-0). Metalsmithing and Jewelry V. F, S. Prerequisite: AR 445. Special fee, \$60.

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. Special fee, \$25.

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. Special fee, \$25.

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. Special fee, \$5.

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. Special fee, \$5.

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. Special fee, \$15.

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. Special fee, \$15.

Continuation in direction of individual creative expression.

AR 465 04(0-8-0). Printmaking IV-Studio Workshop. F, S. Prerequisite: AR 366. Special fee, \$65.

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. Special fee, \$65.

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. Special fee, \$55.

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. Special fee, \$55.

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. Special fee, \$17 per credit. C) Sculpture. Special fee, \$13 per credit. D) Fibers. Special variable (\$8-\$25) fee determined by department. E) Metalsmithing and jewelry. Special fee, \$18.75 per credit. F) Drawing. G) Graphic design. H) Art history. I) Art education. J) Pottery. Special fee, \$20 per credit. K) Photo image making. Special fee, \$5 per credit. L) Papermaking. Special fee, \$40.

AR 496A-L Var [1-4]. Group Study. Maximum of 8 credits allowed per subtopic.

A) Painting. B) Printmaking. Special fee, \$17 per credit. C) Sculpture. Special fee, \$13 per credit. D) Fibers. Special variable (\$8-\$25) fee determined by department. E) Metalsmithing and jewelry. Special fee, \$18.75 per credit. F) Drawing. G) Graphic design. H) Art history. I) Art education. J) Pottery. Special fee, \$20 per credit. K) Photo image making. Special fee, \$28. L) Papermaking. Special fee, \$40.

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.

A) Painting. B) Printmaking. Special fee, \$20 per credit. C) Sculpture. Special fee, \$13 per credit. D) Fibers. Special variable (\$8-\$25) fee determined by department. E) Metalsmithing and jewelry. Special fee, \$18.75 per credit. 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. Special fee, \$20 per credit. C) Sculpture. Special fee, \$13 per credit. D) Fibers. Special variable (\$8-\$25) fee determined by department. E) Metalsmithing and jewelry. Special fee, \$18.75 per credit. F) Drawing. G) Graphic design.

AR 684 Var. Supervised College Teaching. F, S, SS.

AR 695A-H Var. Independent Study.

A) Painting. B) Printmaking. Special fee, \$20 per credit. C) Sculpture. Special fee, \$13 per credit. D) Fibers. Special variable (\$8-\$25) fee determined by department. E) Metalsmithing and jewelry. Special fee, \$18.75 per credit. 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. Special fee, \$20 per credit. C) Sculpture. Special fee, \$13 per credit. D) Fibers. Special variable (\$8-\$25) fee determined by department. E) Metalsmithing and jewelry. Special fee, \$18.75 per credit. F) Drawing. G) Graphic design.

AEROSPACE STUDIES COURSES

Office of Provost/Academic Vice President

AS 101 01(1-2-0). Foundations of the Air Force I. F.

Air Force opportunities, benefits; emphasis on officership, customs, and communicative skills, group problem solving.

AS 102 01(1-2-0). Foundations of the Air Force II. S.

Organizational structure and missions of Air Force organizations; emphasis on leadership, military history, and communicative skills.

AS 201 01(1-2-0). 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(1-2-0). 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(2-2-0). Aerospace Studies. F, S.

Ground school instruction in principles of flight, weather, navigation, radio communications, flight planning, emergency procedures, FAA regulations.

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 150 02(2-0-0). Science of Weather and Climate. F, S.
Prerequisite: High school algebra; high school chemistry or physics.

Basic principles governing weather and climate. Contemporary topics including global warming, ozone hole, acid rain.

AT 151 01(0-3-0). Weather and Climate Laboratory. F, S.
Prerequisite: AT 150 or concurrent registration.

Practical methods used to analyze weather and climate data; specific meteorological events.

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.

AT440 02(2-0-0). Meteorology. F. Prerequisite: M/M CC 161 or M/M CC 255, PH/PHCC 122 or PH/PHCC 141.

Atmospheric processes; application to agriculture, engineering, and forestry.

AT 492 Var. Seminar.

AT 495 Var. Independent Study.

AT 540 02(0-6-0). Daily Weather Laboratory I. F. Corequisite: AT 440 or AT 601.

Synoptic analysis; cyclones, anticyclones, fronts, associated weather; long waves in the westerlies; upper troughs, ridges, basic currents; weather phenomena.

AT541 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.

AT605 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 02(2-0-0). Climatology. F. Prerequisite: ST/STCC 301.

Climatic controls; distribution, analysis of climatic parameters of surface and in atmosphere; climate classification; hydrologic cycle; 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 02(1-2-0). Meteorological Analysis and Forecasting. S. Prerequisite: AT 602, AT 620.

Analysis of formation, maintenance of synoptic weather systems. Application of basic dynamic, energetic principles to forecasting.

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.

***AT703 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.

***AT745 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 752 03(3-0-0). Weather Modification. S. Prerequisite: AT 621.

Physical basis, technology, potential, and consequences of intentional and inadvertent weather and climate modification.

***AT 753 03(3-0-0). Atmospheric Water Resources.** F. Prerequisite: AT 601.

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 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.

°AT772 02(2-0-0). Aerosol Chemistry. F. Prerequisite: C 114, M/M CC 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- 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. 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.

AMERICAN STUDIES COURSES

College of Liberal Arts

AUCC 200 03(3-0-0). Self/Community in American Culture, 1600-1877. F.

Meaning and development of American culture, 1600-1877, through themes of self and community, in art, politics, society, and religion.

AUCC 201 03(3-0-0). Self/Community in American Culture Since 1877. S.

Meaning and development of American culture, 1877-present, 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: AU/AUCC 200, AU/AUCC 201. 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; 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

Department of Anatomy and Neurobiology

College of Veterinary Medicine and Biomedical Sciences

AY 160 01(1-0-0). Issues in Veterinary Medicine. F.

Veterinary medicine from perspective of its history, current issues, and future directions.

AY 200/PS 200 01(0-0-1). Concepts in Human Anatomy and Physiology. F, S. Corequisite: AY 300/PS 300. Credit not allowed for both AY 200 and PS 200.

Basic concepts in the anatomy and physiology of the human body.

AY 230/PS 230 03(3-0-0). Animal Anatomy and Physiology. S. Prerequisite: BY/LSCC 102, C/C CC 107. Credit not allowed for both AY 230 and PS 230.

Comparative systemic anatomy and physiology of farm animals.

AY 231 02(1-2-0). Gross Anatomy of Domestic Animals. S. Prerequisite: AY 230/PS 230 or concurrent registration. Special fee, \$55.

Comparative gross anatomy of domestic animals.

AY 254/HD 254 03(3-0-0). Biological Aspects of Human Development. F, S. Prerequisite: BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110. Credit not allowed for both AY 254 and HD 254.

Human embryology, genetics, developmental processes resulting in birth defects, human physical development through the lifespan.

AY 300/PS 300 04(4-0-0). Principles of Human Anatomy and Physiology. F, S, SS. Prerequisite: 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. Credit not allowed for both AY 300 and PS 300.

Anatomy and physiology of humans.

AY 301 05(3-2-1). Human Gross Anatomy. F, S, SS. Prerequisite: AY 300/PS 300. Special fee, \$100.

Structure and function of the human body. Study of prosected human cadavers; clinical applications; living anatomy.

AY 325 03(3-0-0). Cellular Neurobiology. F. Prerequisite: AY 300/PS 300 or BY 310.

Cellular and molecular bases of nervous system function and behavior.

AY 331 04(3-2-0). Histology. F, S, SS. Prerequisite: AY230/PS 230 or AY 300/PS 300. Credit not allowed for both AY 331 and AY 500. Also offered as an on-line course.

Analysis of animal cells, tissues and organs emphasizing light microscopy.

AY 332 01(0-2-0). Microscopy. F, S, SS. Corequisite: AY 331.

Hands-on manipulation of glass slide utilizing microscopes with primary focus on animal histological structures.

AY 345 04(3-2-0). Functional Neuroanatomy. F. Prerequisite: AY 300/PS 300. Special fee, \$45.

Functional systems and circuits of the human brain and spinal cord.

AY 365 03(3-0-0). Nerve and Muscle-Toxins, Trauma, and Disease. S. Prerequisite: AY 300/PS 300 or BY 310.

Understanding cellular and molecular basis of nerve and muscle activities in health and disease.

AY 384 Var [1-5]. Supervised College Teaching. F, S, SS. Maximum of 10 credits allowed in course.

AY 401 03(3-0-0). Animal Cell Ultrastructure. S. Prerequisite: AY 300/PS 300; BY 310.

Ultrastructure and function of animal cells; emphasis on organelle structure and function in mammalian tissues.

AY 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.

AY 495 Var. Independent Study.

AY 500 04(3-3-0). Histology. F. Prerequisite: PS 500 or concurrent registration. Credit not allowed for both AY 500 and AY 331.

Analysis of animal cells, tissues and organs emphasizing light microscopy; reference to ultrastructural details.

AY 531 03(0-4-1). Domestic Animal Dissection. S. Prerequisite: AY 231.

Detailed dissection of domestic animals; special projects or specimens will be included as available.

AY 545 05(3-4-0). Human Neuroanatomy. S. Prerequisite: Written consent of instructor. Special fee, \$45.

Human central nervous system structure and function presented from a systems perspective.

AY 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.

AY 575 04(0-8-0). Human Anatomy Dissection. F, S. Prerequisite: AY 301 and written consent of instructor.

Regional approach to human gross anatomy through laboratory dissection of human cadaver.

AY 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.

AY 619 02(0-0-2). Advanced Human Gross Anatomy. F, S. Prerequisite: Written consent of instructor.

Advanced dissection of the human body; emphasis on clinical applications.

AY 631 01(0-0-1). Domestic Animal Anatomy-Case Discussions. S. Prerequisite: Concurrent registration in AY 531.

Clinical case discussions utilized in advanced understanding of domestic animal anatomy and physiology.

AY 650 01(0-3-0). Transmission EM Laboratory. S. Prerequisite: AY 550.

Operation of transmission electron microscope; preparation of samples; interpretation of images.

AY 652 01(0-3-0). Scanning EM Laboratory. S, SS. Prerequisite: AY 550.

Operation of scanning electron microscope; preparation of samples; interpretation of images.

AY 672A-B. Advanced Topics in Electron Microanalysis.

A) Freeze fracture 02(1-3-0). SS. Prerequisite: AY 650. B) X-ray microanalysis 01(0-3-0). SS. Prerequisite: AY 652.

AY 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.

AY 695A-F Var. Independent Study.

A) Developmental anatomy. B) Microscopic anatomy. C) Neuroanatomy. D) Radiographic anatomy. E) Surgical anatomy. F) Gross anatomy.

AY 696 Var [1-3]. Group Study in Neurosciences.

Current topics in neuroscience; how to evaluate scientific presentations.

AY 699 Var. Thesis.

AY 784 Var. Supervised College Teaching. F, S, SS.

AY 792 01(0-0-1). Graduate Student Seminar. Prerequisite: Admission to graduate program.

Research seminars presented by M.S. and Ph.D. students.

AY 799 Var. Dissertation.

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). Accounting Information Systems I. 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(3-0-0). Accounting Information Systems II. F, S, SS. Prerequisite: BA 205 or BA 210.

Use of accounting information in decision making focusing on issues involving economic resources, debt, and equity capital.

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 220. 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.

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 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). Tax and Accounting Issues for Entrepreneurs.

S. Prerequisite: BA 220.

Accounting and taxation issues relevant to start-up and operation of small business enterprises.

BA 441 03(3-0-0). Auditing Practices. F. Prerequisite: BA 421.

Environment, professional standards, and practices involved in auditing financial statements and performance of other assurance services.

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 541 03(3-0-0). Contemporary Auditing. S. Prerequisite: BA 441.

Seminar exploring various facets of the assurance services environment.

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.

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.

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 621 03(3-0-0). Advanced Accounting Information Systems. F.

Prerequisite: BA 350, BA 421.

Resources available and hands-on experience with the ERP Documentation.

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 I. F. Prerequisite: BA 220.

Federal income tax principles pertaining to formation and operation of corporate entities.

BA 633 03(3-0-0). Flow-Through Entities. S. Prerequisite: BA 220.

Federal income tax principles and problems pertaining to flow-through entities.

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.

BA 642 03(3-0-0). International Accounting. SS. Prerequisite: BA 220.

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.****BA 699 Var. Thesis.**

BIOCHEMISTRY AND MOLECULAR BIOLOGY COURSES

Department of Biochemistry and Molecular Biology

College of Natural Sciences

BC 103 03(3-0-0). Cells, Genes, and Molecules. F. Prerequisite: High school chemistry and biology. Intended for nonscience majors.

Cellular/molecular biology and its societal implications.

BCCC192 02(1-0-1). Biochemistry Freshman Seminar. F

Introduction to curriculum and career options for biochemistry majors.

BC 293 01(0-0-1). Seminar. Prerequisite: BCCC 192 or written consent of instructor.

BC 301 03(3-0-0). Survey of Biochemistry. F, S, SS. Prerequisite: C 245.

Introduction to chemical processes of living systems emphasizing structure and function of biological molecules.

BC 351 04(4-0-0). Principles of Biochemistry. F, S, SS. Prerequisite: C 245 or C 343 or concurrent registration in C 343. 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 301 or 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 343 or concurrent registration in C 343; 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; NS 204.

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 461A-E 03(3-0-0). Special Topics in Biochemistry. F, S. Prerequisite: BC 351 or BC 403 or concurrent registration.

A) Biochemistry of disease. B) Biochemical toxicology. C) Biochemistry of nerves. E) Protein chemistry.

BC 463 03(3-0-0). Molecular Genetics. F. Prerequisite: NS 201; BC 401 or concurrent registration or BC 351. 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: NS 202; 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 519 03(3-0-0). Cellular Biochemistry. F. Prerequisite: BC 351 or BC 403; BY 310.

Cellular response to environment including mechanisms of membrane signal transduction, motility, organelle biogenesis, and proliferation.

BC 561 03(3-0-0). Biomolecular Spectroscopy. F. Prerequisite: BC 403.

Spectroscopic methods and their application to proteins and nucleic acids.

BC 563 04(3-0-1). Molecular Genetics. F. Prerequisite: NS 201 and BC 401 or concurrent registration. 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: NS 202; BC 403 or concurrent registration. 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 Educational Outreach.

Biochemical and molecular biological foundations of molecular genetics/genetic engineering; molecular analysis of genes.

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-B 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.

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 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.

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: CS/CSCC 153.

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. Also offered as an on-line course.

End user applications in a Graphical User Interface environment including spreadsheet, word processing, and presentation graphics; Internet concepts.

BD 320 03(3-0-0). Project Management for Information Systems. F, S. Prerequisite: BD 240 with grade of C or better.

Project management concepts including work breakdown structure, estimating, scheduling, tools, and reports.

BD 340 03(3-0-0). Visual Application Development. F. Prerequisite: BD 240 with grade of C or better.

Software engineering of business computer programs using GUIs, event-driven techniques, object-oriented techniques, and Web-based languages.

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 240 with grade of C (2.00) or better.

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 240 with a grade of C (2.00) or better.

Physical and logical design, implementation, and administration of databases.

BD 360 03(3-0-0). Systems Analysis and Design. F, S. Prerequisite: BD 240 with grade of C (2.00) or better.

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 460 03(3-0-0). Object-Oriented Systems. F. Prerequisite: BD 355, BD 360.

Object-oriented concepts, development methodologies, techniques, and languages.

BD 462 02(2-0-0). 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 02(0-6-0). 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 565/BL 565 03(2-3-0). Enterprise Computing and Systems Integration. F. Prerequisite: Admission to M.S. program. Credit not allowed for both BD 565 and BL 565.

Business issues of systems integration, implementation issues, business process re-engineering, metrics, and accountability.

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 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: AY 300/PS 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: AY 300/PS 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 586A-B. Biomedical Clinical Practicum. F, S, SS. Prerequisite: ME 570; AY 300/PS 300 or PS 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 Institutions and Derivatives. F. Prerequisite: BF 311.

Management of financial institutions with applications of derivative securities; valuation and modeling of derivatives.

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. S.

Overview of financial instruments, markets, and institutions emphasizing fixed income securities.

BF 655 03(3-0-0). Investments. F.

Investment analysis and decision making emphasizing equity securities and portfolio management.

BF 660 03(3-0-0). Real Estate Investments. F.

Broad survey of real estate investment and development in our economy.

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. F.

Analysis of the foreign exchange market and international financial markets emphasizing international financial management.

BF 678 03(3-0-0). Financial Decisions-Theory and Practice. S. Prerequisite: BF 600.

Analysis of theory of corporate finance with emphasis on underlying assumptions and implications for financial decisions.

BF 695 Var. Independent Study.

BF 696 Var. Group Study.

BF 699 Var. Thesis.

BUSINESS GENERAL COURSES

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. F, S, SS.

Development of university survival skills, as well as critical thinking skills, with emphasis on business applications.

BG 200 04(2-0-2). 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. 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.

BG 235 02(2-0-0). Inquiry Into Capitalism. F.

History and writings in development of capitalistic system.

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 295 Var. Independent Study.

BG 350 03(3-0-0). Travel Abroad-International Comparative Management. SS. Prerequisite: Six credits of business courses.

Travel tour of European business to compare and contrast their business strategies to those of U.S. firms.

BG 425 03(3-0-0). Starting and Managing Your Own Business. F. Prerequisite: Written consent of instructor.

Business aspects of starting and managing your own small enterprise.

BG 430 03(3-0-0). Business and Its Environment. F, S.

Social responsiveness of managers as they face expectations in the firm's internal and external environment.

BG 479 03(3-0-0). Business Policy and Administration. F, S, SS. Prerequisite: BN 301; BF 300 or BF 305; BK 300 or BK 305; BN 320 or BN 305.

An integration of various business subject areas in terms of top-level policy and decision making.

BG 495 Var. Independent Study.

BG 605 03(3-0-0). Managerial Economics. S. Prerequisite: EC/ECCC 202, M/M CC 141, BQ 270.

Economic analysis of management decision making involving productivity, cost, demand, price, profit, and volume.

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). Management, Leadership, and Team Dynamics. F, S. Prerequisite: Admission to M.B.A. program.

Knowledge and skills related to management function, leadership in business organizations, and intra and interteam relationships.

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.

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 I. F, S. Prerequisite: Admission to M.B.A. program.

Social, ethical, and global issues relevant to business decision making.

BG 661 02(2-0-0). Social and Regulatory Issues in Business II. F, S. Prerequisite: BG 660 or concurrent registration.

Dispute resolution, employment relations, workplace safety, and consumer protection.

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 675 03(3-0-0). International Business. S. Prerequisite: Nine credits of business and/or economics.

Managerial requirements for understanding and conducting multinational business operations.

BG 678 03(3-0-0). Business Research. F. Prerequisite: BQ 270.

Techniques for designing, conducting, and evaluating business research.

BG 695 Var. Independent Study.

BG 699 Var. Thesis.

BIOTECHNOLOGY COURSES

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

BI 200 03(3-0-0). Principles of Plant Health. S.

Major factors influencing the health of plants and the role of plant health in global affairs.

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 365 04(3-3-0). Integrated Tree Health Management. F. Prerequisite: BY/LSCC 102 or BZ/BZCC 120. Special fee, \$6.

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-F 01(0-3-0). Plant Health Practica. F, S. Prerequisite: Two courses in plant pathology, weed science, or entomology.

Application of plant health principles to: A) Vegetable and field plants. B) Greenhouse and foliar plants C) Woody plants. D) Turf plants. E) Household and structural. F) Pest management techniques and safety issues.

BI 450 03(3-0-0). Advanced Topics in Plant Health. F. Prerequisite: Senior standing or written consent of instructor.

Integrated principles of plant health including plant growth, diseases, responses to stress, and traditional and biotechnological health management.

BI 451 03(3-0-0). Integrated Pest Management. S. Prerequisite: EN 302 or PD 361 or W 308 or 10 credits of biology.

Concepts of integrated pest management and the strategies and tactics employed in the application of these concepts.

BI 460 01(0-2-0). Plant Health Capstone. S. Prerequisite: Senior standing.

Collaboration on case studies based on faculty field experiences.

BI 487 Var. Internship.

BI 492 Var [1-3]. Seminar.

BI 495 Var [1-3]. Independent Study.

BI 496 Var [1-3]. Group Study.

^oBI 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 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.

^oBI 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 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 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 796 Var [1-3]. Group Study.

BI 798 Var. Research.

BI 799 Var. Dissertation.

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. Also offered as an online course.

Retail markets, institutions, operations, and problems.

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 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, BK 440.

Marketing decisions involving integration of elements of the marketing mix.

BK 487 Var. Internship. Prerequisite: Marketing majors with written consent of instructor. Maximum of 6 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.

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 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 635 03(3-0-0). Managing Business Customer Relationships. F.

Market analysis, planning, and decision making in marketing to business, governments, and other organizations.

BK 640/BL 640 02(2-0-0). Supply Chain Management Strategies.

F. Prerequisite: BL 600. Credit not allowed for both BK 640 and BL 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.

BK 696 Var. Group Study.

BK 699 Var. Thesis.

BUSINESS PRODUCTION AND OPERATIONS MANAGEMENT COURSES

Department of Management

College of Business

BL 487 Var. Internship.

BL 495 Var. Independent Study.

BL 565/BD 565 03(2-3-0). Enterprise Computing and Systems Integration. F. Prerequisite: Admission to M.S. program. Credit not allowed for both BL 565 and BD 565.

Business issues of systems integration, implementation issues, business process reengineering, metrics, and accountability.

BL 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.

BL 640/BK 640 02(2-0-0). Supply Chain Management Strategies.

F. Prerequisite: BL 600. Credit not allowed for both BL 640 and BK 640.

How to create an effective supply chain management system to establish an efficient network for supplying final consumption.

BL 695 Var. Independent Study.

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 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 608 03(3-0-0). Project Management. F. Prerequisite: Admission to graduate degree program.

Project management using quantitative and computer-based tools.

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 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 INDUSTRIAL RELATIONS COURSES

Department of Management

College of Business

BP 350 03(3-0-0). Employment Law and Policy. F.

Legal principle and policy issues arising from the employment relationship.

BP 487 Var. Internship.

BP 495 Var. Independent Study.

BP 600 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.

BP 671 03(3-0-0). Labor Management Relations. S.

Collective bargaining process, administration of contract, and impact of public policy on industrial relations.

BP 695 Var. Independent Study.

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.

BIOLOGICAL SCIENCE COURSES

College of Natural Sciences

BY 103 04(3-2-0). Biology of Organisms-Animals and Plants. F, S, SS. Prerequisite: BY/LSCC 102. Special fee, \$5.

Diversity of animals and plants; their structural and functional characteristics.

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. Credit not allowed for both BY 220 and BY 320. Also offered as on-line course. Interrelationships among organisms and their environments.

+BY 221 01(0-3-0). Introductory Ecology Field Laboratory. F, S. Prerequisite: BY 220 or concurrent registration. Special fee, \$25. 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.

BZCC 101 03(3-0-0). Humans and Other Animals. F, S, SS. Credit not allowed for students who have already taken BY/LSCC 102 or BY 103 or BZ/BZCC 110. Characteristics of animals, their evolution and diversity; humans considered as an animal.

BZCC 104 03(3-0-0). Basic Concepts of Plant Life. F, S, SS. For nonscience and physical science majors. Credit not allowed for students who have already taken BY/LSCC 102 or BY 103 or BZ/BZCC 120. Broad concepts of biology with major emphasis on plant life.

BZCC 105 01(0-2-0). Basic Concepts of Plant Life Laboratory. F, S, SS. Prerequisite: BZ/BZCC 104 or concurrent registration. Special fee, \$5. Modern biology exercises including viruses, Monera, Protista, fungi, plants, genetics, physiology, and ecology.

BZCC 110 03(3-0-0). Principles of Animal Biology. F, S, SS. General features (body form, physiology, life history, ecology) and evolutionary relationships of major phyla of animals.

BZCC 111 01(0-2-0). Animal Biology Laboratory. 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(3-2-0). Principles of Plant Biology. F, S. Special fee, \$5. Diversity of relationships of plants and their structural and functional characteristics.

BZCC 192 02(0-0-2) First-Year Seminar in Life Sciences. 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: BY 103 or BZ/BZCC 111. Special fee, \$15. General biology of invertebrates; their characteristics, classification, and adaptations.

+BZ 214 04(3-3-0). Animal Biology-Vertebrates. F. Prerequisite: BY 103 or BZ/BZCC 111. Special fee, \$9. General biology of vertebrates; their characteristics, classification, and adaptations.

BZ 220 03(3-0-0). Introduction to Evolution. F, S. Prerequisite: BY 103 or BZ/BZCC 110 and BZ/BZCC 111 or BZ/BZCC 120. Fundamental concepts in evolutionary biology.

BZ 223 03(2-2-0). Plant Identification. F, S. Prerequisite: BY 103 or BZ/BZCC 120. Relationships and identification of flowering plants.

BZ 250 03(3-0-0). Economic Biology. F. Prerequisite: BY 103; or BZ/BZCC 110, BZ/BZCC 120. Plants and animals of economic importance to mankind.

BZ 300 03(3-0-0). Animal Behavior. F. Prerequisite: BY 103 or BZ/BZCC 111. 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. Special fee, \$15. Laboratory experiments in animal behavior; demonstrations and independent investigations.

^oBZ 302 03(2-2-0). Poisonous Plants. F. Prerequisite: BY 103 or BZ/BZCC 120. Identification and toxic properties of certain plants; animal reactions to more important ones.

BZ 310/PS 310 03(3-0-0). Fundamentals of Physiology. S. Prerequisite: BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110; C 245 or concurrent registration. Credit not allowed for both BZ 310 and PS 310. Basic mechanisms of physiology: comparative and quantitative.

^oBZ 315 03(2-0-1). Marine Ecology. F. Prerequisite: BY 103 or BZ/BZCC 111 and BZ/BZCC 120, 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: BY 103 or BZ/BZCC 120.

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: BY 103 or BZ/BZCC 111.

Evolution, classification, and biology of mammals; practice in identifying and preparing specimens.

BZ 331 04(2-4-0). Plant Anatomy. F. Prerequisite: BY 103 or BZ/BZCC 120.

Structure of plant cells, tissues, and organs.

***BZ332 04(3-2-0). Introductory Phycology.** F. Prerequisite: BY/LSCC 102 or BY 103 or BZ/BZCC 120.

Morphology, ultrastructure, physiology, ecology, and phylogeny of freshwater and marine algae.

BZ 333 04(2-4-0). Introductory Mycology. F. Prerequisite: BY 103 or BZ/BZCC 120 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: BY 103 or BZ/BZCC 111. Special fee, \$7.

Biology of birds, especially behavior, ecology, and identification in the laboratory and field.

***BZ338 04(2-4-0). Comparative Morphology of Vascular Plants.** S. Prerequisite: BY 103 or BZ/BZCC 120.

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 355 03(3-0-0). Ecology of Landscapes. S. Prerequisite: Three credits of biology.

Principles and techniques necessary to describe and interpret natural and man-modified landscapes.

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: BY 103 or BZ/BZCC 111.

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 405 03(3-0-0). Fish Physiology.** S. Prerequisite: BY 103, C 113, PH/PHCC 110.

Physiology of jawless, cartilaginous, and bony fishes, with emphasis on maintaining homeostasis of the internal environment.

BZ 421 03(1-4-0). Grass Systematics. S. Prerequisite: BZ 223 or BZ 325 or written consent of instructor.

Systematic relationships and identification of grasses and grass-like plants.

***BZ 424/EN 424 03(3-0-0). Principles of Systematic Zoology.** S. Prerequisite: BY 103 or BZ/BZCC 111. Credit not allowed for both BZ 424 and EN 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 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. F, S. Prerequisite: BY 103 or BZ/BZCC 120; C 245 or concurrent registration.

Functions and activities of plants.

BZ 441 02(0-2-1). Plant Physiology Laboratory. F, 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 446 02(2-0-0). Physiology of Seeds.** F. Prerequisite: BZ 440.

Effects of environmental factors on germination, dormancy, and longevity of seeds.

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: BY 103 or BZ/BZCC 111.

Human heredity and its individual and social implications; causes of congenital defects.

BZ 462/MB 462/EN 462 05(3-4-0). Parasitology and Vector Biology. F. Prerequisite: BY 103 or BZ/BZCC 110; MB 301 or MB 302 or BZ 212. Credit allowed for only one of the following: BZ 462, MB 462, EN 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: BY 103 or BZ/BZCC 111.

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. Special fee, \$13.

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. Special fee, \$13.

Biology, chemistry, and physics of lakes including limnological methods.

+BZ 475 04(2-3-1). Advanced Ecology. F. Prerequisite: BY 220. Special fee, \$15.

Current theory in populations and community ecology; emphasis on field techniques and independent projects.

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: BY 103 or BZ/BZCC 111, BZ/BZCC 120. Special fee, \$125.

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-E Var [1-3]. Seminar.

A) Behavior. B) Ecology. C) Genetics. D) Ornithology. E) Herpetology.

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 and department chair.

Supervised lab or field research in biology, botany, or zoology.

***BZ 505 03(2-3-0). Ecology of Parasitism.** S. Prerequisite: BZ 462/EN 462/MB 462.

Host, parasite, and environment as interacting systems.

BZ 507 03(2-3-0). Parasitic Protozoa. S. Prerequisite: BZ 462/EN 462/MB 462.

Protozoa as disease agents: classification, identification, transmission, and host-parasite relations.

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 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: BY 103 or BZ/BZCC 111; 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 536 03(3-0-0). Cellular Basis of Behavior. F. Prerequisite: AY 300/PS 300, BZ 300; or written consent of instructor.

Exploration of how nerve cells produce behavior in multi-cellular animals.

***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 550 03(2-2-0). Research Methods in Plant Ecology. S. Prerequisite: BZ 450.

Quantitative analysis of plant communities.

***BZ 551 03(3-0-0). Plant Geography.** S. Prerequisite: BZ 450.

Floristic and ecological principles of plant geography.

***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/EN 562 05(1-8-0). Field Ecology of Disease Vectors. S. Prerequisite: BZ 462/MB 462/EN 462 or MB 300; EN 302. Credit allowed for only one of the following: BZ 562, MB 562, EN 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: BY 103 or BZ/BZCC 120.

Environmental cleanup using plants.

BZ 576 03(2-2-0). Biophysical Ecology. S. Prerequisite: BZ 450 or BZ 475; 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. Special fee, \$50.

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 587 Var [1-6]. Internship.

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 684 Var. Supervised College Teaching. F, S.

BZ 692A-F Var [1-3]. Seminar.

A) Behavior. B) Development. C) Ecology. D) Genetics. E) Ornithology. F) Limnology.

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 794 Var. Independent Study.

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. 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. 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. F, S, SS. Prerequisite: 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.

C CC 108 01(0-3-0). Fundamentals of Chemistry Laboratory. 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. F, S, SS. Prerequisite: 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.

C CC 112 01(0-3-0). General Chemistry Laboratory I. 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(0-0-2). Introductory Seminar in Chemistry. 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 not allowed for both C 245 and C 341. 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. Special fee, \$20.

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, S. 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, S. Prerequisite: C 114; C 331 or concurrent registration. Special fee, \$20.

Laboratory applications of principles presented in C 331.

C 334 01(0-3-0). Quantitative Analysis Laboratory. F, S. Prerequisite: C 114; C 331 or concurrent registration. Special fee, \$20.

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.

Modern and classical applications and methods in analytical chemistry including statistical, kinetic, spectroscopic, and chromatographic analysis.

C 341 03(3-0-0). Organic Chemistry I. F, S. Prerequisite: C 113. Intended for science majors. Students should plan to complete the sequence C 341, C 343, and C 344. Credit not allowed for both C 341 and C 245.

Structure, nomenclature, dynamics, spectroscopy, reactions of organic molecules.

C 343 03(3-0-0). Organic Chemistry II. F, S. Prerequisite: C 341.

Continue studies of reactions and mechanisms of organic molecules.

C 344 02(0-6-0). Organic Chemistry Laboratory. F, S. Prerequisite: C 114; C 343 or concurrent registration. Credit not allowed for both C 344 and C 246. Special fee, \$20.

Laboratory applications of principles presented in C 341/C 343.

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 476 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 343, C 344. Special fee, \$20.

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). Fundamentals of Physical Chemistry. F. Prerequisite: C 113; M/M CC 161 or M/M CC 255; PH/PHCC 122 or PH/PHCC 142. Credit not allowed for both C 471 and C 474.

Thermodynamics; electrolyte solutions; transport phenomena; kinetics, quantum theory, molecular structure, spectroscopy, statistical thermodynamics.

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. F, S. Prerequisite: C 471 or C 474; and C 332 or C 334 or CB 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 476.

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 343, 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 343, 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 343.

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 343.

Descriptive and mechanistic organometallic chemistry applied to homogeneous catalysis and organic synthesis.

C 561 03(3-0-0). Advanced Inorganic Chemistry. F. 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.

Chemical bonding models; basis set expansion approach; origins of perturbation methods; electron correlation.

C 571 03(3-0-0). Advanced Physical Chemistry. F. Prerequisite: C 476.

Quantum chemistry: simple systems, symmetry, approximation methods, molecular structure. Statistical mechanics: molecular thermodynamics, absolute rate theory.

***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 471.

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. D) Physical chemistry. [C 651C chgd to C 641]

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 771 03(3-0-0). Quantum Mechanics I-Chemical Bonding. S. Prerequisite: C 571.

Principles; Hartree-Fock approach; Roothaan's equations; molecular orbital methods; approximation techniques.

***C 773 03(3-0-0). Quantum Mechanics II-Spectroscopy.** S. Prerequisite: C 571.

Time-dependent perturbation theory; selection rules; vibrational, rotational, and electronic spectroscopy; magnetic resonance.

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 798 Var. Research.

Proposal preparation outlining an original research idea.

C 799 Var [1-15]. Dissertation.

CHEMICAL AND BIORESOURCE ENGINEERING COURSES

Department of Chemical and Bioresource Engineering

College of Engineering

CBCC 104 03(2-2-0). Strategies of Engineering Problem Solving. S. Prerequisite: CB 103/CBCC 192.

Engineering approach to problem solving, computer program-ming, term project.

CBCC 192 03(2-2-0). Strategies of Engineering Design. Special fee, \$12.

Engineering design and problem solving, measurements, calculations, and statistics; team projects; technical presentation skills.

CB 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.

CB 202 03(3-0-0). Thermodynamic Process Analysis. S. Prerequisite: CB 201.

Thermodynamic fundamentals and applications to ideal and non-ideal mixtures, power cycles, and chemical equilibria.

CB 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 CB 204 and EV 204.

Measurement techniques for analysis and design of agricultural and environmental systems based on engineering principles.

CB 330 03(3-0-0). Process Simulation. F. Prerequisite: CB 202, concurrent registration in M 340.

Analysis of chemical engineering problems by numerical simulation.

CB 331 03(3-0-0). Momentum Transfer and Mechanical Separations. F. Prerequisite: CB 201, M 340; CB 202 or ME 237.

Fluid properties; conservation equations; compressible and incompressible flow; pumping and metering; mixing; separation of fluid-solid mixtures.

CB 332 03(3-0-0). Heat Transfer and Thermal Separations. F. Prerequisite: M 340; CB 331 or CE 300 or concurrent registration.

Conservation of energy; thermal processes; steady and unsteady conduction; convective heat transfer; radiation; heat exchange equipment design.

CB 333 02(0-6-0). Momentum and Heat Transfer Laboratory. S. Prerequisite: CB 332.

Momentum and heat transfer experimentation; rheology, heat exchangers, steam condensation, drying.

CB 341 04(4-0-0). Equilibrium-Staged Separations. S. Prerequisite: CB 202 or ME 237; one course in physical chemistry.

Thermodynamics of phase equilibrium; distillation; absorption and stripping; washing and extraction; energy conservation; process economics.

CB 360/SC 360 03(2-2-0). Geographic Information Systems in Agriculture. F. Prerequisite: CS 110. Credit not allowed for both CB 360 and SC 360.

Introduction to geographic information systems and global positioning systems with applications to agriculture.

CB 405 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.

CB 406 03(3-0-0). Introduction to Transport Phenomena. F. Prerequisite: C 474, CB 332.

Fundamental treatment of momentum and mass transport processes; dimensional analysis for parameter identification and order of magnitude estimation.

CB 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.

CB 430 04(3-2-0). Process Control and Instrumentation. S. Prerequisite: CB 332, CB 341, CB 420.

Measurement and control of process variables; transient behavior of chemical processes; feedback, feedforward, and computer control concepts.

CB 439/CE 439 03(2-3-0). Environmental Engineering Chemical Concepts. F. Prerequisite: C 113, M 340. Credit not allowed for both CB 439 and CE 439.

Application of chemical principles to environmental engineering problems.

CB 442/EV 442 03(3-0-0). Rate-Controlled Separations. F. Prerequisite: CB 331 or CE 300; M 340; one course in physical chemistry. Credit not allowed for both CB 442 and EV 442.

Diffusion; convective mass transfer; packed tower operations; electrophoretic and membrane separations; selection and sequencing of separations.

CB 443/EV 443 02(0-6-0). Mass Transfer and Separation Laboratory. F. Prerequisite: CB 341 or CB 442/EV 442 or concurrent registration. Credit not allowed for both CB 443 and EV 443.

Mass transfer experimentation: evaporation, distillation, solvent extraction, ion exchange, gas absorption, humidification.

CB 451 03(3-0-0). Chemical Engineering Design I. F. CB 341, CB 420, CB 442/EV 442 or concurrent registration.

Process synthesis and simulation; engineering economics principles.

CB 452 03(2-2-0). Chemical Engineering Design II. S. Prerequisite: CB 451.

Design projects requiring students to complete a process design with cost estimation; technical progress and final reports.

CB 460 03(3-0-0). Engineering Law and Ethics. S. Prerequisite: CO/COCC 150.

Legal system as it applies to engineers, managers, and consultants including professional registration, liability, and ethics.

CB 462 03(3-0-0). Environmental Law. F, S. Prerequisite: CO/COCC 150.

Laws and regulations governing air, surface, and groundwater quality, solid, hazardous, and toxic wastes.

CB 464 04(3-3-0). Soil and Water Engineering. S. Prerequisite: CB 331 or CE 300 or SC 240.

Control of the soil-water-plant medium for optimum plant growth and environmental protection.

CB 466/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 CB 466 and ME 440.

Power sources, transmissions, wheels, tracks, and human factors for off-highway vehicles, tillage, and earthmoving machinery.

CB 470 01(0-0-1). Engineering Design I. S. Prerequisite: CB 201 or CB 204/EV 204.

Selection of engineering design project; development of project proposal.

CB 471 03(2-2-0). Engineering Design II. F. Prerequisite: CB 470.

Engineering project requiring each student to work on an individual basis with adviser; technical progress reports, final project report.

CB 493 01(0-0-1). Seminar.

CB 495A-B Var. Independent Study.

A) Chemical engineering. B) Agricultural and bioresource engineering.

CB 496A-B Var. Group Study.

A) Chemical engineering. B) Agricultural and bioresource engineering.

CB 501 03(3-0-0). Chemical Engineering Thermodynamics. F.

Definition, correlation, and estimation of thermodynamic properties; nonideal chemical and physical equilibria.

CB 502 03(3-0-0). Advanced Reactor Design. S. Prerequisite: CB 503 or written consent of instructor.

Nonideal flow and tracers, reactions and diffusion, evaluation of complex kinetics, stability of reactors. Biochemical reactor examples.

CB 503 03(3-0-0). Transport Phenomena Fundamentals. S. Prerequisite: CB 406.

General topics in transport phenomena; analytical and numerical solutions of laminar flows; perturbation techniques; coupled transport.

CB 504 03(3-0-0). Fundamentals of Biochemical Engineering. F. Prerequisite: MB 300; M/M CC 255 or M 340; BH 306 or CB 420 or concurrent registration.

Application of chemical engineering principles to enzyme kinetics, fermentation and cell culture, product purification, and bioprocess design.

CB 514 03(3-0-0). Polymer Science and Engineering. F. Prerequisite: C 343, C 474.

Fundamentals of polymer science: synthesis, characterization, processing of polymers. Physical properties of polymers; rheology of melts and solutions.

CB 521 03(3-0-0). Mathematical Modeling for Chemical Engineers. F. Prerequisite: CB 420, CB 442/EV 442, one course in computer programming.

Application of mathematical models to analysis and design of chemical reactors and separation processes.

CB 523 03(3-0-0). Separation Processes. S. Prerequisite: CB 341, CB 442/EV 442.

Equilibrium processes, multistage separations, continuous contacting devices, energy requirements.

CB 524 03(3-0-0). Environmental Biotechnology. S. Prerequisite: MB 300; CB 420 or CB 504 or CB 439/CE 439.

Use of microorganisms for pollution control. Biodegradation kinetics, bioreactor design, and in situ bioremediation.

CB 530 03(3-0-0). Irrigation Management for Water Quality. F. Prerequisite: CB 464.

Environmental impacts of irrigation; reduced environmental impact by improved design and management of irrigation; sustainability.

CB 531/CE 531 03(3-0-0). Groundwater Hydrology. F. Prerequisite: CE 300 or CB 331 or ME 342. Credit not allowed for both CB 531 and CE 531.

Groundwater occurrence, distribution, movement, exploration and recharge, well hydraulics and design, interaction of ground and surfacewater.

CB 532 03(3-0-0). Drainage and Wetlands Engineering. S. Prerequisite: CB 464.

Drainage and wetlands design for agricultural and natural resource applications. Water table modification for nonpoint sources pollution control.

CB 533 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.

CB 534/CE 534 03(2-3-0). Groundwater Measurements. F.
Prerequisite: CB 531/CE 531 or concurrent registration. Credit not allowed for both CB 534 and CE 534.

Groundwater measurements of hydraulic properties and water quality using laboratory and field methods.

CB 535 03(3-0-0). Surface Irrigation Systems. F. Prerequisite: CB 464.

Design and evaluation of surface irrigation systems. Water measurements, conveyance and control structures, land forming.

CB 536 03(3-0-0). Sprinkler and Trickle Irrigation Systems. S.
Prerequisite: CB 464, CE 300.

Basic principles, design, and evaluation of pressurized irrigation systems.

CB 537 01(0-3-0). Surface Irrigation Laboratory. F. Prerequisite: CB 535 or concurrent registration.

Outdoor laboratory experiments in surface irrigation.

CB 542 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.

CB 545/CE 545 03(3-0-0). Management and Monitoring of Water Quality. F. Prerequisite: CE 322/EV 322 or ER 418. Credit not allowed for both CB 545 and CE 545.

Management activities, information needs, data analysis protocols, network design, case studies.

CB 547/ST 547 03(3-0-0). Statistics for Environmental Monitoring. S. Prerequisite: ST/STCC 301. Credit not allowed for both CB 547 and ST 547. Also offered as an on-line course.

Applications of statistics in environmental pollution studies involving air, water, or soil monitoring; sampling designs; trend analysis; censored data.

CB 567 03(1-4-0). Monitoring and Evaluation of Irrigation Systems. SS. Prerequisite: CB 464, written consent of instructor.

Monitoring, evaluation, and feedback principles and practices applied to irrigation systems in northern Colorado.

***CB 568 03(1-0-2). Irrigation System Management. SS.** Prerequisite: CB 567.

Principles of irrigation system management; analysis of case studies of irrigation systems around the world.

CB 603 03(3-0-0). Advanced Mass Transfer. S. Prerequisite: CB 503.

Molecular and turbulent diffusion and interphase mass transport. Applications to continuous contact separation processes.

CB 610 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.

CB 621 03(3-0-0). Advanced Process Control. F. Prerequisite: CB 430.

Application of modern control theory to chemical processes. Computer control aspects emphasized.

CB 638/CE 638 03(3-0-0). Groundwater Quality and Contaminant Transport. S. Prerequisite: CB 531/CE 531. Credit not allowed for both CB 638 and CE 638.

Analysis of hydrochemical data. Advection with and without mixing. Retardation of reactive solutes. Design of groundwater quality investigations.

CB 693 Var. Seminar I.**CB 695A-B Var. Independent Study.**

A) Chemical engineering. B) Agricultural and bioresource engineering.

CB 696A-B Var. Group Study.

A) Chemical engineering. B) Agricultural and bioresource engineering.

CB 699A-B Var. Thesis.

A) Chemical engineering. B) Agricultural and bioresource engineering.

CB 704 03(3-0-0). Advanced Fermentation Technology. S.

Prerequisite: CB 504.

Media and air sterilization; scale-up; continuous culture; mixed cultures; fermentor design and instrumentation; recovery of fermentation products.

CB 705 03(3-0-0). Enzyme Technology. S. Prerequisite: CB 504.

Enzyme kinetics and preparation, soluble and immobilized enzyme technology.

CB 723 03(2-2-0). Bioseparation Processes. S. Prerequisite: CB 504.

Analysis of processes used to recover and purify fermentation products.

CB 733/CE 733 03(3-0-0). Flow in Porous Media. S. Prerequisite: CE 300; CB 531/CE 531 or SC 470. Credit not allowed for both CB 733 and CE 733.

Mechanics of single and two-phase fluids in soils and porous rocks with application to infiltration, drainage, and petroleum production.

***CB 767 03(3-0-0). Advanced Irrigation Topics. S.** Prerequisite: CB 535, CB 536.

Advanced topics selected from soil-water-plant relationships, irrigation hydraulics, irrigation management, developments in equipment.

CB 784A-B Var. Supervised College Teaching. F, S, SS.

A) Chemical engineering. B) Agricultural and bioresource engineering.

CB 793A-B Var. Seminar II.

A) Chemical engineering. B) Agricultural and bioresource engineering.

CB 795A-B Var. Independent Study.

A) Chemical engineering. B) Agricultural and bioresource engineering.

CB 799A-B Var. Dissertation.

A) Chemical engineering. B) Agricultural and bioresource engineering.

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.

CE106 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. S. Prerequisite: CE 108.

Introduction to the profession and academia; principles of civil engineering design; graphical, oral, and written communication; team projects.

CECC 208 03(2-2-0). Civil Engineering Analysis I. 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; CB 103/ CBCC 192 or CE 108 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 209; concurrent registration in CE 300.

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 ER 416 or CB 331, 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 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. Special fee, \$11.

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 ER 416.

Fluvial geomorphology, sediment transport, river response with special emphasis on environmental aspects.

CE423 03(3-0-0). Groundwater Engineering. S. Prerequisite: CE 300 or ER 416 or CB 331.

Development of groundwater resources; origin, movement, distribution of water below ground surface.

CE 438/EV 438 04(4-0-0). Pollution Control Engineering. F, S. Prerequisite: C 113, CE 300 or CB 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/CB 439 03(2-3-0). Environmental Engineering Chemical Concepts. F. Prerequisite: C 113, M 340. Credit not allowed for both CE 439 and CB 439.

Application of chemical principles to environmental engineering problems.

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 469 01(1-0-0). Design Practice I. F. Prerequisite: CE 367.

Design of civil engineering systems, consideration of non engineering factors in the design process, development of design project proposals.

+CE 470 02(1-2-0). Design Practice II. S. Prerequisite: CE 469.

Class project in design of civil engineering systems; development of final project design and project reports.

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: AT 440 or CE 300.

Influence of wind on humanity. Applications to structures, air pollution, windenergy, 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.

+*CE510 03(3-0-0). Operation of Hydraulic Systems. F. Prerequisite: CE 401. Special fee, \$41.

Operational management systems, data collection, real-time control, management modeling, rehabilitation and retrofit, maintenance.

+CE514 03(3-0-0). Hydraulic Structures/Systems. F. Prerequisite: CE 401. Special fee, \$25.

Analysis and design of hydraulic structures which make up components of water resource systems.

°CE515 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.

CE520 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 521 03(2-3-0). Hydrometry. SS. Prerequisite: CE 322/EV 322.

Principles, methods, instruments, and equipment for measuring water quantity and water quality variables in nature.

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/ER 524 04(3-0-1). Modeling Watershed Hydrology. S. Prerequisite: CE 322/EV 322 or ER 416, ST 304 or ST/STCC 309. Credit not allowed for both CE 524 and ER 524.

Development and application of watershed models: structure, calibration, evaluation, sensitivity analysis, simulation.

CE 531/CB 531 03(3-0-0). Groundwater Hydrology. F. Prerequisite: CE 300 or CB 331 or ME 342. Credit not allowed for both CE 531 and CB 531.

Groundwater occurrence, distribution, movement, exploration and recharge, well hydraulics and design, interaction of ground and surface water.

CE 534/CB 534 03(2-3-0). Groundwater Measurements. F. Prerequisite: CE 531/CB 531 or concurrent registration. Credit not allowed for both CE 534 and CB 534.

Groundwater measurements of hydraulic properties and water quality using laboratory and field methods.

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.

°CE539 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; CB 331 or CE 300 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.

CE543 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.

CE544 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/CB 545 03(3-0-0). Management and Monitoring of Water Quality. F. Prerequisite: CE 322/EV 322 or ER 418. Credit not allowed for both CE 545 and CB 545.

Management activities, information needs, data analysis protocols, network design, case studies.

CE546 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.

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). Geoenvironmental Engineering Principles. F. Prerequisite: CE 450.

Basic principles of geoenvironmental engineering practice, including use of clay soils in waste containment and in situ remediation systems.

CE560 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.

CE564 03(3-0-0). Analysis of Continua. F. Prerequisite: CE 300 or CE 360, M 340.

Cartesian tensors, linear algebra, tensor calculus, and variational principles as applied to analysis of continuous media.

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.

CE567 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 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 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.

CE614 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.

CE622 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: CB 531/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 CB 531/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 CB 531 or CE 531.

Geostatistics; modeling fracture flow; saltwater intrusion, heat transfer; conjunctive use, optimal groundwater management; solution nonlinear problems.

CE 638/CB 638 03(3-0-0). Groundwater Quality and Contaminant Transport. S. Prerequisite: CE 531/CB 531. Credit not allowed for both CE 638 and CB 638.

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). Geoenvironmental Engineering Applications. S. Prerequisite: CE 558.

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 695A-I 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.

CE 696A-I 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.

CE 699A-I 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.

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.

°CE721 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/CB 733 03(3-0-0). Flow in Porous Media. S. Prerequisite: CE 300; CE 531/CB 531 or SC 470. Credit not allowed for both CE 733 and CB 733.

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 799A-I 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.

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.

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 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 701A-I. Topics in Cell and Molecular Biology. F, S. Prerequisite: D, I) BC 403, CM 501, M/M CC 255. G) C 344.

A) Intracellular proteolysis 01(0-0-1). D) Radiation cytogenetics 01(1-0-0). G) Steroid hormone mechanism of action 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: 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/PD 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 PD 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 796 Var. Group Study.

CM 799 Var. Dissertation.

COMPOSITION COURSES

Department of English *College of Liberal Arts*

COCC 150 03(3-0-0). College Composition. F, S, SS. Prerequisite: Composition Placement Examination.

Expository and argumentative writing emphasizing purpose and audience; writing and reading processes; development of ideas; coherence; effective style.

COCC 192 03(0-0-3). Academic Writing. F, S. Prerequisite: Composition Placement Examination.

Academic writing, critical thinking, and critical reading through study of a key academic issue.

COCC 300 03(3-0-0). Writing Arguments. F, S, SS. Prerequisite: CO/COCC 150.

Reading, analyzing, researching, and writing arguments.

COCC 301A-D 03(3-0-0). Writing in the Disciplines. F, S, SS. Prerequisite: CO/COCC 150.

Learning writing strategies for addressing general audiences in: A) Arts and humanities. B) Sciences. C) Social sciences. D) Education.

COCC 302 03(3-0-0). Writing Online. 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.

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(3-0-0). Computer Science Concepts and Practices. F, S. Prerequisite: High school algebra, experience with PC's.

Development of computer science, central concepts: algorithm, recursion, autonomous computation, computability limits. Examples using programming.

CSCC 151 04(3-0-1). C++ for Scientists and Engineers. F, S. Prerequisite: M/M CC 124, M/M CC 126.

Structured programming in C++ language syntax including problem solving and basic data structures with a strong science/ engineering approach.

CS 152 02(2-0-0). FORTRAN Programming Module. F, S, SS. Prerequisite: CS/CSCC 151. Not intended as a first course in programming.

Constants, variables, expressions, statements, program and data structures, I/O, libraries.

CSCC 153 04(3-0-1). Java Programming. F, S, SS. Prerequisite: M/M CC 118 or M/M CC 121. 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 154 02(2-0-0). C++ to Java Programming Module. F, S. Prerequisite: College-level C++ course. Credit not allowed for both CS 154 and CS/CSCC 153.

Conversion from C++ to Java programming for those with C++ programming maturity. Computer-based instruction using the World Wide Web.

CS 166/M 166 04(4-0-0). Discrete Structures. F, S. Prerequisite: CS/CSCC 151 or CS/CSCC 153 or CS 154, 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.

CS 200 04(3-2-0). Algorithms and Data Structures. F, S. Prerequisite: CS/CSCC 153 or CS 154, CS 166/M 166.

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 200, CS 270.

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, concurrent registration in CS 200, M/M CC 124.

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, CS 200, M/M CC 161, M 229.

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.

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, CS 270, ST/STCC 301 or ST/STCC 309.

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, M 229.

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.

Object-oriented methods for large-scale software systems. Software design for reuse using patterns. Development of WWW applications in languages, e.g., Java.

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.

Orders of magnitude, upper and lower bounds, recurrence relations; P, NP completeness; approximate algorithms and search.

CS 430 04(3-2-0). Database Systems. S. Prerequisite: CS 314.

Database analysis, design, administration, implementation, hierarchical, network relational models; data sublanguages; query facilities.

CS 440 04(3-2-0). Introduction to Artificial Intelligence. F. Prerequisite: CS 253, CS 301.

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.

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, CS 301.

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.

Principles of communications, local area networks, communication protocols, TCP/IP, and the Internet.

CS 470 04(3-2-0). Computer Architecture. S. Prerequisite: CS 370.

Instruction set; control: hardwired, microprogramming; memory; arithmetic; I/O and buses; performance evaluation; pipelining; RISC.

CS 475 04(3-3-0). Parallel Programming. F, S. Prerequisite: CS 370. Also offered as online course.

Parallel programming techniques for shared-memory and message-passing systems; process synchronization, communication; example languages.

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 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.

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.

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). Principles of Operating Systems. F. Prerequisite: CS 451.

Distributed operating systems, memory management, computer security, client-server computing, distributed resource management failure recovery.

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 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.

CS 612 04(3-2-0). Topics in Computer Graphics. F. Prerequisite: CS 510.

Computer graphics research topics.

CS 614A-F 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. E) Software process. F) Software reliability and fault tolerance.

CS 620A-E Var [1-4]. Topics in Computing Theory. F. Prerequisite: CS 520 or written consent of instructor.

A) Algorithms. B) Information theory. C) Logic in computing. D) Formal languages and automata theory. E) Mathematical foundations.

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. Also offered as online course.

Link technologies, multiple access, hardware and software for internetworks routing, switching flow control, multicast, performance, and applications.

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. 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 02(0-4-0). Dance Techniques II. F, S. Prerequisite: D 120A-C.
A) Modern. B) Ballet. C) Jazz.

D 220A-C 02(0-4-0). Dance Techniques III. F. Prerequisite: D 121A-C.
A) Modern. B) Ballet. C) Jazz.

D 221A-C 02(0-4-0). Dance Techniques IV. S. Prerequisite: D 220A-C.
A) Modern. B) Ballet. C) Jazz.

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 02(0-4-0). Dance Techniques V. F. Prerequisite: D 221A-C.
A) Modern. B) Ballet. C) Jazz.

D 321A-C 02(0-4-0). Dance Techniques VI. S. Prerequisite: D 320A-C.
A) Modern. B) Ballet. C) Jazz.

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 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 330, D 325, D 326, 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 486 Var [1-3]. Practicum. Prerequisite: D 221 A or B or C.

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 130 03(3-0-0). Design Appreciation. F, S.

Impact of elements and principles of design on everyday life.

DM 172 03(3-0-0). Consumers in the Marketplace. F, SS.

Consumer rights and responsibilities to ensure well-being and social responsibility.

DMCC 263 03(3-0-0). Historical Perspectives of Material Culture. F, S.

Analytical and chronological study of significant, multidimensional human experiences related to apparel, textiles, and interior environments.

DM 300 03(3-0-0). Retail Sales and Customer Strategies. F, S, SS.

Also offered as an online course.

Examine selling practices and their impact on business and consumers in the global marketplace.

DM 320 03(3-0-0). Finance-Personal and Family. F, S.

Management of income, expenditures, credit, savings, investment, insurance, taxes, and assets considering legislation and economic conditions.

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. Also offered as an online course.

Retail markets, institutions, operations, and problems.

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) AM 371, DM 360/BK 360, DM 492. B) AM 343, AM 446, DM 492. D) DM 492, ID 376. F) Written consent of instructor. Special fee, \$5 per credit per subtopic.

A) Merchandising. Var [12-16]. B) Apparel design and production. Var [12-16]. D) Interior design. Var [3-16]. 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. Special fee, \$35.

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. F. Prerequisite: Written consent of instructor.

Design and methods of research applicable to design and merchandising.

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.

ENGLISH COURSES

Department of English

College of Liberal Arts

E CC 140 03(3-0-0). The Study of Literature. F, S, SS.

Basic principles of reading literary texts.

E 160 03(3-0-0). Mythical and Biblical Backgrounds. F, S, SS.

Central myths and stories of classical and Biblical traditions necessary to understanding Western culture.

E 179 03(3-0-0). Western American Literature. F, S, SS.

Trans-Mississippi West in fiction and other literary forms.

E 210 03(3-0-0). Beginning Creative Writing. F, S. Prerequisite: E/E CC 140.

Basic techniques of writing fiction and poetry; may include some elements of drama.

E CC 232 03(3-0-0). Introduction to Humanities. 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 236 03(3-0-0). Literature of Social Protest. F, S. Offered only through Division of Educational Outreach.

Social problems and alienation of the individual as viewed by modern writers.

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. F, S.

20th-century fiction chosen for its relevance to global and cultural awareness.

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. 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. F, S.

World drama in cultural contexts.

E 247 03(3-0-0). Vietnam War in Fiction. F.

Novels selected by internal chronology to show origins, development, and effects of Vietnam War.

E CC 270 03(3-0-0). Introduction to American Literature. F, S, SS.

History and development of American writings from 16th-century travel narratives through early 20th-century modernism.

E CC 275 03(3-0-0). Introduction to British Literature. F, S.

Selected major works of British literature from Beowulf to the present in relation to their historical contexts.

E 300/AU 300 03(3-0-0). American Lives-Methods in American Studies. F, S. Prerequisite: AU/AUCC 200, AU/AUCC 201. 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 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.

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 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 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 430 03(3-0-0). 18th-Century English Fiction. F. Prerequisite: One course in literature.

English fiction from Defoe to Austen stressing Richardson, Fielding, Smollett, and Sterne.

E 431 03(3-0-0). 19th-Century English Fiction. S. Prerequisite: One course in literature.

English fiction in Victorian and Edwardian eras emphasizing Dickens, the Brontes, Thackeray, George Eliot, and Hardy.

E 432 03(3-0-0). 20th-Century British Fiction. F. Prerequisite: One course in literature.

British fiction from Conrad to the present emphasizing Joyce, Lawrence, Forster, Woolf, and Beckett.

E 434 03(3-0-0). American Fiction, 1865-1914. F. Prerequisite: One course in literature.

Form, content, and context of American fiction, 1865-1914: James, Twain, Crane, Wharton, Norris, and others.

E 435 03(3-0-0). American Fiction, 1914-1945. F. Prerequisite: One course in literature.

Form, content, and context of American fiction, 1914-1945: Hemingway, Faulkner, Fitzgerald, Cather, Dos Passos, and others.

E 436 03(3-0-0). American Fiction, 1945-Present. S. Prerequisite: One course in literature.

Form, content, and context of American fiction from 1945 to present: Kesey, Updike, Heller, Pynchon, Barthelme, Vonnegut, and others.

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. S. Maximum of 9 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 521 03(3-0-0). Advanced Syntax. S.

Recent generative theories of language structure and research in second language acquisition and 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.

E601 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 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. 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. F, S. Credit not allowed for both EA/EACC 240 and EC/ECCC 240. Also offered as correspondence course.

Discussion and economic analysis of current environmental issues with special emphasis on the impact of economic growth.

EA 305 03(2-2-0). Farm and Ranch Records and Analysis. F, S. Prerequisite: EA/EACC 202 or EC/ECCC 202.

Utilization of records in farm 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. Special fee, \$5. Also offered as on-line course.

Monetary affairs of farming and ranching emphasizing agricultural credit, facilities, procurement, extension, and management.

EA 310 03(3-0-0). Agricultural Marketing. F, S, SS. Prerequisite: EA/EACC 202 or EC/ECCC 202. Also offered as on-line course.

Market structure, behavior, and performance including futures market and market games theory.

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, 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 392 01(0-0-1). Professional Seminar. F.

Outcomes assessment; exposure to and preparation for employment in agricultural and resource economics.

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. Special fee, \$10.

Agricultural marketing and agribusiness principles applied to current marketing problems relating to livestock and field and horticultural crops.

EA 415 03(3-0-0). International Agricultural Trade. F. Prerequisite: 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 II. S.

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.

ECONOMICS COURSES

Department of Economics

College of Liberal Arts

ECCC 101 03(3-0-0). Economics of Social Issues. F, S.

Economic analysis of poverty, crime, education, and other social issues. Basics of macro, micro, and political economy.

ECCC 202 03(2-0-1). Principles of Microeconomics. F, S, SS. Prerequisite: M/M CC 118 or M/M CC 120A-B. Credit not allowed for both EC/ECCC 202 and EA/EACC 202.

Introduction to decision-making by households, firms, and government, and resulting allocation of resources through markets.

ECCC 204 03(2-0-1). Principles of Macroeconomics. 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 210 03(3-0-0). Economics, Law, and Employment Relations. S.

Relationship between economics, law, and workplace policy.

ECCE 211 03(3-0-0). Gender in the Economy. S.

Role gender plays in economies; the way gender affects economic outcomes for individuals and societies.

ECCE 212 03(3-0-0). Racial Inequality and Discrimination. F.

Economic inequality between Afro-Americans and Euro-Americans. Debates about causes, consequences, and remedies.

ECCE 240/EACC 240 03(3-0-0). Issues in Environmental Economics. F, S. Credit not allowed for both EC/ECCC 240 and EA/EACC 240. Also offered as correspondence course.

Discussion and economic analysis of current environmental issues with special emphasis on the impact of economic growth.

EC 300 03(3-0-0). Managerial Economics. F, S. Prerequisite: EA/EACC 202 or EC/ECCC 202.

Applied microeconomics emphasizing use of empirical demand, production, and cost functions in business decisions under alternate market structures.

EC 304 03(3-0-0). Intermediate Macroeconomics. F, S, SS. Prerequisite: EC/ECCC 204, M/M CC 141. Also offered as correspondence course.

Theory of national income, its measurement and determinants; analysis of inflation, growth, debt, and public policy.

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.

⁹EC 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. Also offered as on-line course.

Monetary theory and policy; description of financial institutions and markets.

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.

EC 332/PO 332 03(3-0-0). International Political Economy. F, S. Prerequisite: EA/EACC 202 or EC/ECCC 202 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, 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.

⁹EC 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 350 03(3-0-0). Industrial Organization Economics.** F. Prerequisite: EC/ECCC 202 or EA/EACC 202.

Structure, conduct, and performance of industries in competitive versus noncompetitive markets. Antitrust laws and policies.

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. 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.

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.

⁹EC 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.

^oEC 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.

^oEC 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.

Problems of intertemporal optimality.

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. B) International. 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. 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. 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 Educational Outreach.

Psychological conditions of classroom learning and teaching including understanding needs of exceptional children in the classroom.

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(1-2-1). 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: ED 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: ED 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: ED 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: ED 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, S. 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: ED 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-B. Var [6-14]. Student Teaching. F, S. Prerequisite: ED 450 and appropriate special methods courses.

Teacher education candidates participate in an intensive and extensive on-site capstone experience within a public school setting. A) Elementary. B) Secondary.

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 and appropriate special methods course, concurrent registration in ED 485A or B. B) ED 450 and appropriate special methods courses, concurrent registration in ED 485A or B 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. F, S. 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 590 Var. Workshop.

ED 591B-D Var. Workshop.

B) Instruction. D) Community partnerships.

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. 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 Educational Outreach. Also offered as telecourse.

Process of change in education, focusing on teacher's role as leader and facilitator.

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 695A-E Var. Independent Study.**

A) Administration. B) Curriculum. C) Guidance and counseling. D) Developmental reading. E) Rural education.

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. Also offered as on-line course.

Examination of qualitative research theory, methods, and applications to education and the social sciences.

ED 705 03(2-0-1). Qualitative Data Analysis. S. Prerequisite: ED 704 or written consent of instructor. Also offered as an on-line course.

Examination of qualitative methods of data analysis, data presentation, and use of computer.

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 Licensure 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 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. 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. Corequisite: 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.

EE251 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.

EE325 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.

EE404 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.

EE412 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).

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.

EE452 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.

EE457 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 501 01(0-2-0). Analog Circuits Laboratory I. F. Corequisite: EE 532.

Operational amplifier circuits are built and tested.

EE 502 01(0-2-0). Analog Circuits Laboratory II. S. Corequisite: EE 533.

Active analog filters are built and tested.

EE512 03(3-0-0). Digital Signal Processing. F. Prerequisite: EE 312 or written consent of instructor. Also offered as online course.

Discrete time signals and systems, digital filter design and implementation, fast algorithms, quantization effects.

EE 513 03(3-0-0). Digital Image Processing. S. Prerequisite: EE 303/ST 303 and EE 312.

Image acquisition and display systems, image enhancement, restoration and encoding, image analysis; real-life applications.

EE514 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 521 03(3-0-0). Satellite Communication. S. Prerequisite: EE 421.

Principles of satellite communication systems engineering.

EE524 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. Prerequisite: EE 471.

Optoelectronic and optical components for fiber optics; communications system physical layer issues and examples.

EE 532 03(3-0-0). Passive and Active Filters. F. Prerequisite: EE 312, EE 332.

Passive, active transfer functions; maximally flat and equal ripple designs; terminated LC ladder design; parameter sensitivity; operational amplifier models.

EE533 03(3-0-0). Operational Amplifier Circuits. S. Prerequisite: EE 532.

Active filter implementations with operational amplifiers; nonideal amplifier; cascade, multiple feedback, leapfrog implementations; switched capacitor filters.

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.

EE543 03(3-0-0). VLSI Plasma Processing. F. Prerequisite: EE 332, EE 342.

Fundamental processes in gas discharges; elementary gas phase chemistry, basic surface physics; transport of materials between surface and gas phase.

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. S. Prerequisite: EE 444 or written consent of instructor.

Fundamental ideas of radar operation and basic design of various radar types including current topics.

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 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 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 573 03(3-0-0). Polarimetry. F, S. Prerequisite: EE 342.

Polarization in optical and high frequency systems.

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 578 03(3-0-0). VLSI Processing-Science and Technology II. S. Prerequisite: EE 576.

Advanced VLSI processes for microelectronic fabrication.

EE611 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 647 03(3-0-0). Microwave Nondestructive Evaluation. S. Prerequisite: EE 548

Fundamental physical and theoretical principles of microwave nondestructive/testing/evaluation methods and their applications.

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 654 03(3-0-0). Design Automation. F. Prerequisite: EE 472 or EE 571.

Advanced logic design methods; digital system modelling, simulation, and testing; design for testability; CAD systems.

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 657 03(3-0-0). Advanced Computer Networks. F. Prerequisite: EE 421 or CS 457 or ST 420.

Computer network architectures, protocols, random access, performance models, priority mechanisms, circuit switching, integrated traffic, ISDN.

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. Also offered as online course.

Link technologies, multiple access, hardware and software for interworks routing, switching flow control, multicast, performance, and applications.

EE 660 03(3-0-0). Advanced Topics in VLSI Design. S. Prerequisite: EE 571.

VLSI synthesis, optimization, and other issues.

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 671 03(3-0-0). Thin Film Physical Vapor Deposition.** F. Prerequisite: One course in thermodynamics or written consent of instructor.

Thermodynamic and kinetic foundations; high vacuum; RF and DC discharges; evaporation and sputtering; novel deposition technologies.

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. Prerequisite: EE 543.

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. 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 Health

College of Veterinary Medicine and Biomedical Sciences

EHCC 110/PSCC 110 03(2-0-1). Human Health and Environmental Perspectives. F, S, SS. Prerequisite: High school level biology. Credit not allowed for both EHCC 110 and PSCC 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: BC 103 or BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 104 or BZ/BZCC 110 or BZ/BZCC 120 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 02(0-4-0). Environmental Health Field Methods. S. Prerequisite: EH 220, high school chemistry. Special fee, \$25.

Field and laboratory techniques necessary for practice of environmental health.

EHCC 307/STCC 307 03(3-0-0). Introduction to Biostatistics. 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. S. Prerequisite: AY 300/PS 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 343, 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 343.

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: AY 300/PS 300, C 245 or C 343.

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, SS. Prerequisite: MB 300, C 343.

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 341; 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. Special fee, \$25.

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.

Also offered through the Division of Educational Outreach.

Measurement and control of industrial or environmental noise emphasizing practical solutions.

***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

Department of Bioagricultural Sciences and Pest Management College of Agricultural Sciences

ENCC 102 03(3-0-0). Insects, Science, and Society. F, S.

How insects develop, behave, and affect human activity. What every student should know about the most diverse life form on Earth.

EN 103 01(0-2-0). Insects, Science, and Society Laboratory. F, S.
Prerequisite: EN/ENCC 102 or concurrent registration.

Recognition and classification of insects; demonstrations.

EN 300/AN 300B 01(1-0-0). Topics in Livestock Entomology. S.

Prerequisite: AN 100. Credit not allowed for both EN 300 and AN 300B.
Identification, biology, and management of insect, tick, and mite pests.

EN 302 02(2-0-0). Applied and General Entomology. F.

Biology and management of insects.

EN 303A-C. Entomology Laboratory. F. Prerequisite: EN 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).

°EN 423 04(2-4-0). Evolution and Classification of Insects. F.
Prerequisite: EN 303A or B or C.

Major groups of insects, living and fossil; major evolutionary trends in structure and behavior.

***EN 424/BZ 424 03(3-0-0). Principles of Systematic Zoology.** S.
Prerequisite: BY 103 or BZ/BZCC 111. Credit not allowed for both EN 424 and BZ 424.

Principles and methods of classification, zoological nomenclature, taxonomic decisions regarding species and higher categories.

EN 445 04(2-4-0). Aquatic Insects. F. Prerequisite: BY 103 or BZ/BZCC 111.

Biology and recognition of major orders and families of aquatic insects; a collection is required.

EN 451 04(3-2-0). Insect Pest Management. S. Prerequisite: EN 303A or B or C.

Selection and use of insect-control actions that will ensure favorable economic, ecological, and sociological consequences.

EN 453 03(3-0-0). Population Ecology. S. Prerequisite: M/M CC 155, one previous course in ecology.

General principles of theoretical and applied population ecology.

EN 462/MB 462/BZ 462 05(3-4-0). Parasitology and Vector Biology. F. Prerequisite: BY 103 or BZ/BZCC 110; MB 301 or MB 302 or BZ 212. Credit allowed for only one of the following: EN 462, MB 462, BZ 462.

Protozoa, helminths, and insects and related arthropods of medical importance; systematics, epidemiology, host damage and control.

°EN 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.

°EN 510/PD 510 03(3-0-0). Insect-Plant Disease Relationships. F.
Prerequisite: One entomology or plant disease course. Credit not allowed for both EN 510 and PD 510.

Relationships between insects and various plant pathogens as they affect survival and transmissions of pathogens.

°EN 511/PD 511 01(0-2-0). Insect-Plant Disease Relationships Laboratory. F. Prerequisite: EN 510/PD 510 or concurrent registration. Credit not allowed for both EN 511 and PD 511.

Detailed studies of insect-plant interactions.

***EN 525 03(3-0-0). Insect Physiology.** S. Prerequisite: EN 302.

Principles of insect function.

°EN 551 03(1-4-0). Immature Insects. S. Prerequisite: EN 303A or B or C.

Characteristics of immature forms of orders and families of insects emphasizing those important to humans.

°EN 562/MB 562/BZ 562 05(1-8-0). Field Ecology of Disease Vectors. Prerequisite: EN 462/MB 462/BZ 462 or MB 300; EN 302. Credit allowed for only one of the following: EN 562, MB 562, BZ 562.

Evolution, morphology, life cycles, and field biology of disease vectors; field techniques and experience in surveillance of arthropods and pathogens.

***EN 570 03(3-0-0). Chemical Ecology.** S. Prerequisite: C 245 or C 341.

Chemical interactions among animals, plants, fungi, and microorganisms.

EARTH RESOURCES COURSES

Department of Earth Resources College of Natural Resources

+ERCC 130 03(3-0-0). Earth System Science. F, S, SS. Credit allowed for only one of the following: ER/ERCC 130, ER/ERCC 140, ERCC 192A/ER 150. Special fee, \$5.

Descriptions, dynamics, and interactions of the four earth science subsystems: tectonics, surficial processes, oceanography, and atmospheric sciences.

+ERCC 140 04(3-3-0). Physical Geology. F, S, SS. Credit allowed for only one of the following: ER/ERCC 130, ER/ERCC 140, ERCC 192A/ER 150. Special fee, \$4.

Develops scientific understanding and thinking skills through introduction to earth processes, materials, resources, and hazards.

ER 150 04(3-3-0). Physical Geology for Scientists and Engineers. F. Credit allowed for only one of the following: ER/ERCC 130, ER/ERCC 140, ERCC 192A/ER 150. Special fee \$20.

Earth materials, structures, and surface processes. Geologic analysis using field data, topographic and geologic maps, and aerial photos.

+ER 154 04(3-3-0). Historical and Analytical Geology. S. Prerequisite: ER/ERCC 130 or ER/ERCC 140 or ERCC 192A/ER 150. Special fee, \$12.

Physical and biological history of Earth with introduction to laboratory, computer, and field techniques.

+ERCC 192 02(0-0-2). First-Year Seminar in Earth Resources. F, S.

Introduction to critical issues in earth resources.

+ER 232 03(2-3-0). Mineralogy. F. Prerequisite: ER/ERCC 140 or ERCC 192A/ER 150; C/C CC 111, M/M CC 124 or concurrent registration; concurrent registration in ER 332; or written consent of instructor. Special fee, \$15.

Crystal structures, crystal chemistry, rock-forming and economically important minerals, crystal growth and defects, physical properties of minerals.

ER 272 03(3-0-0). Oceanography I. F.

General survey of the geology and physics of the oceans and their basins.

ER 274 03(3-0-0). Oceanography II. S.

General survey of the chemistry, sedimentation, biology, and pollution of the oceans.

ERCC 304 03(3-0-0). Principles of Watershed Management. F, S.

Effects of land use practices on watersheds: hydrology, soil loss, and water quality.

ER 332 02(1-2-0). Optical Mineralogy. F. Prerequisite: ER 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.

+ER 342 03(2-3-0). Paleontology. F. Prerequisite: ER 154.

Description of invertebrates, vertebrates, and plants and their distribution in earth history.

+ER 344 04(3-3-0). Stratigraphy and Sedimentology. F. Prerequisite: ER 154. Special fee, \$20.

Description, genesis, correlation and age of sediments, sedimentary rocks and layered rock sequences.

+ER 364 04(3-3-0). Igneous and Metamorphic Petrology. S. Prerequisite: ER 232. Special fee, \$13.

Identification, classification, geochemistry, petrogenesis of igneous and metamorphic rocks; textural interpretation of hand samples and thin sections.

+ER 366 04(3-3-0). Sedimentary Petrology and Geochemistry. F. Prerequisite: C 113, ER 154, ER 364. Special fee, \$20.

Composition, identification, and classification of sedimentary rocks; geochemical processes affecting sedimentary rocks and surficial deposits.

+ER 372 04(3-3-0). Structural Geology. S. Prerequisite: ER 154, M/M CC 125, concurrent registration in PH/PHCC 141. Special fee, \$20.

Stress and strain in rocks, geometry of deformed rocks, and tectonic principles.

+ER 376 03(1-4-0). Geologic Field Methods. S. Prerequisite: ER 344; ER 372 or concurrent registration. Special fee, \$40.

Scientific, surveying, and mapping methods used in geologic field studies; proposal, map, and report preparation.

ER 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.

+ER 406 03(2-3-0). Seasonal Snow Environments. S. Prerequisite: Written consent of instructor. Special fee, \$40.

Evaluation of the physical environment; characteristics of snow; methods of studying snow; snow safety.

ER 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.

+ER 417 02(1-2-0). Watershed Measurements. F. Corequisite: ER 416. Special fee, \$13.

Instrument and field techniques in watershed science. Project design and data analysis.

ER 418 03(3-0-0). Land Use and Water Quality. S. Prerequisite: C/C CC 107, ER 416.

Physical, chemical, biological water quality parameters affecting land use; land management to maintain water quality; water quality standards, legislation.

ER 419 02(0-4-0). Water Quality Laboratory for Wildland Managers. S. Corequisite: ER 418. Special fee, \$47.

Sampling and determination of water quality parameters.

+ER 420 02(0-6-0). Watershed Field Practicum. F. Corequisites: ER 416 and ER 417 or written consent of instructor. Special variable (\$60-\$80) fee determined by department.

Field visits to watershed management projects and sites of significant field studies.

+ER 434 03(3-0-0). Geology of National Parks and Monuments. F. Prerequisite: ER/ERCC 130 or ER/ERCC 140. Special fee, \$20.

Geology of outdoor museums with consideration of environmental problems.

+ER 436 06(0-18-0). Geology Summer Field Course. SS. Prerequisite: ER 364, ER 376. Special fee, \$350; plus \$100 equipment loss fee may be assessed by department.

Geologic mapping, measuring sections, interpreting geologic history in Colorado. Required comprehensive reports, geologic maps, and cross sections.

+ER 440 03(2-2-0). Watershed Problem Analysis. S. Prerequisite: CE 322/EV 322, ER 416. Special fee, \$45.

Hydrologic analysis and problem solving in watershed management.

+ER 446 03(3-0-0). Environmental Geology. S. Prerequisite: ER 454 or concurrent registration. Special fee, \$20.

Geology applied to environmental problems.

°ER 447 03(2-3-0). Mineral Deposits. F. Prerequisite: ER 372.

Occurrence, origin, and exploration of economic metallic mineral deposits.

ER 450 03(3-0-0). Marine Geology. F. Prerequisite: ER/ERCC 130 or ER/ERCC 140 or ER 272.

Geology of oceans including structure, geomorphology, sedimentation.

+ER 452 04(3-3-0). Hydrogeology. F. Prerequisite: ER/ERCC 140 or ERCC 192A/ER 150 or GR 210; PH/PHCC 141; M/M CC 161 or M/M CC 255 or written consent of instructor. Special fee, \$10.

Interaction of water and geologic materials; surface and groundwater; quantitative analysis and geologic effects on quality and flow of groundwater.

ER 454 04(2-4-0). Geomorphology. S. Prerequisite: ER/ERCC 140 or ERCC 192A/ER 150 or GR 210; M/M CC 155 or M/M CC 160. Special fee, \$25.

Origin of landforms; morphology and processes.

ER 460 04(3-3-0). Advanced Petrology and Geochemistry. F. Prerequisite: ER 364.

Petrology of igneous and metamorphic rocks; magma generation and emplacement; thermodynamics; quantitative methods; isotopes; ore deposits.

+ER 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.

+⁰ER 474 03(3-0-0). Snow Hydrology. F. Prerequisite: ER 416 or CE 322/EV 322.

Snowfall, accumulation, distribution, physical processes in the snowpack, energy balance, ablation and runoff, measurement methods, runoff forecasting.

+ER 492 Var. Seminar. Special variable (\$60-\$80) fee determined by department.

ER 494A-H Var. Independent Study.

A) Environmental-engineering geology. B) Geomorphology. C) Mineralogy-petrology. E) Paleontology-stratigraphy. F) Sedimentology. G) Structural geology. H) Oceanography.

ER 495 Var. Independent Study in Watershed Sciences.

ER 500 03(2-3-0). Quaternary Geology. S. Prerequisite: ER 154, ER 454.

Quaternary geologic processes as analogs for future and more distant past.

ER 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.

ER 510 02(2-0-0). Watershed Management in Developing Countries. F. Prerequisite: CE 322/EV 322 or ER/ERCC 304.

Watershed management problems, approaches, and solutions in developing countries.

⁰ER 516 03(2-0-1). Cumulative Effects and Watershed Analysis. S. Prerequisite: ER 416, ER 417.

Definition, casual processes, and modeling of cumulative watershed effects; comparison and evaluation of current watershed analysis procedures.

ER 520 02(2-0-0). Evapotranspiration. S. Prerequisite: PH/PHCC 122.

Theory, estimation, measurement, simulation, and application of evapotranspiration processes in hydrology.

⁰ER 524/CE 524 04(3-0-1). Modeling Watershed Hydrology. S. Prerequisite: CE 322/EV 322 or ER 416, ST 304 or ST/STCC 309. Credit not allowed for both ER 524 and CE 524.

Development and application of watershed models: structure, calibration, evaluation, sensitivity analysis, simulation.

+ER 544 03(2-3-0). Engineering Geology. F. Prerequisite: ER/ERCC 140.

Geology and geologic methods applied to civil engineering problems.

+ER 546 04(3-3-0). Sedimentary Basin Analysis. S. Prerequisite: ER 344 or written consent of instructor. Special fee, \$25.

Sedimentologic data base, correlation, mapping, facies models, classification, and evolution of sedimentary basins. Applications to petroleum exploration.

+⁰ER 547 03(3-0-0). Mineral Deposits. S. Prerequisite: ER 447.

Tectonic setting and parameters in minerals exploration.

***ER 549 03(3-0-0). History of Geology.** F. Prerequisite: ER/ERCC 140, ER 154.

Historical development of geological ideas.

ER 552 Var [2-3]. Advanced Topics in Hydrogeology. S. Prerequisite: ER 452 or written consent of instructor.

Current literature, new techniques, legislative and political developments in hydrogeology, and appropriate case histories.

⁰ER 560 03(2-3-0). Clay Mineralogy. F. Prerequisite: ER 364 or written consent of instructor.

Crystallography and chemistry of clay minerals. Applications to geology, engineering, and soil sciences, X-ray analysis of clays.

⁰ER 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.

ER 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.

***ER 567 03(3-0-0). Sedimentary Geochemistry.** S. Prerequisite: ER 366.

Geochemical processes affecting sedimentary rocks and other surficial materials.

ER 570 03(1-0-2). Tectonics. S. Prerequisite: ER 372, ER 364.

Evidence, environments, and consequences of tectonic theories.

+*ER 574 03(1-0-2). Advanced Topics in Snow Hydrology. S. Prerequisite: ER 474.

New techniques and theoretical topics in snowpack energy balance, snow melt and runoff, electromagnetic properties and remote sensing of the snowpack.

ER 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.

+ER 601 02(1-0-1). Earth Resources Analysis. F. Prerequisite: ER 372 or ER 416. Special fee, \$30.

Analytical techniques and their applications in the geology and watershed programs.

***ER 616 03(1-0-2). Hillslope Hydrology and Runoff Processes.** S. Prerequisite: CE 322/EV 322 or ER 416 or written consent of instructor.

Hillslope hydrology and runoff processes in different environments; implications for management and modeling.

+ER 652 03(3-0-0). Fluvial Geomorphology. F. Prerequisite: ER/ERCC 140. Special fee, \$12.

Geomorphology of channels, slopes, and drainage systems.

+ER 672 03(2-3-0). Advanced Structural Geology. F. Prerequisite: ER 436.

Rheology, deformation mechanisms, structural associations, and advanced methods of structural analysis.

***ER 674 03(1-4-0). Modeling in Snow Hydrology.** F. Prerequisite: ER 474, written consent of instructor.

Modeling spatial distribution of snow, snow-covered area, and snow melt: operational and research models.

ER 684 Var [1-5]. Supervised College Teaching. F, S, SS. Prerequisite: Written consent of instructor.

ER 692 Var. Seminar.

ER 695 Var. Independent Study.

+ER 696 Var. Group Study. Special variable (\$30-\$60) fee determined by department.

ER 698 Var. Research.

ER 699 Var. Thesis.

***ER 712 03(2-2-0). Watershed Systems.** F. Prerequisite: ER 416 or CE 322/EV 322, ST 304.

Dynamic simulation of watershed behavior; application and evaluation of current hydrologic models.

***ER 714 03(3-0-0). Water Quality for Wildland Managers.** F. Prerequisite: ER 418.

Sampling, statistics of sampling, concepts of ionic equilibrium, water quality modeling, instream flow requirements.

ER 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.

^oER 737 04(3-3-0). Advanced Igneous Petrology. S. Prerequisite: ER 364.

Physicochemical principles of igneous systems utilizing phase rule chemistry and thermodynamics.

***ER 738 04(3-3-0). Advanced Metamorphic Petrology.** S. Prerequisite: ER 364.

Physicochemical principles utilizing phase rule chemistry, thermodynamics, petrofabric analysis.

ER 746 03(2-3-0). Techniques in Environmental Geology. S. Prerequisite: ER 652.

Advanced techniques and legal aspects pertinent to environmental geology; field application of methods to problems.

***ER 747 04(3-3-0). Advanced Sedimentary Petrology.** S. Prerequisite: ER 344.

Classification, origin, depositional history, and diagenesis of detrital sedimentary rocks as determined from thin sections.

ER 798 Var. Research.

ER 799 Var. Dissertation.

ENGINEERING SCIENCE COURSES

College of Engineering

ES 492 01(0-0-1). Seminar.

ES 495 Var. Independent Study.

AMERICAN ETHNICITY COURSES

College of Liberal Arts

ETCC 200 03(3-0-0). Ethnicity in America. 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. 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. 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 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. 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. 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. 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. 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. 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. S.

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. 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. S.

Colonial and post-colonial discourse, politics of representation and epistemology of "location" it has produced: first and third world.

ET260 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. Prerequisite: AP/APCC 100. Credit not allowed for both ET 318 and AP 318.

Analyze development of cultures of the American Southwest including migration, political incorporation, socioeconomic, and cultural development.

ET 320 03(3-0-0). Ethnicity and Film Asian-American Experience. F.

Asian-American film image and film representation through both mainstream and independent movies.

ET 324 03(3-0-0). Asian-Pacific Americans and the Law. S.

Legal history of Asian-Pacific Americans examined through case studies.

ET 332 03(3-0-0). Contemporary Chicana/o/Latina/o Issues. S.

Current Latina/o issues including conquest, immigration, urbanization, health in context of societal trends.

ET 340 03(3-0-0). Native-American Perspectives on Conquest. S.

Native life and expression in the U.S. through response of Native Americans to conquest via revitalization movements, literature, arts.

ET 344 03(3-0-0). Native-American Ceremony and the Sacred. F.

Native ritual, ceremony, and sacred existence; clearer understanding of Native life and religious ways.

***ET 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.

⁰ET 412 03(3-0-0). Africa and African Diaspora. S.

Interdisciplinary investigation of retention, transformation, and creation of culture in plantation economies of Americas.

⁰ET 414/⁰AP 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.

⁰ET42003(3-0-0). Asian/Pacific-American Families/ Communities. S.

Formation and transformation of families, institutions, and communities.

⁰ET424 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.

ET438/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. F, S, SS. 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.

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 CB 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/CB 442 03(3-0-0). Rate-Controlled Separations. F.

Prerequisite: CB 331 or CE 300; M 340; one course in physical chemistry. Credit not allowed for both EV 442 and CB 442.

Diffusion; convective mass transfer; packed tower operations; electrophoretic and membrane separations; selection and sequencing of separations.

EV 443/CB 443 02(0-6-0). Mass Transfer and Separation Laboratory. F. Prerequisite: CB 341 or EV 442/CB 442 or concurrent registration. Credit not allowed for both EV 443 and CB 443.

Mass transfer experimentation: evaporation, distillation, solvent extraction, ion exchange, gas absorption, humidification.

Mass transfer experimentation: evaporation, distillation, solvent extraction, ion exchange, gas absorption, humidification.

EV 448/ME 448 03(3-0-0). Pollution Prevention. F. Prerequisite: CB

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.

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/CB 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 CB 204.

Measurement techniques for analysis and design of agricultural and environmental systems based on engineering principles.

EV 322/CE322 03(3-0-0). Basic Hydrology. F, S. Prerequisite: CE 300

or ER 416 or CB 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.

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. Special fee, \$4. C) Soccer. D) Self-defense. E) Tennis. J) Volleyball. K) Swimming. L) Golf. Special fee, \$57. M) Basketball. N) Racquetball. O) Weight training. P) Ice skating. Special fee, \$75.

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. Special fee, \$57. F) Soccer. G) Basketball. H) Racquetball. I) Aerobics. J) Ice skating. Special fee, \$75.

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. Special fee, \$75.

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. F, S, SS. Special fee \$2.

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. 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. F, S, SS. Credit not allowed for both EXCC 143 and EX/EXCC 145.

Personal health behaviors and personal choice in response to wellness.

EX203 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. Special fee, \$12.

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. Special fee, \$4.

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. Special fee, \$10.50.

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: AY 300/PS 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). Special fee, \$57. 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: AY 300/PS 300. Special fee, \$7.

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. Special fee, \$6.

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. Special fee, \$8.

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.

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.

EX540 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.

EX645 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.**EY 577 02(2-0-0). Analysis of Risk Assessment Simulation Models.**

S. Prerequisite: EY 576 or NR 575.

Theoretical and practical aspects of validation, verification, uncertainty analysis, and sensitivity analysis of risk assessment models.

EY 578 03(3-0-0). Distribution and Transport of Contaminants. F.

Prerequisite: C 113, M/M CC 155.

Fundamental concepts of transport processes and linkages with environmental contaminants.

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 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 Sciences
College of Natural Resources

ECOLOGY COURSES
Colleges of Natural Resources and Natural Sciences

EY 500A-B. Organism and Population Ecology. F. Prerequisite: One college-level course in each: physics, calculus, statistics, basic ecology.

Current theories in population ecology, including evolutionary concepts, sociobiology, regulation and adaptation, and population models. A) 03(3-0-0). B) 04(3-0-1).

EY 501A-B. Community and Ecosystem Ecology. S. Prerequisite: One college-level course in each: physics, calculus, statistics, basic ecology.

Current theories in community ecology, including competition, predation, community organization, and ecosystem function. A) 03(3-0-0). B) 04(3-0-1).

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 576 03(3-0-0). Ecological Risk Assessment Modeling. F. Prerequisite: M/M CC 155.

Theoretical and practical aspects of simulation modeling in support of ecological risk assessment.

F CC 192 02(0-0-2). Forestry Inquiries. F.

Field and laboratory exercises in forest sciences; discussion of current topics in forestry.

F 210 03(0-6-0). Dendrology. F, S. Prerequisite: BZ/BZCC 120.

Important forest trees of North America; morphology, taxonomy, nomenclature, ecological requirements, and economic significance.

+F 224 01(0-2-0). Wildland Fire Measurements. F. Prerequisite: F CC 192. Special fee, \$23.

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.

Relationships of ecological concepts to the dynamics of forest ecosystems.

+F 321 03(2-2-0). Forest Biometry. F. Prerequisite: ST/STCC 201 or ST/STCC 301; NR 220. Special fee, \$15.

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.

F489A-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 Educational Outreach.

A) Numerical analysis for fire managers. B) Economics and management for fire specialists. C) Fuels and fuel management. D) Fire effects. E) Fire and land management. F) Technical fire management project.

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 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 02(2-0-0). Forest Policy.** F. Prerequisite: NR/NRCC 320.

Significance and evolution of policies and institutions affecting management of forest lands; analysis of current forest policy problem.

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. F, S.
Nutritional quality and safety of food related to human health.

FNCC 150 03(3-0-0). Survey of Human Nutrition. F, S, SS.

Basic nutrition principles and concepts; their application to personal health and interactions with societal and environmental issues.

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.

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. Special fee, \$30.

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: AY 300/PS 300 or PS 310/BZ 310, C 245.

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 03(1-2-1). Nutrition Assessment. S. Prerequisite: C 246 or C 344, FN 350. Special fee, \$25.

Techniques for anthropometric, dietary, and biochemical assessment of nutritional status.

FN 386 02(0-4-0). Practicum in Food Service Management.

FN 414 03(2-2-0). Food Service Systems-Operations Analysis. F, S. Prerequisite: FN 310.

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 450 04(3-0-1). Diet and Disease. F. Prerequisite: FN 350, BC 301 or 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 301 or 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) Food and culture. 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. Also offered as correspondence course.

A) Nutrition for a healthy heart 01(0-2-0). B) Advanced clinical nutrition Var [1-3].

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 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). 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.

⁰FN 700 02(2-0-0). Cellular Nutrition. F. Prerequisite: FN 550, FN 551; or BC 403; PS 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). Introduction to Food Science and Technology. S. Prerequisite: High school chemistry.

Commercial food processing related to preservation and enhancing of food quality, safety, and value.

FT 230 02(2-0-0). Alcoholic Beverage Technology and Control. F. Prerequisite: C/C CC 103 or C/C CC 107.

Classification, production, service, and control of wines, beers, and distilled spirits.

FT 334 04(2-4-0). Food Microbiology. F. Prerequisite: MB 301 or MB 302.

Microorganisms in production of foods, in preservation and spoilage, and in food-borne diseases. Control of microorganisms in foods.

***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.

FT448 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.

***FT570 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 341.

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

Fishery and Wildlife Biology Department *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. F. Prerequisite: FW 100 or concurrent registration. Special fee, \$17.

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: BY 103 or BZ/BZCC 111.

Biology of fishes: anatomy, taxonomy, physiology, behavior, ecology, evolution, and zoogeography.

+FW 301A-B 01(0-3-0). Ichthyology Laboratory. S. Prerequisite: FW 300 or concurrent registration. Credit not allowed for both FW 301A and B. Special fee, \$16 per subtopic.

A) Fish biology. Anatomy, taxonomy, ecology of North American freshwater fishes. B) Fishery biology. Applications of biology and ecology to management of fishes.

FW 312 03(3-0-0). Diseases of Wildlife. F. Prerequisite: BY 103 or BZ/BZCC 111.

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.

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.

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.

FW 360 03(3-0-0). Principles of Vertebrate Management. F, S. Prerequisite: BY 220; 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 371 04(2-4-0). Wildlife Data Collection and Analysis. F, S. Prerequisite: NR 220, NR 260, ST/STCC 301 or ST/STCC 307 or EH/EHCC 307. Special fee, \$36.

Field and laboratory methods used in wildlife management, research.

+FW 375 02(1-0-1). Field Wildlife Studies. S, SS. Prerequisite: BY 220. Special fee, \$72.

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; NR 260 or CS 110; M/M CC 141 or M/M CC 155.

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 301A or B. Special fee, \$21.

Principles and practices to produce food, bait, and sport fishes.

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.

+⁰FW 468 03(2-3-0). Wild Bird Management. S. Prerequisite: FW 360. Special fee, \$32.

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. Special fee, \$47.

Ecology and management of large wild mammals with emphasis on North American species both hunted and nonhunted.

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. Special fee, \$25.

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 502 03(2-2-0). Fish Reproduction and Early Life History.** S. Prerequisite: FW 300.

Fish reproduction; embryology; larval biology, habitat, management.

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.

⁰FW 540 04(2-0-2). Fisheries Ecology. F. 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, EH 446, ST/STCC 301; or written consent of instructor.

Ecological effects of contaminants on populations, communities, and ecosystems.

FW 551 Var [2-3]. Design of Fish and Wildlife Studies. F. Prerequisite: 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. Special fee, \$32.

Strategies for biologic, chemical, integrated control of wildlife pests; life histories, management; economic, cultural restraints on control methods.

FW 57303(3-0-0). TravelAbroad-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.

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.

^oFW 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.

GEOGRAPHY COURSES
*Department of Earth Resources**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.

^oGR 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.

+GR 342 03(3-0-0). Geography of Water Resources. F. Special fee, \$10.

Overview of spatial and temporal issues.

+^oGR 345 03(3-0-0). Geography of Hazards. S. Prerequisite: GR 210.

Special fee, \$10.

Causes, effects, distributional patterns, and human adjustments to environmental hazards.

GR 495 Var. Independent Study.**GR 595 Var. Independent Study.**

GRADUATE SCHOOL COURSES
*Office of Graduate School***GS 510 03(2-2-0). Fundamentals of High Performance Computing.**

F. Prerequisite: CS 152.

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 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. F, S. Prerequisite: High school biology. Special fee, \$20.

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. Special fee, \$20.

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.

+H 221 04(2-4-0). Landscape Plants. F, S. Special fee, \$12.

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. Special fee, \$10.

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. Special fee, \$20.

Theories, principles, and techniques of sexual and asexual propagation.

+H 310 04(3-2-0). Greenhouse Management. F, S, SS. Special fee, \$15. Also offered as an on-line course.

Design and use of enclosed structures to manipulate controlled environments, effects on growth as applied to crops, production, and marketing crops.

+*H 321 04(3-2-0). Nursery Production and Management. S. Prerequisite: H/H CC 100. Special fee, \$20.

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. Special fee, \$20.

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. Special fee, \$20.

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. Special fee, \$14.

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. Special fee, \$6.

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.

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.

H 375 02(2-0-0). Resources for Horticultural Therapy Programs. F. Prerequisite: H 170. Offered only off campus.

Resource development for horticulture therapy programs, including funding, research, human resources, community integration, and marketing HT services.

H 384 Var [1-5]. Supervised College Teaching. F, S. Maximum of 10 credits allowed in course.

+⁰**H 412 04(3-0-1). Floriculture Crops.** F. Prerequisite: H 310. Special fee, \$15.

Commercial production and marketing of bedding plants, potted container crops, and cut flowers.

+**H 432 05(2-6-0). Intensive Landscape Design Studio.** S. Prerequisite: H 332. Special fee, \$20.

Site planning and design for landscape projects of a limited scale. Problems of increasing complexity. Emphasis on real sites and clients.

+⁰**H 441 03(3-0-0). Turfgrass Science.** F. Prerequisite: BZ/BZCC 120, H 341, SC 240. Special fee, \$7.50.

Examination of turfgrass management practices from a scientific perspective; discussion of advanced turfgrass management technologies.

+⁰**H 450A-D 01(1-0-0). Horticulture Food Crops.** F. Prerequisite: One plant science course. Special fee, \$10 per subtopic.

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.** F. Prerequisite: H 310 or H 450A-B. Special fee, \$10.

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. Special fee, \$12.

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. Special fee, \$7.

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). Development and Management of HT Programs. S. Prerequisite: H 371, H 373, H 375. Offered only off campus.

Horticultural therapy program development, site planning and management, program proposals.

⁰**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.

⁰**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.

HOUSING AND CONSUMER SCIENCES COURSES

Department of Design and Merchandising College of Applied Human Sciences

HC 384 Var. Supervised College Teaching. F, S. Maximum of 10 credits allowed in course.

HC 494A-E Var. Independent Study.

A) Consumer issues. B) Finance and economics. C) Management. D) Equipment and energy. E) Housing.

HC 496 Var. Group Study.

HC 590 Var. Workshop.

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. 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.

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.

HD 254/AY 254 03(3-0-0). Biological Aspects of Human Development. F, S. Prerequisite: BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110. Credit not allowed for both HD 254 and AY 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.

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 Var [2-3]. Practicum-Observational Skills. Prerequisite: CO/COCC 150 and HD/HDCC 101 or concurrent registration.

Observational experience with children, adolescents, and families.

HD 301 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. Also offered as telecourse.

Using multidisciplinary perspectives to explore a variety of issues in human aging; emphasis on applied gerontology.

HD 302 03(3-0-0). Marriage and Family Relationships. F, S. Prerequisite: PY/PYCC 100, S/S CC 100. Also offered as telecourse.

Preparation for and adjustment to marital and family relationships throughout the life cycle.

HD 310 03(3-0-0). Infant and Child Development in Context. F, S. Prerequisite: HD/HDCC 101 and PY/PYCC 100. Also offered as telecourse.

Physical, cognitive, and socioemotional development from conception through middle childhood in context of family, relationships, and culture.

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. Also offered as a correspondence course.

Developmental issues and processes pertaining to middle and later adulthood. Contexts in which adult development and aging occur are emphasized.

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.

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.

HD 354 03(3-0-0). Biological Aspects of Aging. S. Prerequisite: BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110. Also offered as correspondence course.

Biological human and comparative aging, including cellular and genetic mechanisms, alterations to organ systems due to aging, and disease conditions.

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.

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.

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.

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 03(3-0-0). Adult Development and Aging.** F, S. Prerequisite: One course in adult development or three credits of upper-division behavioral science.

Advanced study of developmental change and adaptation during adult years.

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 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.

^oHD 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 02(2-0-0). Applications of Marital and Family Therapy. F, S, SS. Prerequisite: HD 677 or concurrent registration; admission to MFT Program.

Applications of family therapy theory to clinical cases.

HD 684 Var. Supervised College Teaching. F, S.

HD 686A-E Var [1-15]. Practicum. Prerequisite: Nine credits in human development.

Application of human development skills in a variety of professional settings. A) Human development. B) Family studies. D) Developmental assessment. E) Early childhood education.

HD 687A-C Var. Internship. Prerequisite: A-B) Nine graduate credits in human development. C) HD 677, HD 678, HD 688 or concurrent registration.

Application of advanced human development skills in professional settings. A) Human development. B) Family studies. C) Marriage and family therapy.

HD 688 Var [1-5]. Field Placement. Prerequisite: Admission to MFT Program; concurrent registration in HD 678.

Application of knowledge, skills, and methods to therapy and intervention.

HD 692 03(3-0-0). Seminar-Contemporary Family Issues. Prerequisite: Six credits in behavioral sciences.

Current issues in the family with implications for intervention and therapy.

HD 695A-C Var. Independent Study.

A) Human development. B) Family studies. C) Early childhood education.

HD 697 Var [1-6]. Group Study.

HD 698A-B Var [1-3]. Research.

A) Human development. B) Family studies.

HD 699 Var. Thesis. Prerequisite: HD 550.

HE 670 03(0-0-3). College Student Personnel Administration. F. Prerequisite: Written consent of instructor.

Historical, philosophical, and professional development in student affairs functions; analysis of role of student affairs in higher education.

HE 671 02(2-0-0). Higher Education Administration. F. Prerequisite: HE 670.

Purpose, structure, and role of administration of higher education. Emphasis on financial management for student affairs administrators.

HE 673 03(0-0-3). Student Development Theory. F. Prerequisite: HE 670.

Strategies for application of student development theories in practice of student affairs.

HE 675 03(3-0-0). The Community College. F. Prerequisite: VE 601 or appropriate experience.

Role and scope of community college: history, philosophy, organization, administration.

HE 676 03(3-0-0). Organizational Behavior in Student Affairs. S. Prerequisite: HE 670.

Understanding and application of basic organizational behavior principles within administration of student affairs in higher education.

HE 677 03(2-0-1). 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 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.

HE750 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.

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 792 Var [1-6]. Seminar-Community College Leadership. Prerequisite: HE 710 or consent of program chair.

HE 799 Var. Dissertation.

HONORS COURSES

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 102 01(0-0-1). Honors Attributes of Living Systems. F. Corequisite: BY/LSCC 102; participation in University Honors Program. Selected readings complementing "Attributes of Living Systems" material.

HP 103 02(1-0-1). Honors Biology of Organisms. S. Corequisite: BY 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. 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. 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 375 03(3-0-0). The Brain-A User's Guide. S. Prerequisite: Participation in University Honors Program or approval of the Honors Program and written consent of instructor. How the brain functions and how to think about the mechanisms underlying thoughts and behaviors.

HP 384 Var. Supervised College Teaching. F, S.

HPCC 392 03(0-0-3). Seminar. 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.

HP 492 03(0-0-3). Seminar. Prerequisite: Participation in University Honors Program.

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 Var [3-5]. Senior Honors Thesis. Prerequisite: Enrolled in the University Honors Program and approval of the Honors Director. Maximum of 6 credits allowed in course.

HUMAN SERVICES COURSES

College of Applied Human Sciences

HSCC 192 02(0-0-2). Applied Human Sciences First Year Seminar. F, S, SS. Concepts and topics integral to applied human sciences; development of community; enhancement of reading, critical thinking, and communication skills.

HSCC 300 03(3-0-0). Research in Applied Professions. F, S, SS. Application of social science research methodology to applied professions including problem formulation, research design, and data collection.

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 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. 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. F, S, SS.

Historical development of Western civilization from c. 1600 C.E. to the contemporary era.

HYCC 115 3(3-0-0). Islamic World to 1500. 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. F.

Major traditional intellectual and cultural patterns of Asia during the formative years.

HYCC 150 03(3-0-0). U.S. History to 1876. 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. 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. 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. 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. S.

Religion, society, and culture in the Islamic world since 1500.

HYCC 216 03(3-0-0). The Islamic World. S.

Religion, society, and culture in the Islamic world since the time of Muhammad.

HYCC 219 03(3-0-0). Africa-Precolonial States and Empires. 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. S.

Transformation of major intellectual and cultural patterns and the process of globalization in Asia.

HYCC 230 03(3-0-0). Medieval Europe. 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. F. Political, cultural, socioeconomic development of Slavic and East Central Europe emphasizing similarity and diversity of the peoples of the region.

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. 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. 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. 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. 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 264 03(3-0-0). The War in Vietnam. S.

Causes and consequences of U.S. involvement in the war in Vietnam.

HYCC 270 03(3-0-0). Colonial Latin America. F.

Iberian (Spanish and Portuguese) empires in America: origins, establishment, organization, and conclusion in independence.

HYCC 271 03(3-0-0). Latin America Since Independence. S.

Development of nation-states in Latin America; their adjustment to independence in 19th and 20th Centuries.

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.

Basic historical skills and methods with emphasis on research, writing, and interpretation. Topics vary by instructor.

***HY 302 03(3-0-0). Ancient Civilization-Near East.** S.

Development of civilization in Near East from neolithic times to 500 B.C. emphasizing Mesopotamia and Egypt.

HY 303 03(3-0-0). Ancient Civilization-Greece. S.

From Minoan to Roman times emphasizing political, socioeconomic, and cultural developments.

°HY 304 03(3-0-0). Ancient Civilization-Rome. S.

From Etruscan period to later Empire stressing political, legal, social, economic, and cultural achievements.

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 340 03(3-0-0). China Until the Manchus. F, SS.

Chinese civilization from the Shang to the Manchu period, emphasizing cultural development and China's place in world history.

HY 341 03(3-0-0). China Since the Manchus. S, SS.

Chinese civilization from the Manchu conquest to present, emphasizing cultural continuity as China developed from imperial to socialist state.

***HY 344 03(3-0-0). Muhammad and the Origins of Islam.** F.

Emergence of Islam and growth of the Islamic community from time of Muhammad to decline of the Arab Caliphate.

°HY 345 03(3-0-0). The Medieval Middle East. S.

The Middle East from the time of the Crusades to the rise of the Ottoman Empire.

HY 348 03(3-0-0). The Modern Middle East. S.

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 HY/HYCC 270 or HY/HYCC 271.

Socioeconomic, political, and cultural development of the nations of the Caribbean.

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). Age of Jefferson. F, SS. Prerequisite: HY/HYCC 150.

Society, culture, and political life in times of Thomas Jefferson.

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 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 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 420 03(3-0-0). History of Spain. F.

Iberian Peninsula from Roman era emphasizing modern Spain.

HY 421 03(3-0-0). Modern France Since 1789. F.

France from the Revolution to present.

***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 440 03(3-0-0). Imperial Russia. F, S, SS. Also offered as correspondence course.

Tsarist Russia from its beginnings to November 1917 Revolution with emphasis on modern period.

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 453 03(3-0-0). Pacific Wars, 1937-1975. S.

World War II in the Pacific; subsequent conflicts in China, Korea, and Viet Nam.

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 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 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.

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 500A-C 03(0-0-3). Historical Method. F. Prerequisite: Written consent of instructor.

A) Historiography. B) Archives. C) Historic preservation.

HY 510A-C 03(0-0-3). Reading Seminar. F, S, SS. Prerequisite: HY 500A or written consent of instructor.

A) United States. B) Europe. C) Third World.

***HY 515 03(3-0-0). Archival Records Management.** S. Prerequisite: HY 500A.

Historical context of records management and instruction in techniques for controlling, creation, use, and disposition of records.

HY 586 Var. Practicum. Prerequisite: HY 500A.

HY 587 Var [1-6]. Internship. Prerequisite: HY 500A or written consent of adviser.

Work-oriented instruction involving implementation of classroom or laboratory experiences coordinated by faculty member.

HY 610A-C 03(0-0-3). Research Seminar. F, S, SS. Prerequisite: HY 500A or written consent of instructor.

A) United States. B) Europe. C) Third World.

HY 684 Var. Supervised College Teaching. F, S, SS.

Discussions and readings to enhance teaching proficiency.

HY 695 Var. Independent Study. Prerequisite: HY 500A.

HY 697 Var [1-3]. Group Study.

HY 699 Var. Thesis. Prerequisite: HY 500A.

INTERIOR DESIGN COURSES

Department of Design and Merchandising

College of Applied Human Sciences

ID 166 03(0-6-0). Design Sketching. F.

Conceptual sketching techniques focusing on the built environment.

ID 175 03(1-4-0). Small-Scale Interiors. S. Prerequisite: DM 130 or concurrent registration.

Application of elements and principles of design and human factors to small-scale interiors.

ID 250 03(3-0-0). Interior Facility Design. S.

Designing facilities to coordinate physical workplace with people and work of an organization.

ID 266 03(0-6-0). Design Communications I. F, S. Prerequisite: MC 131.

Introduction to drawing and presentation techniques for interior design.

ID 275 03(1-4-0). Interior Design I. F, S.

Overview of interior design discipline; application of elements and principles of design, awareness of human factors, and understanding programming.

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 320 03(2-2-0). Computer-Aided Design. F. Prerequisite: Formal admission to junior-level courses.

Computer-aided drafting and design using a microcomputer and various software including AutoCAD.

ID 330 03(3-0-0). Color and Light. F. Prerequisite: ID 275. Special fee, \$15.

Theories and systems of color and light.

ID 340 03(3-0-0). Interior Materials and Market Study. S. Prerequisite: Formal admission to junior-level courses.

Analysis of materials and understanding of resources for interior design professionals.

***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 366 03(0-6-0). Design Communications II. S. Prerequisite: ID 375.

Advanced communication and presentation techniques for interior designers.

ID 375 03(1-4-0). Interior Design II. F. Prerequisite: Formal admission to junior-level courses.

Application of design elements and principles to small-scale interiors, emphasizing human factors in interior design.

ID 376 03(1-4-0). Interior Design III. S. Prerequisite: ID 320, ID 330, ID 375.

Application of components of interior design to intermediate-scale interiors.

ID 384 Var. Supervised College Teaching. Maximum of 10 credits allowed in course.

ID 420 03(1-4-0). Computer Multimedia in Interior Design. S. Prerequisite: ID 320.

Three-dimensional communication of interior spaces using multimedia technologies.

ID 430 03(3-0-0). Environmental Technologies. F. Prerequisite: ID 375 or senior status in restaurant/resort management or written consent of instructor.

Technical systems of interior environment and their influence on human comfort.

***ID 440 02(2-0-0). Professional Practice for Interior Designers.** S. Prerequisite: ID 375.

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 457 03(3-0-0). History of American Interiors. F. Prerequisite: AR/ARCC 100.

Historical interiors in the United States through the 20th century.

ID 460 03(3-0-0). Housing and Design for Special Populations. F, S. Prerequisite: ID 275.

Housing and design problems of special population groups.

ID 475 03(1-4-0). Interior Design IV. F. Prerequisite: ID 340, ID 357, ID 366, ID 376.

Comprehensive planning and design of large-scale interior environments.

ID 476 03(1-4-0). Comprehensive Design Project and Portfolio. S. Prerequisite: ID 320, ID 457, ID 475.

Senior exhibition and portfolio organization using all major interior design components.

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. 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 270A/A CC 270 03(3-0-0). World Interdependence-Population and Food. S. Credit not allowed for both IE/IECC 270A and A/A CC 270.

Survey of world population and food; emphasis on understanding the problems and opportunities in a world context.

IE 270B-C. World Interdependence.

*B) The revolutionary century. 03(3-0-0). F. C) Current global issues. 01(1-0-0). F.

IE 271 03(3-0-0). India. S.

Interdisciplinary interpretation of philosophical, historical, cultural, physical, social, and technological influences shaping modern India.

IE 470 03(3-0-0). Women and Development. S.

Research and policy issues related to women in developing countries.

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) HY/HYCC 273, HY/HYCC 274, IN 300. B) HY/HYCC 270, HY/HYCC 271, 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. 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. 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. F, S, SS. Prerequisite: admission to major.

Basic journalism skills; newsgathering and newswriting.

JT200 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 tests.

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. 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.

JT 310 04(2-4-0). Copy Editing and Production. F, S. Prerequisite: JT 210.

Theory and practice of copy preparation and editing; publication design and layout. Introduction to commercial printing processes.

JT 311 03(3-0-0). History of Media. F, S.

Media development, growth, trends within context of political, social, and economic change.

JT 316/ET 316 03(3-0-0). Multiculturalism and the Media. S. Credit not allowed for both JT 316 and ET 316.

Media and multiculturalism with emphasis on race, ethnicity, and other protected groups.

JT 320 03(1-4-0). Reporting. F, S. Prerequisite: JT 210.

Theory, methods, and practice of gathering information and reporting news.

JT 326 03(2-2-0). Online Journalism. F, S. Prerequisite: 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. Special fee, \$25.

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. Special fee, \$85.

Theory and technique of editing picture and sound on analog and digital platforms.

JT 341 03(2-2-0). Broadcast News. F, S. Prerequisite: JT 210. Special fee, \$30.

Practical application of principles, techniques used in broadcast newswriting and radio and television reporting.

JT 342 03(2-2-0). Writing for Specialized Electronic Media. F. Prerequisite: JT 210.

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. Special fee, \$85.

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.

JT 351 03(2-2-0). Public Relations Practices. F, S. Prerequisite: JT 210, JT 350.

Case studies, problems in public relations. Planning, preparation, and application of public relations techniques.

JT 361 03(2-2-0). Writing for Specialized Magazines. F, S. Prerequisite: JT 210.

Writing articles for agricultural, business, hobby, technical, trade, and other specialized periodicals whose readers use information to make decisions.

JT372 03(2-2-0). Web Design and Management. F, S. Prerequisite: 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 and Society. F, S.

Relation of media systems to the social system; ethics and journalism.

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.

JT413 03(3-0-0). New Communication Technologies and Society. F, S.

Political, economic, social, philosophical, legal, and educational impacts of new technologies.

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.

JT435 03(2-3-0). Documentary Video Production. F. Prerequisite: JT 345. Special fee, \$85.

Writing, directing, and editing of long-form television documentaries.

+JT440 03(2-2-0). Advanced Electronic Media Production. F, S. Prerequisite: JT 345 or JT 372. Special fee, \$60.

Techniques and concepts used in advanced media production for television, multimedia applications, and Internet distribution.

JT 450 03(2-2-0). Public Relations Campaigns. F, 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 460 03(3-0-0). Publication Management. F, S.

Advertising, circulation, editorial, production, and management problems of print media.

JT 461 03(2-2-0). Writing about Science, Health, and Environment. F. Prerequisite: JT 210.

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.

JT465 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.

JT502 03(3-0-0). Technical Communication. F, S. Offered only off campus.

Communication principles and their application emphasizing technical communication in a business environment.

JT513 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.

JT544 03(2-3-0). Corporate and Institutional Media Production. S. Special fee, \$30.

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.

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 696 Var [1-3]. Group 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. 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

Foreign Languages and Literatures Department College of Liberal Arts

L CC 105 05(5-2-0). First-Year Language I. F, S, SS. Prerequisite: Registration allowed only for students with no previous study in the language. Credit not allowed for both L/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.

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. 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 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. S.

Language, cultural issues, and historical heritage of modern Italian and Japanese societies.

L CC 200. Second-Year Language I. 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. 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/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. 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. 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. S) Spanish.

L CC 255 03(3-0-0). Crossing Cultures. 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. 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: L/L CC 201 or L 208.

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. G) German. S. 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 Spanish Translation/Interpreting. F, S. Prerequisite: L 313S or written consent of instructor.

Advanced practice in translation and interpreting of written and oral texts into and from 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 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 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 492 03(0-0-3). Language, Literature, and Society. F, S. Prerequisite: L 310 and two 400-level courses; senior status.

Integrative study of language, literature, and society emphasizing relationships between texts and the society of their origin. 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: F, G, S) L/L CC 300. J, R) L 305.

Group study in language/literature/culture. C) Chinese. F) French. G) German. I) Italian. J) Japanese. R) Russian. S) Spanish. X) General.

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 596 Var [1-5]. Group Study.

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.

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. Special variable (\$40-\$90) fee determined by department. 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. Special variable (\$40-\$90) fee determined by department. Initiation of formal exploration of design elements, materials, and principles, and introduction of design process as a defensible methodology.

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. Special variable (\$40-\$90) fee determined by department. Site programming, analysis, design, and construction, including skill development in specifying earthwork, drainage, and vegetative composition.

+LA 361 03(2-2-0). Digital Methods. S. 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. Special variable (\$40-\$90) fee determined by department. 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. F. Prerequisite: LA 360 or concurrent registration. Special variable (\$40-\$90) fee determined by department. 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. Special variable (\$40-\$90) fee determined by department. 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. Special variable (\$40-\$90) fee determined by department. 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. Special variable (\$40-\$90) fee determined by department. Idea, values, and process landscape form applied to interactions of natural, cultural systems at the site and community scale; design competitions.

LANDSCAPE ARCHITECTURE COURSES

Department of Horticulture and Landscape Architecture

College of Agricultural Sciences

+LA 110 03(1-2-1). Introduction to Landscape Architecture. F. Special fee, \$15. Introductory theories, methods, and applications of landscape studies.

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 445 03(1-4-0). Environmental Analysis. S. Prerequisite: LA 366.

Exploration and understanding of natural and cultural landscapes through analytical simulation techniques and geographic information system technology.

+LA 446 04(0-8-0). Urban Design. F. Prerequisite: LA 366. Special variable (\$40-\$90) fee determined by department.

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. Special variable (\$40-\$90) fee determined by department.

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: BZ 355, 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 486 Var [1-8]. Landscape Architectural Practicum. Maximum of 16 credits allowed in course.

Public and private assistance projects for Colorado communities.

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. Special variable (\$30-\$50) fee determined by department.

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 445 or written consent of instructor. Special variable (\$30-\$50) fee determined by department.

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. F, S.

Culturally significant literary texts from the beginnings of writing to 1500 from Europe, Asia, and Africa.

LBCC 171 03(3-0-0). World Literatures-The Modern Period. F, S.

Culturally significant literary texts from 1500 to the present from Europe, Asia, Africa, the Americas.

LBCC 192 03(0-0-3). College of Liberal Arts First-Year Seminar. F.

Traditions, concepts, and topics integral to the liberal arts; cultivates reading, communication, and critical thinking.

LB 487 Var [1-3]. Internship.

LB 492A-B 01(0-0-1). Seminar

Capstone course for liberal arts majors. A) Arts and humanities. B) Social sciences.

LIBRARY INFORMATION COURSE

Office of University Libraries Dean

LI 301 01(1-0-0). Research in the Information Age. F, S.

Developing strategies for library research; locating appropriate resources; and selecting, evaluating, and recording relevant information.

LIFE SCIENCE COURSES

Office of Provost/Academic Vice President

LSCC 102 04(3-2-0). Attributes of Living Systems. F, S, SS. Prerequisite: 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.

MATHEMATICS COURSES

Department of Mathematics

College of Natural Sciences

M CC 117 01(1-0-0). College Algebra in Context I. 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. 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. 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. 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. 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. 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. 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. 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. 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. 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. 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. 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.

M CC 160 04(3-2-0). Calculus for Physical Scientists I. 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.

M CC 161 04(3-2-0). Calculus for Physical Scientists II. 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 151 or CS/CSCC 153 or CS 154, 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. 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. 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. 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). Methods of Applied Mathematics II. 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(4-0-0). Introduction to Ordinary Differential Equations. F, S, SS. Prerequisite: M/M CC 255 or M 261. Credit not allowed for both M 340 and M 345.

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 not allowed for both M 345 and M 340.

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 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.

M369 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.

M417 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). Capstone in Applied Mathematics. F. Prerequisite: M 331, M 340 or M 345, M 369, CS/CSCC 153 or CS 154.

Open-ended projects with emphasis on problem identification and formulation, team approach, and reporting results.

M 460 03(3-0-0). Information Integrity and Security. F. Prerequisite: M 369; M 301 or M 366.

Modern algebra applied to information theory; finite fields; error correcting codes, computational complexity, one-way functions, cryptosystems.

M466 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). Euclidean and Non-Euclidean Geometry. S. Prerequisite: M/M CC 161.

Topics from real Euclidean, affine metric and non-Euclidean geometries emphasizing methods and connections with other areas of 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 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, Riemann-Stieltjes integral.

M 518 03(3-0-0). Introduction to Mathematical Analysis II. S. Prerequisite: M 369, M 517.

Sequences and series of functions. Differential and integral calculus of functions of several variables.

M 519 03(3-0-0). Complex Variables I. F. Prerequisite: M 317.

Analytic functions, complex integration theory, singularities, elementary functions, and mappings.

M 520 03(3-0-0). Nonlinear Programming. S. Prerequisite: EG 510/M 510.

Theoretical, computational, practical aspects of nonlinear programming (NLP); unconstrained, constrained NLP; quadratic programming; large-scale NLP.

***M 525 03(3-0-0). Optimal Control.** F. Prerequisite: M 340 or M 345.

Theory and application of optimal control and optimal estimation theory; continuous and discrete time systems; Pontryagin maximum principle.

M 531 03(3-0-0). Discrete Models of Physical Systems. F. Prerequisite: M 340 or M 345.

Discrete models for physical systems; systems of ordinary differential equations, applied linear algebra; introduction to finite elements.

M 532 03(3-0-0). Continuous Models of Physical Systems. S, SS. Prerequisite: M 340 or M 345. Credit not allowed for both M 532 and M 332.

Continuous models for physical systems, integral transforms, and eigenfunction expansions for solving partial differential equations.

M 540 03(3-0-0). Dynamical Systems. F. Prerequisite: M 369, M 417.

Linear and nonlinear systems, orbits, phase space, flows of vector fields, stability, bifurcation theory, chaos, strange attractors and applications.

M 545 03(3-0-0). Partial Differential Equations I. F. Prerequisite: M 340 or M 345.

Second order linear PDEs, elliptic and parabolic equations, equations of math physics, separation of variables, Fourier series.

M 546 03(3-0-0). Partial Differential Equations II. S. Prerequisite: M 545.

Laplace's equation, Green's functions, complex variable methods, eigenfunction expansions.

M 550 03(3-0-0). Difference Methods-Partial Differential Equations. S. Prerequisite: M 532 or M 545; knowledge of a programming language.

Explicit, implicit methods for second order equations, higher-dimensional problems, stability analysis, method of characteristics.

M 560 03(3-0-0). Linear Algebra. F. Prerequisite: Written consent of instructor.

Finite dimensional vector spaces, inner products, dual spaces, transformations, projections, adjoints, norms, eigenvalues, eigenvectors.

M 561 04(4-0-0). Numerical Analysis I. S. Prerequisite: M 369 and preparedness to do programming in a standard language.

Numerical linear algebra, solving nonlinear systems, least squares, and minimization.

M 566 03(3-0-0). Introduction to Abstract Algebra I. F. Prerequisite: M 366.

Analysis of algebraic structures including groups, rings, fields, and vector spaces.

M 567 03(3-0-0). Introduction to Abstract Algebra II. S. Prerequisite: M 566.

Field theory, Galois theory, and advanced linear algebra.

M 570 03(3-0-0). Topology I. F. Prerequisite: Twelve credits of mathematics at 300 level or above.

Point-set topology including basic set theory, continuity, product and quotient spaces, metrization, compactness, and connectedness.

M 571 03(3-0-0). Topology II. S. Prerequisite: M 566, M 570.

Fundamental group, free groups and presentations, and manifolds.

M 584 01(1-0-0). Supervised College Teaching. F, S.

M 592 01(0-0-1). Seminar in Mathematics. F, S, SS.

M 601 03(3-0-0). Advanced Combinatorics I. F. Prerequisite: M 502, M 566.

Special numbers, mobius inversions, transversals, partial orders, different sets, codes, t-designs.

M 602 03(3-0-0). Advanced Combinatorics II. S. Prerequisite: M 601.

Hypergeometric functions, graph algorithms, hadamard matrices, strongly regular graphs, association schemes.

M 617 04(4-0-0). Real Analysis I. S. Prerequisite: M 517.

Measure and integration, Fubini's theorem, Lp spaces, differentiation theory.

M 618 03(3-0-0). Real Analysis II. F. Prerequisite: M 560, M 617.

Normed linear spaces, Banach and Hilbert spaces, elements of functional analysis.

M 619 03(3-0-0). Complex Variables II. S. Prerequisite: M 519.

Infinite products, entire functions, analytic continuation, Reimann 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 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

College of Veterinary Medicine and Biomedical Sciences

MBCC 149 03(3-0-0). The Microbial World. F, S.

Importance of microbiology in daily life, with emphasis on positive and negative roles of microbes, infectious disease, and current microbiology issues.

MBCC 192 02(0-0-2). Microbiology First-Year Seminar. F.

Introduction to microbiology major and faculty; academic and career planning; information sources in biomedical sciences.

MB 275 02(1-0-1). Microcomputing Applications in Microbiology. S.

Network software on MS-DOS microcomputers will be used to acquire and analyze data and information that are commonly encountered in microbiology.

MB 300 03(3-0-0). General Microbiology. F, S, SS. Prerequisite: C 245 or C 341 or concurrent registration; BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120.

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 335 032(0-4-0). Food Microbiology Laboratory. F. Prerequisite: MB 301 or MB 302.

Laboratory skills and techniques related to the presence of microorganisms in food, production, and preservation.

MB 342 04(3-0-1). Immunology. S, SS. Prerequisite: MB 300.

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/EN 462 05(3-4-0). Parasitology and Vector Biology. F. Prerequisite: BY 103 or BZ/BZCC 110; MB 301 or MB 302 or BZ 212. Credit allowed for only one of the following: MB 462, BZ 462, EN 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/EN 562 05(1-8-0). Field Ecology of Disease Vectors. S. Prerequisite: MB 462/BZ 462/EN 462 or MB 300; EN 302. Credit allowed for only one of the following: MB 562, BZ 562, EN 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. Special fee, \$50.

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 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 343.

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 784 Var. Supervised College Teaching. F, S, SS.

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. Special fee, \$5-10.

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. Special fee, \$3.

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. Also offered as correspondence course and online course.

Introduction to and application of computer-aided design and drafting software. Applications using the latest release of AutoCAD.

MC 141 02(1-0-1). Applications of Energy/Transportation. F, S.

Explores how natural resources are converted into energy used for transportation and environmental control.

MC 151 03(2-2-0). Introduction to Manufacturing and Construction. F, S. Special fee, \$25.

Applied introduction to construction and manufacturing materials, processes, and systems.

MC 210 03(2-2-0). Quality Improvement Techniques. F, S.

Decision-making tools utilized in quality assessment and improvement efforts in modern organizations.

MC 231 02(1-2-0). Architectural Plan Reading. F, S, SS. Prerequisite: MC 131, MC 151.

Architectural plan reading; representation, scale, coordination, and accuracy.

MC 233 03(2-2-0). Manufacturing Graphics. F, S. Prerequisite: MC 131, MC 151.

Manufacturing graphics principles: auxiliary views, fasteners, welding, fits, surface finishes, and linkages.

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.

MC 235 02(1-2-0). Construction Graphics. F, S. Prerequisite: MC 131, MC 231 or concurrent registration. Interior Design students must be approved for advancement to 2nd year level. Special fee, \$3.

Technical drawing principles; techniques for producing building site plans, floor plans, elevations, sections, and interior details.

MC 241 03(2-2-0). Energy Controls for Industry. F, S, SS. Special fee, \$20.

Selection, application, and evaluation of electronics and fluidics-based control systems.

MC 242 03(2-2-0). Analog and Digital Electronics. F, S. Prerequisite: MC 241. Special fee, \$30.

Theories and applications of analog and digital electronics.

MC 251 03(2-2-0). Materials Testing and Processing. F, S. Prerequisite: MC 151, PH/PHCC 111. Special fee, \$20.

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/M CC 125. Special fee, \$10.

Surveying fundamentals to field of construction, building layout, measurement procedures, vertical controls, line and grade, surveying, instrument operation.

MC 310 03(2-2-0). Process Planning and Costing. S. Prerequisite: MC 210.

Application of project management software to manufacturing process planning and costing in areas such as new product introduction or plant layout.

MC 317 02(2-0-0). Safety Management. F, S.

Safety management in a) industrial, b) construction, or c) school environments.

MC 318 03(2-2-0). Manufacturing Facilities Planning. S. Prerequisite: BN 301, JT/JTCC 300, SP/SPCC 200.

Designing, planning, equipping, and organizing manufacturing facilities.

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 Educational Outreach.

How construction type, alterations, design and materials influence a building's reaction to fire. Fireground influence on tactics and strategy.

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 Educational Outreach.

Management of large-scale emergency incidents, including mitigation strategies and organizational management of resources and personnel.

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 Educational Outreach.

Process of preparing reports and developing a proposal supported by research. Introduction to research techniques, Internet and library use; conventions of documentation.

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 Educational Outreach.

Demonstration of knowledge, skill, and professional experience for the purpose of enhancing documentation and career development skills.

MC 342 03(2-2-0). Industrial Controls. F, S. Prerequisite: MC 242. Special fee, \$15.

Industrial electronic control devices emphasizing programmable controllers and devices for control applications.

MC 352 03(2-2-0). Advanced Manufacturing Processes-Metals. F, S. Prerequisite: MC 251. Special fee, \$20.

Material properties and advanced manufacturing processes as they impact the methodologies and costs of manufacturing metallic-based products.

MC 353 03(2-2-0). Industrial Plastics. F, S. Prerequisite: C/C CC 104; MC 251. Special fee, \$20.

Sources, structures, applications, and processing of industrial plastics.

MC 354 03(1-4-0). Advanced Manufacturing Processes-Woods. F. Prerequisite: MC 251. Special variable (\$50-\$100) fee determined by department.

Material properties and advanced manufacturing processes as they impact the methodologies and costs of manufacturing wood-based products.

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 231.

Commercial construction planning, bidding, and contract administration.

MC 363 02(1-2-0). Quantity Surveying. F, S. Prerequisite: MC 231 or concurrent registration.

Fundamentals of quantity surveying based on small examples for different Construction Specification Institute (CSI) divisions.

MC 364 03(2-2-0). Advanced Construction Systems. F, S. Prerequisite: MC 231 or concurrent registration or MC 233. Special variable (\$40-\$55) fee determined by department.

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. Special variable (\$10-\$20) fee determined by department.

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, MC 365 or concurrent registration.

Equipment/methods in heavy and highway construction; equipment selection, productivity, and costs. Infrastructure, tunneling, and trenchless technology.

MC 384 Var [1-5]. Supervised College Teaching. F, S, SS. Maximum of 10 credits allowed in course.

MC 386D-F Var [1-3]. Practicum. Prerequisite: Admission to Teacher Licensure Program.

D) Construction management. E) Industrial technology management. F) Technology education and training.

MC 410 03(2-2-0). Modern Manufacturing Management Strategies. S. Prerequisite: BN 471, MC 310, MC 318.

Evaluation and application of modern manufacturing management strategies for continuous organizational improvement in a competitive global economy.

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 Educational Outreach.

Industrial processes and fire protection managed by fire and safety personnel.

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 Educational Outreach.

Case histories of local, national, and international violent occurrences. Academic training and participation in simulated events.

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 Educational Outreach.

Overview of the three model building codes centering on the Uniform Building Code, how the codes are influenced by and influence the fire service.

MC 442 03(2-2-0). Electronics in Manufacturing. F, S. Prerequisite: MC 342. Special fee, \$15.

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 452 03(2-2-0). CAD and Computer-Aided Manufacturing. F, S. Prerequisite: CE 359, MC 233, MC 352. Special fee, \$20.

Computer-aided design (CAD) and computer-aided programming (CAP) for manufacturing process applications.

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. Special fee, \$5.

Integration of concepts of mathematics and science with technology, industrial processes, and career demands.

MC 474 03(1-4-0). Product Development and Manufacturing. F, S. Prerequisite: MC 352 or MC 354 for technology education and training majors; MC 452 for industrial technology management majors. Special variable (\$15-\$45) fee determined by department.

Industrial organization, materials, processes, and products; product development and manufacturing.

MC 487A-E Internship.

A) Construction management. 06(0-18-0). B) Industrial technology management. Var. C) Technology education and training. Var. D) Construction management I. 03(0-9-0). E) Construction management II 03(0-9-0).

MC 495A-L Var. Independent Study.

A) Automotive-power. B) Construction. C) Drafting. D) Electronics. E) Industrial sciences education. F) Machine tools. G) Manufacturing. I) Welding. J) Wood. L) Robotics.

MC 496A-C Var. Group Study. Maximum of 9 credits allowed per subtopic.

A) Construction. B) Industrial sciences education. C) Industrial technology.

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. Prerequisite: A) MC 354. Special variable (\$40-\$75) fee per subtopic determined by department.

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 550 02(1-2-0). Manufacturing Technology. F, SS. Prerequisite: MC 352.

New techniques of machining and fabricating processes.

MC 556 03(3-0-0). Manufacturing Planning and Administration. F. Prerequisite: Written consent of department head.

Manufacturing processes and procedures involving equipment, facilities, and personnel.

MC 560 03(3-0-0). Applied Project Management. F. Prerequisite: MC 310 or MC 461 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 590B-J Var. Workshop. Special variable (\$30-\$60) fee per subtopic determined by department.

B) Electronics. C) Graphics. D) Manufacturing. E) Wood. F) Auto emissions control. G) Elementary school projects. H) Alternate energy. I) Model rocketry. J) Computer applications.

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). Administration in Industrial Sciences. F, SS.

Administration, supervision, management, and planning techniques necessary for successful operation of industrial sciences.

MC 684 Var. Supervised College Teaching. F, S, SS.

MC 687 Var [1-6]. Internship. Maximum of 6 credits allowed in course.

MC 695A-C Var. Independent Study.

A) Construction. B) Industrial sciences education. C) Industrial technology.

MC 696A-C Var. Group Study. Prerequisite: Written consent of instructor.

A) Construction management. B) Industrial technology management. C) Technology education and training.

MC 698 Var. Research in Industrial Sciences.

MC 699 Var [1-6]. Thesis.

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. 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. S. Prerequisite: M/M CC 161.

Use of digital computers in instrumentation, control, and analysis.

ME 304 03(3-0-0). Engineering Design. S. Prerequisite: ME 307, ME 324, ME 325, ME 331, ME 342 or concurrent registration in these courses..

Design fundamentals, including design processes, project planning, creativity, manufacturing, and human factors.

ME 307 04(3-3-0). Mechatronics and Measurement Systems. F, S.

Prerequisite: CE 261, EE 204, M 340.

Instrumentation and measurement system analysis and design; sensors and actuators; computer data acquisition and control.

ME 324 04(3-2-0). Dynamics of Machines. F. Prerequisite: CE 261, concurrent registration in ME 250.

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 409 03(2-0-1). Manufacturing Quality Design and Control. S. Prerequisite: M 340, ME 250.

Design of decision-making models for industrial engineering.

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/CB 466 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 CB 466.

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: CB 331 or CE 300 or ME 342. Credit not allowed for both ME 448 and EV 448.

Prevention of environmental problems by modification of industrial processes.

ME 460 03(3-0-0). Aeronautics. S. Prerequisite: ME 342.

Thermodynamics and fluid mechanics principles applied to the mechanics, aerodynamics, performance, stability, and control of airplanes.

ME 463 03(2-2-0). Building Energy Systems. S. Prerequisite: ME 344. Credit not allowed for both ME 463 and ME 676.

Comfort, psychrometrics, loads, solar radiation, heating and cooling system design, transport, solar system design, economics.

ME467 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.

ME486A-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 504 03(3-0-0). Advanced Engineering Design. F. Prerequisite: ME 486B.

Systematic design process and various design methodologies; design projects.

***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 02(2-0-0). Reliability Engineering. F. Prerequisite: ST/STCC 309.

Models to predict time to failure of mechanical or electronic devices.

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.

ME524 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 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.

ME538 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.

***ME563 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 570 03(3-0-0). Bioengineering.** F. Prerequisite: ME 307, ME 324.

Physiological and medical systems analysis using engineering methods including mechanics, fluid dynamics, control, electronics, and signal processing.

***ME 571 03(3-0-0). Biomechanics.** S. Prerequisite: BE 470 or ME 570.

Mathematical approach to analysis of living systems, their function, diseases, and replaceable parts.

***ME 573 03(3-0-0). Structure and Function of Biomaterials.** S. Prerequisite: ME 331.

Structure-function relationships of natural biomaterials; application to analysis of biomimetic materials and biomaterials used in medical devices.

***ME604 03(3-0-0). Engineering Design Theory.** S. Prerequisite: ME 504.

Various design theories, design constraint management, and optimal solution using classical and artificial intelligence techniques.

°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.

***ME628 03(3-0-0). Applied Fracture Mechanics.** S. Prerequisite: CE 560.

Stress distribution near cracks; energy criteria for fracture; design criteria; fracture toughness testing.

°ME644 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.

ME676 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.

***ME727 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 752 03(3-0-0). Physical Gas Dynamics II.** S. Prerequisite: ME 551.

Flows with chemical and vibrational rate processes, nonequilibrium kinetic theory, flow with translational nonequilibrium radiative heat transfer in gases.

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

Office of Provost/Academic Vice President

+MS 110 02(2-0-0). Military Skills I. F, S. Special fee, \$20.

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. Special fee, \$20.

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. Special fee, \$20.

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. Special fee, \$20.

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. Special fee, \$50.

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. Special fee, \$50.

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. Special fee, \$45.

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. Special fee, \$50.

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.

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. 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 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.

MUSIC COURSES

Department of Music, Theatre, and Dance *College of Liberal Arts*

MUCC 100 03(3-0-0). Music Appreciation. F, S, SS. Previous musical training not necessary.

Survey of music from a wide range of periods and styles.

MUCC 111 03(3-0-0). Music Theory Fundamentals. 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.

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. COMPOSITION: F) Composition. 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 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(0-3-0). 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(0-3-0). 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(0-3-0). 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(0-3-0). 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, AY 300/PS 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.

^oMU 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. COMPOSITION: F) Composition. 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 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 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 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-M 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.

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. COMPOSITION: F) Composition. 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 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 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 PS 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 504 02(1-3-0). Techniques in Neuroscience II. S. Prerequisite: One college-level course with laboratory in each: biology, biochemistry, physics, and written consent of instructor.

Current methods in cellular and organismal neurobiology and electrophysiology.

NB 505 03(3-0-0). Neuronal Circuits, Systems and Behavior. S. Prerequisite: AY 325 or NB 501 or PS 500.

Anatomical and physiological organization of the nervous system.

^oNB 650 01(1-0-0). Computer Analysis of Neuronal Proteins. S. Theory and practice of using computers to study proteins.

^oNB 750 02(2-0-0). Physiology of Ion Channels. S. Prerequisite: PS 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). B) 04(3-3-0). Prerequisite: Participation in University Honors Program.

NRCC 192 02(0-0-2). Natural Resources Freshman Seminar. 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: BY 103 or BZ/BZCC 120; M/M CC 121. Special fee, \$40.

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 Ranch 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 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. 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 324/A 324 03(2-0-1). Integrated Ranch Management II. S. Prerequisite: NR 224/A 224. Credit not allowed for both NR 324 and A 324.

Application of enterprise planning analysis for use in ranch resource management. Continued emphasis on interdisciplinary systems analysis.

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.

NR 365 03(3-0-0). Environmental Education. S. Prerequisite: 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 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.

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 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.

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.

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.

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.

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.

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.

NR 440 03(2-2-0). Land Use Planning. F. Also offered as an on-line

course.

Integration of natural resource, social, institutional factors in regional resource planning.

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. Special fee, \$23.

Management of wilderness in the U.S. National Wilderness Preservation System and equivalent international wildlands.

NR 483/A 483 02(0-2-1). U.S. Travel-Integrated Ranch

Management. S. Prerequisite: NR 324/A 324. Credit not allowed for both A 483 and NR 483.

Evaluation of integrated ranch management decision alternatives in conjunction with professional resource managers.

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.

NR 503 03(2-3-0). Remote Sensing for Resource Management. 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.

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 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 CS/CSCC 151.

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 687 Var [3-6]. Natural Resources Internship. Prerequisite: NR 525.

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 201 04(3-0-1). Molecular Biosciences-Genetic Mechanisms.

S. Prerequisite: BY/LSCC 102; C/C CC 111, C/C CC 112 or concurrent registration.

Basic molecular genetics and molecular aspects of development.

NS 202 04(3-0-1). Molecular Biosciences-Cellular Biochemistry.

F. Prerequisite: BY/LSCC 102; C/C CC 111, C/C CC 112 or concurrent registration.

Molecular aspects of cellular and subcellular biology and introductory biochemistry.

NS 203 01(0-3-0). Genetic Mechanisms Laboratory. S. Prerequisite:

C/C CC 112, NS 201 or concurrent registration.

Basic molecular genetics and molecular aspects of development laboratory.

NS 204 01(0-3-0). Cellular Biochemistry Laboratory. F.

Prerequisite: C/C CC 112, NS 202 or concurrent registration.

Molecular aspects of cellular and subcellular biology and introductory biochemistry 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). F) Graphics calculator workshop 02(2-0-0). G) Small-scale chemistry. 02(1-2-0). H) Informational technology. 02(0-4-0).

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.

Also offered as on-line course.

Roles and activities in occupational therapy.

OT 215 01(0-0-1). Medical Terminology. F, S. Also offered as on-line course.

Definition and use of medical terms.

OT 320 04(3-2-0). Biomechanical Bases for OT Practice. S.

Prerequisite: AY 301, OT 301, OT 302.

Integrated approach to human movement and purposeful activity performance with application to occupational therapy practice.

OT 321 04(3-2-0). Biomechanical Applications in OT. F.

Prerequisite: OT 320. Special fee, \$8.

Theories and OT evaluation and intervention with persons who have problems that are primarily biomechanical.

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 384 Var [2-5]. Supervised College Teaching. F, S. Maximum of

10 credits allowed in course.

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 404 02(0-2-1). Professional Seminar III. S. Prerequisite: OT

403.

Small group integration of fieldwork with OT theories and practice issues.

OT 420 04(2-4-0). Neurobehavioral Applications in OT I. F.

Prerequisite: AY 345, OT 301. Special fee, \$27.

Theories and OT intervention with persons with central nervous system dysfunction.

OT 421 04(2-4-0). Neurobehavioral Applications in OT II. S.

Prerequisite: OT 420. Special fee, \$6.

Theories and OT intervention with persons with central nervous system dysfunction.

OT 450 03(2-0-1). Research Evaluation in OT Practice. S.

Prerequisite: OT 301, a statistics course.

Importance and methods of research in occupational therapy.

OT 475 03(2-0-1). Management, Systems Delivery, and Leadership. S. Prerequisite: OT 311, OT 321.

Program planning, budgeting, marketing, management styles, supervisory relationships.

OT 486F-I 01(0-2-0). Practicum-OT Treatment. F, S, SS.

Prerequisite: OT 301.

Overview of OT practice areas. F) Level IA. G) Level IB. H) Level IC. I) Level ID.

OT 488I-Z Var [1-20]. Field Placement. F, S, SS. Prerequisite: Written consent of department head. Special fee, \$10 per subtopic.

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 494 Var. Independent Study.

OT 496 Var. Group Study.

OT 498 Var. Research. Prerequisite: OT 450, S 310 or ST/STCC 311.

OT 588I-Z Var [1-20]. Field Placement. Prerequisite: Written consent of department head. Special fee, \$10 per subtopic.

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 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 I. 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 604 02(0-0-2). Graduate Professional Seminar II. F. Prerequisite: OT 603.

Guidance and discussion of fieldwork and classwork with emphasis on professional roles, assessment, and service planning.

OT 605 02(0-0-2). Graduate Professional Seminar III. S. Prerequisite: OT 604.

Guidance and discussion of fieldwork and classwork with emphasis on supervision, conflict management, ethics, and professional development.

OT 606 03(1-2-1). 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 03(2-2-0). 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. F. 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. S. Prerequisite: OT 610.

Evaluation and intervention principles in practice of psychiatric occupational therapy.

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 650 04(3-0-1) 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 04(3-0-1). 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 [1-3]. Occupational Therapy Practicum I. Prerequisite: OT 601.

A) OT practice. B) OT practice and seminar.

OT 688A-H Var [1-16]. Field Placement. Prerequisite: Degree in occupational therapy.

A) Physical dysfunction. B) Psychosocial dysfunction. C) Pediatrics. D) Industrial rehabilitation. E) Gerontology. F) Handrehabilitation. G) Community transition. H) Nontraditional.

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 Pathology

College of Veterinary Medicine and

Biomedical Sciences

PA 315A-B. Human and Animal Disease. F, S. Prerequisite: AY 230/PS 230 or AY 300/PS 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: AY 300/PS 300.

Principles of disease processes; emphasis on reactivity of the diseased cell, tissue, organ, or organism.

°PA 67003(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 700 03(2-2-0). Pathology of Nutritional Diseases.** S. Prerequisite: VM 640.

Functional and morphological changes accompanying nutritional diseases.

°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.

PD 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.

°PD 510/EN 510 03(3-0-0). Insect-Plant Disease Relationships. F. Prerequisite: One entomology or plant disease course. Credit not allowed for both PD 510 and EN 510.

Relationships between insects and various plant pathogens as they affect survival and transmissions of pathogens.

°PD 511/EN 511 01(0-2-0). Insect-Plant Disease Relationships Laboratory. F. Prerequisite: PD 510/EN 510 or concurrent registration. Credit not allowed for both PD 511 and EN 511.

Detailed studies of insect-plant interactions.

***PD 520 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.

PD 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 PD 710 and CM 710.

Genetic manipulation of bacteria, bacteriophage, and yeast including experiments in molecular cloning and gene expression.

°PD 740/SC 740 03(3-0-0). Plant Molecular Genetics. F. Prerequisite: BC 351, SC 330. Credit not allowed for both PD 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.

PERFORMING ARTS COURSES

Department of Music, Theatre, and Dance *College of Liberal Arts*

PFCC 110 03(2-0-1). Performing Arts Around the World. F.

Music, theatre, and dance traditions via exploration of a broad range of representative cultures.

PF 250 02(1-3-0). Performing in Musical Theatre. 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.

PLANT DISEASE COURSES

Department of Bioagricultural Sciences and Pest Management *College of Agricultural Sciences*

PD 361 03(2-2-0). Elements of Plant Pathology. S. Prerequisite: BY/LSCC 102 or BZ/BZCC 104 or BZ/BZCC 120 or H/H CC 100.

Diseases of economic plants.

PHYSICS COURSES

Department of Physics

College of Natural Sciences

PHCC 110 03(3-0-0). Descriptive Physics. 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. 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. 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).

PHCC 122 05(3-2-1). General Physics II. 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).

PHCC 141 05(3-2-1). Physics for Scientists and Engineers I. 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. 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. 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: PH/PHCC 142, M/M CC 161.

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: PH/PHCC 141, M 340.

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: PH/PHCC 142, M 261.

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: PH 314, M 340.

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. S. 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. 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 651 03(3-0-0). Quantum Mechanics . 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 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, photoelectronic 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: PH451 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 741 03(3-0-0). Advanced Electromagnetism. S. Prerequisite: PH 641.

Maxwell's equations, electromagnetic waves, radiation by accelerated charges, special relativity, Lagrangian formulation of electromagnetism.

PH 751 03(3-0-0). Advanced Quantum Mechanics. S. Prerequisite: PH 651.

Wigner-Eckhart theorem, symmetries, density matrix, identical particles, interaction picture, time-dependent perturbation theory, scattering.

***PH 761 03(3-0-0). General Relativity.** S. Prerequisite: PH 641.

Special relativity, gravitation, cosmology, astrophysical applications.

***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 765 03(3-0-0). Statistical Mechanics. 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 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. F, S, SS.

Basic issues in philosophy including theories of knowledge, metaphysics, ethics, and aesthetics.

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.

PLCC 103 03(3-0-0). Moral and Social Problems. 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. 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.

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. 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. S.

Major issues in bioethics.

PLCC 170 03(2-0-1). World Philosophies. F.

Philosophies of North America, Mesoamerica, West Africa, South Asia, and East Asia.

PL 171 03(3-0-0). Religions of the West. F, S.

Major religions of the Near East and West emphasizing their classical development; Judaism, Zoroastrianism, Christianity, Islam.

PL 172 03(3-0-0). Religions of the East. F, S.

Major religions of India and the Far East emphasizing their classical development; Hinduism, Buddhism, Confucianism, Taoism.

PLCC 192 03(0-0-3). Conceptions of the Good Life. F, S.

Explores conceptions of happiness and human flourishing in philosophy and everyday life.

PL 204 03. Ethics in America. F, S, SS. Offered as telecourse only.

Ethical problems in contemporary society.

PL 205 03(3-0-0). Introduction to Ethics. F, S. Prerequisite: Sophomore standing or higher or written consent of instructor. Problems and theories concerning values and standards, right action, and the good life.

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 369 03(3-0-0). Mind and Body in Eastern Thought. S.

Prerequisite: Sophomore standing or higher or written consent of instructor.

Investigation of mind-body and mental activity in eastern tradition.

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 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. 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. 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. 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. B) Credit not allowed for both POCC 192B and POCC 103. C) Credit not allowed for both POCC 192C and POCC 232. D) Credit not allowed for both POCC 192D and POCC 241.

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. 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. F, 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.

PO 301 03(3-0-0). Political Parties and Interest Groups. F. Prerequisite: PO/POCC 101.

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.

Structure, organization, behavior, processes, and policy implications of U.S. legislatures.

PO 305 03(3-0-0). Judicial Politics. F. Prerequisite: PO/POCC 101.

Allocation of powers among judicial structures in American federal system.

PO 306 03(3-0-0). Executive Politics. F. Prerequisite: PO/POCC 101.

Structure, organization, behavior, processes, and policy implications of U.S. executive leadership.

PO 309 03(3-0-0). Urban Politics. F, S. Prerequisite: PO/POCC 101 or PO/POCC 103.

Governmental structures and political processes in urban government.

PO 320 03(3-0-0). Empirical Political Analysis. F, S.

Methods of empirical political inquiry.

PO 321 01(0-2-0). Empirical Political Analysis Laboratory. F, S. Corequisite: PO 320.

Laboratory applications of empirical research methods.

PO 331 03(3-0-0). Politics and Society Along Mexican Border. F, S.

Analysis of U.S.-Mexican relations and domestic politics as these affect regional characteristics and development of U.S.-Mexican border region.

PO 332/EC 332 03(3-0-0). International Political Economy. F, S. Prerequisite: EA/EACC 202 or EC/ECCC 202 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: 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: 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.

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.

Public and contemporary issues relating to U.S. environmental policy.

PO 362 03(3-0-0). Global Environmental Politics. F, S, SS. Prerequisite: 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. Also offered as an on-line course.

Analysis of U.S. space politics, space law, and space policy making.

PO 410 03(3-0-0). American Constitutional Law. F. Prerequisite: PO/POCC 101.

Allocation of powers among structures in American federal system.

PO 413 03(3-0-0). U.S. Civil Rights and Liberties S, SS. Prerequisite: PO/POCC 101.

U.S. Constitutional provisions and cases pertaining to the rights and liberties of individuals.

PO 420 03(3-0-0). Western Political Theory. F, S.

Origin, nature, and function of Western political theories.

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.

Major American theories and ideologies: their development and present uses.

PO 431 03(3-0-0). International Law. F, S. Prerequisite: 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: 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: 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 232, 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.

PO 444 03(3-0-0). Comparative African Politics. S, SS. Prerequisite: 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: 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: 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: 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.

Explanations of policy formation, implementation, and impact.

PO 486A-B. Practicum.

+A) Legislative politics 06(0-8-2). Special fee, \$150. 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, S.

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.****PSCC 122 02(2-0-0). Drugs and the Human Body.** F, S.

Drugs effect on body functions. Implications of drug use in society.

PSCC 124 03(3-0-0). Sexuality and Health. F, S.

Basic concepts of human reproduction, contraception, pregnancy, abortion, and venereal disease; their relationship to health.

PSCC 192 03(0-0-3). First Year Seminar in Physiology. F.

The university and its resources, college survival skills, careers in the biomedical sciences; current issues in health and biotechnology.

PS 200/AY 200 01(0-0-1). Concepts in Human Anatomy and Physiology. F, S. Corequisite: PS 300/AY 300. Credit not allowed for both PS 200 and AY 200.

Basic concepts in the anatomy and physiology of the human body.

PS 230/AY 230 03(3-0-0). Animal Anatomy and Physiology. S.

Prerequisite: BY/LSCC 102, C/C CC107. Credit not allowed for both PS 230 and AY 230.

Comparative systemic anatomy and physiology of farm animals.

PS 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.

PS 300/AY 300 04(4-0-0). Principles of Human Anatomy and Physiology. F, S, SS. Prerequisite: 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. Credit not allowed for both PS 300 and AY 300.

Anatomy and physiology of humans.

PS 302 02(0-3-1). Laboratory in Principles of Physiology. F, S. Prerequisite: AY 300/PS 300 or PS 310/BZ 310 or concurrent registration.

Basic physiology lab exercises.

PS 310/BZ 310 03(3-0-0). Fundamentals of Physiology. S. Prerequisite: BY/LSCC 102 or BZ/BZCC 101 or BZ/BZCC 110; C 245 or concurrent registration. Credit not allowed for both PS 310 and BZ 310.

Basic mechanisms of physiology: comparative and quantitative.

PS 384 Var [1-5]. Supervised College Teaching. F, S, SS. Prerequisite: PS 300/AY 300.

Supervision by and work with graduate teaching assistants in small group learning sessions involving students enrolled in PS 300/AY 300.

PHYSIOLOGY COURSES**Department of Physiology****College of Veterinary Medicine and
Biomedical Sciences**

PSCC 110/EHCC 110 03(2-0-1). Human Health and Environmental Perspectives. F, S, SS. Prerequisite: High school level biology. Credit not allowed for both PSCC 110 and EHCC 110.

Survey of health and wellness, physical activity and nutrition, the environment, drugs and health, diseases and injuries, sexuality and pregnancy.

PSCC 120 02(2-0-0). Human Health and Disease. F, S, SS.

Function of the human body in health and disease; exercises for decision making related to health.

PS 384 Var [1-5]. Supervised College Teaching. F, S, SS. Prerequisite: PS 300/AY 300.

Supervision by and work with graduate teaching assistants in small group learning sessions involving students enrolled in PS 300/AY 300.

PS 410 03(3-0-0). Physiological Responses to the Environment. S. Prerequisite: AY 300/PS 300.

Acute and chronic physiological responses to various environmental factors.

PS 420 03(3-0-0). Cardiopulmonary Physiology. F. Prerequisite: AY 300/PS 300.

Normal and pathophysiology of cardiovascular and pulmonary systems.

PS 430 03(3-0-0). Endocrinology. F. Prerequisite: AY 300/PS 300.

Physiology of the glands of internal secretion.

PS 450 03(3-0-0). Pharmacology. S. Prerequisite: AY 300/PS 300 or PS 310/BZ 310 or written consent of instructor.

Pharmacologic principles, absorption, distribution, metabolism, excretion, side effects, and actions of drugs.

PS 495 Var. Independent Study.

PS 500 04(4-0-0). Mammalian Physiology I. F. Prerequisite: Six credits of biological science. Credit not allowed for both PS 500 and NB 501.

Nervous, muscular, cardiovascular, and respiratory systems.

PS 501 04(4-0-0). Mammalian Physiology II. S. Prerequisite: Six credits of biological science, one physiology course, and one biochemistry course..

Renal, digestive, metabolic, endocrine, and reproductive function.

***PS 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.

***PS 620 03(3-0-0). Cardiovascular Physiology.** S. Prerequisite: PS 500.

Physiology and biophysics of the circulatory system.

***PS 625 03(3-0-0). Pulmonary Physiology.** S. Prerequisite: PS 420 or PS 500.

Structure, function, and pathophysiology of respiratory system.

***PS 631 02(2-0-0). Mechanisms of Hormone Action.** S. Prerequisite: PS 430 or PS 501.

Synthesis, secretion, and mechanisms of action of hormones.

***PS 632 02(2-0-0). Metabolic Endocrinology.** S. Prerequisite: PS 631.

Endocrine regulation of metabolic homeostasis; effects of exercise or pregnancy.

***PS 640 05(5-0-0). Reproductive Physiology and Endocrinology.** F. Prerequisite: PS 501.

Reproductive physiology and endocrinology of vertebrate animals.

***PS 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.

PS 684 Var. Supervised College Teaching. F, S, SS.

PS 699 Var. Thesis.

***PS 710 03(3-0-0). Renal Pathophysiology.** S. Prerequisite: AY 300/PS 300 or PS 501.

Urine formation, acid-base balance and renin-angiotensin-aldosterone system.

***PS 740 03(3-0-0). Metabolism.** F. Prerequisite: PS 501.

Applied pathophysiology of disorders of carbohydrate, lipid, protein, fluid, and electrolyte metabolism.

PS 792 Var [1-5]. Seminar.

PS 795A-E Var. Independent Study.

A) Endocrinology. B) Neurophysiology. C) Cell physiology. D) Cardiopulmonary physiology. E) Reproductive physiology.

PS 796A-C Var. Group Study.

A) Neurophysiology. B) Cardiopulmonary physiology. C) Reproductive physiology.

PS 799 Var. Dissertation.

PSYCHOLOGY COURSES

Department of Psychology

College of Natural Sciences

PYCC 100 03(3-0-0). General Psychology. F, S, SS. Also offered as telecourse.

Principles of psychology emphasizing empirical approaches; theories and research on learning, individual differences, perception, social behavior.

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.

PYCC 192 02(1-0-1). Introductory Seminar. F, S. Corequisite: PYCC 100.

Introduction to the University and the field of psychology. Examination of subareas within psychology and research methods used.

PYCC 228 03(3-0-0). Psychology of Human Sexuality. F, S, SS. Also offered as correspondence course.

Physiology, psychology of human sexuality; cross cultural issues, development, social perspectives, values, sexual dysfunction.

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. Special fee, \$20.

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.

¹PY 295 Var [1-3]. Independent Study.

Individual investigation of a special topic in psychology under direction of faculty.

¹PY 296 Var [1-3]. Group Study.

Collective investigation of a special topic in psychology under direction of faculty.

PY 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. Also offered as correspondence course.

Social psychological theory and research on effects of behavior on the environment; environmental influences on behavior.

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. Also offered as telecourse.

Definition and description of behavior pathology; theory and research on factors in etiology and treatment of behavior disorders.

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.

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. Special fee, \$50.

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. Special fee, \$5.

Exercises and problems in test administration, norming, reliability, validity, and scale construction.

¹PY 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 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. Also offered as correspondence course.

Human thinking and information processing as related to attention, pattern recognition memory, forgetting, hypothesis testing, and problem solving.

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).

¹Maximum of 12 credits allowed for psychology majors toward graduation for any combination of PY 295, PY 296, PY 384, PY 486, PY 488, PY 495, PY 496, PY 498, PY 499; enrollment limited to one per student per semester.

PY 455A-B 02(0-4-0). Physiological Psychology Laboratory. F, S, SS. Prerequisite: PY 250; concurrent registration in PY 454A or B.B. Special fee, \$50 per subtopic.

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.

¹PY 486 Var [1-3]. Practicum.

Supervised work experience in approved psychological setting with periodic consultation of faculty.

¹PY 488 Var [1-3]. Field Placement. F, S, SS.

Supervised affiliation with and/or service work in approved psychological setting.

PY 492 Var [1-3]. Seminar. Prerequisite: For psychology majors or written consent of instructor.

Special topics in psychology; may include psychology of women, psychology of religion, and clinical psychology.

¹PY 495 Var [1-3]. Independent Study.

Individual investigation of a special topic in psychology under direction of faculty.

¹PY 496 Var [1-3]. Group Study.

Collective investigation of a special topic in psychology under direction of faculty.

¹PY 498 Var [1-3]. Research.

Independent research project culminating in formal research paper.

¹PY 499 Var [1-6]. Thesis.

Independent research project culminating in a thesis presented to a faculty committee.

PY 589A-E 02(2-0-0). Special Topics in Psychology and Mental Health. F, S, SS. Offered only through Division of Educational Outreach.

A) Psychological management of difficult child. B) Psychology of communication patterns. C) Psychology of child abuse and child suicide. D) Psychology of and response to disturbed children. E) Psychology of divorce/loss/learning disturbance.

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-K 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) PY 452. G) PY 315. H) PY 260. I) PY 325. J) PY 340. K) PY 370.

A) History. B) Physiological. C) Neuropsychology. D) Sensation and perception. E) Animal learning. F) Human learning and memory. G) Social. H) Developmental. I) Personality. J) Group and organizational. K) Measurement.

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 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. F. 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. 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. S. 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. F. Prerequisite: C 114, M/M CC 155; R 530 or concurrent registration. Theory and application to 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 or C or D. 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. L) Hyperthermia. 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, S.

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 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; fulfillment of 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. Special fee, \$25.

Management of advanced techniques in culinary technique; catering of food and beverages for special functions.

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.

RR231 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. Prerequisite: RR 100.

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. Prerequisite: RR 100.

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. S. Prerequisite: RR 100.

Develop administrative and program planning skills for private, public, and nonprofit recreation/tourism organizations.

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 100.

Budget development, presentation, types, techniques; computer-aided budgeting using spread sheets; revenue generating sources.

RR 376 03(2-2-0). Recreation Measurements. F. Prerequisite: RR 100, 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(0-6-0). Park and Protected Area Management. S.

Prerequisite: RR 100, RR 330. Special fee, \$24.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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-tent camping methods and volunteers, and expectations for the future.

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.

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.

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.

RR 460 02(2-0-0). Event and Conference Planning. S.

Prerequisite: RR 270.

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. Special variable (\$50-\$70) fee determined by department.

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 100.

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 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 531 03(1-4-0). Recreation Resource Management Field Studies. F. Prerequisite: S 310 or ST/STCC 311, and written consent of instructor.

Application of problem-solving techniques to resolve current recreation management problems.

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 01(0-0-1). Research Issues. F.

Research issues, scientific process, nomenclature, ethics, and philosophy.

RR 570 03(0-6-0). Regional and Community Tourism Development. S. Prerequisite: RR 270.

Analysis of planning principles for improving tourism potential for a selected region.

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). Research Methods in Recreation and Tourism. S. Prerequisite: RR 565, ST/STCC 301.

Research designs, sampling, analysis, computer packages, and proposal development.

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). Advanced Research Methods. 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 796 Var. Group Study.

RR 798 Var. Research.

RR 799 Var. Dissertation.

RANGELAND ECOSYSTEM SCIENCE COURSES

Department of Rangeland Ecosystem Science 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.

RS 300 03(3-0-0). Principles of Range Management. F, S, SS. Prerequisite: BY 103 or BZ/BZCC 120. Also offered as an on-line course.

Conservation and management of rangeland-ecosystem values using sustainable practices.

RS 320/SC 320 03(3-0-0). Forage and Range Management. S. Prerequisite: One course in biological sciences. Credit not allowed for both RS 320 and SC 320.

Biology and management of introduced and native forage crops including production, preservation, and utilization.

RS 331 03(2-2-0). Rangeland Ecogeography. F. Prerequisite: RS 300, BZ 223 or F 210 or NR 220.

Production characteristics and ecological niches of important plants and their rangeland communities.

+RS 332 02(1-3-0). Range Measurements. F. Prerequisite: 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. Special fee, \$30.

Field measurements of rangelands emphasizing vegetation sampling.

RS 351 03(3-0-0). Range Plant Production and Decomposition. F. Prerequisite: BY 220, RS 300, SC 240.

Biotic and abiotic factors affecting primary production, decomposition, and biogeochemical cycling in rangeland ecosystems.

RS 400 02(2-0-0). Rangeland Improvements. F. Prerequisite: RS 300 or RS 320/SC 320.

Improvement of rangelands through biological and cultural methods; management of improved rangelands.

RS 420 03(1-4-0). Grass Taxonomy. S. Prerequisite: BZ 223 or written consent of instructor.

Anatomy, morphology, and identification of grasses.

RS 452 02(2-0-0). Range Animal-Habitat Interactions. F, S, SS. Prerequisite: NR 367, RS 300 or RS 320/SC 320. Also offered as online course.

Secondary productivity and consumer functions at the organismal and ecosystem level.

RS 470 02(2-0-0). Rangeland Economics and Analysis. F. Prerequisite: EA/EACC 202, RS 300.

Economics of rangeland resource use; analytical techniques for allocation of rangeland resources.

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 501 03(3-0-0). Range Habitat Manipulation. F. Prerequisite: RS 300 or RS 320/SC 320.

Improvement of range habitats and effects on ecosystem components.

***RS 520 02(2-0-0). Range Issues and Policy.** F. Prerequisite: RS 300, RS 320/SC 320.

Explores and evaluates current issues and policies concerning range use.

RS 531 03(2-3-0). World Grassland Ecogeography. F. Prerequisite: BZ 223.

Distribution, climate, and structure of the world's major grasslands with emphasis on North America.

+^oRS 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. Also offered as online course.

Biological and ecological basis for production of meat from rangelands.

^oRS 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. 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. F, S.

Analysis of global and domestic social problems.

S CC 192 03(0-0-3). Civic Culture and Social Responsibility. S.

Erosion of civility in society with particular emphasis on civic culture on the university campus.

S CC 205 03(3-0-0). Contemporary Race-Ethnic Relations. 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.

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. Also offered as telecourse.

Rural life in U.S. and Third World societies: analysis of sociocultural systems, social differentiation, social institutions, and problems of social change.

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 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 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 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 674 03(0-0-3). Seminar in Social Movements and Collective Behavior. S. Prerequisite: S 500.

Theory and research on causes, organizational structure, and outcomes of social movements and collective behavior.

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.

STUDY ABROAD

Office of International Programs

SACC 482V. Study Abroad.

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. 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. Also offered as correspondence course.

Principles of seed anatomy including reproduction, identification, and seed characteristics of plant families.

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. Also offered as correspondence course.

Basic processes controlling seed development, maturation, dormancy, storage, germination, and how these factors relate to seedling growth.

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. Also offered as correspondence course.

Fundamentals for determining physical purity of a seed lot using established rules and procedures.

SC 301 02(0-4-0). Seed Germination and Viability. F, S, SS. Prerequisite: SC 201 or written consent of instructor. Also offered as correspondence course.

Seed viability tests including standard germination and tetrazolium, seed viability, dormancy, parameters of viability and evaluation.

***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, 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: BY/LSCC 102 or BZ/BZCC 110 or BZ/BZCC 120.

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 360/CB 360 03(2-2-0). Geographic Information Systems in Agriculture. F. Prerequisite: CS 110. Credit not allowed for both SC 360 and CB 360.

Introduction to geographic information systems and global positioning systems with applications to agriculture.

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 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.

^oSC 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 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 02(2-0-0). 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/PD 740 03(3-0-0). Plant Molecular Genetics.** F. Prerequisite: BC 351, SC 330. Credit not allowed for both SC 740 and PD 740.

Advances in study of organization and function of nuclear and organellar genomes, gene expression in higher plants, and plant-microbe interactions.

***SC 755 03(3-0-0). Advanced Soil Microbiology.** S. Prerequisite: MB 624 or SC 455.

Ecology of soil microorganisms emphasizing population and activity relationships, nitrogen fixation, and microbe-pesticide interactions.

***SC 760 03(3-0-0). Advanced Soil Chemistry.** F. Prerequisite: Four semesters of chemistry, one course in computer science, one semester of calculus.

Surface chemistry of soils, electrical double layer models of surface charge and potential, colloid stability, computer modeling of adsorption.

***SC 770 04(3-2-0). Advanced Soil Physics.** S. Prerequisite: M 261 or SC 470.

Description and analysis of principles of storage and movement of water, solutes, heat, and gases in soils.

SC 784 Var. Supervised College Teaching. F, S, SS.

SC 792 01(0-0-1). Seminar.

SC 795 Var. Independent Study.

SC 796 Var. Group Study.

SC 799 Var. Dissertation.

SPEECH COMMUNICATION COURSES

Department of Speech Communication *College of Liberal Arts*

SPCC 100 03(3-0-0). Communication and Popular Culture. 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. F.

Analysis of communication differences and similarities across cultures and co-cultures; effective communication in intercultural interactions.

SPCC 200 03(3-0-0). Public Speaking. F, S, SS.

Fundamentals of public speaking emphasizing content, organization, delivery, audience response.

SPCC 201 03(3-0-0). Rhetoric in Western Thought. 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. 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.

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.

Rhetorical theory applied to planning, producing, and evaluating computer-mediated messages.

SP 347 03(2-2-0). Video Communication. F, S. Prerequisite: SP/SPCC 100.

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.

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, 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 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.

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.

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.

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 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 527 03(3-0-0). Communication in Organizations. SS.

Communication theory and strategy for empowerment of nonsupervisory and supervisory personnel.

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 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.

ST 302 03(3-0-0). Design of Experiments. F, S, 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 02(2-0-0). 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. F, 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. 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. 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, S. 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. 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.

ST321 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.

STATISTICS COURSES

Department of Statistics

College of Natural Sciences

STCC 101 03(2-2-0). Activity Based Statistics. 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. 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. 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.

STCC 201 03(2-0-1). General Statistics. F, S, SS. 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. 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. 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.

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.

ST460 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 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.

ST511 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.

ST512 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.

ST525 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.

ST544/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/CB 547 03(3-0-0). Statistics for Environmental Monitoring. S. Prerequisite: ST/STCC 301. Credit not allowed for both ST 547 and CB 547.

Applications of statistics in environmental pollution studies involving air, water, or soil monitoring; sampling designs; trend analysis; censored data.

ST560 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.

Statistical packages; graphical data presentation; model fitting and diagnostics; random numbers; simulation; numerical methods in statistics.

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. E) 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 Var. Seminar.

ST 795 Var. Independent Study.

ST 796 Var. Group Study.

Methodology, stochastic processes, experimental design, multidimensional statistics.

ST 799 Var. Dissertation.

SOCIAL WORK COURSES

Department of Social Work

College of Applied Human Sciences

SWCC 110 03(2-0-1). Contemporary Social Welfare. 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. Also offered as telecourse.

Historical development of social welfare. Knowledge, values, intervention skills, settings, and groups served by social workers.

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 03(3-0-0). Social Work Practice-Schools. S.

Application of practice processes in various settings.

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 487 Var [1-6]. Internship.

Internship in non-profit agency administration.

SW 488 Var [5-10]. Field Placement. F, S, SS. Prerequisite: S 311 or concurrent registration, 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. Also offered as telecourse.

Knowledge, values, history, and philosophy of social work.

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 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 [1-5]. Field Placement. Prerequisite: SW 511, concurrent registration in SW 592.
Supervised professional practice.

SW 590 Var [1-6]. Workshop.

SW 592 01(0-2-0). Seminar. Corequisite: SW 588.

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. B) S. 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 02. Research. Prerequisite: SW 601. Maximum of 6 credits allowed in course.

SW 699 Var. Thesis. Maximum of 6 credits allowed in course.

THEATRE COURSES

Department of Music, Theatre, and Dance *College of Liberal Arts*

THCC 141 03(3-0-0). Introduction to Theatre. 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 02(0-4-0). Graphic Expression for the Theatre. F.

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(0-0-3). From Page to Stage: Freshman Theatre Seminar. F, S, SS.

Collaborative creative processes required to transfer literature to theatrical performances with faculty artists/scholars.

TH 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(1-4-0). Design I. S. Prerequisite: 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 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.

VE370 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.

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.

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.

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. Also offered as an on-line course.

Methods for teaching business education.

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. Also offered as an on-line course.

Instructional methods and resource materials development for vocational marketing education.

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.

VE471 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.

Orientation to teaching and individual assessment of teaching skills; development and implementation of professional growth plan.

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.

VE473 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.

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.

VE506 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.

VE571 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 the Division of Educational Outreach.

Basic educational systems; the scientific method as a basis for analysis; systems as a tool for planning and decision making.

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. Also offered as on-line course.

Procedures for organizing new programs and for managing or modifying existing programs.

°VE 631 02(0-0-2). Management of Business-Office Departments. SS. Prerequisite: VE 300. Also offered as on-line course.

Preparation of teachers and administrators for implementation of vocational business and office education programs.

°VE 640 02(0-0-2). Methods in Vocational Marketing Education. SS. Prerequisite: VE 441. Also offered as on-line course.

Instruction and curricula for secondary and postsecondary vocational marketing education.

°VE641 02(0-0-2). Programs in Vocational Marketing Education. SS. Prerequisite: VE 441. Also offered as on-line course.

Techniques used in determining need for and implementations of new or additional programs of vocational marketing education.

VE656 03(0-0-3). Tests and Assessment. F, SS. 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 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. chg to ED 705 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 638 05(4-0-1). Biology of Disease Agents. S. Corequisite: VM 640.

Biology of principle infectious disease agents of importance to veterinary medicine.

VM 640 05(3-0-2). Biology of Disease I. S. Corequisite: VM 638.

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. S. Prerequisite: VM 606, VM 638 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 706 01(1-0-0). Introduction to Preventive Medicine. F. Prerequisite: VM 606.

Vaccination programs, parasite control, and other common preventive medical practices.

VM 711 02(2-0-0). Applied Dairy Nutrition. S.

Nutrient requirements of dairy animals; feedstuffs in dairy rations; computer ration formulation.

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 04(2-0-2). Epidemiology and Environmental Health. F. Prerequisite: VM 638, VM 640.

Principles of epidemiology and environmental health hazards in veterinary medicine.

VM 720 01(1-0-0). Alternative and Complementary Therapeutics. S. 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 638, VM 640.

Pathogenesis of toxicologic/metabolic, and immune-mediated diseases; systemic pathology.

VM 742 02(1-0-1). 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 04(4-0-0). Equine Medicine and Surgery I. 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: VM 747.

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) Camelid medicine. 01(0-0-1).

VM 786A-B Var [1-22]. Practicum. Prerequisite: A) Completion of second year of professional veterinary medicine curriculum. Maximum of 12 credits allowed in course. B) VM 786A.

A) Junior practicum. Var [5-7]. 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). G) Small ruminant medicine 01(1-0-0). J) Swine medicine 01(1-0-0). R) Food animal clinical problems 02(0-0-2).

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: BY 103 or BZ/BZCC 110 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.

²**VS 605 02(2-0-0). Comparative Anesthesiology.** S. Prerequisite: PS 450.

Techniques in anesthesia for large and small animals.

²**VS 606 01(0-3-0). Comparative Anesthesiology Laboratory.** S. Prerequisite: VS 605 or concurrent registration.

Techniques in anesthesia for large and small animals.

VS 612 02(2-0-0). Plastic and Reconstructive Surgery. F. Prerequisite: VM 786B.

Advances in surgical patient care, surgical instrumentation, and reconstruction.

VS 613 01(0-3-0). Plastic and Reconstructive Surgery Laboratory. F. Prerequisite: VM 786B.

Advances in surgical patient care, surgical instrumentation, and reconstruction.

²**VS 626 02(2-0-0). Infertility and Genital Disease.** F. Prerequisite: PS 500 or written consent of instructor.

Infectious and noninfectious causes of reproductive failure in food animals.

²**VS 630 03(3-0-0). Orthopedic Surgery.** F.

Techniques, devices, and prosthetic materials in rehabilitating musculoskeletal problems.

²**VS 631 01(0-3-0). Orthopedic Surgery Laboratory.** F. Prerequisite: VM 786A or B; VS 630 or concurrent registration.

Procedures applied to skeletal preparations and living animals.

VS 642 05(4-2-0). Ophthalmology. F. Prerequisite: Written consent of instructor.

Instrumentation, ocular therapeutics, and clinical ophthalmology.

²**VS 645 03(2-3-0). Surgery of the Eye.** S. Prerequisite: VS 642.

Techniques, indications, and complications.

²**VS 650 03(3-0-0). Comparative Abdominal Surgery.** F.

New techniques in surgery of abdominal viscera.

²**VS 651 01(0-3-0). Comparative Abdominal Surgery Laboratory.**

F. Prerequisite: VM 786A or B; VS 650 or concurrent registration.

Reparative and reconstructive abdominal surgical procedures.

²**VS 660 03(3-0-0). Neurology and Neurosurgery.** S.

Diagnostic and surgical techniques for the nervous system.

²**VS 661 01(0-3-0). Neurology and Neurosurgery Laboratory.** S.

Prerequisite: VM 786A or B; VS 660 or concurrent registration.

Production and correction of surgically amenable lesions in central and peripheral nervous system; electrodiagnosis.

²**VS 662/EH 662 03(2-0-1). Applied Research-Planning/Design/Analysis.** S. Prerequisite: 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.

²**VS 673 03(3-0-0). Thoracic and Cardiovascular Surgery.** F.

Surgical approaches to the thorax and the central and peripheral cardiovascular system.

²**VS 674 01(0-3-0). Thoracic and Cardiovascular Surgery Laboratory.** F. Prerequisite: VM 786A or B; VS 673 or concurrent registration.

Surgical procedures applied to the chest, heart, and vessels.

VS 699 Var. Thesis.
²**VS 701 Var [1-3]. Postgraduate Medicine I.** F. Prerequisite: D.V.M. or written consent of department head.

Comprehensive review, update of immunology, emergency medicine, dermatology, and endocrinology.

²**VS 702 Var [1-3]. Postgraduate Medicine II.** S. Prerequisite: D.V.M. or written consent of department head.

Comprehensive review, update of neurology, gastroenterology, and ophthalmology.

²**VS 703 Var [1-3]. Postgraduate Medicine III.** F. Prerequisite: D.V.M. or written consent of department head.

Comprehensive review, update of oncology, cardiology, reproduction, ophthalmology, and radiology.

²VS 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. E) Food animal surgery. F) Small animal orthopedics. G) Equine orthopedics. H) Large animal reproduction. I) Anesthesiology. J) Cardiology. K) Neurology. L) Dermatology. N) Ophthalmology. O) Herd health management. P) Equine lameness. Q) Comparative surgery. S) Epidemiology.

VS 796 Var. Group Study-Medicine.

VS 798 Var. Research.

VS 799 Var. Dissertation.

WEED SCIENCE COURSES

Department of Bioagricultural Sciences and Pest Management

College of Agricultural Sciences

+W 308 04(2-2-1). Biology and Control of Weeds. F. Prerequisite:

BY 103 or BZ/BZCC 120; C/C CC 107 or C/C CC 111. Special fee, \$7. Classification, characteristics, reproduction, identification, ecology of weeds; weed control by cultural, biological, and chemical means; herbicides.

***W 509 03(3-0-0). Herbicide Selectivity and Action.** S.

Prerequisite: BZ 440, W 308.

Selectivity of major photosynthetic and growth inhibitor herbicides based on herbicide transport, metabolism, and mode of action.

***W 528 03(3-0-0). Ecophysiology of Weeds.** F. Prerequisite: BZ 440, W 308.

Comparative ecophysiology of weeds with crops and factors involved in weed competition and population dynamics.

WOMEN'S STUDIES COURSES

College of Liberal Arts

WS 200 03(3-0-0). Introduction to Women's Studies. F.

Examination of gender roles in work, education, spirituality, relationships, health, institutions, and organizations.

WS 397 03(3-0-0). Group Study.

WS 472A-C 03(3-0-0). Seminar in Women's Studies. F, S. Prerequisite: Enrolled in Women's Interdisciplinary Studies Program or written consent of instructor.

A) Humanities. B) Social sciences. C) Natural sciences.

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.

Faculty and Staff

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Patrick Garcia	Pueblo	2002
Patrick A. Grant	Denver	2005
Donald A. Hamstra	Brighton	2003
Sean Mattox	Fort Collins ³	2002
Dr. C.W. Miller	Fort Collins ³	2001
Dr. Susan Moss	Durango ²	2002
Jacob Murdock	Durango ²	2002
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² Faculty and student representatives from Fort Lewis College

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Sommers, Lee E., B.S. (University of Wisconsin, Platteville), M.S., Ph.D. (University of Wisconsin, Madison), Acting Dean, College of Agricultural Sciences and Director, Agricultural Experiment Station.

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Hilbert, Leslie, Director of Public Relations.

Trujillo, Tillie, B.A. (Colorado State University), Director of Operations.

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ACADEMIC FACULTY

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Department Chair

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Pritchett, James G., B.S., M.S. (Colorado State University), Ph.D. (University of Minnesota).

Seidl, Andrew F., B.A. (University of Wisconsin, Madison), M.S., Ph.D. (University of Florida).

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Department of Animal Sciences

Department Head

Professor J. Daryl Tatum

B.S., M.S., Ph.D. (Texas A & M University).

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Wailes, William, B.S. (Colorado State University).

Instructors

Greene, Virginia S., B.S. (Colorado State University).

Schoning, Heather (King School, Devon, England).

Affiliate Faculty

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Geary, Thomas W., B.S. (Montana State University), M.S., Ph.D. (Washington State University).

Green, Ronnie D., B.S. (Virginia Polytechnic Institute and State University), M.S. (Colorado State University), Ph.D. (University of Nebraska).

Lawrence, A. E., B.S. (Southeast Missouri State University), M.S. (Kansas State University), Ph.D. (University of Missouri).

Odde, Kenneth G., B.S. (South Dakota State University), M.S., Ph.D., D.V.M. (Kansas State University).

Parker, Charles F., B.S., M.S. (The Ohio State University), Ph.D. (Texas A & M University).

Seitzinger, Ann Hillberg, B.A. (Stanford University), M.S., Ph.D. (Purdue University).

Temple, Robert S., B.S., M.S. (Colorado State University), Ph.D. (Iowa State University of Science and Technology).

Wise, Jimmy W., B.S. (Oklahoma State University), M.S., Ph.D. (University of Nebraska).

Department of Bioagricultural Sciences and Pest Management

Department Head

Professor Thomas O. Holtzer

B.A. (Thiel College), M.S., Ph.D. (North Carolina State University at Raleigh).

Professors

Bauer, Penelope H., B.S. (McNeese State University), M.S. (Louisiana State University and Agricultural and Mechanical College), Ph.D. (University of Kentucky).

Beck, K. George, B.S., M.S., Ph.D. (University of Idaho).

Bjostad, Louis B., B.A. (College of William and Mary in Virginia), Ph.D. (University of California, Riverside).

Brown, William M., Jr., B.S. (University of California, Davis), Ph.D. (Oregon State University).

Cranshaw, Whitney S., B.A. (Hampshire College), M.S., Ph.D. (University of Minnesota).

Hendrix, John E., B.S., B.A. (California State University, Fresno), M.S., Ph.D. (The Ohio State University).

Jacobi, William R., B.S. (State University of New York), M.S. (West Virginia University), Ph.D. (North Carolina State University at Raleigh).

Knudson, Dennis L., B.S. (University of Illinois at Urbana-Champaign), D.Phil. (University of Oxford, England).

Kondratieff, Boris C., B.S. (Tennessee Technological University), M.S., Ph.D. (Virginia Polytechnic Institute and State University).

Peairs, Frank B., B.S. (Allegheny College), M.S. (University of Massachusetts), Ph.D. (Cornell University).

Ranu, Rajinder S., D.V.M. (Panjab College of Veterinary Science, India), M.S., Ph.D. (University of Pennsylvania).

Roberts, P. Elaine, B.A. (Western Michigan University), Ph.D. (University of Illinois).

Schwartz, Howard F., B.S., Ph.D. (University of Nebraska), M.S. (University of Minnesota).

Westra, Philip, B.A. (University of Wisconsin, Madison), B.A. (Calvin College), Ph.D. (University of Minnesota).

Zimdahl, Robert L., B.S., M.S. (Cornell University), Ph.D. (Oregon State University).

Associate Professors

Hill, Joseph P., B.A., M.S., Ph.D. (The Pennsylvania State University).

Ishimaru, Carol Anne, B.S., Ph.D. (Michigan State University).

Nissen, Scott J., B.S. (University of Montana), M.S. (University of Nevada), Ph.D. (Montana State University).

Assistant Professors

Hufbauer, Ruth A., B.A. (University of California, Berkeley), Ph.D. (Cornell University).

Lawrence, Christopher B., B.S., M.S., Ph.D. (Auburn University).

Orr, Gregory L., B.S., M.S. (Eastern Illinois University), Ph.D. (Purdue University).

Affiliate Faculty

Blodgett, Sue L., B.S. (Syracuse University), M.S. (Cornell University), M.S., Ph.D. (Kansas State University).

Cushing, Paula E., B.S., M.S. (Virginia Polytechnic Institute and State University), Ph.D. (University of Florida).

Evans, Mary Alice, B.S., Ph.D. (Cornell University), M.A. (Oberlin College).

Farrell, Brian D., (University of Vermont), M.S., Ph.D. (University of Maryland).

Franc, Gary D., B.S. (University of Wisconsin, Madison), M.S. (University of Minnesota), Ph.D. (Colorado State University).

Gage, Kenneth L., B.S. (Wichita State University), M.S., Ph.D. (University of Oklahoma).

Geils, Brian W., B.S. (Utah State University), M.S. (University of Idaho), Ph.D. (Colorado State University).

Gray, Fred A., B.S. (Troy State University), M.S., Ph.D. (University of Arizona).

Hein, Gary L., B.A. (Concordia College), M.S., Ph.D. (Iowa State University of Science and Technology).

Kemp, William P., B.S. (University of Maine), M.S. (Michigan State University), Ph.D. (University of Idaho).

Lundquist, John E., B.S. (University of Washington), M.F. (Yale University), Ph.D. (University of Georgia).

Lynch, Ann M., B.S. (The Pennsylvania State University), M.S., M.F., Ph.D. (University of Michigan).

MacVean, Charles M., B.A. (Kalamazoo College), M.S., Ph.D. (Colorado State University).

Martin, Susan S., B.A. (University of Colorado at Boulder), M.S. (Utah State University), Ph.D. (University of California, Santa Cruz).

Meneley, J. C., B.S., Ph.D. (University of Arizona).

Moore, Chester G., Jr., B.S., M.S., Ph.D. (University of California, Davis).

Moore, John C., B.A. (University of California, Santa Barbara), M.S. (Michigan State University), Ph.D. (Colorado State University).

Nasci, Roger S., B.S., M.S. (Ohio University), Ph.D. (University of Massachusetts).

Negron, Jose F., B.S. (University of Puerto Rico), M.S., Ph.D. (Louisiana State University and Agricultural and Mechanical College).

Panella, Lee, B.S. (Michigan State University), M.S. (Texas A & M University), Ph.D. (University of California, Davis).

Piesman, Joseph, B.S. (Cornell University), D.Sc. (Harvard University).

Polhemus, John T., B.S. (Iowa State University of Science and Technology), Ph.D. (University of Colorado).

Ruppel, Earl G., B.S., Ph.D. (University of Wisconsin).

Savage, Harry M., B.Sc. (The Ohio State University), M.Sc., Ph.D. (Florida State University).

Schweizer, Edward E., B.S., M.S. (University of Illinois), Ph.D. (Purdue University).

Shaw, Charles G., III, B.S. (Washington State University), Ph.D. (Oregon State University).

Tabachnick, Walter J., B.S. (The City University of New York, Brooklyn College), M.S., Ph.D. (Rutgers University).

Walter, David E., B.S. (University of Maryland), M.S. (California State University, Hayward), Ph.D. (Oregon State University).

Walters, Christina.

Weissmann, Michael J., B.A., M.A. (University of Colorado), Ph.D. (Colorado State University).

Wiles, Lori J., B.S. (Cornell University), M.S. (Oregon State University), Ph.D. (North Carolina State University at Raleigh).

Department of Horticulture and Landscape Architecture

Department Head

Professor Stephen J. Wallner
B.S., M.S. (South Dakota State University), Ph.D. (Iowa State University of Science and Technology).

Professors

Holm, David G., B.S., M.S. (University of Idaho), Ph.D. (University of Minnesota).

Hughes, Harrison G., B.S. (Eastern Illinois University), Ph.D. (Purdue University).

Klett, James E., B.S. (The Ohio State University), M.S., Ph.D. (University of Illinois).

Paulson, Merlyn J., B.S.L.A. (Utah State University), M.L.A. (Harvard University).

Reid, Grant W., B.S. (University of Canterbury, New Zealand), M.L.A. (University of California, Berkeley).

Stushnoff, Cecil, B.S.A., M.Sc. (University of Saskatchewan, Canada), Ph.D. (Rutgers University).

Associate Professors

Caspari, Horst, Dipl.-Ing. agr., Dr. agr. (University of Rheinische Friedrich-Wilhelms Universität, Germany).

Davidson, Robert D., B.S., B.S., M.S. (Montana State University), Ph.D. (Colorado State University).

Goetz, Bradley C., B.S. (Colorado State University), M.L.A. (Harvard University).

Koski, Anthony J., B.A. (Knox College), M.S., Ph.D. (The Ohio State University).

Lakey, Jeffrey S., B.S.L.A. (Oregon State University), M.L.A. (Harvard University).

Larsen, Harold J., Jr., B.A. (University of Colorado), M.A., Ph.D. (Oregon State University).

McGrane, Joseph, B.S.L.A., (Colorado State University).

Mogen, Elizabeth A. Hobbs, B.A. (American University), M.L.A. (University of Illinois).

Morabito, Daniel G., B.S.L.A., M.L.A. (Michigan State University).

Newman, Steven E., B.S. (Montana State University), M.S. (University of Nebraska, Lincoln), Ph.D. (Texas A & M University).

Qian, Yaling, B.S. (Hangzhou Teachers College), M.S. (Nanjing Agricultural University), Ph.D. (Kansas State University).

Rogoyski, Matthew K., B.S. (University of Guelph, Canada), Ph.D. (Cornell University).

Thompson, Asunta Lee, B.S., M.S. (North Dakota State University of Agriculture and Applied Science), Ph.D. (University of Idaho).

Vivanco, Jorge M., B.S. (Universidad Nacional Agraria La Molina, Lima, Peru), Ph.D. (The Pennsylvania State University).

Instructor

Whiting, David, B.S. (Utah State University), M.S. (Washington State University).

Affiliate Faculty

Clark, James, B.S. (Kansas State University), B.S. (Colorado State University).

Haller, Rebecca L., B.S., M.S. (Kansas State University).

Hartley, David E., B.S., M.S. (University of Illinois), Ph.D. (Oregon State University).

Lang, Harvey J., B.S. (Kansas State University), M.S. (Texas A & M University), Ph.D. (The Pennsylvania State University).

Panter, Karen L., B.S., Ph.D. (Colorado State University), M.S. (University of Nebraska).

Roos, Eric E., B.S. (Waynesburg College), Ph.D. (West Virginia University).

Towill, Leigh E., B.S. (University of Wisconsin-Milwaukee), M.S., Ph.D. (University of Michigan).

Volk, Gayle M., B.S. (Colorado State University), M.S. (Purdue University), Ph.D. (Cornell University).

Walters, Christina, B.S., Ph.D. (Cornell University).

Zhang, Xingping, B.S. (Gansu Agricultural University), M.S. (Northwestern Agricultural University), Ph.D. (Clemson University).

Department of Soil and Crop Sciences

Department Head

Professor James S. Quick

B.S. (North Dakota State University of Agriculture and Applied Science), M.S., Ph.D. (Purdue University).

Professors

Barbarick, Kenneth A., B.S., M.S. (University of Arizona), Ph.D. (Colorado State University).

Brick, Mark A., B.S. (University of Wisconsin, River Falls), M.S. (University of Arizona), Ph.D. (University of Minnesota).

Davis, Jessica G., B.S. (Cornell University), M.S. (Texas Tech University), Ph.D. (Texas A & M University).

Kelly, Eugene F., B.S., M.S. (Colorado State University), Ph.D. (University of California, Berkeley).

Niehaus, Merle H., B.S., M.S. (Oklahoma State University), Ph.D. (Purdue University).

Paustian, Keith, B.S., M.S. (Colorado State University), Ph.D. (Swedish University of Agricultural Science, Uppsala).

Pearson, Calvin H., B.S. (Brigham Young University), M.S. (Oklahoma State University), Ph.D. (Oregon State University).

Peterson, Gary A., B.S., M.S. (University of Nebraska), Ph.D. (Iowa State University of Science and Technology).

Smith, Danny H., B.S. (Texas Tech University), M.S., Ph.D. (University of Nebraska).

Soltanpour, Parviz N., B.S., M.S. (American University of Beirut, Lebanon), Ph.D. (University of Nebraska).

Sommers, Lee E., B.S. (University of Wisconsin, Platteville), M.S., Ph.D. (University of Wisconsin-Madison).

Westfall, Dwayne G., B.S. (University of Idaho), Ph.D. (Washington State University).

Associate Professors

Butters, Gregory L., B.S., Ph.D. (University of California, Riverside).

Cardon, Grant E., B.S. (Utah State University), Ph.D. (University of California, Riverside).

Fenwick, Jack R., B.S., M.S., Ph.D. (Purdue University).

Haley, Scott D., B.S. (Washington State University), M.S., Ph.D. (Colorado State University).

Lapitan, Nora L., B.S. (University of the Philippines), M.S., Ph.D. (Kansas State University).

Schweissing, Frank C., B.S., M.S. (Colorado State University), Ph.D. (Kansas State University).

Ward, Sarah, B.S. (Wye College, University of London, United Kingdom), M.S., Ph.D. (Colorado State University).

Assistant Professors

Byrne, Patrick E., A.B. (Washington University), M.S., Ph.D. (University of Missouri).

Heil, Dean M., B.S., M.S. (Colorado State University), Ph.D. (University of California, Berkeley).

Affiliate Faculty

Aguilar, Richard, B.S. (New Mexico State University), M.S. (Cornell University), Ph.D. (Colorado State University).

Ahuja, Laj, B.S. (University of Delhi, India), M.S. (Indian Agric. Res. Inst., N. Delhi), Ph.D. (University of California, Davis).

Aiken, Robert, B.S., M.S. (University of Nebraska, Lincoln), Ph.D. (Michigan State University).

Anderson, Randy L., B.S., M.S. (South Dakota State University), Ph.D. (University of Wyoming).

Baltensperger, David D., B.S. (Nebraska Wesleyan University), M.S. (University of Nebraska), Ph.D. (New Mexico State University).

Benjamin, Joseph G., B.S., M.S., Ph.D. (Iowa State University).

Bowman, Rudolph A., B.S. (University of Arizona), Ph.D. (University of California, Riverside).

Chadwick, Oliver A., B.S. (George Washington University), M.S. (Cornell University), Ph.D. (University of Arizona).

Delgado, Jorge A., B.S. (University of Puerto Rico), M.S., Ph.D. (Louisiana State University).

Ebinger, Michael H., B.A., M.S. (University of Arizona), Ph.D. (Purdue University).

Ferguson, Richard B., B.S. (Friends University), M.S., Ph.D. (Kansas State University).

Follett, Ronald F., B.S., M.S. (Colorado State University), Ph.D. (Purdue University).

Gonzales, Gilbert J., B.S., M.S., Ph.D. (New Mexico State University).

Halvorson, Ardell D., B.S.(North Dakota State University), M.S., Ph.D. (Colorado State University).

Hutchinson, Gordon L., B.S., M.S. (Colorado State University), Ph.D. (University of Illinois).

Levy, David B., B.S., M.S. (Colorado State University), Ph.D. (University of California, Riverside).

Ma, Liwang, B.S., M.S. (Beijing Agricultural University), Ph.D. (Louisiana State University).

McCray, John E., B.S. (West Virginia University), M.S. (Clemson University), Ph.D. (University of Arizona).

McMaster, Gregory S., B.S. (Michigan State University), M.S. (San Diego State University), Ph.D. (Colorado State University).

Miller, Robert O., B.S., M.S. (University of Nebraska), Ph.D. (Montana State University).

Morgan, Jack A., B.S. (New Mexico State University), M.S., Ph.D. (University of Georgia).

Mosier, Arvin R., B.S., M.S., Ph.D. (Colorado State University).

Munn, Larry C., B.S., M.S. (The Ohio State University), Ph.D. (Montana State University).

Neff, Jason C., B.A. (University of Colorado), Ph.D. (Stanford University).

Nielsen, David C., B.S., M.S. (Iowa State University of Science and Technology), Ph.D. (University of Nebraska).

Panella, Lee, B.S. (Michigan State University), M.S. (Texas A & M University), Ph.D. (University of California, Davis).

Rechel, Eric, B.S. (Fort Lewis College), M.S., Ph.D. (Utah State University).

Reeder, Jean, B.S. (University of Nebraska), M.S., Ph.D. (Colorado State University).

Ries, Matthew N., B.S., M.S. (Montana State University), Ph.D. (University of Arizona).

Schuman, Gerald E., B.S. (University of Wyoming), M.S. (University of Nevada), Ph.D. (University of Nebraska).

Shaffer, Marvin J., B.S. (The Ohio State University), M.S., Ph.D. (University of Arizona).

Shands, Henry L., B.S. (University of Wisconsin), M.S., Ph.D. (Purdue University).

Six, Johan, B.S., M.S. (Katholieke Universiteit Leuven, Belgium), Ph.D. (Colorado State University).

Suzuki, Akio, B.S. (Hokkaido University, Japan), M.S., Ph.D. (North Carolina State University at Raleigh).

Truman, Clinton C., B.S., M.S. (University of Georgia), Ph.D. (Purdue University).

Vigil, Merle F., B.S., M.S. (Colorado State University), Ph.D. (Kansas State University).

Wang, Shaoke, B.S. (Suzhou Agricultural University, China), M.S. (Chinese Academy of Agricultural Sciences, China), Ph.D. (Colorado State University).

Wiesner, Loren E., B.S., M.S. (South Dakota State University), Ph.D. (Oregon State University).

College of Applied Human Sciences

Department of Design and Merchandising

Department Head

Professor Antigone Kotsiopulos

B.S., M.S. (University of Nebraska), Ph.D. (Oklahoma State University).

Professors

Birdsong, Craig W., B.S., M.S. (Oklahoma State University).

Drennen, Nancy Hungerford, B.S., Ph.D. (Michigan State University), M.S. (Cornell University).

McKenna, Judy S., B.A. (The University of Kansas), B.S., M.S. (Colorado State University), Ph.D. (Oklahoma State University).

Tremblay, Kenneth R., Jr., B.A. (University of Alaska), M.A., Ph.D. (Washington State University).

Associate Professors

Bickle, Marianne Y., B.S., M.A., Ph.D. (Michigan State University).

Clemons, Stephanie T., B.A. (Michigan State University), M.S. (Utah State University), Ph.D. (Colorado State University).

Eckman, Molly, B.S., M.S. (Iowa State University of Science and Technology), Ph.D. (University of Maryland).

Sparks, Diane, B.A. (Humboldt State University), M.S., Ed.D. (University of Arkansas).

Assistant Professors

Hyllegard, Karen H., B.A. (Hobart and William Smith Colleges), M.A. (Oregon State University), Ph.D. (University of Maryland).

Ogle, Jennifer, B.S., Ph.D. (Iowa State University of Science and Technology), M.S. (University of Illinois at Urbana-Champaign).

Sanders, Eulanda, B.A., M.A. (Colorado State University), Ph.D. (University of Nebraska, Lincoln).

Sarkar, Ajoy, B.S. (University of Bombay, India), M.S., Ph.D. (The University of Georgia).

Lecturers

Carlile, Brenda, B.F.A. (Colorado State University), M.A. (Parsons School of Design).

Carlson, Linda L., B.S. (The Pennsylvania State University), M.S. (Colorado State University).

Culp, Gerald E., B.A. (Kearney State College), M.S., Ed.S. (University of Nebraska).

Deardorff, Carolyn, B.S., M.A. (Colorado State University).

Affiliate Faculty

Hutton, Sandra S., B.A., Ph.D. (Arizona State University), M.S. (Oregon State University).

Leibrock, Cynthia, B.F.A. (University of Colorado), M.A. (Colorado State University).

Sherman, Donald J., B.F.A. (University of Colorado), M.A. (University of California-Los Angeles).

Department of Food Science and Human Nutrition**Department Head**

Professor L. Arthur Campfield
B.S., M.S., Ph.D. (University of California, Los Angeles).

Professors

Allen, Kenneth G. D., B.S. (University of London, England), Ph.D. (Montana State University).

Anderson, Jennifer E., B.S. (Leicester Domestic Science College, England), M.S., Ph.D. (Colorado State University).

Avens, John S., B.S. (Syracuse University), M.S., Ph.D. (Colorado State University).

Kendall, Patricia A., B.S., M.S. (Kansas State University), Ph.D. (Colorado State University).

Melby, Christopher L., B.S. (Colorado State University), M.A. (University of Northern Colorado), D.H.Sc. (Loma Linda University).

Stone, Martha B., B.S. (University of Tennessee at Martin), M.S., Ph.D. (University of Tennessee).

Associate Professors

Auld, Garry W., B.S. (Drexel University), Ph.D. (The Pennsylvania State University).

Gregory, Susan R., B.S. (University of Wisconsin, Whitewater), M.S. (University of Wisconsin, Stout), Ed.D. (Temple University).

Harris, Mary A., B.S. (Michigan State University), M.S. (Framingham State College), Ph.D. (University of Rhode Island).

Sampson, David A., B.S. (Bowdoin College), M.S. (University of Connecticut), Ph.D. (Colorado State University).

Smith, Kenneth D., B.S. (Colorado State University), M.B.A. (University of Nebraska at Omaha), Ed.D. (University of LaVerne).

Assistant Professors

Adams, Elizabeth, B.S., Ph.D. (Cornell University), M.S. (University of Washington).

Yu, Liangli, B.S., M.S. (China Pharmaceutical University), Ph.D. (Purdue University).

Instructors

Miller, Jeffrey P., B.G.S. (University of Kansas), A.O.S. (New England Culinary Institute), M.S. (Kansas State University).

Affiliate Faculty

Chase, Peter H., M.D. (University of Wisconsin).

Eckel, Robert H., B.S., M.D. (University of Cincinnati).

Francis, Coni C., B.A. (California State University, Fresno), M.S. (San Jose State University), Ph.D. (Texas Woman's University).

Hambidge, Michael, M.D. (Westminster Medical School, London University, England).

Hay, William W., Jr., B.A. (Dartmouth College), M.D. (Yale University School of Medicine).

Hill, James O., B.A. (University of Tennessee), M.S., Ph.D. (University of New Hampshire).

Krebs, Nancy F., B.S. (Iowa State University of Science and Technology), M.S. (University of Maryland), M.D. (University of Colorado Health Sciences Center).

Marshall, Julie A., B.S. (Colorado State University), M.S. (University of Hawaii), Ph.D. (University of Washington).

Mathias, Melvin M., B.S. (Purdue University), M.S., Ph.D. (Cornell University).

McElwee, Hugh P., B.Sc. (St. Lawrence University), M.A. (University of Colorado at Boulder), M.D. (University of Colorado at Denver).

Thompson, Henry J., B.S., Ph.D. (Rutgers University).

Department of Health and Exercise Science**Department Head**

Professor Richard G. Israel
B.S., M.A. (Appalachian State University), Ed.D. (West Virginia University).

Professors

Cordain, Loren, B.S. (Pacific University), M.A. (University of Nevada, Reno), Ph.D. (University of Utah).

Gotshall, Robert W., B.S. (Mount Union College), M.S., Ph.D. (The Ohio State University).

Johnson, M. L., B.S. (Abilene Christian University), M.S. (Baylor University), Ed.D. (University of Texas).

Associate Professors

DeVoe, Dale E., B.S. (University of Massachusetts at Amherst), M.S. (Springfield College), Ph.D. (The University of New Mexico).

Kennedy, Catherine A., B.S. (Findlay College), M.S. (Ball State University), Ph.D. (The University of Toledo).

Prassas, Spiros G., B.S. (Panteios Highest School of Political Sciences, Greece), M.A., Ph.D. (University of Maryland at College Park).

Assistant Professors

Davy, Kevin P., B.S. (State University of New York at Cortland), M.A. (Adelphi University), Ph.D. (Virginia Polytechnic Institute and State University).

Hickey, Matt, B.S. (Western Carolina University), M.S. (Virginia Polytechnic Institute and State University), Ph.D. (Ball State University).

Nelson, Tracy, B.S. (Colorado State University), M.P.H. (University of Northern Colorado), Ph.D. (The Pennsylvania State University).

Sutlive, Vinson, B.A., M.Ed. (College of William and Mary in Virginia), Ph.D. (Indiana University).

Instructors

Hutcheson, Katherine A., B.S. (University of Manitoba, Canada), M.A. (Northern Arizona University), Ed.D. (University of Colorado).

Linnell, Sheri, B.A. (Wellesley College), M.A.T. (Harvard University), M.Ed. (Colorado State University).

Affiliate Faculty

Downes, Thomas R., B.S., M.D. (Texas Tech University).

Eades, Mary D., B.S., M.D. (University of Arkansas).

Eades, Michael R., B.S. (California State Polytechnic University, Pomona), M.D. (University of Arkansas).

Toohey, Lynn, B.A. (Western Michigan University), M.S., Ph.D. (Colorado State University).

Department of Human Development and Family Studies

Department Head

Professor Clifton E. Barber

B.A. (Portland State University), M.S. (Brigham Young University), Ph.D. (The Pennsylvania State University).

Professors

Abkarian, Gene G., B.S., Ph.D. (State University of New York at Buffalo), M.S. (University of Wisconsin-Madison).

Bigner, Jerry J., B.A., M.S. (University of Georgia), Ph.D. (Florida State University).

Cook, Alicia Skinner, B.S., M.S. (University of Alabama), Ph.D. (Arizona State University).

Fetsch, Robert J., B.S. (Conception Seminary), M.A. (St. Mary's University of San Antonio), M.Ed. (Our Lady of the Lake University of San Antonio), Ph.D. (University of Wyoming).

Fritz, Janet J., B.A. (University of Colorado), M.S., Ph.D. (Cornell University).

Gray, Mary McPhail, B.S. (Iowa State University of Science and Technology), M.A., Ph.D. (Michigan State University).

MacPhee, David, B.S. (College of Idaho), M.S. (Purdue University), Ph.D. (University of North Carolina).

Yang, Raymond K., B.A., M.A. (University of Hawaii), Ph.D. (Cornell University).

Associate Professors

Barrett, Karen C., B.S. (Cornell University), M.A., Ph.D. (University of Denver).

Oltjenbruns, Kevin A., B.S., M.H.Ec. (Colorado State University), Ph.D. (University of Colorado).

Zimmerman, Toni, B.A. (Ohio University), M.A. (Radford University), Ph.D. (Virginia Polytechnic Institute and State University).

Assistant Professors

Biringen, Zeynep, B.A. (State University of New York at Binghamton), M.A. (Stanford University), Ph.D. (University of California, Berkeley).

Byers, Steven R., B.S. (University of Tulsa), M.S. (University of Michigan), Ph.D. (University of Colorado at Boulder).

Haddock, Shelley, B.A. (University of Utah), M.S., Ph.D. (Colorado State University).

Lyness, Kevin P., B.S., M.S. (Texas Tech University), Ph.D. (Purdue University).

Mazzoni, Dale, B.S., M.S., Ph.D. (Colorado State University).

Lecturers

McBride, Ruth M., B.S. (Old Dominion University), M.S. (Colorado State University).

Peterson, Rick, B.S., M.S., Ph.D. (Kansas State University).

Rattenborg, Karen, B.S., M.S. (Colorado State University).

Department of Manufacturing Technology and Construction Management

Department Head**Professor Larry Grosse**

B.L.S. (St. Edward's University), M.S., Ph.D. (Texas A & M University).

Professors

Maness, Tom, B.S., M.A. (Sam Houston State University), Ed.D. (University of Northern Colorado).

Parnell, James O., B.I.A., M.I.A. (University of Oklahoma), Ed.D. (University of Wyoming).

Associate Professors

DeMiranda, Michael A., B.A., M.A. (California State University, Long Beach), Ph.D. (University of California).

Dunbar, Brian H., B.S., M.Arch. (University of Michigan).

Hauck, Allan J., B.A. (Kalamazoo College), M.Ed. (Bowling Green State University), Ph.D. (University of Maryland).

Assistant Professors

Folkestad, James E., B.A. (University of Colorado), M.A. (California State University, Long Beach), Ph.D. (Texas A & M University).

Jaouen, Stephen H., B.A. (Western State College of Colorado), M.S. (Colorado State University).

Johnson, Russell L., B.S., M.S. (Iowa State University of Science and Technology), Ph.D. (Colorado State University).

Koziol, Christopher J., B.S., M.S., M.Arch. (University of Illinois).

Schaeffer, Steven L., B.S. (Millersville University of Pennsylvania), M.S., Ph.D. (Colorado State University).

Senior, Bolivar, B.S., M.S., Ph.D. (Purdue University).

Smith, Charles W., B.S., M.S., Ph.D. (Colorado State University).

Instructor

Sigmon, Brent A., B.S., M.S. (Colorado State University).

Affiliate Faculty

Hill, Richard, B.S., B.S. Arch. (University of Nebraska), M.S. (Oxford University), M.S. (University of Notre Dame).

Thode, Henry Paul, Jr., B.A. (Colorado College), M.D. (University of Colorado Health Sciences Center).

Department of Occupational Therapy

Department Head**Professor Jodie R. Hanzlik**

B.S., O.T.R., M.S. (University of Wisconsin-Madison), Ph.D. (Iowa State University of Science and Technology).

University Distinguished Professor

Fisher, Anne G., B.S., O.T.R. (Western Michigan University), M.S., Sc.D. (Boston University).

Professors

Bundy, Anita C., B.S., O.T.R. (Western Michigan University), M.S., Sc.D. (Boston University).

Gliner, Jeffrey A., B.A. (University of California, Los Angeles), M.A., Ph.D. (Bowling Green State University).

Associate Professors

Greene, David, B.S., O.T.R., M.S. (Louisiana State University and Agricultural and Mechanical College), Ph.D. (Colorado State University).

Sample, Pat L., B.A. (University of Wyoming), M.Div. (Luther Northwestern Theological Seminary), Ph.D. (Colorado State University).

Spencer, Karen C., B.S., O.T.R. (University of New Hampshire), M.A. (University of Colorado at Boulder), Ph.D. (Colorado State University).

Assistant Professors

Atler, Karen E., B.S., O.T.R., M.S. (Colorado State University).

Borg, Barbara C., B.S., O.T.R. (Colorado State University), M.A. (University of Northern Colorado).

Davies, Patricia L., B.S., O.T.R. (Colorado State University), M.S., Ph.D. (University of Wyoming).

White, Louise W., B.S., (Colorado State University), M.S. (University of Northern Colorado).

Affiliate Faculty

Miller, Lucy J., B.S. (Lewis & Clark College), M.S. (Boston University), Ph.D. (University of Denver).

Short, Margaret, B.S. (Colorado State University), M.S., (Texas Woman's University), Ph.D. (University of Texas).

Department of Social Work

Department Chair

Professor Ben P. Granger

B.A. (Whittier College), M.S.W., M.P.A. (University of Southern California), Ph.D. (Brandeis University).

Professors

Buchan, Victoria V., B.A. (University of Colorado), M.S.W., Ph.D. (University of Denver).

Sheafor, Bradford W., B.S., M.S.W. (The University of Kansas), Ph.D. (University of Denver).

Associate Professors

Baez, Victor A., B.A. (Iona College), M.A. (University of Chicago), Ph.D. (University of Denver).

Hall, Bruce, B.S., M.S.W.A. (St. Louis University).

Jackson, Robert L., B.A., M.S.W. (University of Washington), Ph.D. (University of Utah).

Jenkins, Lowell E., B.A. (William Jewell College), M.S.W. (The University of Kansas).

Schatz, Mona, B.A. (Metropolitan State College), M.S.W. (University of Denver), D.S.W. (University of Pennsylvania).

Assistant Professors

Banman, Nancy A., B.A. (Bethel College), M.S.W. (The University of Kansas), Ph.D. (Bryn Mawr College).

Downey, Eleanor P., B.A. (Queens College), M.S.W. (Rutgers University), Ph.D. (University of Denver).

Puig, Maria E., B.A. (Florida State University), M.S.W. (Florida International University), Ph.D. (Barry University).

Seiz, Robert, B.A. (Passionist Monastic Seminary), M.A. (St. Michael College), M.A. (Ball State University), M.S.W. (Our Lady of the Lake University of San Antonio), Ph.D. (University of Texas-Austin).

Affiliate Faculty

Granger, Georgia V., B.S. (Mankato State University).

Hawkins, Sharon, B.A. (Marillac College), M.S.W. (University of Denver).

Lazzari, Marceline, B.A. (Mount St. Mary College), M.S.W. (St. Louis University), Ph.D. (University of Denver).

School of Education

Director

Professor Rick Ginsberg

B.A. (State University of New York at Albany), Ph.D. (University of Chicago).

Professors

Albright, Leonard O., B.S. (Findley College), M.Ed. (Bowling Green State University), Ph.D. (University of Illinois)

Banning, James H., B.A. (William Jewell College), M.A., Ph.D. (University of Colorado).

Cobb, Brian R., B.A., M.Ed. (University of Vermont), Ph.D. (University of Illinois at Urbana-Champaign).

Feller, Richard W., B.S., M.Ed. (Westfield State College), Ph.D. (Colorado State University).

Geroy, Gary D., B.S. (The Ohio State University), M.Ed., Ed.D. (University of Minnesota).

Hartley, Nancy K., B.A. (Southern Illinois University), M.A. (Sangamon State University), Ph.D. (Colorado State University).

Jansen, Duane G., B.S.Ed. (University of South Dakota-Springfield), M.Ed., Ph.D. (Colorado State University).

Nelson, Barbara J., B.A.Ed. (University of Wisconsin), M.Ed. (Colorado State University), Ph.D. (University of Colorado).

Richburg, Robert W., B.A. (Grinnell College), M.A. (University of Southern California), Ph.D. (University of Colorado).

Timpson, William M., A.B. (Harvard University), M.Ed. (Cleveland State University), Ph.D. (University of Wisconsin).

Whaley, David C., B.S., M.S. (University of California, Davis), Ph.D. (Cornell University).

Williams, Robert T., B.S.Ed., M.S.Ed., Ed.D. (The University of Kansas).

Associate Professors

Anderson, Sharon K., B.A., M.A. (University of Wyoming), Ph.D. (University of Denver).

Beaudin, Bart P., B.A. (York University, Canada), M.Ed. (University of Toronto, Canada), Ph.D. (The Ohio State University).

Davies, Timothy G., B.A. (Adrian College), M.A. (Eastern Michigan University), Ph.D. (Michigan State University).

Gloekner, Gene W., B.S., Ph.D. (The Ohio State University), M.S. (Colorado State University).

Kees, Nathalie, B.Mus. (St. Norbert College), M.A. (University of Wyoming), Ed.D. (West Virginia University).

Lehmann, Jean P., B.S. (George Peabody College for Teachers at Vanderbilt University), M.S. (University of Wisconsin-Stout), Ph.D. (University of Northern Colorado).

Lewis, Wiley B., B.S. (Virginia Polytechnic Institute and State University), M.S. (West Virginia University), Ph.D. (The Ohio State University).

Assistant Professors

Carlson, Laurie A., B.S. (Moorhead State University), M.Ed. (Western Washington University), Ph.D. (University of Arkansas).

Gould, Lois M., B.Ed. (Keene State College), M.Ed. (Plymouth State College), Ph.D. (University of Arizona).

McWhorter, Barbara A., B.A., M.Ed., Ph.D. (Colorado State University).

Middleton, Valerie, B.S. (Illinois State University), M.Ed., Ph.D. (Colorado State University).

Paccione, Angela V., B.A. (Stanford University), M.Ed., Ph.D. (Colorado State University).

Safarik, Lynn, B.A. (Rutgers University), M.A. (California State University, Long Beach), Ph.D. (University of California, Los Angeles).

Tochterman, Suzanne M., B.A. (Vanderbilt University), M.A., Ph.D. (George Washington University).

Yohon, Teresa, B.S.E. (Emporia State University), M.S.E. (Fort Hays State University), M.S.M. (Friends University), Ph.D. (University of Nebraska).

Instructors

Deniston, Terry L., B.A. (Michigan State University), M.Ed. (George Peabody College for Teachers of Vanderbilt University), Ph.D. (Colorado State University).

Elliott, Judy K., B.S. (University of Nebraska), M.A. (Colorado State University).

Mallette, Dawn M., B.S. (Fort Hays State University), M.S. (University of Nebraska, Lincoln), Ph.D. (Colorado State University).

College of Business

Department of Accounting

Interim Department Chair

Associate Professor Donald P. Samelson, B.A. (Macalester College), M.S. (University of Wisconsin-Madison), Ph.D. (Virginia Polytechnic Institute and State University).

Professors

Mister, William G., B.Sc., M.B.A. (University of Maryland at College Park), Ph.D. (University of California, Berkeley).

O'Neil, Cherie J., B.S., M.B.A., Ph.D. (University of Colorado at Boulder).

Vaughan, D. Michael, B.B.A., M.S., D.B.A. (Texas Tech University).

Associate Professor

Johnson, Laurence E., B.S.B.A., M.B.A. (Northern Arizona University), C.P.A. (Arizona).

Assistant Professors

Casterella, Jeffrey R., B.S. (Clarkson University), Ph.D. (University of Colorado at Boulder).

Middlemist, Melanie R., B.A. (University of Colorado), M.S., Ph.D. (Oklahoma State University), C.P.A. (Oklahoma).

Rowe, Beverly J., B.A. (University of Houston at Clear Lake), M.S. (Purdue University), Ph.D. (Texas A & M University).

Department of Computer Information Systems

Department Chairman

Associate Professor W. John Plotnicki, B.S., Ph.D. (University of Tennessee), M.B.A. (Colorado State University).

Professors

Butler, Charles W., B.A., M.S. (University of South Florida), Ph.D. (Texas A & M University).

Clark, Jon D., B.A. (Michigan State University), M.B.A. (Eastern Michigan University), Ph.D. (Case Western Reserve University).

Rademacher, Robert A., B.A. (Kearney State College), M.A., Ph.D. (University of Nebraska), C.D.P.

Weston, Frederick C., Jr., B.B.A. (Clarkson College of Technology), M.B.A., D.B.A. (Indiana University).

Associate Professors

Athey, Susan, B.S. (Virginia Polytechnic Institute and State University), M.B.A. (Colorado State University), Ph.D. (University of Arizona).

Hayne, Stephen C., B.Com. (University of Alberta), Ph.D. (University of Colorado at Boulder).

Hoxmeier, John A., B.S. (University of Nebraska), M.S. (Colorado State University), Ph.D. (University of Colorado).

Assistant Professors

Irwin, Gretchen, B.S. (University of Florida), M.S., Ph.D. (University of Colorado).

Lewis, Gene W., B.S. (Grove City College), M.S. (University of Southern California).

Smith, C.A.P., B.S. (Massachusetts Institute of Technology), Ph.D. (University of Arizona).

Turk, Daniel E., B.A. (Southern College of Seventh-Day Adventists), M.S. (Andrews University).

Vijayarathy, Leo R., B.Com. (Loyola College), M.B.A. (Marquette University), Ph.D. (Florida International University).

Lecturer

Roberts, John L., B.A. (Lawrence University), J.D. (University of Minnesota), M.B.A., (Colorado State University).

Affiliate Faculty

Shipley, Dale F., B.S., M.S. (Colorado State University).

Department of Finance and Real Estate

Department Chairman

Professor Timothy J. Gallagher
B.S., M.S., Ph.D. (University of Illinois at Urbana-Champaign).

Professor

Switzer, Ralph V., B.A., J.D. (University of Illinois), C.P.A. (Illinois).

Associate Professors

Bajtelsmit, Vickie L., B.A. (University of Virginia), J.D. (Rutgers University), Ph.D. (University of Pennsylvania).

Johnson, Richard D., B.S. (California State University, Long Beach), M.B.A., Ph.D. (University of Oregon).

Olienyk, John P., B.A., M.S. (North Dakota State University of Agriculture and Applied Science), Ph.D. (Colorado State University).

Worzala, Elaine M., B.B.A., M.S., Ph.D. (University of Wisconsin, Madison).

Assistant Professors

Prill, Edward L., B.S. (Wisconsin State University), M.S., Ph.D. (University of Illinois at Urbana-Champaign).

Ryan, Patricia A., B.S. (University of Tampa), M.B.A., Ph.D. (University of South Florida).

Schwebach, Robert G., B.S., M.A. (University of South Dakota), Ph.D. (University of Nebraska).

Department of Management

Department Chairman

Professor Willie E. Hopkins
B.S., M.B.A. (San Diego State University), Ph.D. (University of Colorado).

Professors

Costello, Daniel E., B.S., M.A. (The Ohio State University), Ph.D. (Michigan State University).

Francis, G. James, B.A. (Central University of Iowa), M.A., Ph.D. (University of Nebraska).

Hogler, Ray L., B.A. (Fort Lewis College), Ph.D., J.D. (University of Colorado).

Middlemist, R. Dennis, B.S., M.B.A. (University of Colorado), Ph.D. (University of Washington).

Thornton, Billy M., B.A. (University of Florida), M.S. (University of Arizona), Ph.D. (Texas A & M University).

Associate Professors

Hulen, Myron C., B.A. (Duke University), M.B.A., Ph.D. (University of Texas at Austin).

Mallette, Paul M., B.S., M.B.A. (Fort Hays State University), Ph.D. (University of Nebraska, Lincoln).

McCambridge, James A., B.S., Ph.D. (Colorado State University), M.A. (Michigan State University).

McCarthy, Anne M., B.A. (Georgetown University), M.B.A. (University of Connecticut), Ph.D. (Purdue University).

Powell-Sterkel, Karen S., B.S., M.A.T. (Colorado State University), Ph.D. (University of Northern Colorado).

Assistant Professors

Gross, Michael, B.S., Ph.D. (Arizona State University), M.A. (University of Southern California).

Hartman, Jackie L., B.S., M.S. (Kansas State University), Ph.D. (Colorado State University).

Pullman, Madeleine, B.S. (Evergreen State College), M.S., M.B.A., Ph.D. (University of Utah).

Sarason, Yolanda, B.A. (University of New Mexico), M.B.A., Ph.D. (University of Colorado).

Department of Marketing

Department Chairman

Professor O.C. Ferrell
B.A., M.B.A. (Florida State University), Ph.D. (Louisiana State University and Agricultural and Mechanical College).

Professors

Hoffman, K. Douglas, B.S. (The Ohio State University), M.S., Ph.D. (University of Kentucky).

Ingram, Thomas N., B.S. (Auburn University), M.A. (University of Alabama), Ph.D. (Georgia State University).

Lantry, Terry L., B.A., J.D. (Valparaiso University), M.B.A. (Indiana University), C.P.A. (Indiana and Colorado).

Associate Professors

Cannon, Joseph P., B.S. (Marquette University), M.B.A. (Santa Clara University), Ph.D. (University of North Carolina at Chapel Hill).

Kelly, Kathleen J., B.S., M.S., Ph.D. (Colorado State University).

Menon, Ajay, B.S. (University of Bombay, India), M.B.A. (Pan American University), Ph.D. (University of North Texas).

Stanley, Linda R., B.A. (University of Montana), M.S., Ph.D. (University of Wyoming).

Assistant Professors

Allerheiligen, Robert P., B.A., M.B.A. (Colorado State University), Ph.D. (University of Southern California).

Gilliland, David I., B.S. (University of Tennessee), M.B.A., Ph.D. (Georgia State University).

Manning, Kenneth C., B.S. (Colorado State University), M.S. (University of Colorado at Boulder), Ph.D. (University of South Carolina).

College of Engineering

Department of Atmospheric Science

Department Head

Professor Steven A. Rutledge

B.S. (University of Missouri, Saint Louis), Ph.D. (University of Washington, Seattle).

University Distinguished Professor

Vonder Haar, Thomas H., B.S. (St. Louis University), M.S., Ph.D. (University of Wisconsin).

Professors

Cotton, William R., B.S., M.S. (State University of New York, Albany), Ph.D. (The Pennsylvania State University).

Cox, Stephen K., B.A. (Knox College), M.S., Ph.D. (University of Wisconsin).

Gray, William M., B.A. (George Washington University), M.S., Ph.D. (University of Chicago).

Johnson, Richard H., B.S. (Oregon State University), M.S. (University of Chicago), Ph.D. (University of Washington).

Pielke, Roger A., B.A. (Towson State University), M.S., Ph.D. (The Pennsylvania State University).

Randall, David A., B.S., M.S. (The Ohio State University), Ph.D. (University of California, Los Angeles).

Schubert, Wayne H., B.A., M.S., Ph.D. (University of California, Los Angeles).

Stephens, Graeme L., B.S., Ph.D. (University of Melbourne, Australia).

Associate Professors

Collett, Jeffrey L., Jr., B.S. (Massachusetts Institute of Technology), M.S., Ph.D. (California Institute of Technology).

Kreidenweis-Dandy, Sonia M., B.E. (Manhattan College), M.S., Ph.D. (California Institute of Technology).

Kummerow, Christian, A.B. (University of California, Berkeley), Ph.D. (University of Minnesota).

Montgomery, Michael T., B.S., M.S. (University of Washington), M.S., Ph.D. (Harvard University).

Assistant Professors

Denning, A. Scott, B.S. (University of Maine), M.S., Ph.D. (Colorado State University).

Thompson, David W.J., B.S. (University of Colorado), M.S., Ph.D. (University of Washington).

Affiliate Faculty

Asner, Gregory P., B.S., M.S., Ph.D. (University of Colorado).

Baumgardner, Darrel, B.S. (Georgia Institute of Technology), M.S., Ph.D. (University of Wyoming).

Black, Peter G., B.S. (St. Louis University), M.S. (University of Chicago), Ph.D. (The Pennsylvania State University).

Davis, Christopher A., B.S. (University of Massachusetts), Ph.D. (Massachusetts Institute of Technology).

DeMaria, Mark, B.S. (Florida State University), M.S., Ph.D. (Colorado State University).

Dye, James E., B.S., Ph.D. (University of Washington).

Feingold, Graham, B.Sc. (University of Witwatersrand, South Africa), B.Sc., M.Sc., Ph.D. (Tel Aviv University, Israel).

Hillger, Donald W., B.S. (University of Minnesota), M.S., Ph.D. (Colorado State University).

Kiladis, George N., B.S. (University of Massachusetts), M.S., Ph.D. (University of Colorado).

Lemone, Margaret Anne, A.B. (University of Missouri), Ph.D. (University of Washington).

McGinley, John A., B.A. (San Jose State University), M.S., Ph.D. (University of Oklahoma).

Moeng, Chin-Hoh, B.S. (National Central University of Taiwan, Taiwan), M.S. (South Dakota School of Mines and Technology), Ph.D. (University of California, Los Angeles).

Remer, Lorraine A., B.S. (National Central University), M.S. (University of California, San Diego), Ph.D. (University of California, Davis).

Starr, David O'C., B.S. (The Catholic University of America), M.S., Ph.D. (Colorado State University).

Tao, Wei-Kuo, B.S. (National Central University), M.S. (John Hopkins University), M.S., Ph.D. (University of Illinois).

Wakimoto, Roger M., B.S. (San Jose State University), Ph.D. (University of Chicago).

Weisan, Morris L., B.S. (Worcester Polytech), M.S., Ph.D. (The Pennsylvania State University).

Welch, Ronald M., B.S., M.A. (California State University, Long Beach), Ph.D. (University of Utah).

Department of Chemical and Bioresource Engineering

Interim Department Chair

Professor Vincent G. Murphy
B.S. (Manhattan College), M.S., Ph.D. (University of Massachusetts).

Professors

Belfiore, Laurence A., B.E. (Stevens Institute of Technology), Ph.D. (University of Wisconsin, Madison).

Karim, M. Nazmul, B.S. (B.U.E.T., Dacca, Bangladesh), M.S., Ph.D. (University of Manchester, England).

Associate Professors

Dandy, David S., B.S. (University of California, Davis), M.S., Ph.D. (California Institute of Technology).

Reardon, Kenneth F., B.S.E. (University of Pennsylvania), M.S., Ph.D. (California Institute of Technology).

Assistant Professors

Batt, Brian C., B.S. (Wichita State University), M.S. (University of Kansas), Ph.D. (University of Colorado).

Bhadra, Rajiv, B.Tech. (Indian Institute of Technology, India), Ph.D. (Rice University).

Henk, Linda L., B.S., Ph.D. (Colorado State University).

Rinker, Kristina D., B.S. (University of Alabama), Ph.D. (North Carolina State University).

Wickramasinghe, Ranil, B.E., M.E. (University of Melbourne, Australia), Ph.D. (University of Minnesota).

Affiliate Faculty

Bourquin, Al W., B.S., M.S., Ph.D. (University of Houston).

Butler, James E., S.B. (Massachusetts Institute of Technology), Ph.D. (University of Chicago).

Hamilton, Kenneth M., B.S. (University of Manchester, England), M.Sc., Ph.D. (University College of Swansea, England).

Himmel, Michael E., B.S. (University of Northern Colorado), Ph.D. (Colorado State University).

Kuhn, Robert H., B.S. (Rutgers University), M.S. (Colorado State University), Ph.D. (North Carolina State University at Raleigh).

Mahaffey, William, B.S., M.S. (State University of New York), Ph.D. (University of Texas).

Mattoon, James R., B.S. (University of Illinois, Urbana), M.S., Ph.D. (University of Wisconsin, Madison).

McConica, Carol M., B.S. (University of Denver), M.S., Ph.D. (Stanford University).

McMillan, James D., B.S. (Colorado State University), M.S., Ph.D. (Massachusetts Institute of Technology).

Riesfield, Bradley, B.S. (University of California, Davis), M.S. (The Pennsylvania State University), Ph.D. (Northwest University).

Seely, Robert J., B.S. (Oregon State University), M.S. (University of Colorado Health Sciences Center), Ph.D. (Colorado State University).

Siegrist, Robert L., B.S., M.S., Ph.D. (University of Wisconsin).

Simpkin, Thomas J., B.S., M.S., Ph.D. (University of Wisconsin, Madison).

Stewart, Rodger, B.S.M.E. (University of Colorado).

Department of Civil Engineering

Department Head

Professor Sandra L. Woods
B.S. (Michigan State University), M.S., Ph.D. (University of Washington).

Harold H. Short Endowed Professor

Roesner, Larry A., B.S. (Valparaiso University), M.S. (Colorado State University), Ph.D. (University of Washington).

Professors

Abt, Steven R., B.C.E., M.S., Ph.D. (Colorado State University).
Professional Engineer.

Ayers, Paul D., B.S., M.S. (Virginia Polytechnic Institute and State University), Ph.D. (North Carolina State University).

Bienkiewicz, Bogusz, M.S. (Technical University of Gdansk, Poland), Ph.D. (Colorado State University).

Charlie, Wayne A., B.S., M.S., Ph.D. (Michigan State University). Professional Engineer.

Criswell, Marvin E., B.S. (University of Nebraska), M.S., Ph.D. (University of Illinois). Professional Engineer.

Durnford, Deanna S., B.S. (University of Wisconsin, Platteville), M.S., Ph.D. (Colorado State University). Professional Engineer.

Fontane, Darrell G., B.S. (Louisiana State University and Agricultural and Mechanical College), M.S. (Georgia Institute of Technology), Ph.D. (Colorado State University). Professional Engineer.

Gessler, Johannes, Dipl., Dr.Sc.Techn. (Swiss Federal Institute of Technology, Switzerland). Professional Engineer.

Grigg, Neil S., B.S. (United States Military Academy), M.S. (Auburn University), Ph.D. (Colorado State University). Professional Engineer.

Gutkowski, Richard M., B.S., M.S. (Worcester Polytechnic Institute), Ph.D. (University of Wisconsin). Professional Engineer.

Heyliger, Paul R., B.S., M.S. (Colorado State University), Ph.D. (Virginia Polytechnic Institute and State University).

Julien, Pierre, B.Sc.A., M.Sc., Ph.D. (Laval University, Canada).

Labadie, John W., B.S., M.S. (University of California, Los Angeles), Ph.D. (University of California, Berkeley). Professional Engineer.

Loftis, Jim C., B.S. (Oklahoma State University), M.S., Ph.D. (Colorado State University). Professional Engineer.

Meroney, Robert N., B.S. (University of Tennessee), M.S., Ph.D. (University of California, Berkeley). Professional Engineer.

Nelson, John D., B.S., M.S., Ph.D. (Illinois Institute of Technology). Professional Engineer.

Oad, Ramchand, B.S. (N.E.D. Engineering College, Pakistan), M.Eng. (Asian Institute of Technology, Thailand), Ph.D. (Cornell University).

Podmore, Terence H., ANCAE (National College of Agricultural Engineering, England), M.S. (Michigan State University), Ph.D. (Purdue University). Professional Engineer.

Reddy, J., Mohan, B.S. (A.P. Agricultural University), M.S. (Utah State University), Ph.D. (Colorado State University).

Ruff, James F., B.S., M.S. (Colorado State University), Ph.D. (Massachusetts Institute of Technology). Professional Engineer.

Salas, Jose D., B.S. (National University of Engineering, Lima, Peru), M.S., Ph.D. (Colorado State University).

Shackelford, Charles D., B.S. (University of Missouri, Rolla), M.S., Ph.D. (University of Texas at Austin). Professional Engineer.

Sunada, Daniel K., B.S., M.S., Ph.D. (University of California, Berkeley). Professional Engineer.

Thompson, Erik G., B.S. (Southern Methodist University), M.S., Ph.D. (University of Texas).

Ward, Robert C., B.S. (Mississippi State University), M.S., Ph.D. (North Carolina State University of Raleigh). Professional Engineer.

Associate Professors

Broner, Israel, B.S., M.S. (Technion- Israel Institute of Technology), Ph.D. (Clemson University).

Gates, Timothy K., B.S. (Louisiana Tech University), M.S. (Colorado State University), Ph.D. (University of California, Davis).

Garcia, Luis A., B.S., M.S. (Texas A & M University), Ph.D. (University of Colorado at Boulder).

Neff, David E., B.S. (Washington State University), M.S., Ph.D. (Colorado State University).

Ramirez, Jorge A., Ingeniero Civil (Facultad Nacional De Minas of Medellin, Colombia), M.S., Ph.D. (Massachusetts Institute of Technology).

Sanders, Thomas G., B.E. (Vanderbilt University), M.S.C.E., Ph.D. (University of Massachusetts).

Siller, Thomas J., B.S. (State University of New York at Buffalo), M.S. (University of Massachusetts at Amherst), Ph.D. (Carnegie Mellon University).

Warner, James W., B.S. (California State University, Fresno), M.S. (California State University, Fullerton), Ph.D. (Colorado State University).

Watson, Chester C., B.S. (Louisiana Polytechnic Institute), M.S., (Louisiana Tech University), Ph.D. (Colorado State University).

Assistant Professors

Affi, Sameh M., B.S. (Cairo University, Egypt), M.S., Ph.D. (Colorado State University).

Bledsoe, Brian P., B.S. (Georgia Institute of Technology), M.S. (North Carolina State University), Ph.D. (Colorado State University).

Carlson, Kenneth, B.S. (University of Wisconsin-Madison), M.S. (Colorado State University), Ph.D. (University of Colorado at Boulder).

Hartnagel, Bryan A., B.S., M.S., Ph.D. (University of Missouri, Columbia).

Saito, Laurel S., B.S. (University of California, Davis), M.S., Ph.D. (Colorado State University). Professional Engineer.

Thornton, Christopher I., B.S., M.S., Ph.D. (Colorado State University). Professional Engineer.

Affiliate Faculty

Abu-Zeid, Khaled M., B.S. (Cairo University, Egypt), M.S., Ph.D. (Colorado State University).

Abu-Zeid, Mahmoud A., B.S. (Cairo University, Egypt), M.S., Ph.D. (University of California, Davis).

- Ahuja, Lajpat R.**, B.S. (University of Delhi, India), M.S. (Indian Agriculture Research Institute, India), Ph.D. (University of California, Davis).
- Andales, Allan A.**, B.S. (University of the Philippines at Los Banos, Philippines), M.S., Ph.D. (Iowa State University, Ames).
- Arneson, Larry A.**, B.S., M.S. (Montana State University), Ph.D. (Colorado State University).
- Ascough, James C., II**, B.S., M.S., Ph.D. (Purdue University).
- Bartholow, John M.**, B.E. (Vanderbilt University), M.S. (Colorado State University).
- Bell, Harry F.**, B.S. (Elizabethtown College), Ph.D. (University of Delaware).
- Bellamy, William D.**, B.S., M.S. (University of Wyoming), Ph.D. (Colorado State University).
- Biedenharn, David S.**, B.S. (Louisiana Tech University), M.S., Ph.D. (Colorado State University).
- Boggs, Daryl W.**, B.A., B.S., M.S. (Massachusetts Institute of Technology); Ph.D. (Colorado State University).
- Boyd, Landis L.**, B.S.A.E., M.S., Ph.D. (Iowa State University).
- Brazil, Larry E.**, B.S. (Massachusetts Institute of Technology), M.S., Ph.D. (Colorado State University).
- Buchleiter, Gerald W.**, B.S. (University of Colorado, Boulder), M.S., Ph.D. (Colorado State University).
- Charles, Frederick L.**, B.S. (The Pennsylvania State University), M.S. (Colorado State University), Ph.D. (The Pennsylvania State University).
- Chen, Yung-Hai**, B.S. (Taiwan Cheng Kung University, Taiwan), M.S., Ph.D. (Colorado State University).
- Clark, John R.**, B.S. (University of Colorado), M.S. (University of Oklahoma), Ph.D. (Colorado State University).
- Combs, Phil**, B.S., M.S. (Southern Methodist University), Ph.D. (Colorado State University).
- Croce, Fulvio**, Laurea in Civil Engineering (Università di Palermo, Italy), M.S. (Colorado State University).
- Danielson, Jeris A.**, B.S., M.S., Ph.D. (Colorado State University).
- Duke, Harold R.**, B.S. (Texas Tech University), M.S., Ph.D. (Colorado State University).
- Edgar, Thomas V.**, B.S. (University of Colorado, Boulder), M.S., Ph.D. (Colorado State University).
- Eckhardt, John R.**, B.S., M.S., Ph.D. (Colorado State University).
- Evans, Norman A.**, B.S. (South Dakota State University), M.S. (Utah State University), Ph.D. (Colorado State University).
- Falvey, Henry T.**, B.S. (Georgia Institute of Technology), M.S. (California Institute of Technology), Dr.-Ing. (Technische Hochschule Karlsruhe, Germany).
- Farahani, Hamid J.**, B.S. (Kansas State University), M.S. (University of Arizona), Ph.D. (Colorado State University).
- Flug, Marshall**, B.E. (The City University of New York, City College), M.S., Ph.D. (Colorado State University). Professional Engineer.
- Frevert, Donald K.**, B.S. (University of Arizona), M.S., Ph.D. (Colorado State University).
- Green, Jacklyn R.**, B.S. (University of Arizona, Tucson), M.S., Ph.D. (University of Texas, Austin).
- Green, Timothy R.**, B.S. (University of Washington, Seattle), M.S., Ph.D. (Stanford University).
- Gutwein, Barry J.**, B.S., M.S. (Purdue University), Ph.D. (Colorado State University).
- Heermann, Dale F.**, B.S.A.E. (University of Nebraska), M.S., Ph.D. (Colorado State University).
- Heermann, Raymond**, B.S. (Columbia University), M.S., Ph.D. (University of Wyoming).
- Heo, Jun-Haeng**, B.S., M.S. (Yonsei University, Korea), Ph.D. (Colorado State University).
- Hussein, Iyad**, B.Sc. (Yarmouk University, Jordan), M.Sc. (Jordan University), Ph.D. (Colorado State University).
- Illangaseraye, Tissa H.**, B.S. (University of Ceylon, Sri Lanka), M.A. (Asian Institute of Technology), Ph.D. (Colorado State University).
- Jarrett, Robert D.**, B.S. (University of New Hampshire), M.S., Ph.D. (Colorado State University).
- Jensen, Marvin E.**, B.S., M.S. (North Dakota State University), Ph.D. (Colorado State University).
- Karavitis, Christos A.**, B.S. (University of Athens, Greece), M.S., Ph.D. (Colorado State University).
- Kruse, E. Gordon**, B.S., M.S. (University of Nebraska), Ph.D. (Colorado State University).
- Lagasse, Peter F.**, B.S. (United States Military Academy), M.S. (University of California, Berkeley), Ph.D. (Colorado State University).
- Lane, William L.**, B.S., M.S. (Montana State University), Ph.D. (Colorado State University).
- Lee, Brian E.**, B.S., Ph.D. (Leicester University, United Kingdom).
- McBride, Graham B.**, B.Sc. (Victoria University), M.Sc. (University of Newcastle-upon-Tyne).
- Mefford, Brent W.**, B.S., M.S. (Colorado State University).

Mehta, Kishor C., B.S., M.S. (University of Michigan), Ph.D. (University of Texas at Austin).

Middlebrooks, E. Joe, B.C.E., M.S.E. (University of Florida), Ph.D. (Mississippi State University).

Mohorjy, Abdullah M., B.S. (King Abdulaziz University, Saudi Arabia), M.S. (University of Michigan), Ph.D. (Colorado State University).

Molinas, Albert, B.S. (Bogazici University), M.S., Ph.D. (Colorado State University).

Mussetter, Robert A., B.S. (Montana State University), M.S., Ph.D. (Colorado State University).

Natterer, Julius, Diploma (Technical University, Munich).

Olsen, Harold, S.B., S.M., Sc.D. (Massachusetts Institute of Technology).

Petersen, Ronald, B.S., M.S. (South Dakota School of Mines and Technology), Ph.D. (Colorado State University).

Peterson, Richard E., B.S. (California Institute of Technology), M.S. (University of Chicago), Ph.D. (University of Missouri).

Peterson, Roger J., B.S. (University of Vermont), M.S., Ph.D. (Colorado State University).

Ponce, Stanley L., B.S. (University of Missouri), M.S. (Oregon State University), Ph.D. (Utah State University).

Puckett, Jay A., B.S. (University of Missouri), M.S., Ph.D. (Colorado State University).

Quinn, Frank H., B.S., M.S. (Wayne State University), Ph.D. (University of Michigan).

Sarkar, Partha, B.Tech. (Indian Institute of Technology, India), M.S. (Washington State University), Ph.D. (The Johns Hopkins University).

Shepherd, Thomas A., B.S. (Duke University), M.B.A. (Indiana University), Ph.D. (Colorado State University).

Sherlock, Philip, B.S. (University of Witwatersrand, South Africa).

Smith, Douglas A., B.S., M.S., Ph.D. (Texas Tech University).

Smith, Roger E., B.Sc. (Texas Tech University), M.Sc. (Stanford University), Ph.D. (Colorado State University).

Steele, Timothy D., A.B. (Wabash College), M.S., Ph.D. (Stanford University).

Stewart, David R., B.S. (Colorado State University), M.S. (University of Arizona), M.B.A., Ph.D. (Colorado State University).

Sture, Stein, B.S., M.S., Ph.D. (University of Colorado).

Sullivan, Peter P., B.S., Ph.D. (Colorado State University), M.S. (University of British Columbia, Canada).

Summers, R. Scott, B.S., M.S. (University of Cincinnati), Ph.D. (Stanford University).

Taber, John T., B.S. (Lafayette College), M.S. (Princeton University), Ph.D. (Utah State University).

Tamayo, Carlos E., B.S. (University of Yucatan), M.S., Ph.D. (Colorado State University).

Thorne, Colin R., B.Sc., Ph.D. (University of East Anglia, United Kingdom).

Troutman, Brent M., B.S. (Colorado School of Mines), M.S., Ph.D. (Colorado State University).

Watts, Raymond D., B.A. (Pomona College), Ph.D. (University of Toronto, Canada).

Wittler, Rodney J., B.S., M.S., Ph.D. (Colorado State University).

Woolhiser, David A., B.S., Ph.D. (University of Wisconsin), M.S. (University of Arizona).

Yang, Chih Ted, B.S. (National Cheng Kung University), M.S., Ph.D. (Colorado State University).

Zimelman, Darell D., B.S., M.S. (Colorado State University), Ph.D. (Arizona State University).

Znidarcic, Dobroslav, B.S., M.S. (University of Zagreb), Ph.D. (University of Colorado, Boulder).

Department of Electrical and Computer Engineering

Department Head

Professor Derek L. Lile

B.S., M.S. (University of Wales), Ph.D. (Imperial College, University of London, England).

Professors

Azimi-Sadjadi, Mahmood, B.Sc. (University of Tehran, Iran), M.Sc., Ph.D. (Imperial College, University of London, England).

Bringi, V. N., B.Tech. (IIT, Bombay, India), M.S., Ph.D. (The Ohio State University).

Chandrasekaran, Venkatachala, B.Tech. (Indian Institute of Technology, India), M.S., Ph.D. (Colorado State University).

Collins, George J., B.E.E. (Manhattan College), M.S., Ph.D. (Yale University).

Jayasumana, M. A. Anura P., B.Sc. (University of Sri Lanka), M.S., Ph.D. (Michigan State University).

Mahan, John E., B.S., M.S. (Purdue University), Ph.D. (Stanford University).

Robinson, Gary Y., B.S. (University of Texas at Austin), M.S., Ph.D. (University of California, Berkeley).

Rocca, Jorge J., B.S. (University of Rosario, Argentina), Ph.D. (Colorado State University).

Scharf, Louis, B.S., M.S., Ph.D. (University of Washington, Seattle).

Wilmsen, Carl W., B.S., M.E. (Texas A & M University), B.S., M.S., Ph.D. (University of Texas).

Associate Professors

Chen, Tom (Wei), B.S. (Shanghai Jiao Tong University, People's Republic of China), Ph.D. (University of Edinburgh, United Kingdom).

Lear, Kevin L., B.S. (University of Colorado at Boulder), M.S., Ph.D. (Stanford University).

Menoni, Carmen S., B.S. (University of Rosario, Argentina), Ph.D. (Colorado State University).

Mitkas, Pericles A., Diploma of Electrical Engineering (Aristotelian University of Thessaloniki, Greece), M.Sc., Ph.D. (Syracuse University).

Assistant Professors

Nassar, Carl R., B.E., M.E., Ph.D. (McGill University, Canada).

Young, Peter M., B.A. (Oxford University, England), M.S. (University of Florida), Ph.D. (California Institute of Technology).

Department of Mechanical Engineering

Interim Department Head

Professor Steven R. Abt

B.C.E., M.S., Ph.D. (Colorado State University). **Professors**

Burns, Patrick J., B.S. (Tulane University of Louisiana), M.S., Ph.D. (University of California, Berkeley).

Duff, William S., B.M.E. (Cornell University), M.B.A. (University of Pennsylvania), M.S., Ph.D. (Stanford University).

Edwards, Harry W., B.S. (University of Nevada), Ph.D. (University of Arizona).

Histand, Michael B., B.S. (Lehigh University), M.S., Ph.D. (Stanford University).

Hittle, Douglas C., B.S., M.S., Ph.D. (University of Illinois at Urbana-Champaign).

Kirkpatrick, Allan T., B.S., Ph.D. (Massachusetts Institute of Technology), M.S. (College of William and Mary in Virginia).

Mitchell, Charles E., B.S., M.A., Ph.D. (Princeton University).

Smith, Frederick W., B.S., M.S., Ph.D. (University of Washington). Professional Engineer.

Wilbur, Paul J., B.S. (University of Utah), M.A., Ph.D. (Princeton University). Professional Engineer.

Associate Professors

Alciatore, David G., B.S. (University of New Orleans), M.S., Ph.D. (University of Texas-Austin).

Fitzhorn, Patrick A., B.S. (Old Dominion University), M.S., Ph.D. (Colorado State University).

James, Susan P., B.S. (Carnegie Mellon University), Ph.D. (Massachusetts Institute of Technology).

Radford, Donald W., B.A.Sc., M.A.Sc. (University of British Columbia, Canada), Ph.D. (Rensselaer Polytechnic Institute).

Sakurai, Hiroshi, B.S. (University of Tokyo, Japan), M.S., Ph.D. (Massachusetts Institute of Technology).

Sampath, W. S., B.Tech. (Indian Institute of Technology, India), M.S., Ph.D. (Arizona State University).

Troxell, Wade O., B.S., M.S., Ph.D. (Colorado State University).

Willson, Bryan D., B.S. (Texas A & M University), M.S., Ph.D. (University of Texas at Austin).

Wheeler, Donna L., B.S., M.S., Ph.D. (University of Florida).

Affiliate Faculty

Bennet, Joel G., B.S., M.S., Ph.D. (Virginia Polytechnic Institute).

Broker, Jeffrey P., B.S., Ph.D. (University of California, Los Angeles).

Butterfield, Sandy, B.S., M.S. (University of Massachusetts).

Davidson, Jane H., B.S., M.S. (University of Tennessee), Ph.D. (Duke University).

Egger, Erick L., B.S., D.V.M. (Colorado State University).

Ferguson, Colin R., S.B. (University of California, Davis), S.M., Ph.D. (Massachusetts Institute of Technology).

Jacobs, Harold R., B.S. (University of Portland), M.S. (Washington State University), Ph.D. (The Ohio State University).

Klarstrom, Dwaine, B.S., M.S., Ph.D. (University of Wisconsin, Madison).

Nowack, Mark L., B.S. (The Pennsylvania State University), M.S. (Air Force Institute of Technology), Ph.D. (Cambridge University).

O'Brien, Michael F., B.S. (Columbia University), M.D. (State University of New York).

Peterson, Michael L., B.S. (General Motors Institute, Michigan), M.S., Ph.D. (Northwestern University).

Raichel, Daniel R., B.A. (Rensselaer Polytechnic Institute), M.S. (Massachusetts Institute of Technology), Ph.D. (New York University, Bronx).

Robinson, Michael C., B.S., M.S., Ph.D. (University of Colorado).

Rubin, James B., B.S., M.S., Ph.D. (New Mexico Institute of Mining and Technology).

Tong, Timothy W., B.S. (Oregon State University), M.S., Ph.D., (University of California, Berkeley).

Torcellini, Paul A., B.S. (Worcester Polytechnic Institute), M.S.M.E., Ph.D. (Purdue University).

Van Blarigan, Peter, B.S. (Virginia Polytechnic Institute and State University), M.S., Ph.D. (University of California).

College of Liberal Arts

Department of Anthropology

Department Chair

Professor Jeffrey L. Eighmy
B.A. (University of Oklahoma), M.A., Ph.D. (University of Arizona).

Associate Professors

Browne, Katherine E., B.A., M.A., Ph.D. (Southern Methodist University).

Galvin, Kathleen A., B.A., M.A. (Colorado State University), Ph.D. (State University of New York at Binghamton).

Jennings, Calvin H., B.A., M.A., Ph.D. (University of Colorado).

Magennis, Ann L., B.A. (Michigan State University), M.A. (University of Tennessee), Ph.D. (University of Massachusetts at Amherst).

Pressel, Esther J., B.S. (The Pennsylvania State University), M.A., Ph.D. (The Ohio State University).

Todd, Lawrence C., B.A. (University of Wyoming), M.A., Ph.D. (The University of New Mexico).

Assistant Professors

Glantz, Michelle M., B.A., Ph.D. (University of Pennsylvania).

Pickering, Kathleen A., B.A. (College of William and Mary in Virginia), J.D. (New York Law School), M.A., Ph.D. (University of Wisconsin).

Snodgrass, Jeffrey G., B.S. (Vanderbilt University), M.A., Ph.D. (University of California, San Diego).

Valdez, Norberto, B.A. (University of Colorado), M.A. (University of Idaho), M.A., Ph.D. (University of Wisconsin, Madison).

Van Buren, Mary, B.A. (University of Oregon), M.A., Ph.D. (University of Arizona).

Affiliate Faculty

Allen, Craig D., B.S., M.S. (University of Wisconsin, Madison), Ph.D. (University of California, Berkeley).

Benedict, James B., B.A. (University of Colorado), Ph.D. (University of Wisconsin).

Brett, John A., B.A. (University of Northern Colorado), M.A. (University of Colorado), Ph.D. (University of California).

Cummings, Linda Scott, B.A., M.A., Ph.D. (University of Colorado).

France, Diane L., B.A., M.A. (Colorado State University), Ph.D. (University of Colorado at Boulder).

Maloney, Thomas J., B.S. (Northeastern University), M.A., Ph.D. (Washington University).

Zier, Christian J., B.A., M.A., Ph.D. (University of Colorado at Boulder).

Department of Art

Department Chair

Professor Philip E. Risbeck
B.F.A., M.F.A. (The University of Kansas).

Professors

DeVore, Richard E., B.Ed. (The University of Toledo), M.F.A. (Cranbrook Academy of Art).

Dormer, James T., B.A. (The William Paterson College), M.A. (The Pennsylvania State University), M.A. (University of Iowa).

Ellerby, David A., B.S. (Western Michigan University), M.F.A. (University of Cincinnati).

Getty, Nilda C. F., B.A. (Stetson University), M.F.A. (University of Georgia).

Hendry, Kenneth A., B.S. (University of Northern Illinois), M.F.A. (Claremont Graduate School and University Center).

Jacobs, Peter A., B.S., M.A. (State University of New York at New Paltz), Ed.D. (Vanderbilt University-Peabody College).

Kutzik, John F., B.A., M.F.A. (University of Minnesota).

Lundberg, Thomas R., B.F.A. (University of Iowa), M.F.A. (Indiana University).

Twarogowski, Leroy, B.F.A., M.F.A. (The University of Kansas).

Wassell, Harold J., B.S., M.S. (Illinois State University).

Yust, David E., B.F.A. (The University of Kansas), M.F.A. (University of Oregon).

Associate Professors

Coronel, Patricia D., B.A. (University of California, Riverside), M.A., Ph.D. (University of California, Santa Barbara).

Fahey, Patrick G., B.A. (Viterbo College), M.A., Ph.D. (University of Iowa).

Gravdahl, John, B.F.A. (Colorado State University), M.F.A. (Syracuse University).

Huibregtse, Gary, B.A. (University of Wisconsin, LaCrosse), M.F.A. (University of Colorado).

Keimig, Gary L., B.F.A. (Wichita State University), M.F.A. (University of Colorado).

Nelson, Christine N., B.A., M.A. (Michigan State University), Ph.D. (University of Michigan).

Silberberg-Peirce, Susan, B.A., M.A., Ph.D. (University of California, Los Angeles).

Simons, Stephen, B.F.A., M.F.A. (Colorado State University).

Sullivan, Patrice M., B.F.A., M.A. (Massachusetts College of Art), M.F.A. (University of Pennsylvania).

Voss, Gary W., B.F.A. (University of Illinois at Urbana-Champaign), M.F.A. (Colorado State University).

Assistant Professor

Kokoska, Mary Ann, B.F.A. (Queen's University, Ontario, Canada), M.F.A. (Concordia University, Quebec, Canada).

Affiliate Faculty

Powers, John G., B.A. (Princeton University), LL.B. (Harvard University).

Department of Economics**Department Chair****Associate Professor Robert W. Kling**

A.B. (Davidson College), M.S., Ph.D. (The University of Kansas).

Professors

Cochrane, Harold C., B.S. (The Pennsylvania State University), Ph.D. (University of Colorado).

Fan, Chuen-mei, B.A. (National Taiwan University, Republic of China), M.A., Ph.D. (University of Minnesota).

Fan, Liang-Shing, B.A. (National Taiwan University, Republic of China), M.A., Ph.D. (University of Minnesota).

Keller, Robert R., B.A. (San Jose State University), M.A. (University of California, Los Angeles), Ph.D. (University of Wisconsin).

Ozawa, Terutomo, B.A. (Tokyo University of Foreign Studies, Japan), M.B.A., Ph.D. (Columbia University).

Phillips, Ronnie J., B.A. (University of Oklahoma), Ph.D. (University of Texas at Austin).

Shulman, Steven J., B.A., M.A., Ph.D. (University of Massachusetts at Amherst).

Stanfield, James Ronald, B.A., M.A. (University of Texas), Ph.D. (University of Oklahoma).

Associate Professors

Bernasek, Alexandra, B.S. (University of Sydney, Australia), M.A., Ph.D. (University of Michigan).

Cutler, Harvey, B.S. (University of Colorado), M.S. (Portland State University), Ph.D. (University of Washington).

Jianakoplos, Nancy A., A.B. (Smith College), M.A. (University of Missouri, St. Louis), Ph.D. (The Ohio State University).

Nickerson, David, B.A. (University of Missouri, Kansas City), M.A., Ph.D. (Northwestern University).

Revier, Charles F., B.A., M.A. (University of Colorado), Ph.D. (Massachusetts Institute of Technology).

Assistant Professors

Mushinski, David, B.A. (College of William and Mary in Virginia), J.D. (University of Virginia), Ph.D. (University of Wisconsin, Madison).

Weiler, Stephan, B.A., M.A. (Stanford University), Ph.D. (University of California, Berkeley).

Department of English**Department Chair****Professor Pattie Cowell**

B.A. (Pacific Lutheran University), M.A., Ph.D. (University of Massachusetts).

Professors

Bucco, Martin, B.A. (New Mexico Highlands University), M.A. (Columbia University), Ph.D. (University of Missouri).

Calderazzo, John W., B.A. (University of South Florida), M.F.A. (Bowling Green State University).

Campbell, SueEllen, B.A. (Rice University), M.A., Ph.D. (University of Virginia).

Cantrell, Carol, B.A. (Valparaiso University), M.A., Ph.D. (Northwestern University).

Crow, Mary W., B.A. (The College of Wooster), M.A. (Indiana University).

Henze, Richard H., B.A. (University of Evansville), M.A., Ph.D. (University of Nebraska).

Kiefer, Kathleen E., B.A. (University of Dayton), M.A., Ph.D. (The Ohio State University).

Milofsky, David, B.A., M.A. (University of Wisconsin), M.F.A. (University of Massachusetts).

Mogen, David, B.A. (Columbia University), Ph.D. (University of Colorado).

Palmquist, Michael E., B.A. (Saint Olaf College), M.A., Ph.D. (Carnegie Mellon University).

Pratt, John Clark, B.A. (University of California, Berkeley), M.A. (Columbia University), Ph.D. (Princeton University).

Reid, Stephen D., B.A. (Grinnell College), M.A. (University of Missouri), Ph.D. (The University of Kansas).

Ronda, Bruce A., B.A. (Hope College), M.Phil., Ph.D. (Yale University).

Thiem, Jon E., B.A. (Dickinson College), M.A., Ph.D. (Indiana University).

Tremblay, William A., B.A., M.A. (Clark University), M.F.A. (University of Massachusetts).

Work, James C., B.A., M.A. (Colorado State University), Ph.D. (The University of New Mexico).

Associate Professors

Becker, Leslee, B.A. (State University of New York, College at Cortland), M.A. (University of Vermont), M.A. (Hollins College), M.F.A. (University of Iowa).

Delahunty, Gerald P., B.A., M.A. (University College, Dublin, Ireland), Ph.D. (University of California, Irvine).

Findlay, Gilbert P., B.A., Ph.D. (University of Washington).

Flahive, Douglas E., B.A., M.A. (Xavier University), M.A., Ph.D. (Southern Illinois University).

Garvey, James J., B.A. (Loyola University), M.A., Ph.D. (University of Michigan).

Krahnke, Karl J., B.A., M.A., Ph.D. (University of Michigan).

LeCourt, Donna, B.A. (Fitchburg State College), M.A. (Washington State University), Ph.D. (The Ohio State University).

Lindstrom, David H., B.A. (University of Rochester), M.A. (Colgate University), Ph.D. (The Pennsylvania State University).

Mitchell, Carol A., B.A., M.A.T., Ph.D. (Indiana University).

Mullen, Laura K., B.A. (University of California, Berkeley), M.F.A. (University of Iowa).

Petrie, Neil, B.A. (University of Northern Colorado), Ph.D. (Kent State University).

Reid, Louann, B.A. (Linfield College), M.A. (Washington State University), Ph.D. (New York University).

Schamberger, J. Edward, B.S. (Colorado State University), M.A. (University of Colorado), Ph.D. (University of Pennsylvania).

Schwartz, Steven, B.A. (University of Colorado), M.F.A. (University of Arizona).

Sloane, Sarah, B.A. (Middlebury College), M.F.A. (University of Massachusetts, Amherst), M.A. (Carnegie Mellon University), Ph.D. (Ohio State University).

Swinson, H. Ward, B.A. (Northwestern University), M.A., Ph.D. (University of Illinois).

Trembath, Paul, B.A., M.A. (University of Wisconsin, Milwaukee), Ph.D. (University of Virginia).

Vernon, Irene, B.A., Ph.D. (University of California, Berkeley), M.A. (The University of New Mexico).

Assistant Professors

Brinks, Ellen, B.A. (Agnes Scott College), M.A. (Millersville University of Pennsylvania), Ph.D. (Princeton University).

Doenges, Judy, B.A. (University of Wisconsin), M.F.A. (University of Massachusetts).

Gómez, Reid, B.A., M.A., Ph.D. (University of California, Berkeley).

Marvin, William, B.A. (University of Denver), Ph.D. (University of Minnesota).

O'Donnell-Allen, Cindy, B.A., M.S., Ph.D. (University of Oklahoma).

Rhodes, Winthrop, B.A. (Trinity College), Ph.D. (State University of New York at Stony Brook).

Rilling, Sarah, B.A. (Willamette University), M.A.T., M.A. (Portland State University), Ph.D. (Northern Arizona University).

Sebek, Barbara, B.A. (University of Chicago), M.A., Ph.D. (University of Illinois).

Thompson, Deborah, B.A. (University of Florida), M.A., Ph.D. (Rice University).

Lecturers

Gough, Margaret, B.A., M.A. (University of Montana).

Lindstrom, Margaret D., B.A. (University of Rochester), M.A. (Colorado State University).

Noone, Leslie J., B.A. (University of Colorado), M.A. (Colorado State University).

Wedum, Mary Kay, B.A. (University of Colorado, Boulder), M.A. (Colorado State University).

Department of Foreign Languages and Literatures

Department Chair

Professor Sara M. Saz

B.A., Ph.D. (University of Southampton, England), Licenciada en Filología Hispánica (Universidad Autónoma, Spain).

Professor

Hunt, Irmgard E., B.A., M.A. (University of Alaska), Ph.D. (University of Washington).

Associate Professors

Bodine, Jay F., B.A. (University of Utah), M.A., Ph.D. (Princeton University).

Hoffmann, Klaus-Dieter, M.A. (Northeast Missouri State University), Ph.D. (University of Iowa).

Malpezzi-Price, Paola, Laurea cum laude (University of Pisa, Italy), M.A., Ph.D. (University of Oregon).

Sargent, Stuart H., B.A. (University of Oregon), M.A., Ph.D. (Stanford University).

Suárez-García, José Luis, B.A. (Universidad de Granada, Spain), M.A., Ph.D. (University of Illinois at Urbana, Champaign).

Wolff, Roland A., B.A., M.A. (University of Wisconsin, Milwaukee), Ph.D. (University of Wisconsin, Madison).

Assistant Professors

Castro, Amanda, B.A. (Escuela Superior del Profesorado, Honduras), M.A., Ph.D. (University of Pittsburgh).

Lopez-Cabrales, Maria del Mar, B.A. (University of Cadiz, Spain), M.A., Ph.D. (University of Pittsburgh).

Mah, Kai-Ho, B.A. (University of California, Los Angeles), M.A. (University of Illinois), Ph.D. (University of Washington).

Thai, Minh Danh Edouard, B.A., M.A. (Washington State University).

Valerio-Holguín, Fernando, Licenciado en Letras (Universidad Autónoma, Dominican Republic), M.A., Ph.D. (Tulane University).

Velázquez-Castillo, Maura, B.A. (National University, Paraguay), M.A. (University of Kansas), Ph.D. (University of California, San Diego).

Vogl, Mary Beth, B.A. (Oberlin College), M.A., Ph.D. (Indiana University).

Lecturers

Beecken, Masako, B.A. (Jissen Women's University, Japan), M.A. (Colorado State University).

Berwanger, Elizabeth, B.A. (Macalester College), M.A. (The University of Kansas).

Kenyon, Jennifer L., B.A. (State University of New York at Albany), M.A. (Colorado State University).

Lewus, William, B.A., M.A. (University of Colorado).

Department of History

Department Chair

Professor Ruth M. Alexander

B.A. (The City University of New York, City College), M.A. (University of California, Santa Barbara), Ph.D. (Cornell University).

Professors

Enssle, Manfred J., B.A., M.A., Ph.D. (University of Colorado).

Hansen, James E., II, B.A. (Middlebury College), M.A., Ph.D. (University of Denver).

Knight, Thomas J., B.A., M.A. (University of North Texas), Ph.D. (University of Texas).

McComb, David G., B.A. (Southern Methodist University), M.B.A. (Stanford University), M.A. (The Rice University), Ph.D. (University of Texas).

Rock, Kenneth W., B.A. (The University of Kansas), M.A., Ph.D. (Stanford University).

Rosenberg, Harry, B.A., Ph.D. (University of California, Berkeley).

Weisser, Henry G., B.A. (Hartwick College), M.A., Ph.D. (Columbia University).

Associate Professors

Fiege, Mark T., B.A. (Western Washington University), M.A. (Washington State University), Ph.D. (University of Utah).

Margolf, Diane C., B.A. (Pomona College), M.A., Ph.D. (Yale University).

Xing, Jun, B.A. (Shanghai University of International Studies, China), M.A. (Beijing University of International Studies, China), Ph.D. (University of Minnesota).

Assistant Professors

Citino, Nathan J., B.A. (University of Notre Dame), M.A., Ph.D. (Ohio State University).

Didier, John C., B.A. (University of Minnesota), M.A., Ph.D. (Princeton University).

Gaughan, Judy E., B.A. (San Francisco State University), M.A., Ph.D. (University of California, Berkeley).

Jones, Elizabeth B., B.A. (Mount Holyoke College), M.A. (University of Wisconsin, Madison), Ph.D. (University of Minnesota).

Lindsay, James E., B.S., M.A.T. (Calvin College), M.A., Ph.D. (University of Wisconsin, Madison).

Little, Ann M., B.A. (Bryn Mawr College), M.A., Ph.D. (The University of Pennsylvania).

Long, Kelly A., B.A., M.A. (Colorado State University), Ph.D. (University of Colorado).

Ore, Janet, B.A. (Carroll College), M.A. (Washington State University), Ph.D. (University of Utah).

Orsi, Jared P., B.A. (University of California, Davis), M.A. (Northwestern University), Ph.D. (University of Wisconsin, Madison).

Smith, Alison K., B.A., M.A., Ph.D. (The University of Chicago).

Sunseri, Thaddeus, B.A., M.A. (University of Northern Iowa), M.A. (University of Oregon), Ph.D. (University of Minnesota).

Towers, Frank, B.A. (University of Wisconsin), M.A. (University of California, Irvine), Ph.D. (University of California, Los Angeles).

Yarrington, Douglas K., B.A. (College of William and Mary), M.A., Ph.D. (University of Texas).

Department of Journalism and Technical Communication

Department Chair

Professor Garrett J. O'Keefe
B.A. (University of Colorado), M.S. (Iowa State University), Ph.D. (University of Wisconsin, Madison).

Professors

Buddenbaum, Judith M., A.B., M.A., Ph.D. (Indiana University).

Rouner, Donna, B.A. (University of Iowa), M.A. (Ball State University), Ph.D. (University of Wisconsin, Madison).

Slater, Michael D., B.A. (Columbia University), M.P.A. (New York University), Ph.D. (Stanford University).

Zimmerman, Donald E., B.S., M.S. (Kansas State University), Ph.D. (University of Wisconsin, Madison).

Associate Professors

Long, Marilee, B.A. (Colorado State University), M.S., Ph.D. (University of Wisconsin, Madison).

Luft, Gregory N., B.A. (Colorado State University), M.A. (American University).

Ray, Garrett W., B.A., M.A. (University of Colorado), Ph.D. (University of Wales).

Seel, Peter B., B.F.A. (San Francisco Art Institute), M.A. (San Francisco State University), Ph.D. (Indiana University).

Assistant Professors

Hallahan, Kirk, B.A. (University of California, Los Angeles), M.A., Ph.D. (University of Wisconsin, Madison).

Kodrich, Kris, B.A. (University of Wisconsin, La Crosse), M.S. (The Ohio State University).

Landers, James C., B.A. (Southern Illinois), M.S. (Iowa State University), Ph.D. (University of Wisconsin, Madison).

Shimoda, Todd A., B.S., M.S. (Colorado State University), Ph.D. (University of California, Berkeley).

Instructor

Pearson, Jonna L., B.S. (Syracuse University), M.S. (Colorado State University).

Affiliate Faculty

Buller, David B., B.A. (West Virginia University), M.A. (Auburn University), Ph.D. (Michigan State University).

Danbom, Daniel R., B.A. (Colorado State University), M.A. (Ball State University).

Kinney, Don, B.A. (University of Montana).

Department of Music, Theatre, and Dance

Department Chair

Professor Eric S. Prince
B.Ed. (Hons) (University of Leeds, England), D.Phil. (University of Ulster, Northern Ireland).

Professors

Burns, Morris U., B.A. (College of Saint Benedict), M.A. (St. Louis University), Ph.D. (The University of Kansas).

Davis, William B., B.M.E. (Virginia Commonwealth University), M.M.E., Ph.D. (The University of Kansas).

McCray, James E., B.M.Ed. (Illinois Wesleyan University), M.M. (Southern Illinois University), Ph.D. (University of Iowa).

Schwartz, Wilfred A., B.S., M.S. (The Juilliard School).

Thaut, Michael, M.M., Ph.D. (Michigan State University).

Associate Professors

Brewer, Robert G., B.M.E. (Henderson State University), M.S., D.M.A. (University of Illinois).

Cleveland, M. Barrett, B.A. (Trinity University), M.F.A. (Texas Christian University).

Egbert, Louard E., B.M.E. (Murray State University), M.M.E. (University of Illinois), D.M.A. (University of Kentucky).

Jones, Laura J., B.S. (Northwestern University), M.A.T. (University of Illinois), Ph.D. (University of Denver).

King, Janet Morrow, B.M. (University of Redlands), M.M. (Southern Illinois University), M.M. (University of Idaho), D.M.A. (University of Minnesota).

Landreth, Janet M., B.M., M.M. (University of Tulsa), D.M.A. (University of Oklahoma).

Lawson, Charles E., B.M.Ed., B.M. (The University of Kansas), M.A., D.M.A. (University of Iowa).

Lueck, John C., B.A. (Ripon College), M.M. (University of Wisconsin), D.M.A. (University of Michigan).

Metz, Paul, B.A. (Gettysburg College), M.M., Ph.D. (College-Conservatory of Music of University of Cincinnati).

Nisbett, Robert F., B.S., M.A. (Kent State University), Ph.D. (The Ohio State University).

Runyan, William E., B.M.E. (Murray State University), M.A., Ph.D. (Eastman School of Music, University of Rochester).

Slusarski-Harris, Jane, B.A. (Colorado State University), M.F.A. (University of Colorado).

Assistant Professors

Cleveland, Annie O., B.A. (Trinity University), M.F.A. (The Ohio State University).

Grice, June M., B.A. (St. Ambrose University), M.A., Ph.D. (University of Iowa).

Moody, Gary E., B.A., B.M., D.A. (University of Northern Colorado), M.F.A. (University of Iowa).

Moore, J. Steven, B.M.E. (University of South Carolina), M.M. (University of Kentucky).

Shaner, David, B.M.E. (Murray State University), M.M. (Memphis State University), D.M.A. (University of Iowa).

Department of Philosophy

Department Chair

Professor Ronald G. Williams

B.S., M.S. (University of Colorado), Ph.D. (Stanford University).

University Distinguished Professors

Rolston, Holmes, III, B.S. (Davidson College), B.D. (Union Theological Seminary), Ph.D. (University of Edinburgh, Scotland), M.A. (University of Pittsburgh).

Rollin, Bernard E., B.A. (The City University of New York), Ph.D. (Columbia University).

Professors

Boyd, James W., B.A. (Lawrence University), M.A., Ph.D. (Northwestern University).

Crosby, Donald A., B.A. (Davidson College), B.D., Th.M. (Princeton Theological Seminary), Ph.D. (Columbia University).

Johnson, Frederick A., B.A. (Oberlin College), Ph.D. (The Ohio State University).

Kitchener, Richard F., B.A., M.A. (California State University, Los Angeles), Ph.D. (University of Minnesota).

Lee, Grant S., B.A. (University of Houston), Th.M. (Princeton Theological Seminary), Ph.D. (Temple University).

McKee, Patrick L., B.A. (Gonzaga University), M.A., Ph.D. (University of Maryland).

Associate Professors

Jordan, Robert W., B.S. (University of Houston), M.A. (New School for Social Research).

Kneller, Jane E., B.A. (Western Washington University), M.A., Ph.D. (University of Rochester).

Losonsky, Michael, B.A. (Earlham College), M.A., Ph.D. (University of Rochester).

Assistant Professors

Cafaro, Philip, B.A. (University of Chicago), M.A. (University of Georgia), Ph.D. (Boston University).

Hamid, Idris S., B.Sc. (Georgia State University), M.A., Ph.D. (University at Buffalo, State University of New York).

Maffie, James, B.A. (University of California, Los Angeles), M.A. (University of California, San Diego), Ph.D. (University of Michigan Ann Arbor).

McCulloch, Michael L., B.A. (Sacred Heart Seminary College), Ph.D. (University of Michigan).

Viens, Joachim, S.T.L. (The Catholic University of Louvain), Ed.D. (University of Northern Colorado).

Department of Political Science

Department Chair

Associate Professor G. Wayne Peak

B.A. (University of Colorado), M.A. (San Jose State University), Ph.D. (University of Oregon).

Professors

Charlton, Sue Ellen M., B.A. (Lewis and Clark College), Ph.D. (University of Denver).

Davis, Charles E., B.S. (Colorado State University), Ph.D. (University of Houston).

Hoffert, Robert W., B.A. (Ursinus College), M.Div. (Yale University), M.A. (The Pennsylvania State University), Ph.D. (Cornell University).

Lamborn, Alan C., A.B. (Oberlin College), A.M., Ph.D. (University of Michigan).

Lawrence, Robert M., B.S. (Kansas State University), Ph.D. (The University of Kansas).

Mumme, Stephen P., B.A., M.A. (Arizona State University), Ph.D. (University of Arizona).

Straayer, John A., B.S., M.A. (Western Michigan University), Ph.D. (University of Arizona).

Associate Professors

Allen, David W., B.A., M.A., Ph.D. (University of Wisconsin-Milwaukee).

Assetto, Valerie J., B.A. (Lehigh University), M.A., Ph.D. (The Rice University).

Davis, Sandra K., B.A. (Colorado State University), M.A. (University of Houston), Ph.D. (The Ohio State University).

Duffy, Robert J., B.A. (Lafayette College), M.A. (University of Delaware), Ph.D. (Brandeis University).

Hochstetler, Kathryn A., B.A. (Earlham College), Ph.D. (University of Minnesota).

MacDonald, Bradley J., B.A. (University of North Carolina at Chapel Hill), M.A., Ph.D. (University of California, Los Angeles).

Moore, Scott T., B.A. (Knox College), M.A., Ph.D. (University of Hawaii).

Stevis, Dimitris, B.A. (DePauw University), M.A., Ph.D. (University of Arizona).

Assistant Professor

Betsill, Michele M., B.A. (DePauw University), M.A. (University of Denver), Ph.D. (University of Colorado).

Affiliate Faculty

Furniss, Susan W., B.A. (Smith College), M.A. (University of Minnesota), M.A. (Colorado State University), Ph.D. (University of Colorado).

Lamb, Berton L., B.A. (California Lutheran University), M.A. (San Francisco State University), Ph.D. (Washington State University).

Department of Sociology

Department Chair

Professor Louis E. Swanson, Jr.

B.A. (St. Andrews Presbyterian College), M.A. (North Carolina State University at Raleigh), Ph.D. (The Pennsylvania State University).

Professors

Berry, Kenneth J., B.A. (Kalamazoo College), Ph.D. (University of Oregon).

Freeman, David M., B.A. (Rocky Mountain College), M.P.I.A. (University of Pittsburgh), Ph.D. (University of Denver).

Turner, Ronny E., B.A., M.A. (Texas Tech University), Ph.D. (State University of New York, Buffalo).

Unnithan, N. Prabha, B.S. (Karnatak University, India), M.A. (University of Saugar, India), Ph.D. (University of Nebraska, Lincoln).

Vlachos, Evan C., LL.B. (University of Athens, Greece), M.A., Ph.D. (Indiana University).

Associate Professors

Atchison, Patricia H., B.A., M.A. (Washington University), Ph.D. (University of Nebraska).

Brouillette, John R., B.S. (Iowa State University of Science and Technology), M.A. (Kent State University), Ph.D. (The Ohio State University).

Lacy, Michael G., B.A., M.A., Ph.D. (The University of Kansas).

Murray, Douglas L., B.A. (California State University, Chico), M.A., Ph.D. (University of California, Santa Cruz).

Raynolds, Laura T., B.A. (Bowdoin College), M.S., Ph.D. (Cornell University).

Assistant Professors

Kim, Joon K., B.A. (The New School for Social Research, New York), M.A., Ph.D. (University of California, Berkeley).

Starr, Amory, B.S., M.C.P. (Massachusetts Institute of Technology), M.A., Ph.D. (University of California, Santa Barbara).

Taylor, Peter L., B.A. (Trinity University), M.S., Ph.D. (Cornell University).

Affiliate Faculty

Adams, Christopher B., B.A.S. (Southern Methodist University), M.A., Ph.D. (University of Denver).

Coakley, Jay, B.A. (Regis College), M.A., Ph.D. (University of Notre Dame).

Shinn, Edwin F., B.A. (Occidental College), S.T.M. (San Francisco Theological Seminary), Ph.D. (Colorado State University).

Wilkins-Wells, John, B.A. (University of Colorado, Boulder), M.A. (University of Colorado, Denver), Ph.D. (Colorado State University).

Department of Speech Communication

Department Chair

Professor Dennis D. Phillips

B.A. (Hiram College), M.A., Ph.D. (Ohio University).

Professors

Burghardt, Carl R., B.A. (The Pennsylvania State University), M.A., Ph.D. (University of Wisconsin).

Gill, Ann M., B.A. (Western State College of Colorado), M.A. (Colorado State University), J.D. (University of Colorado at Boulder), Ph.D. (University of Denver).

Gravlee, G. Jack, B.A. (Howard College), M.A., Ph.D. (Louisiana State University and Agricultural and Mechanical College).

Hayes, Laurie S., B.A. (University of Minnesota), M.A., Ph.D. (University of Wisconsin).

Vancil, David L., B.A., M.A. (Wayne State University), Ph.D. (University of Illinois).

Associate Professors

Griffin, Cindy L., B.S. (California State University, Northridge), M.A. (University of Oregon), Ph.D. (Indiana University).

Pendell, Sue D., B.S. (Florida State University), M.A. (Auburn University), Ph.D. (University of Utah).

Vest, David E., Ph.B. (Wayne State University, Monteith College), M.S.A. (Central Michigan University), Ph.D. (University of Michigan).

Assistant Professors

Anderson, Karrin M., B.A. (Metropolitan State College), M.A. (Colorado State University), Ph.D. (Indiana University).

Aoki, Eric, B.A., M.A. (California State University, Fresno), Ph.D. (University of Washington).

Dickinson, Gregory L., B.A. (Walla Walla College), M.A. (University of California, Davis), Ph.D. (University of Southern California, Los Angeles).

Huaco-Nuzum, Carmen, B.F.A. (California College of Arts and Crafts), M.S.M. (University of Michigan), Ph.D. (University of California, Santa Cruz).

Ott, Brian L., B.A. (George Mason University), M.A., Ph.D. (The Pennsylvania State University).

College of Natural Resources

Department of Earth Resources

Department Head

Professor Judith Hannah

B.A., Ph.D. (University of California, Davis).

Professors

Chamberlain, Theodore, B.S. (The University of New Mexico), M.S., Ph.D. (Scripps Institute of Oceanography, University of California).

Erslev, Eric A., B.A. (Wesleyan University), A.M., Ph.D. (Harvard University).

Ethridge, Frank G., B.S. (Mississippi State University), M.S. (Louisiana State University and Agricultural and Mechanical College), Ph.D. (Texas A & M University).

MacDonald, Lee H., B.A. (Stanford University), M.S. (University of Michigan), Ph.D. (University of California, Berkeley).

Smith, Freeman M., B.S., M.S. (University of Arizona), Ph.D. (Colorado State University).

Stednick, John D., B.S., Ph.D. (University of Washington).

Associate Professors

Laituri, Melinda J., B.A. (University of California, Berkeley), M.A. (California State University, Chico), Ph.D. (University of Arizona).

Sutton, Sally J., B.S. (University of Michigan), Ph.D. (University of Cincinnati).

Wohl, Ellen E., B.S. (Arizona State University), Ph.D. (University of Arizona).

Assistant Professors

Magloughlin, Jerry F., B.S., Ph.D. (University of Minnesota), M.S. (University of Washington).

Sanford, William E., B.S. (Beloit College), M.S., Ph.D. (Cornell University).

Affiliate Faculty

Almon, William R., B.A., M.A. (Washington University), Ph.D. (University of Missouri, Columbia).

Armstrong, Richard L., B.A., M.A., Ph.D. (University of Colorado).

Baron, Jill S., B.S. (Cornell University), M.S. (University of Wisconsin-Madison), Ph.D. (Colorado State University).

Birkeland, Karl W., B.A. (University of Colorado), M.S. (Montana State University), Ph.D. (Arizona State University).

Bricker, Owen P., B.S. (Franklin and Marshall College), M.S. (Lehigh University), Ph.D. (Harvard University).

Campbell, Donald H., B.S. (The Pennsylvania State University), M.S. (Colorado State University).

Cline, Don, B.A., M.A., Ph.D. (University of Colorado at Boulder).

Close, Jay C., B.S. (Wittenberg University), M.S. (Miami University), Ph.D. (Southern Illinois University).

Cluer, Brian, B.S. (Idaho State University), M.S. (Northern Arizona University), Ph.D. (Colorado State University).

Davis, Robert E., B.A., M.A., Ph.D. (University of California, Santa Barbara).

Dawson, William C., B.S., Ph.D. (University of Illinois, Urbana-Champaign), M.S. (University of Texas, Arlington).

Doesken, Nolan J., B.S. (University of Michigan), M.S. (University of Illinois).

Dolson, John, B.A. (Colorado College), M.S. (Colorado State University).

Finley, Jim B., B.S. (University of Montana), M.S. (Colorado State University), Ph.D. (University of Wyoming).

Flores, Romeo M., B.S. (University of Philippines), M.S. (University of Tulsa), Ph.D. (Louisiana State University and Agricultural and Mechanical College).

Friedman, Jonathan M., B.S. (Massachusetts Institute of Technology), M.S. (University of Wisconsin, Madison), Ph.D. (University of Colorado at Boulder).

Geary, Edward E., B.S. (Stanford University), M.S., Ph.D. (Cornell University).

Goldhaber, Martin, B.S., Ph.D. (University of California, Los Angeles).

Gonzalez, Alan R., Agric. Eng. (University of San Carlos, Guatemala), Msc. CATIE, Costa Rica, Ph.D. (Colorado State University).

Harvey, Michael, B.A., M.S. (University of Canterbury, New Zealand), Ph.D. (Colorado State University).

Jackson, William L., B.S., M.S. (University of Michigan), Ph.D. (Oregon State University).

Leavesley, George H., B.S., M.S. (The Pennsylvania State University), Ph.D. (Colorado State University).

McCabe, Peter J., B.Sc. (University of Hull, England), Ph.D. (University of Keele, England).

Miller, Kathleen A., B.A., M.A., Ph.D. (University of Washington).

Musselman, Robert C., B.S., M.S. (Iowa State University), Ph.D. (University of Wisconsin-Madison).

Osterkamp, Waite R., B.A. (University of Colorado), M.S., Ph.D. (University of Arizona).

Parker, Randolph S., B.A. (University of Wyoming), M.S. (Oregon State University), Ph.D. (Colorado State University).

Raynolds, Robert G., B.A., Ph.D. (Dartmouth College), M.A. (Stanford University).

Riese, W. C., B.S. (New Mexico Institute of Mining and Technology), M.S., Ph.D. (The University of New Mexico).

Sheng, Ted C., B.S. (National Chekiang University), M.S. (Colorado State University).

Steele, Timothy D., A.B. (Wabash College), M.S., Ph.D. (Stanford University).

Theobald, David M., B.A., Ph.D. (University of Colorado), M.A. (University of California, Santa Barbara).

Tonnessen, Kathy, A.B. (Cornell University), M.S., Ph.D. (University of California, Berkeley).

Troendle, Charles A., B.S., M.S. (Syracuse University), Ph.D. (University of Georgia).

Tucker, Dean F., B.S. (University of Vermont), M.S., Ph.D. (North Carolina State University).

Turk, John T., B.S. (University of Tennessee), Ph.D. (Scripps Institute of Oceanography, University of California).

Warner, Edward M., B.S. (Colorado State University), M.S. (University of California).

Williams, Owen R., B.S. (State University of New York College of Environmental Science and Forestry), M.S. (Colorado State University).

Department of Fishery and Wildlife Biology

Department Head

Professor H. Randall Robinette
B.S. (Harding University), M.S., Ph.D. (Southern Illinois University).

Professors

Benson, Delwin E., B.S., M.S., Ph.D. (Colorado State University).

Covich, Alan P., A.B. (Washington University), M.S., Ph.D. (Yale University).

Fausch, Kurt D., B.S. (University of Minnesota-Duluth), M.S., Ph.D. (Michigan State University).

Hagen, Harold K., B.S. (University of Wyoming), Ph.D. (University of Washington).

Knight, Richard L., B.S. (North Carolina State University at Raleigh), M.S. (University of Washington), Ph.D. (University of Wisconsin).

White, Gary C., B.S. (Iowa State University of Science and Technology), M.S. (University of Maine at Orono), Ph.D. (The Ohio State University).

Associate Professors

Andelt, William F., B.S., M.S. (University of Nebraska), Ph.D. (Colorado State University).

Clements, William H., B.S., M.S. (Florida State University), Ph.D. (Virginia Polytechnic Institute and State University).

Johnson, Brett M., B.S., Ph.D. (University of Wisconsin), M.S. (The Ohio State University).

Kennedy, Patricia L., B.A. (Colorado College), M.S. (University of Idaho), Ph.D. (Utah State University).

Noon, Barry R., B.S. (Princeton University), Ph.D. (State University of New York at Albany).

Wilson, Kenneth R., B.S. (University of California, Davis), M.S. (Utah State University), Ph.D. (Colorado State University).

Assistant Professors

Myrick, Christopher A., B.S. (University of California, Berkeley), M.S., Ph.D. (University of California, Davis).

Savidge, Julie A., B.S. (Colorado State University), M.S. (University of California, Berkeley), Ph.D. (University of Illinois).

Affiliate Faculty

Andersen, Douglas C., B.S. (University of Washington), M.A. (The University of Kansas), Ph.D. (Utah State University).

Anderson, David R., B.S., M.S. (Colorado State University), Ph.D. (University of Maryland).

Armbruster, Michael J., B.A., M.S., Ph.D. (University of Missouri).

Bergersen, Eric P., B.S., M.S. (University of Arizona), Ph.D. (Utah State University).

Boyle, Terence P., B.S., M.S. (The University of New Mexico), Ph.D. (University of Arizona).

Braun, Clait E., B.S. (Kansas State University), M.S. (University of Montana), Ph.D. (Colorado State University).

Bruggers, Richard L., B.A. (Hope College), M.A., Ph.D. (Bowling Green State University).

Carpenter, Len H., B.S., Ph.D. (Colorado State University).

Cushing, Colbert E., B.S., M.S. (Colorado State University), Ph.D. (University of Saskatchewan, Canada).

Davies, Patrick H., B.S. (New Mexico State University), M.S., Ph.D. (Colorado State University).

Flather, Curtis H., B.S. (University of Vermont), M.S., Ph.D. (Colorado State University).

Gilbert, Wendell, B.S., M.S. (California State University, Chico).

Gill, R. Bruce, B.S., M.S. (Colorado State University).

Gregory, Richard W., B.S., Ph.D. (Colorado State University), M.S. (University of Washington).

Grosholz, Edwin D., A.B. (Brown University), Ph.D. (University of California, Berkeley).

Hobbs, N. Thompson, B.S. (Grinnell College), M.S., Ph.D. (Colorado State University).

Johnson, Douglas H., B.A. (University of Minnesota), M.S. (University of Wisconsin-Madison), Ph.D. (North Dakota State University).

Jones, Mark S., B.S., M.S. (Colorado State University).

Klein, Mary L., B.S. (Lehigh University), M.S. (University of Florida).

Knopf, Fritz L., B.A. (Hiram College), M.S., Ph.D. (Utah State University).

McEwen, Lowell C., B.A. (Gustavus Adolphus College), M.S., Ph.D. (The Pennsylvania State University).

McFadden, James T., B.S. (University of Pittsburgh), M.S. (The Ohio State University), Ph.D. (The Pennsylvania State University).

McKnight, Diane M., B.S., M.S., Ph.D. (Massachusetts Institute of Technology).

McLean, Robert G., B.S., M.A. (Bowling Green State University), Ph.D. (The Pennsylvania State University).

Miller, Lowell A., B.A. (Upland College), M.S., Ph.D. (Colorado State University).

Nimmo, DelWayne R., B.S. (Evangel College), M.S. (Wichita State University), Ph.D. (Colorado State University).

Oldemeyer, John L., B.S., M.S. (Colorado State University), Ph.D. (The Pennsylvania State University).

Pague, Christopher A., B.S., M.S. (Virginia Polytechnic Institute and State University).

Reynolds, Richard T., B.S., M.S., Ph.D. (Oregon State University).

Ringelman, James K., B.A. (California State University, Fresno), M.S. (South Dakota State University), Ph.D. (University of Maine at Orono).

Rodda, Gordon, B.A. (University of Colorado), Ph.D. (Cornell University).

Shenk, Tanya M., B.S. (The Ohio State University), M.S., Ph.D. (Colorado State University).

Stubblefield, William A., B.S. (Eastern Kentucky University), M.S. (University of Kentucky), Ph.D. (University of Wyoming).

Tate, Cathy M., B.S., M.S. (Virginia Commonwealth University), Ph.D. (Kansas State University).

Vohs, Paul A., B.S. (Kansas State University), M.S. (Southern Illinois University at Carbondale), Ph.D. (Iowa State University of Science and Technology).

Walker, Peter G., B.A. (University of Maine).

Young, Michael K., B.S., M.S. (University of Montana), Ph.D. (University of Wyoming).

Department of Forest Sciences

Department Head

Professor Susan G. Stafford

B.S. (Syracuse University), M.S., Ph.D. (State University of New York College of Environmental Science and Forestry).

Professors

Bettters, David R., B.S., M.S. (Purdue University), Ph.D. (Colorado State University).

Binkley, Daniel E., B.S. (Northern Arizona University), M.Sc. (University of British Columbia, Canada), Ph.D. (Oregon State University).

Burke, Ingrid C., B.S. (Middlebury College), Ph.D. (University of Wyoming).

Dyer, A. Allen, B.S. (University of California, Berkeley), M.S., Ph.D. (Utah State University).

Hoffer, Roger M., B.S. (Michigan State University), M.S., Ph.D. (Colorado State University).

Laven, Richard D., B.A., B.S., M.S., Ph.D. (University of California, Berkeley).

Omi, Philip N., B.A., M.S., Ph.D. (University of California, Berkeley).

Pellicane, Patrick J., B.S. (The City University of New York), M.A. (St. John's University), M.S., Ph.D. (Colorado State University).

Rideout, Douglas B., B.S., M.S., Ph.D. (University of Washington).

Shaw, Robert B., B.S. (Southwest Texas State University), M.S., Ph.D. (Texas A & M University).

Smith, Frederick W., B.A. (State University of New York College at Potsdam), B.S., M.S., Ph.D. (University of Washington).

Associate Professors

Dean, Denis J., B.S., Ph.D. (Virginia Polytechnic Institute and State University), M.S. (The Pennsylvania State University).

Reich, Robin M., B.S., M.S., Ph.D. (University of Florida).

Assistant Professor

Cheng, Antony S., B.S. (Whitman College), M.S. (University of Minnesota), Ph.D. (Oregon State University).

Instructor

Coleman, Robert O., B.S., M.S. (Colorado State University).

Affiliate Faculty

Aguirre-Bravo, Celedonio, B.S. (Universidad Autonoma Chapingo, Mexico), M.S., Ph.D. (Colorado State University).

Anthony, Ronald, B.S., M.S. (Colorado State University).

Bailey, Robert G., B.S., M.A. (California State University Northridge), Ph.D. (University of California, Los Angeles).

Berry, Joseph K., B.S. (University of California, Berkeley), M.S., Ph.D. (Colorado State University).

Brown, Peter M., B.A., M.S. (University of Arizona)

Carter, Mason, B.S., M.S. (Virginia Tech University), Ph.D. (Duke University).

Ellenwood, James, B.S., M.S. (State University of New York College of Environmental Science and Forestry).

Fiedler, Peggy Lee, B.S. (Harvard University), M.S., Ph.D. (University of California, Berkeley).

Fredrickson, Leigh H., B.S., M.S., Ph.D. (Iowa State University of Science and Technology).

Katliar, Natasha B., B.S. (Ramapo College of New Jersey), M.S. (Rutgers University), Ph.D. (Colorado State University).

Kaufmann, Merrill R., B.S. (University of Illinois at Urbana-Champaign), M.F., Ph.D. (Duke University).

Kenady, Reid M., B.S., M.S. (University of Washington).

Mowrer, H. Todd, B.S., M.S. (University of Illinois), Ph.D. (Colorado State University).

Nichols, Fred, B.S. (University of California, Davis), M.S. (Colorado State University).

Nyquist, Maurice, B.S. (Hamline University), M.S. (Mankato State University), Ph.D. (Washington State University).

Regan, Claudia, B.S., M.S. (Southern Illinois University), Ph.D. (Colorado State University).

Romme, William H., B.A. (The University of New Mexico), M.S., Ph.D. (University of Wyoming).

Ryan, Michael G., B.S. (University of Pittsburgh), M.S. (Northern Arizona University), Ph.D. (Oregon State University).

Schoettle, Anna W., B.S., M.S. (Cornell University), Ph.D. (University of Wyoming).

Schreuder, Hans T., B.S. (Southern Illinois University), M.S. (North Carolina State University at Raleigh), Ph.D. (Iowa State University of Science and Technology).

Sheppard, Wayne D., B.S., M.S., Ph.D. (Colorado State University).

Stohlgren, Thomas J., B.S. (University of California, Berkeley), M.A. (California State University, Fresno), Ph.D. (University of California, Davis).

Stottlemeyer, Robert, B.S. (The Pennsylvania State University), M.S. (University of Maryland), Ph.D. (Duke University).

Veblan, Thomas, B.S., M.A., Ph.D. (University of California, Berkeley).

Department of Natural Resource Recreation and Tourism

Department Chairman

Professor Michael Manfredo

B.A., M.S. (The Pennsylvania State University), Ph.D. (Colorado State University).

Professors

Aukerman, Robert, B.A. (The Pennsylvania State University), M.A., Ph.D. (University of Illinois).

Haas, Glenn E., B.S. (West Virginia University), M.S. (The Pennsylvania State University), Ph.D. (Colorado State University).

Vaske, Jerry J., B.A., M.S. (University of Wisconsin), Ph.D. (University of Maryland).

Associate Professors

Donnelly, Maureen P., B.A. (University of Waterloo), M.A., Ph.D. (University of Maryland).

Wallace, George N., B.A., Ph.D. (Colorado State University), M.A. (The University of New Mexico).

Assistant Professors

Bright, Alan, B.A. (Illinois Wesleyan University), M.B.A. (University of Illinois), Ph.D. (Colorado State University).

Lehto, Xinran, B.A., M.A. (Beijing University, People's Republic of China), M.S., Ph.D. (Purdue University).

Rodriguez, Donald A., B.S. (San Jose State University), M.S. (California State University, Hayward), Ph.D. (Colorado State University).

Instructor

Layden, Paul, B.S., M.S., (Colorado State University).

Affiliate Faculty

Bissell, Steven, B.S. (University of Utah), M.S. (University of Nevada, Las Vegas), Ph.D. (University of Colorado, Denver).

Crysdale, Richard, B.A. (Carroll College), M.S. (Utah State University).

Czarnowski, Kenneth, B.S., M.S. (Colorado State University), Ph.D. (University of Arizona).

Decker, Daniel J., B.S., M.S., Ph.D. (Cornell University).

Gaede, Diane, B.A., M.S. (Indiana State University), Ph.D. (Colorado State University).

Garvey, Carole, B.A. (Marquette University), M.A., Ph.D. (Colorado State University).

Graefe, Alan, B.S. (University of Wisconsin, Green Bay), M.S., Ph.D. (Texas A & M University).

MacFarland, Craig, B.A. (Austin College), M.A., Ph.D. (University of Wisconsin-Madison).

Rastall, Pat, B.A. (Michigan State University), M.A., Ph.D. (Colorado State University).

Stokes, Gerald, B.S.F., M.S. (University of Georgia), Ph.D. (Colorado State University).

Tarrant, Michael, B.A. (Leeds Polytechnic), M.S. (University of Illinois), Ph.D. (Colorado State University).

Taylor, Jonathan G., B.A., Ph.D. (University of Arizona), M.S. (Washington State University).

Williams, Dan E., B.S. (Colorado State University).

Department of Rangeland Ecosystem Science

Department Head

Professor R. Dennis Child

B.S., M.S. (Utah State University), Ph.D. (Colorado State University).

Professors

Bartlett, Ellsworth T., B.S. (Utah State University), M.S., Ph.D. (University of Arizona).

Bonham, Charles D., B.S. (Abilene Christian College), M.S. (Utah State University), Ph.D. (Colorado State University).

Lauenroth, William K., B.S. (Humboldt State University), M.S. (North Dakota State University of Agriculture and Applied Science), Ph.D. (Colorado State University).

Leininger, Wayne C., B.S., M.S. (Montana State University), Ph.D. (Oregon State University).

Ortmann, John A., B.A., B.S., M.S., Ph.D. (University of Nebraska, Lincoln).

Redente, Edward F., B.A. (Western Michigan University), M.S., Ph.D. (Colorado State University).

Rittenhouse, Larry R., B.S. (Utah State University), M.S., Ph.D. (University of Nebraska).

Trlica, Milton J., Jr., B.S. (Southwest Texas State University), M.S. (Texas Tech University), Ph.D. (Utah State University).

Wall, Diana, B.A., Ph.D. (University of Kentucky).

Woodmansee, Robert G., B.S., M.S. (The University of New Mexico), Ph.D. (Colorado State University).

Associate Professor

Roath, L. Roy, B.S., M.S. (Montana State University), Ph.D. (Oregon State University).

Affiliate Faculty

Aradóttir, Ása L., B.S. (University of Iceland), M.Sc. (Montana State University), Ph.D. (Texas A & M University).

Belnap, Jayne, B.S. (University of Southern California), M.S. (Stanford University), Ph.D. (Brigham Young University).

Bement, Robert E., B.S., M.F., Ph.D. (Colorado State University).

Blackburn, Wilbert H., B.S. (Brigham Young University), M.S., Ph.D. (University of Nevada, Reno).

Booth, Terrance, B.S. (University of Nevada), M.S. (University of Nevada, Reno), Ph.D. (University of Wyoming).

Cibils, Andres F., B.S. (Universidad Nacional de Lomas), M.S., Ph.D. (Colorado State University).

Coffin, Debra P., B.S. (Iowa State University), M.S. (San Diego State University), Ph.D. (Colorado State University).

Driscoll, Richard S., B.S., M.S. (Colorado State University), Ph.D. (Oregon State University).

Frasier, Gary W., B.S. (Colorado State University), M.S. (Arizona State University).

Gosz, James R., B.S. (Michigan Tech University), Ph.D. (University of Idaho).

Hanson, Jon D., B.S., M.S. (North Dakota State University of Agriculture and Applied Science), Ph.D. (Texas A & M University).

Hart, Richard H., B.S., M.S. (Iowa State University of Science and Technology), Ph.D. (Oregon State University).

Holland, Elisabeth, B.S., M.S., Ph.D. (Colorado State University).

Joyce, Linda A., B.S. (Grand Valley State College), M.S. (Miami University), Ph.D. (Colorado State University).

Knapp, Alan K., B.S. (Idaho State University), M.Sc., Ph.D. (University of Wyoming).

Laycock, William A., B.S., M.S. (University of Wyoming), Ph.D. (Rutgers University).

Lusigi, Walter J., B.S. (Kenyatta College, Kenya), M.S. (Colorado State University), Ph.D. (Technical University of Munich, Germany).

McLendon, Terry, B.S., Ph.D. (Texas Tech University), M.S. (Colorado State University).

Mitchell, John E., B.S. (Washington State University), M.S. (Utah State University), Ph.D. (Colorado State University).

Moir, William H., B.A. (Purdue University), M.S. (New Mexico State University), Ph.D. (Washington State University).

Price, David, B.S., M.S. (Fort Hays State University), Ph.D. (New Mexico State University).

Sala, Osvaldo E., B.S. (University of Buenos Aires), M.S., Ph.D. (Colorado State University).

Schimmel, David, B.A. (Hampshire College), Ph.D. (Colorado State University).

Seastedt, Timothy R., B.S. (University of Montana), M.S. (University of Alaska), Ph.D. (University of Georgia).

Shields, Deborah, B.S., Ph.D. (Colorado State University), M.S. (Colorado School of Mines).

Singer, Francis J., B.S. (Cornell University), M.S. (University of Idaho), Ph.D. (Colorado State University).

Smith, James L., B.S., M.S. (University of Illinois), Ph.D. (University of Minnesota).

Uresk, Daniel W., B.S., M.S. (University of Utah), Ph.D. (Colorado State University).

Welker, Jefferey M., B.S., M.S. (Montana State University), Ph.D. (Texas A & M University).

Weltz, Mark A., A.S. (Long Beach City College), B.S. (Humbolt State University), M.S. (New Mexico State University), Ph.D. (Texas A & M University).

Wessman, Carol A., B.S. (Colorado State University), M.S., Ph.D. (University of Wisconsin, Madison).

Zakely, Robert T., B.A. (University of Northern Colorado), M.S. (Colorado State University).

College of Natural Sciences

Department of Biochemistry and Molecular Biology

Department Chair

Professor Norman P. Curthoys
B.S. (Clarkson University), Ph.D. (University of California, Berkeley).

Professors

Bamburg, James R., B.S. (University of Illinois), Ph.D. (University of Wisconsin).

Fahrney, David E., B.A. (Reed College), Ph.D. (Columbia University).

Nyborg, Jennifer K., B.S., Ph.D. (University of California, Riverside).

Paule, Marvin R., B.S. (California State University, Los Angeles), Ph.D. (University of California, Davis).

Sneider, Thomas W., B.S. (University of Detroit), M.S., Ph.D. (Marquette University).

Woody, Robert W., B.S. (Iowa State University of Science and Technology), Ph.D. (University of California, Berkeley).

Associate Professors

Laybourn, Paul J., B.A. (University of California, Santa Barbara), Ph.D. (University of California, Davis).

Schenck, Craig C., B.A. (Pomona College), Ph.D. (University of Washington).

Assistant Professors

Bienkiewicz, Ewa A., B.S., Ph.D. (Colorado State University).

Boyle, Judith A., B.A. (Clark University), Ph.D. (Tufts University).

Kraemer, Susan M., B.A. (Saint Mary's College), M.S., Ph.D. (Colorado State University).

Luger, Karolin, B.Sc. (University of Innsbruck, Austria), Ph.D. (University of Basel, Switzerland).

Lumb, Kevin J., B.Sc. (University College London, England), D.Phil. (University of Oxford, England).

Peersen, Olve B., B.S. (Carnegie Mellon University), Ph.D. (Yale University).

Radebaugh, Catherine A., B.A. (University of Northern Colorado), Ph.D. (University of Arizona).

Sreerama, Narasimha, B.S., M.S. (Mysore University, India), Ph.D. (Indian Institute of Science, India).

Stargell, Laurie A., B.A. (University of Virginia), M.S., Ph.D. (University of Rochester).

Summers, Scott A., B.S. (Indiana University), Ph.D. (Southern Illinois University).

Affiliate Faculty

Kano, Adeline K., B.A. (University of Nebraska).

Stinchcomb, Dan T., B.A. (Harvard University), Ph.D. (Stanford University).

Department of Biology**Department Chair****Professor Joan M. Herbers**

B.S. (University of Dayton), M.S., Ph.D. (Northwestern University).

University Distinguished Professor

Wiens, John A., B.S. (University of Oklahoma), M.S., Ph.D. (University of Wisconsin).

Professors

Baker, Myron C., B.A. (San Jose State University), M.Phil., Ph.D. (Yale University).

Detling, James K., A.B. (University of California, Berkeley), M.S. (The Ohio State University), Ph.D. (University of Utah).

Florant, Gregory L., B.S. (Cornell University), Ph.D. (Stanford University).

Kugrens, Paul, B.S., M.S. (University of Nebraska), Ph.D. (University of California, Berkeley).

Moore, Janice K., B.A. (The Rice University), M.A. (University of Texas at Austin), Ph.D. (The University of New Mexico).

Mykles, Donald L., B.A. (University of California, Santa Barbara), M.A., Ph.D. (University of California, Berkeley).

Packard, Gary C., B.S. (University of Illinois), M.A., Ph.D. (The University of Kansas).

Reeves, F. Brent, Jr., B.S., M.S. (Tulane University of Louisiana), Ph.D. (University of Illinois).

Stack, Stephen M., B.A., Ph.D. (University of Texas at Austin).

Van Horne, Beatrice, B.A. (University of California, Santa Cruz), M.S. (Oregon State University), Ph.D. (The University of New Mexico).

Wilson, Thomas G., B.S. (Clemson University), M.S. (North Carolina State University at Raleigh), Ph.D. (University of Tennessee).

Wunder, Bruce A., B.A. (Whittier College), Ph.D. (University of California, Los Angeles).

Associate Professors

Antolin, Michael F., B.A. (University of Pennsylvania), M.Sc. (University of Alberta, Canada), Ph.D. (Florida State University).

Bedinger, Patricia A., B.A. (Evergreen State College), Ph.D. (University of California, San Francisco).

Reddy, Anireddy S. N., B.S. (N.G. College, Nalgonda, India), M.S. (Kakatiya University, India), Ph.D. (Jawaharlal Nehru University, India).

Steingraeber, David A., B.S. (University of Wisconsin, Milwaukee), Ph.D. (University of Wisconsin, Madison).

Wright, William G., B.A. (University of California, Santa Cruz), Ph.D. (Scripps Institute of Oceanography, University of California).

Assistant Professors

Henk, Shanna Carney, B.S. (Clemson University), Ph.D. (University of Georgia).

Medford, June I., B.S. (University of Maryland), Ph.D. (Yale University).

Pilon, Marinus, M.S., Ph.D. (Utrecht University, The Netherlands).

PilonSmits, Elizabeth, M.Sc., Ph.D. (Utrecht University, The Netherlands).

Poff, N. Leroy, B.A. (Hendrix College), M.S. (Indiana University), Ph.D. (Colorado State University).

Simmons, Richard, B.A. (University of Richmond), Ph.D. (Cornell University).

Voss, S. Randal, B.S. (Francis Marion University), M.S. (Western Carolina University), Ph.D. (Clemson University).

Walter, Richard G., B.S. (Colorado State University), M.A. (University of Colorado).

Affiliate Faculty

Ackley, Robert S., B.A. (Cornell College), M.Ed. (Western Maryland College), Ph.D. (University of Colorado).

Alexander, Richard D., B.S. (Illinois State University), M.S., Ph.D. (The Ohio State University).

Beiswenger, Ronald E., B.S., M.S., Ph.D. (University of Michigan).

Breed, Michael D., B.A. (Grinnell College), M.A., Ph.D. (The University of Kansas).

Clark, Larry, B.S. (University of Maryland), M.S. (Northern Arizona University), Ph.D. (University of Pennsylvania).

Rader, Russell B., B.S., M.S. (Brigham Young University), Ph.D. (Colorado State University).

Reading, Richard P., B.S. (Trinity College), M.E.S., M.S., M.Phil., Ph.D. (Yale University).

Department of Chemistry

Department Chair

Professor C. Michael Elliott

B.S. (Davidson College), Ph.D. (University of North Carolina).

Professors

Anderson, Oren P., B.A. (Carleton College), Ph.D. (Northwestern University).

Barisas, B. George, Jr., B.A. (The University of Kansas), B.A. (Oxford University, England), M.Phil., Ph.D. (Yale University).

Bernstein, Elliot R., A.B. (Princeton University), Ph.D. (California Institute of Technology).

Crans, Debbie B., B.S. (University of Copenhagen, Denmark), Ph.D. (Harvard University).

Finke, Richard G., B.A. (University of Colorado), Ph.D. (Stanford University).

Grainger, David W., B.A. (Dartmouth College), Ph.D. (University of Utah).

Greenberg, Marc M., B.S. (New York University), Ph.D. (Yale University).

Hegedus, Louis S., B.S. (The Pennsylvania State University), M.A., Ph.D. (Harvard University).

Ladanyi, Branka M., B.Sc. (McGill University, Canada), M.Phil., Ph.D. (Yale University).

Maciel, Gary E., B.S. (University of California, Berkeley), Ph.D. (Massachusetts Institute of Technology).

Parkinson, Bruce A., B.S. (Iowa State University of Science and Technology), Ph.D. (California Institute of Technology).

Rappé, Anthony K., B.S. (University of Puget Sound), Ph.D. (California Institute of Technology).

Strauss, Steven H., A.B. (Franklin and Marshall College), M.S., Ph.D. (Northwestern University).

Thompson, Stephen, B.S., Ph.D. (University of Birmingham, England).

Williams, Robert M., B.A. (Syracuse University), Ph.D. (Massachusetts Institute of Technology).

Associate Professors

Daugherty, Ned A., B.S. (Purdue University), Ph.D. (Michigan State University).

DeBruin, Kenneth E., B.S. (Iowa State University of Science and Technology), Ph.D. (University of California, Berkeley).

Dorhout, Peter K., B.S. (University of Illinois), Ph.D. (University of Wisconsin, Madison).

Fisher, Ellen R., B.S. (Texas Lutheran College), Ph.D. (University of Utah).

Levinger, Nancy E., B.A. (Northwestern University), Ph.D. (University of Colorado).

Shi, Yian, B.S. (Nanjing University, People's Republic of China), Ph.D. (Stanford University).

Szamel, Grzegorz, M.S., Ph.D. (Warsaw University, Poland).

Assistant Professors

Chen, Eugene, B.S. (Nankai University, People's Republic of China), Ph.D. (University of Massachusetts).

Kennan, Alan J., A.B. (Cornell University), Ph.D. (University of Wisconsin, Madison)

Meersmann, Thomas, Ph.D. (Université de Lausanne, Switzerland).

Rovis, Tomislav, B.S., Ph.D. (University of Toronto, Canada).

Van Orden, Alan K., B.S. (Brigham Young University), Ph.D. (University of California, Berkeley).

Watkins, Kenneth W., B.S., Ph.D. (Kansas State University).

Department of Computer Science**Department Chair****Professor Stephen B. Seidman**

B.S. (City University of New York), A.M., Ph.D. (University of Michigan).

Professors

Böhm, A. P. Willem, B.Sc. (Technical University of Delft, The Netherlands), M.Sc., Ph.D. (University of Utrecht, The Netherlands).

Malaiya, Yashwant K., B.S. (GD College, India), M.S. (Saugor University, India), Ph.D. (Utah State University).

Oldehoeft, Rodney R., B.A. (Southern Illinois University), M.S., Ph.D. (Purdue University).

von Mayrhauser, Anneliese, Dipl. (Technical University of Karlsruhe, Germany), M.A., Ph.D. (Duke University).

Whitley, L. Darrell, B.A. (Western Kentucky University), M.A., Ph.D. (Southern Illinois University).

Associate Professors

Anderson, Charles W., B.S. (University of Nebraska), M.S., Ph.D. (University of Massachusetts).

Beveridge, J. Ross, B.S. (University of California, San Diego), M.S., Ph.D. (University of Massachusetts).

Bieman, James M., B.S. (Wayne State University), M.S., Ph.D. (University of Southwestern Louisiana).

France, Robert B., B.Sc. (University of the West Indies, Trinidad), Ph.D. (Massey University, New Zealand).

Grit, Dale H., B.A. (Hope College), M.S., Ph.D. (University of Minnesota).

Howe, Adele E., B.S.E. (University of Pennsylvania), M.S., Ph.D. (University of Massachusetts).

Vose, Michael, B.A. (University of California, San Diego), M.S., Ph.D., Ph.D. (University of Texas, Austin).

Assistant Professors

Draper, Bruce A., B.S. (Yale University), M.S., Ph.D. (University of Massachusetts).

Ghosh, Sudipto, B.Tech. (Indian Institute of Technology, India), M.S. (Iowa State University), Ph.D. (Purdue University).

Schauble, Carolyn J. C., B.A. (Mount Holyoke College), M.S. (University of Florida), M.S., Ph.D. (University of Colorado at Boulder).

Lecturer

Schleiffers, Sandra M., B.S. (California Polytechnic State University), M.S. (Washington State University), Ph.D. (Texas Woman's University).

Department of Mathematics**Department Chair****Professor Rick Miranda**

B.A. (College of the Holy Cross), Ph.D. (Massachusetts Institute of Technology).

Professors

Allgower, Eugene L., B.S., M.S., Ph.D. (Illinois Institute of Technology).

Clow, Duane J., B.S., M.S., Ph.D. (Colorado State University).

Dangelmayr, Gerhard H., Diplom., D.Sc. (University of Tübingen, Germany).

Darst, Richard B., B.S., M.S. (Illinois Institute of Technology), Ph.D. (Louisiana State University and Agricultural and Mechanical College).

DeMeyer, Frank R., B.S. (Seattle University), M.A., Ph.D. (University of Oregon).

DuChateau, Paul C., B.S., Ph.D. (Purdue University), M.S. (University of Michigan).

Dufлот, Jeanne D., B.A. (University of Texas at Austin), Ph.D. (Massachusetts Institute of Technology).

Georg, Kurt, M.S., Ph.D. (University of Bonn, Germany).

Hardy, Darel W., B.S., M.S., Ph.D. (New Mexico State University).

Kirby, Michael J., S.B. (Massachusetts Institute of Technology), Sc.M., Ph.D. (Brown University).

Liebler, Robert A., B.S., M.A., Ph.D. (University of Michigan).

Locker, John S., B.S.E., M.S., Ph.D. (University of Michigan).

Manvel, Bennet, B.A. (Oberlin College), M.S., Ph.D. (University of Michigan).

Osborne, Richard P., B.A. (University of Colorado), Ph.D. (Michigan State University).

Painter, Richard J., A.B., M.A., Ph.D. (University of North Carolina).

Poore, Aubrey B., Jr., B.S., M.S. (Georgia Institute of Technology), Ph.D. (California Institute of Technology).

Taylor, Gerald D., B.A., M.A. (San Jose State University), Ph.D. (University of Michigan).

Thomas, James W., B.S. (Michigan Technological University), M.S., Ph.D. (University of Arizona).

Zachmann, David W., B.S. (Colorado State University), Ph.D. (University of Arizona).

Associate Professors

Klopfenstein, Kenneth F., B.A. (Iowa Wesleyan College), M.S. (Colorado State University), Ph.D. (Purdue University).

Krier, Nicholas, B.S., Ph.D. (The Ohio State University).

Vilms, Jaak, B.A. (Dickinson College), M.A., Ph.D. (Columbia University).

Assistant Professors

Chappell, Kelly K., B.S., M.S. (University of South Carolina), Ph.D. (University of Washington).

McArthur, Kelly M., A.B. (Harvard University), M.S., Ph.D. (Montana State University).

Peterson, Christopher S., B.A. (Haverford College), M.A., Ph.D. (Duke University).

Department of Physics

Department Chair

Professor David A. Krueger
B.S. (Montana State University), Ph.D. (University of Washington).

Professors

Bradley, Richard M., B.S. (University of Toronto, Canada), Ph.D. (Stanford University).

Culver, Roger B., B.A. (University of California, Riverside), M.S., Ph.D. (The Ohio State University).

Etters, Richard D., B.S., M.S. (Oregon State University), Ph.D. (Iowa State University of Science and Technology).

Fairbank, William M., B.A. (Pomona College), M.S., Ph.D. (Stanford University).

Hochheimer, Hans D., Dipl. (Johann Wolfgang Goethe University), Ph.D. (Universitat Regensburg).

Lee, Siu Au, B.S. (University of Wisconsin-Madison), M.S., Ph.D. (Stanford University).

Leisure, Robert G., B.S. (Western Kentucky University), Ph.D. (Washington University).

Lundeen, Stephen R., B.S. (Trinity College), M.A., Ph.D. (Harvard University).

Patton, Carl E., B.S. (Massachusetts Institute of Technology), M.S., Ph.D. (California Institute of Technology).

Raich, John C., B.S., Ph.D. (Iowa State University of Science and Technology).

She, Chiao-Yao, B.S. (National Taiwan University, Republic of China), M.S. (North Dakota State University of Agriculture and Applied Science), Ph.D. (Stanford University).

Sites, James R., B.S. (Duke University), M.S., Ph.D. (Cornell University).

Toki, Walter, A.B. (University of California, Berkeley), Ph.D. (Massachusetts Institute of Technology).

Wilson, Robert J., B.Sc. (University of London, England), M.S., Ph.D. (Purdue University).

Associate Professors

Eykholt, Richard, B.A. (University of California, Irvine), M.S., Ph.D. (University of California).

Field, Stuart B., B.S. (Stanford University), M.S., Ph.D. (University of Chicago).

Gelfand, Martin P., B.A. (University of Pennsylvania), Ph.D. (Cornell University).

Harton, John, B.S. (University of California, Davis), Ph.D. (Massachusetts Institute of Technology).

Kern, Sanford, B.S. (Brooklyn College), M.S., Ph.D. (Purdue University).

Robinson, Raymond S., B.S., M.S. (Idaho State University), Ph.D. (Colorado State University).

Affiliate Faculty

Bishop, Alan R., B.S. (University of East Anglia, England), Ph.D. (University of Cambridge, England).

Camley, Robert E., B.A., M.A., Ph.D. (University of California, Irvine).

Craine, Eric R., B.S. (University of Oklahoma), Ph.D. (The Ohio State University).

Fahrenbruch, Alan, M.S., Ph.D. (Stanford University).

Green, Jerome J., B.S. (Northwestern University), M.S., Ph.D. (Harvard University).

Lacerda, Alex, B.S., M.S. (Universidade Federal de Pernambuco), Ph.D. (University Joseph Fourier, France).

Roder, Heinrich, Ph.D. (University of Oxford, England).

Swanson, Basil, B.S. (Colorado School of Mines), Ph.D. (Northwestern University).

Wieder, H. Harry, B.S. (University of California).

Department of Psychology

Department Chair

Professor Ernest L. Chavez

B.A. (The University of New Mexico), M.S., Ph.D. (Washington State University).

Professors

Avery, David D., B.A. (University of Texas), M.A., Ph.D. (University of Houston).

Bell, Paul A., B.A. (Southwestern University), M.A. (Trinity University), Ph.D. (Purdue University).

Bloom, Larry J., B.A. (Arizona State University), M.A. (University of Missouri, Kansas City), Ph.D. (The University of Kansas).

Boyer, William N., B.A. (Carleton College), M.S. (University of Toronto, Canada), Ph.D. (Oklahoma State University).

Cole, Charles W., B.A., M.Ed., Ph.D. (University of Missouri).

Deffenbacher, Jerry L., B.S. (University of Washington), M.A., Ph.D. (University of Oregon).

Hamilton, Scott B., B.S. (Colorado State University), M.A., Ph.D. (University of Montana).

Hautaluoma, Jacob E., B.A. (University of Minnesota), M.A., Ph.D. (University of Colorado).

Loomis, Ross J., B.A. (Seattle Pacific College), M.A., Ph.D. (University of Denver).

Oetting, Eugene R., B.S., M.S., Ph.D. (University of Wisconsin).

Richards, Ralph W., B.A., M.A., Ph.D. (Michigan State University).

Rosén, Lee A., B.A. (University of Minnesota), M.A., Ph.D. (State University of New York at Stony Brook).

Thornton, George C., III, B.A. (DePauw University), M.S., M.S., Ph.D. (Purdue University).

Vattano, Frank J., B.S. (Colorado State University), M.A., Ph.D. (The Ohio State University).

Viney, A. Wayne, B.A. (Oklahoma Baptist University), M.S., Ph.D. (University of Oklahoma).

Associate Professors

Canetto, Silvia S., D.Psych (University of Padua, Italy), M.A. (The Hebrew University of Jerusalem, Israel), Ph.D. (Northwestern University).

Chen, Peter Y., B.S. (Chung-Yuan Christian University), M.A., Ph.D. (University of South Florida).

Cropanzano, Russell S., Jr., B.A. (Louisiana State University and Agricultural and Mechanical College), M.A. (Southern Methodist University), Ph.D. (Purdue University).

James, Keith, B.A. (University of Massachusetts at Amherst), M.A., Ph.D. (University of Arizona).

Nerger, Janice L., B.A., M.A., Ph.D. (University of California, San Diego).

Rickard, Kathryn M., B.S. (University of Alabama), M.S., Ph.D. (University of Georgia).

Volbrecht, Vicki J., B.A. (University of Wisconsin, Madison), M.A., Ph.D. (University of Colorado).

Assistant Professor

AloiseYoung, Patricia A., B.S., M.S., Ph.D. (University of Florida).

Borrayo, Evelinn A., B.S. (University of the Ozarks), M.A., Ph.D. (University of North Texas).

Clegg, Benjamin A., B.S. (University of Bath, England), M.S., Ph.D. (University of Oregon).

DeLosh, Edward L., Jr., B.A. (Northwestern University), M.S., Ph.D. (Purdue University).

Heggstad, Eric D., B.A. (St. Olaf College), M.A., Ph.D. (University of Minnesota).

Seger, Carol A., A.B. (Harvard University), M.A., Ph.D. (University of California, Los Angeles).

VachaHaase, Tammi, B.S., M.C. (Arizona State University), Ph.D. (Texas A & M University).

Affiliate Faculty

Aguinis, Herman, Licenciado (University of Buenos Aires, Argentina), M.A., Ph.D. (State University of New York at Albany).

Ambrose, Maureen L., B.A. (University of California, Santa Barbara), A.M., Ph.D. (University of Illinois at Urbana-Champaign).

Athey, Timothy R., B.S. (University of Nebraska), M.S. (University of Kansas), Ph.D. (Colorado State University).

Bitgood, Stephen C., B.S. (University of Massachusetts), M.A., Ph.D. (University of Iowa).

Cawley, Brian D., B.S. (University of Wisconsin, Madison), M.A., Ph.D. (The University of Akron).

Eisenberger, Robert, A.B. (University of California at Los Angeles), Ph.D. (University of California at Riverside).

Landy, Frank J., B.A. (Villanova University), M.A., Ph.D. (Bowling Green State University).

Robinson, David D., B.A., M.A. (Michigan State University), Ph.D. (The Ohio State University).

Thwaites, Gregory A., B.S., M.S., Ph.D. (Colorado State University).

Department of Statistics

Department Chair

Professor Richard A. Davis

B.A., Ph.D. (University of California, San Diego).

Professors

Boardman, Thomas J., B.A. (Bucknell University), M.S., Ph.D. (Rutgers University).

Bowden, David C., B.S., M.S., Ph.D. (Colorado State University).

Brockwell, Peter J., B. Elec. Eng., B.A., M.A. (University of Melbourne, Australia), Ph.D. (Australian National University).

Butler, Ronald W., B.S., Ph.D. (University of Michigan).

Iyer, Hariharan K., B.S. (University of Bombay, India), M.S., Ph.D. (University of Notre Dame), Ph.D. (Colorado State University).

Mielke, Paul W., Jr., B.A., Ph.D. (University of Minnesota), M.A. (University of Arizona).

Siddiqui, M. Moinuddin, B.A., M.A. (Osmania University, India), M.A. (American University), Ph.D. (University of North Carolina).

Srivastava, J. N., B.S., M.S. (University of Lucknow, India), Ph.D. (University of North Carolina).

Associate Professors

Breidt, F. Jay, B.A. (College of Idaho), M.S., Ph.D. (Colorado State University).

Chapman, Phillip L., B.A. (University of California, Berkeley), Ph.D. (University of Minnesota).

Chiu, Shean-Tsong, B.S. (National Tsing-Hua University, Taiwan), M.S., Ph.D. (University of California, Berkeley).

Givens, Geof H., B.A. (Pomona College), M.S., Ph.D. (University of Washington).

Assistant Professors

Anderson, Jana C., B.S., B.A. (Southern Methodist University), M.S., Ph.D. (Colorado State University).

Hannig, Jan, Magister/M.S. (Charles University, Czech Republic), Ph.D. (Michigan State University).

Hoeting, Jennifer A., B.S. (University of Michigan), M.S., Ph.D. (University of Washington).

Lee, Thomas C.M., B.S. (University of Technology, Australia), Ph.D. (Macquarie University, Australia).

Affiliate Faculty

Biggerstaff, Bradley J., B.S. (University of Michigan), M.S., Ph.D. (Colorado State University).

Burnham, Kenneth P., B.S. (Portland State University), M.S., Ph.D. (Oregon State University).

Engeman, Richard M., B.S., M.S. (Colorado State University), Ph.D. (University of Colorado Health Sciences Center).

Lund, Robert B., B.S., M.S. (Auburn University), Ph.D. (University of North Carolina at Chapel Hill).

Nychka, Douglas W., B.A. (Duke University), Ph.D. (University of Wisconsin, Madison).

Resnick, Sidney I., B.S. (Queens College), M.S., Ph.D. (Purdue University).

Richardson, Gary V., B.S. (Colorado State University), M.S., Ph.D. (Virginia Polytechnic Institute and State University).

Troutman, Brent M., B.S. (Colorado School of Mines), M.S., Ph.D. (Colorado State University).

Tweedie, Richard L., B.A., M.A., D.Sc (Australian National University), Ph.D. (Cambridge University, England).

Vecchia, Aldo V., B.S., M.S., Ph.D. (Colorado State University).

Wang, Chih Ming, B.S., M.S. (National Chang-Chi University, Taiwan), Ph.D. (Colorado State University).

College of Veterinary Medicine and Biomedical Sciences

Department of Anatomy and Neurobiology

Department Chairman

Professor F. Edward Dudek

B.S., Ph.D. (University of California, Irvine).

Professors

Beam, Kurt G., B.A. (Pomona College), Ph.D. (University of Washington).

Handa, Robert J., B.S. (California State University, Long Beach), M.S. (University of Arizona), Ph.D. (University of California, Los Angeles).

Nornes, Howard O., B.A. (Concordia College), M.A., Ph.D. (Purdue University).

Pickard, Gary E., B.S., M.S. (Purdue University), Ph.D. (University of Wisconsin).

Rash, John E., B.S., M.S., Ph.D. (University of Texas-Austin).

Whalen, L. Ray, B.S., D.V.M., Ph.D. (University of California, Davis).

Associate Professors

Bowman, James P., B.A. (University of California), M.S., Ph.D. (Northwestern University).

Kinnamon, Sue C., B.A. (State University of New York, College at Potsdam), M.S. (University of Massachusetts), Ph.D. (Kansas State University).

Madl, James E., B.S. (Lake Superior State University), M.S., D.V.M., Ph.D. (University of Minnesota).

Magnusson, Kathy, B.S., D.V.M., Ph.D. (University of Minnesota).

Walrond, John P., B.S. (Ohio University), Ph.D. (University of Wisconsin).

Assistant Professors

Frasier, Mark B., B.S., M.S. (Colorado State University).

McConnell, Sherry L., B.S., M.S., D.V.M. (Colorado State University).

Partin, Kathryn M., B.A. (University of Michigan), Ph.D. (State University of New York at Stony Brook).

Reist, Noreen E., B.A. (University of California, Berkeley), Ph.D. (Stanford University).

Sollars, Patricia J., B.A. (St. John's College), Ph.D. (University of Oregon).

Wuarin, Jean-Pierre, B.A. (College of Geneva, Switzerland), M.D. (University of Geneva, Switzerland).

Department of Clinical Sciences**Department Head**

Professor Anthony P. Knight
B.V.S. (University of Nairobi, Kenya), M.S. (Colorado State University).

Professors

Baxter, Gary M., B.S. (The Pennsylvania State University), V.M.D. (University of Pennsylvania), M.S. (University of Georgia).

Garry, Franklyn B., B.S., D.V.M. (Cornell University), M.S. (The Ohio State University).

Greco, Deborah S., B.S. (California State Polytechnic University, Pomona), D.V.M. (University of California, Davis), M.S. (Texas A & M University).

Johnson, LaRue W., B.S., D.V.M., Ph.D. (University of Minnesota).

Kimberling, Cleon V., B.S., D.V.M. (Colorado State University), M.P.H. (University of Minnesota).

Lappin, Michael R., B.S., D.V.M. (Cornell University), Ph.D. (University of Georgia).

Macy, Dennis W., B.S. (Oregon State University), D.V.M. (University of California), M.S. (University of Illinois).

McIlwraith, C. Wayne, B.V.Sc. (Massey University, New Zealand), M.S., Ph.D. (Purdue University).

Nelson, Albert W., D.V.M. (Cornell University), M.S., Ph.D. (Colorado State University).

Ogilvie, Gregory K., B.A. (University of Colorado), D.V.M. (Colorado State University).

Orton, E. Christopher, B.S. (Oregon State University), D.V.M. (Washington State University), M.S. (The Ohio State University).

Seim, Howard B., B.S., D.V.M. (Washington State University).

Stashak, Ted S., B.S., D.V.M. (University of California), M.S. (Colorado State University).

Traub-Dargatz, Josie L., B.A., D.V.M. (University of Illinois), M.S. (Washington State University).

Trotter, Gayle W., D.V.M. (University of Saskatchewan, Canada), M.S. (Colorado State University).

Turner, A. Simon, B.V.Sc. (University of Melbourne, Australia), M.S. (The Ohio State University).

Twedt, David C., D.V.M. (Iowa State University of Science and Technology).

Voss, James L., B.S., D.V.M., M.S. (Colorado State University).

Wingfield, Wayne E., B.S., M.S. (University of Wyoming), D.V.M. (University of Missouri).

Withrow, Stephen J., B.S., D.V.M. (University of Minnesota).

Associate Professors

Bright, Janice M., B.S.N. (University of Michigan), M.S. (University of Maryland), D.V.M. (Purdue University).

Campbell, Terry W., B.S. (Pittsburg State University), D.V.M., Ph.D. (Kansas State University).

Cuddon, Paul A., B.V.Sc. (University of Sydney, Australia).

Dernell, William S., B.S., B.S. (Utah State University), D.V.M. (University of Illinois), M.S. (Washington State University).

Dinsmore, R. Page, D.V.M. (Purdue University).

Gaynor, James S., B.A. (Colorado College), D.V.M., M.S. (The Ohio State University).

Hellyer, Peter W., B.S., D.V.M., M.S. (The Ohio State University).

Kesel, M. Lynne, B.A., M.A. (University of Northern Colorado), D.V.M. (Colorado State University).

McCue, Patrick M., B.A. (State University of New York College at Potsdam), D.V.M., Ph.D. (University of California, Davis).

Mortimer, Robert G., B.S. (Texas A & M University), M.S., D.V.M. (Colorado State University).

Rosychuk, Rod A. W., D.V.M. (University of Saskatchewan, Canada).

Smith, Mary O., B.V.M.&S. (University of Edinburgh, Scotland), Ph.D. (University of California, Davis).

Wagner, Ann E., D.V.M. (The Ohio State University), M.S. (Colorado State University).

Assistant Professors

Billinghurst, R. Clark, D.V.M. (University of Guelph, Canada), M.S. (University of Saskatchewan, Canada), Ph.D. (McGill University, Canada).

Callan, Robert J., B.S. (University of California, Davis), D.V.M. (Oregon State University), Ph.D. (University of Wisconsin, Madison).

Dickinson, Charles E., B.S. (Gannon University), D.V.M., M.S. (Colorado State University).

Fitch, Randall B., B.A. (University of Northern Iowa), D.V.M. (University of Wisconsin, Madison), M.S. (Colorado State University).

Frisbie, David D., B.S. (University of Wisconsin, River Falls), D.V.M. (University of Wisconsin, Madison), Ph.D. (Colorado State University).

Gionfriddo, Juliet R., B.S., D.V.M. (Colorado State University), M.S. (Iowa State University of Science and Technology).

Hackett, Timothy B., B.S. (University of Nevada, Reno), D.V.M., M.S. (Colorado State University).

Hendrickson, Dean A., B.A. (Carroll College), D.V.M. (Colorado State University), M.S. (Cornell University).

Kawcak, Christopher E., B.S. (University of Nevada, Reno), D.V.M., M.S. (Colorado State University).

Lana, Susan E., B.S. (University of Iowa), D.V.M., M.S. (Colorado State University).

MacLeay, Jennifer M., B.S. (The University of New Hampshire), D.V.M. (The Ohio State University), Ph.D. (University of Minnesota).

Mama, Khurshed R., B.V.S., D.V.M. (Washington State University).

Monnet, Eric P., D.V.M. (University Paris XII, France), M.S., Ph.D. (Colorado State University).

Mueller, Ralf S., MACVSc. (Ludwig-Maximilians University Munich, Germany).

Powell, Cynthia C., B.S. (University of Oklahoma), D.V.M. (Cornell University), M.S. (University of Georgia).

Stevens, Reyneld D., D.V.M. (Iowa State University of Science and Technology), M.S. (University of Minnesota).

Stricklin, Joe B., B.S., D.V.M. (Texas A & M University)

Van Metre, David C., B.S., D.V.M. (Cornell University)

Wimsatt, Jeffrey H., D.V.M., Ph.D. (Cornell University).

Affiliate Faculty

Allen, Timothy A., D.V.M. (Cornell University).

Becker, Marty, D.V.M. (Washington State University).

Beeman, G. Marvin, B.S., D.V.M. (Colorado State University).

Bright, Ronald M., D.V.M. (The Ohio State University), M.S. (Colorado State University).

Burge, Gary D., B.S., D.V.M. (University of California, Davis).

Cattell, Marguerita B., B.S., D.V.M., M.S. (Colorado State University).

Cleland, Paul P., B.S. (North Carolina State University), D.V.M. (University of Georgia).

Cunningham, Wayne E., B.S. (Utah State University), D.V.M., M.S. (Colorado State University).

Dargatz, David A., B.S. (Oregon State University), D.V.M. (Washington State University), M.S., Ph.D. (Colorado State University).

Eckhoff, Donald G., B.A., M.S., M.D. (University of Minnesota).

Egger, Erick L., B.S., D.V.M. (Colorado State University).

Emily, Peter, D.D.S. (Creighton University).

Evans, Christopher H., B.Sc., Ph.D. (University of Wales), M.A. (University of Pittsburgh).

Guadagnoli, Mark D., B.S., M.D. (The University of New Mexico).

Hammond, David L., B.S. (University of Idaho), D.V.M. (Washington State University).

Holland, Cynthia J., B.S. (University of Arizona), M.S., Ph.D. (University of Illinois).

Horwitz, Lawrence, B.A. (University of Rochester), M.D. (Yale Medical School).

Jaouen, Richard M., B.A. (University of Colorado), M.D. (Universidad Autonoma de Guadalajara, Mexico).

Kato, Gen, D.V.M. (National Hokkaido University, Japan).

Kenny, David, B.A. (Manhattan College), V.M.D. (University of Pennsylvania).

Lance, William N., B.S. (Oklahoma State University), M.S., Ph.D. (Colorado State University).

Lee, Arthur C., D.V.M., M.S., Ph.D. (Colorado State University).

Levin, Jana R., B.V.S., D.V.M. (University of California, Davis).

Miller, Michael W., B.S., D.V.M., Ph.D. (Colorado State University).

Nixon, Alan J., B.V.Sc. (University of Sydney), M.S. (Colorado State University).

Olson, Jerry D., B.S., D.V.M., M.S. (University of Minnesota).

Olson, Patricia N., B.S., D.V.M., M.S. (University of Minnesota), Ph.D. (Colorado State University).

Renger, Hartmut C., B.S. (University of Giessen, Germany), Ph.D. (Kansas State University), M.D. (University of Miami).

Robinson, Narda G., A.B. (Harvard University), D.O. (Texas College of Osteopathic Medicine), D.V.M. (Colorado State University).

Rucker, Nolan C., B.S., D.V.M. (University of Missouri), M.S. (Colorado State University).

Sabick, Michelle B., B.S. (Case Western Reserve University), M.S., Ph.D. (University of Iowa).

Savage, Catherine J., B.V.Sc., Ph.D. (University of Melbourne, Australia).

Schoen, Allen M. S., B.A. (University of Bridgeport), M.S. (University of Illinois), D.V.M. (Cornell University).

Shelburne, Kevin B., B.S., M.S. (Texas A & M University), Ph.D. (University of Texas).

Taylor, Robert A., B.S., M.S., D.V.M. (Texas A & M University), M.S. (Colorado State University).

Torgenson, Betsy, B.A. (The College of Saint Scholastica), D.V.M. (University of Minnesota).

Torry, Michael R., B.S., M.S. (Illinois State University), Ph.D. (Southern Illinois University).

Tripp, Rolan, B.A., (California State University, Los Angeles), D.V.M. (University of California-Davis).

Weber, Stephen E., B.S., D.V.M., M.B.A. (Colorado State University).

Wilkins, Ross M., B.A. (University of Colorado), M.S., M.D. (Wayne State University).

Department of Environmental Health

Department Head

Professor John S. Reif

D.V.M. (Cornell University), M.Sc. (University of Pennsylvania).

Professors

Andersen, Melvin E., Sc.B. (Brown University), Ph.D. (Cornell University).

Billings, Ruth E., A.B., Ph.D. (Indiana University).

Buchan, Roy M., B.S. (Colorado State University), M.P.H., D.P.H. (University of Oklahoma).

Herron, Robert E., B.A. (Queens University, England), M.S., Ph.D. (University of Illinois).

Keefe, Thomas J., B.A. (St. Ambrose College), M.A. (University of Missouri), Ph.D. (Iowa State University of Science and Technology).

Salman, Mowafak D., B.S. (University of Baghdad, Iraq), M.P.V.M., Ph.D. (University of California, Davis).

Stallones, Lorann, B.S. (University of California, Santa Barbara), M.P.H., Ph.D. (University of Texas Health Science Center- Houston).

Yang, Raymond S. H., B.S. (National Taiwan University, Taiwan), Ph.D. (North Carolina State University at Raleigh).

Associate Professors

Bigelow, Philip L., B.S. (Simon Fraser University, Canada), M.H.S. (University of Toronto, Canada), Ph.D. (University of Calgary, Canada).

Blehm, Kenneth D., B.A. (University of Northern Colorado), M.S. (Colorado State University), Ph.D. (University of Oklahoma).

Nuckols, John R., B.S. (Texas A & I University), M.S. (Northwestern University), Ph.D. (University of Kentucky).

Ramsdell, Howard S., B.A. (Pomona College), Ph.D. (Oregon State University).

Tessari, John D., B.A. (University of Northern Colorado), M.S., Ph.D. (Colorado State University).

Assistant Professors

Campaign, Julie A., B.S. (Colorado State University), Ph.D. (University of Nebraska).

McCarthy, Barbara J., B.S. (University of Wisconsin, LaCrosse), M.S., Ph.D. (Colorado State University).

Morley, Paul S., B.S., B.S., D.V.M. (Washington State University), Ph.D. (University of Saskatchewan, Canada).

Sandfort, Delvin R., B.S., M.S. (Colorado State University).

Affiliate Faculty

Applehans, Frederick M., B.S., M.S., D.V.M. (Colorado State University).

Beaulieu, Harry J., B.S., M.S. (University of Minnesota), Ph.D. (University of Oklahoma).

Belleville, Bruce R., B.A. (Case Western Reserve University), M.D. (The Ohio State University), M.P.H. (University of North Carolina).

Cosma, Greg N., B.S. (University of Illinois at Urbana-Champaign), M.S., Ph.D. (University of Kansas).

Cox, Douglas N., B.A. (State University of New York at Geneseo), M.S., Ph.D. (University of Kansas).

Dennis, David T., A.B. (Whitman College), M.D. (Cornell University).

Duval, Kirby J., B.A., M.S. (Stanford University), M.D. (University of Arizona).

Freier, Jerome E., B.S. (Central Michigan University), M.S., Ph.D. (University of Illinois).

Fulfs, Jon C., B.A., M.A. (Drake University), Ph.D. (Albany Medical College of Union University).

Gunter, Bobby J., B.S. (Southeastern Oklahoma University), M.S., Ph.D. (University of Oklahoma).

Hamman, Richard F., B.S. (Michigan State University), M.D. (Case Western Reserve University), M.P.H. (The Johns Hopkins University).

Heiderscheidt, Judy M., B.S., M.S. (Colorado State University).

Higgins, Charles L., B.S., M.S. (Colorado State University).

Hurd, H. Scott, B.S. (Virginia Polytechnic Institute and State University), D.V.M. (Iowa State University of Science and Technology), Ph.D. (Michigan State University).

Jackson, James O., B.S. (Detroit Institute of Technology), M.S. (Wayne State University), Ph.D. (University of Michigan).

Johnson, Janet A., B.S. (University of Massachusetts), M.S. (University of Rochester), Ph.D. (Colorado State University).

Johnston, John J., B.S. (Rutgers University), Ph.D. (University of Florida).

Koons, Robin K., B.S., Ph.D. (Colorado State University).

Martyn, John W., B.S. (The Ohio State University), M.S. (Humboldt State University), Ph.D. (Colorado State University).

McCannon, Charles S., Jr., B.S. (Arizona State University), M.S. (University of Cincinnati), Ph.D. (Colorado State University).

Melvin, Walter W., M.D. (University of Colorado), Sc.D. (University of Cincinnati).

Richard, Michael G., A.B., M.S., Ph.D. (University of California, Berkeley).

Rosenthal, Gary J., B.S. (Boston College), M.S., Ph.D. (New York University).

Thompson, James J., B.A. (The University of New Mexico), M.S., Ph.D. (Purdue University).

Tillery, Marvin I., B.S. (The University of New Mexico), M.S. (University of Rochester), Ph.D. (Colorado State University).

Department of Microbiology

Interim Department Head

Professor Ralph E. Smith

B.S. (Colorado State University), Ph.D. (University of Colorado Health Sciences Center).

University Distinguished Professors

Brennan, Patrick J., B.Sc., M.Sc. (National University of Ireland), M.A., Ph.D. (Trinity College, Dublin, Ireland).

Beaty, Barry J., B.S., M.S., Ph.D. (University of Wisconsin).

Professors

Blair, Carol D., B.A. (University of Utah), Ph.D. (University of California, Berkeley).

Calisher, Charles H., B.S. (Philadelphia College of Pharmacy and Science), M.S. (University of Notre Dame), Ph.D. (Georgetown University).

Carlson, Jonathan O., B.S. (Colorado State University), Ph.D. (University of California, Berkeley).

Collins, James K., B.S. (Stanford University), M.S. (University of Minnesota), Ph.D. (University of California, Berkeley).

Coulter, Gary R., B.A. (The University of Kansas), M.S. (Loma Linda University), Ph.D. (Colorado State University).

Ellis, Robert P., B.S. (University of Wyoming), M.S., Ph.D. (Purdue University).

Jones, Robert L., B.S., D.V.M. (Washington State University), Ph.D. (University of Missouri).

Klein, Donald A., B.S., M.S. (University of Vermont), Ph.D. (The Pennsylvania State University).

Linden, James C., B.S. (Colorado State University), Ph.D. (Iowa State University of Science and Technology).

McNeil, Michael, B.S. (Allegheny College), M.S. (Massachusetts Institute of Technology), Ph.D. (University of Colorado at Boulder).

Orme, Ian M., B.Sc., Ph.D. (University of London, England).

Pearson, Leonard D., B.S., D.V.M. (Colorado State University), Ph.D. (University of California, Davis).

Associate Professors

Black, William C., IV, B.A. (Grinnell College), M.F. (Duke University), Ph.D. (Iowa State University of Science and Technology).

Chatterjee, Delphi, B.Sc., M.Sc. (Vista Bharati University, India), M.S., Ph.D. (University of London, England).

Howell, Mark D., B.S. (Texas A & M University), Ph.D. (University of Wyoming).

Inamine, Julia M., B.S. (University of Washington), Ph.D. (Duke University).

Olson, Kenneth E., B.S. (North Carolina State University at Raleigh), M.S., Ph.D. (Colorado State University).

Schweizer, Herbert P., Diplome, Ph.D. (University of Konstanz, Germany).

Wilcox, Christine L., B.S. (Wayne State University), Ph.D. (Washington University).

Assistant Professors

Belisle, John T., B.S., Ph.D. (Colorado State University).

Cooper, Andrea M., B.Sc., Ph.D. (University of London).

DuTeau, Nancy M., B.A. (Grinnell College), Ph.D. (Iowa State University of Science and Technology).

Gentry-Weeks, Claudia, B.S. (University of Arkansas), Ph.D. (University of Oklahoma).

Higgs, Stephen, B.Sc. (King's College, London University, England), Ph.D. (University of Reading, England).

Karkhoff-Schweizer, RoxAnn R., B.S., B.A. (Bemidji State University), Ph.D. (University of North Dakota).

Suchman, Erica L., B.A. (University of California, San Diego), Ph.D. (University of California, Irvine).

Instructor

Deines, Susan M., B.S., M.S. (Colorado State University).

Affiliate Faculty

Burkot, Thomas R., B.Sc. (University of Notre Dame), M.Sc., Ph.D. (University of Wisconsin-Madison).

Chang, Gwong-Jen J., B.V.Sc. (National Chung-Hsing University, Taiwan), M.V.M. (National Taiwan University, Taiwan), Ph.D. (Colorado State University).

Chu, May Chin-May, B.S. (Michigan State University), Ph.D. (University of Hawaii).

Gilmore, Robert D., B.S., M.S. (Northwestern State University of Louisiana), Ph.D. (Oregon State University).

Griffin, John P., B.S. (The University of Akron), Ph.D. (Colorado State University).

Hesterberg, Lyndal K., B.S. (University of Illinois), Ph.D. (St. Louis University).

Johnson, Barbara J. B., B.A., Ph.D. (University of Wisconsin, Madison).

Kinney, Richard M., B.A. (Carleton College), M.S. (Colorado State University), Ph.D. (Surrey University, England).

Lee, Sun Y., B.S. (Kon-Kuk University, Korea), M.S. (Iowa State University of Science and Technology).

Longcore, Joyce E., B.S. (University of Michigan), M.S. (Indiana University), Ph.D. (University of Maine).

Mattoon, James R., B.S. (University of Illinois), M.S., Ph.D. (University of Wisconsin).

Maxwell, Ian H., B.A., Ph.D. (University of Cambridge, England).

Mecham, James O., B.S., M.S. (Brigham Young University), Ph.D. (Colorado State University).

Milhausen, Michael J., B.S. (LeMoyne College), Ph.D. (Syracuse University).

Miller, Barry R., B.S., M.S., Ph.D. (University of Wisconsin, Madison).

Mitchell, Carl J., B.S. (Northeastern State University), M.S. (University of Hawaii), Sc.D. (The Johns Hopkins University).

Osorio, Jorge E., D.V.M. (Universidad de Antioquia, Columbia), M.S., Ph.D. (University of Wisconsin).

Quan, Thomas J., B.A. (University of California, Berkeley), M.P.H. (University of Minnesota), Ph.D. (University of Michigan).

Roehrig, John T., B.S. (University of Illinois at Urbana, Champaign), Ph.D. (University of Missouri, Columbia).

Smith, Roderic L., A.B. (Harvard University), Ph.D., M.D. (Washington University).

Tengelsen, Leslie A., B.S. (University of California, Irvine), Ph.D. (Oregon State University), D.V.M. (Michigan State University).

Walton, Thomas E., D.V.M. (Purdue University), Ph.D. (Cornell University).

Wilson, William C., B.S., Ph.D. (University of Illinois at Urbana-Champaign).

Zeidner, Nordin, B.A. (American University), D.V.M. (Washington State University), Ph.D. (Colorado State University).

Department of Pathology

Interim Department Head

University Distinguished Professor

Professor Edward A. Hoover

B.S., D.V.M. (University of Illinois), M.S., Ph.D. (The Ohio State University).

Professors

Akkina, Ramesh K., B.V.Sc. (A.P. Agricultural University, India), M.V.Sc. (University of Agricultural Sciences, India), Ph.D. (University of Minnesota).

Benjamin, Stephen A., A.B. (Brandeis University), D.V.M. (State University of New York, Veterinary College at Cornell University), Ph.D. (Cornell University).

DeMartini, James C., B.S., D.V.M., Ph.D. (University of California, Davis).

Fettman, Martin J., B.S., D.V.M., M.S. (Cornell University), Ph.D. (Colorado State University).

Gould, Daniel H., B.S., D.V.M. (Colorado State University), Ph.D. (University of California, Davis).

Grieve, Robert B., B.S., M.S. (University of Wyoming), Ph.D. (University of Florida).

Lassen, E. Duane, D.V.M., Ph.D. (Iowa State University of Science and Technology).

Norrudin, Robert W., B.S. (Brooklyn College of The City University of New York), D.V.M., Ph.D. (Cornell University).

Powers, Barbara E., B.S., M.S., D.V.M. (Purdue University), Ph.D. (Colorado State University).

Thrall, Mary Anna, B.A. (University of Evansville), D.V.M. (Purdue University), M.S. (Colorado State University).

Titus, Richard G., B.A. (Northern Arizona University), M.S., Ph.D. (University of Washington).

Weiser, M. Glade, B.S., D.V.M. (University of California, Davis).

Associate Professors

Baker, Dale C., D.V.M. (Colorado State University), Ph.D. (Texas A & M University).

Basaraba, Randall J., B.S., D.V.M., Ph.D. (Washington State University).

Callahan, Gerald N., B.S., Ph.D. (University of Utah).

Cheney, John M., B.S., D.V.M., M.S. (Colorado State University).

Hamar, Dwayne W., B.A. (Nebraska State College), M.S., Ph.D. (University of Nebraska).

Schultheiss, Patricia C., B.A. (Saint Olaf College), D.V.M., Ph.D. (University of Minnesota).

Spraker, Terry R., B.S., D.V.M., Ph.D. (Colorado State University).

Vandewoude, Sue, B.S. (California Institute of Technology), D.V.M. (Virginia-Maryland Regional College of Veterinary Medicine).

Assistant Professors

Avery, Anne C., B.A. (Mount Holyoke College), V.M.D. (University of Pennsylvania), Ph.D. (Cornell University).

Barillas-Mury, Carolina V., B.S. (Universidad del Valle de Guatemala), M.D. (Universidad Francisco Marroquín de Guatemala), Ph.D. (University of Arizona).

Burnett, Robert C., B.A. (Syracuse University), Ph.D. (University of Illinois at Chicago).

Mason, Gary L., B.S. (Colorado State University), D.V.M., M.S. (Texas A & M University).

Oliver, Christine S., B.S. (University of North Carolina), D.V.M., Ph.D. (The Ohio State University).

Smith, Joseph D., B.A. (Macalester College), Ph.D. (Washington University).

Instructor

Somers, Kyra L., B.S., D.V.M., Ph.D. (Colorado State University).

Affiliate Faculty

Brown, Diane E., B.S., D.V.M., Ph.D. (Colorado State University).

Galey, Francis D., B.S., D.V.M. (Colorado State University), Ph.D. (University of Illinois).

Gardner, Henry S., Jr., B.A. (University of Montana), M.S.Ph. (Tulane University of Louisiana), Dr.P.H. (The Johns Hopkins University).

Mullins, James I., B.A. (University of South Florida), Ph.D. (University of Minnesota).

O'Brien, Stephen J., B.S. (St. Francis College), Ph.D. (Cornell University).

O'Rourke, Katherine I., B.A. (University of Massachusetts Boston), Ph.D. (Washington State University).

Pope, Melissa J., B.S., Ph.D. (The University of Adelaide, Australia).

Stafford, Darrel W., B.A. (Southwest Missouri State College), Ph.D. (University of Miami).

Telling, Glenn C., B.A., M.A. (University of Oxford, England), Ph.D. (Carnegie Mellon University).

Wenger, David A., B.S., Ph.D. (Temple University).

Wild, Margaret A., B.S., D.V.M. (Colorado State University)

Williams, Elizabeth S., B.S. (University of Maryland), D.V.M. (Purdue University), Ph.D. (Colorado State University).

Zeidner, Nordin S., B.A. (The American University), D.V.M. (Washington State University), Ph.D. (Colorado State University).

Department of Physiology

Department Head

Professor Alan Tucker

B.A., Ph.D. (University of California, Santa Barbara).

University Distinguished Professors

Niswender, Gordon D., B.S. (University of Wyoming), M.S. (University of Nebraska), Ph.D. (University of Illinois).

Seidel, George E., Jr., B.S. (The Pennsylvania State University), M.S., Ph.D. (Cornell University).

Professors

Anthony, Russell V., B.S. (Kansas State University), M.S. (University of Nebraska), Ph.D. (University of Wyoming).

Ishii, Douglas N., B.A. (University of California, Berkeley), Ph.D. (Stanford University).

Miller, Charles W., B.S. (Purdue University), M.S., Ph.D. (Colorado State University).

Nett, Torrance M., B.S. (Montana State University), Ph.D. (Washington State University).

Roess, Deborah A., B.A. (University of Missouri, Columbia), Ph.D. (St. Louis University).

Sawyer, Heywood R., Jr., B.A. (East Carolina University), M.S., Ph.D. (University of Wyoming).

Squires, Edward L., B.S., M.S. (West Virginia University), Ph.D. (University of Wisconsin).

Tamkun, Michael M., B.A., M.A. (University of South Florida), Ph.D. (University of Washington).

Associate Professors

Bowen, Richard D., D.V.M., M.S., Ph.D. (Colorado State University).

Clay, Colin, B.S., M.S., Ph.D. (Colorado State University).

Graham, James K., B.S. (University of Minnesota), Ph.D. (Cornell University).

Veeramachaneni, D. N. Rao, B.V.Sc., M.Sc. (A P Agricultural University, India), Ph.D. (University of Illinois).

Wilke, W. Lee, B.S., D.V.M. (University of Illinois), M.S. (Iowa State University of Science and Technology), Ph.D. (Colorado State University).

Assistant Professors

Carnevale, Elaine, B.S., D.V.M., M.S. (Colorado State University), Ph.D. (University of Wisconsin-Madison).

Marley, Wanda S., B.S.N. (University of South Alabama), M.S. (University of Kansas), Ph.D. (Colorado State University).

Vader-Lindholm, Connie, B.A. (Western State College of Colorado), M.S., Ph.D. (Colorado State University).

Affiliate Faculty

Battaglia, Frederick C., B.A. (Cornell University), M.D. (Yale University).

Gardner, David K., B.Sc., Ph.D. (University of York, United Kingdom).

Kraft, Monica, B.A. (University of California, Davis), M.D. (University of California, San Francisco).

Luckasen, Gary J., B.S. (Colorado State University), M.D. (University of Colorado).

Martin, Richard J., B.S., M.D. (University of Michigan).

McMurty, Ivan F., B.S. (University of Wyoming), M.S. (University of Nebraska), Ph.D. (Colorado State University).

Miller, Lowell A., B.A. (Upland College), M.S., Ph.D. (Colorado State University).

Miller, James C., B.A., Ph.D. (University of California, Santa Barbara).

Seals, Douglas, B.S. (William Jewell College), M.S., Ph.D. (University of Wisconsin).

Tissot van Patot, Martha Caperton, B.S. (Western State College of Colorado), M.S., Ph.D. (Colorado State University).

Wilkening, Randall E., B.A. (Carleton College), M.D. (University of Missouri, Columbia).

Department of Radiological Health Sciences**Department Chairman**

Professor F. Ward Whicker
B.S., Ph.D. (Colorado State University).

Professors

Bedford, Joel S., B.A., M.S. (University of Colorado), D. Phil. (Oxford University, England).

Borak, Thomas B., B.S. (St. John's University), Ph.D. (Vanderbilt University).

Fox, Michael H., B.S. (McPherson College), M.S., Ph.D. (Kansas State University).

Ibrahim, Shawkī A., B.S. (Alexandria University, Egypt), M.S. (Long Island University, C. W. Post College), Ph.D. (New York University).

Park, Richard D., B.S. (Utah State University), D.V.M. (Colorado State University), Ph.D. (University of California, Davis).

Ullrich, Robert L., B.S., M.S. (Creighton University, Omaha), Ph.D. (University of Rochester, New York).

Waldren, Charles A., B.A., M.S., Ph.D. (University of Colorado Health Sciences Center).

Wrigley, Robert H., B.V.Sc. (University of Sydney, Australia), D.V.R. (Royal College of Veterinary Surgeons), M.S. (Colorado State University).

Associate Professors

Hakanson, Thomas, B.S., M.S., Ph.D. (Colorado State University).

Kraft, Susan L., B.S. (University of Alaska), D.V.M., Ph.D. (Washington State University).

LaRue, Susan M., D.V.M. (University of Georgia), M.S., Ph.D. (Colorado State University).

Pinder, John E., B.S. (Towson University), M.S., Ph.D. (University of Georgia).

Steyn, Phillip F., B.Sc. (University of the Orange Free State, Republic of South Africa), B.V.Sc. (The University of Pretoria, Republic of South Africa), M.S. (Texas A & M University).

Assistant Professors

Durham, James S., B.S., M.S., Ph.D. (University of Illinois).

Okayasu, Ryuichi, B.S. (Science University of Tokyo, Japan), M.S. (University of Oregon, Ph.D. (Colorado State University).

Smith, Maria Leia M., B.S. (University of the Philippines), Ph.D. (Northwestern University).

Affiliate Faculty

Akselrod, Mark S., B.S., Ph.D. (Ural Polytechnical Institute, Russia).

Balbinder, Elias, B.S. (University of Michigan), Ph.D. (Indiana University).

Barcellos-Hoff, Mary Helen, A.B. (University of Chicago), Ph.D. (University of California, San Francisco).

Ben-Hur, Ehud, B.Sc. (Hebrew University, Israel), M.Sc., D.Sc. (Technion Israel Institute of Technology, Israel).

Blakely, Eleanor A., B.A. (University of San Diego), M.S., Ph.D. (University of Illinois at Urbana-Champaign).

Chatterjee, Alope, B.S., M.S. (University of Delhi, India), Ph.D. (University of Notre Dame).

Cooper, Priscilla K., B.A. (University of Rochester), Ph.D. (Stanford University).

Dewey, William C., B.S. (University of Washington), Ph.D. (University of Rochester).

Efurd, Edward W., B.A., M.S. (Texas A & M University), Ph.D. (University of Arkansas).

Fresquez, Philip R., B.Sc., M.Sc. (New Mexico University), Ph.D. (Colorado State University).

Hendrick, Edward R., B.A. (Hendrix College), B.S. (Columbia University), Ph.D. (Rockefeller University).

Hetzel, Fredrick W., B.Sc., M.Sc., Ph.D. (University of Waterloo, Canada).

Hinton, Thomas G., B.S., M.S., Ph.D. (Colorado State University).

Kocher, David C., B.S. (University of Maryland), M.S., Ph.D. (University of Wisconsin-Madison).

Kronenberg, Amy, B.A. (Brown University), D.Sc. (Harvard University).

Little, Craig A., B.A. (McPherson College), M.S., Ph.D. (Colorado State University).

Markham, O. Doyle, B.Sc., M.Sc., Ph.D. (Colorado State University).

Muhlmann-Diaz, Maria C., B.Sc. (University of Buenos Aires, Argentina), Ph.D. (Colorado State University).

Ostrander, Elaine A., B.S. (University of Washington), Ph.D. (Oregon Health Sciences University).

Rowan, David J., B.Sc., M.Sc. (Ohio State University), Ph.D. (McGill University).

van der Kogel, Albert J., B.Sc., Ph.D. (Free University of Amsterdam, The Netherlands), Ph.D. (University of Amsterdam, The Netherlands).

University Libraries

Dean

Professor Camila Alire

B.A. (Adams State College of Colorado), M.L.S. (University of Denver), Ed.D. (University of Northern Colorado).

Professors

Ernest, Douglas J., B.A. (University of Colorado at Colorado Springs), M.A. (University of Colorado at Boulder), M.L.S. (University of Denver).

Godden, Irene P., B.A. (The City University of New York, Brooklyn College), M.A., M.L.S. (University of California, Los Angeles).

Lange, Holley R., B.A. (Beloit College), M.A. (University of Wisconsin-Madison), M.A. (Colorado State University).

Newman, John J., B.A., M.Lib. (University of Washington), M.A. (Colorado State University).

Schmidt, Fred C., Jr., B.A. (Fort Hays Kansas State College), M.A. (University of Denver).

Associate Professors

Beam, Joan T., B.A. (University of Washington), M.L.S. (Southern Connecticut State University).

Branstad, Barbara, B.A. (Whitman College), M.A. (University of Denver).

Bush, Carmel C., B.S. (College of Saint Catherine), M.S. (University of Illinois at Urbana-Champaign).

Cochenour, Donnice K., B.S. (Oklahoma State University), M.L.S. (University of Hawaii).

Copeland, Nora S., B.A. (Beirut University College, Lebanon), M.L.S. (State University of New York, Geneseo).

Culbertson, Michael R., B.S. (California State University, Los Angeles), M.S. (University of Southern California).

DeMiller, Anna L., B.A., M.A. (University of Utah), M.S. (University of Illinois at Urbana-Champaign).

Enssle, Halcyon R., B.A. (University of Colorado), M.A. (University of Denver).

Moothart, Tom, B.A. (University of Northern Iowa), M.L.S. (University of Iowa).

Smith, Patricia A., B.A. (University of Nebraska), M.L.S. (University of Michigan).

Switzer, Teri R., B.A., M.L.S. (University of Illinois), M.B.A. (Colorado State University).

Taylor, Suzanne N., B.A., M.L.S. (University of Arizona), M.A. (Washington State University).

Thistlethwaite, Polly J., B.S., M.S. (University of Illinois), M.S. (City University of New York).

Wessling, Julie E., B.A. (Cornell College), M.L.S. (University of Illinois).

Assistant Professors

Anderson, Lou E., B.A. (Louisiana Tech University), M.A., M.P.A. (University of Missouri, Columbia).

Chaffin, Nancy J., B.A., M.L.S. (University of Arizona).

Cowgill, Allison A., B.A. (University of Colorado at Denver), M.A. (University of Denver).

Cullen, Kevin, B.A. (Winthrop University), M.S.L.S. (University of Kentucky).

Cunningham, Kate E., B.A. (State University of New York, Buffalo), M.S.L.S. (University of Texas, Austin).

Hendrix, Dean D., B.A., M.S.L.S. (University of Texas, Austin).

Lederer, Naomi, B.A. (Carleton College), M.S. (University of Illinois), M.A. (Arizona State University).

Level, Allison, B.S. (University of Arkansas), M.Ed. (Kent State University), M.L.S. (Emporia State University).

Lunde, Diane B., B.A., M.A. (University of Wisconsin, Madison).

Mach, Michelle J., B.A. (University of California, Santa Cruz), M.L.S. (University of Illinois).

Neely, Teresa, B.S. (South Carolina State University), M.L.S. (University of Pittsburgh), Ph.D. (University of Pittsburgh).

Oling, Lori L., B.A. (University of Colorado, Boulder), M.S. (University of Illinois).

Reyes-Lucca, Awilda, B.B.A., M.A., M.L.S. (University of Puerto Rico).

Wilde, Michelle, B.A. (Oregon State University), M.L.S. (Indiana University).

The Emeritus Academic Faculty

Aanes, Wilbur A., D.V.M., M.S., Emeritus Professor of Clinical Sciences.

Ager, Charlene L., B.S., M.A., Emeritus Assistant Professor of Occupational Therapy.

Albertson, Maurice L.¹, B.S., M.S., Ph.D., D.P.S., Emeritus Centennial Professor of Civil Engineering.

Alden, Howard R., B.S., M.S., Ph.D., Emeritus Professor of Recreation Resources and Landscape Architecture.

Alexander, Archibald F., B.S., D.V.M., M.S., Ph.D., Emeritus Professor of Pathology.

Aldredge, A. William, B.S., M.S., Ph.D., Emeritus Professor of Fishery and Wildlife Biology.

Altman, Jack, B.S., Ph.D., Emeritus Professor of Bioagricultural Sciences and Pest Management.

Amann, Rupert P., B.S., M.S., Ph.D., Emeritus Professor of Physiology.

Anderson, B. Harold, B.S., M.Ed., Ph.D., Emeritus Professor and Emeritus Head of Education.

Anderson, Edward D., B.A., M.M., Emeritus Professor of Music.

Anderson, LeMoyné W., B.A., B.S.L.S., M.S., Ph.D., Emeritus Professor and Emeritus Director of Libraries.

Anderson, Rodney E., B.S., M.A., Ed.D., Emeritus Professor of Industrial Sciences.

Azari, Parviz, B.A., M.S., Ph.D., Emeritus Professor of Biochemistry and Molecular Biology.

Baer, Margaret, B.A., M.S., Ph.D., Emeritus Associate Professor of Textiles and Clothing.

Bagby, John R., Jr., B.S., M.S., Ph.D., Emeritus Professor of Microbiology and Environmental Health.

Bailey, James A., B.A., M.S., Ph.D., Emeritus Professor of Fishery and Wildlife Biology.

Baldwin, Lionel V., B.S., S.M., Ph.D., Emeritus Dean, College of Engineering, and Emeritus Professor of Civil Engineering.

Ball, Leslie, B.S., D.V.M., M.S., Emeritus Professor of Clinical Sciences.

Barney, Charles W., B.S., M.S., D.F., Emeritus Professor and Emeritus Head, Department of Forest and Wood Sciences.

Basri, Saul A., B.S., Ph.D., Emeritus Professor of Physics.

Bates, Paul A., B.A., M.A., Ph.D., Emeritus Professor of English.

Bayard, Charles J., B.A., M.A., Ph.D., Emeritus Professor of History.

Benjamin, Maxine M., B.S., D.V.M., M.S., Emeritus Professor of Pathology.

Bennett, Dwight G., B.S., M.S., Ph.D., D.V.M., Emeritus Professor of Clinical Sciences.

Bennett, Thomas L., B.A., M.S., Ph.D., Emeritus Professor of Psychology.

Benson, Gerald P., B.A., M.A., Ed.D., Emeritus Associate Professor of Psychology.

Benson, Paula J., B.A., M.A., Ph.D., Emeritus Associate Professor of Philosophy.

Benton, Douglas A., B.S., M.S., D.B.A., Emeritus Professor of Management.

Ben-Zvi, Linda M., B.A., M.A., Ph.D., Emeritus Professor of English.

Berger, Peggy S., B.S., M.S., Ph.D., Emeritus Professor of Design and Merchandising.

Berland, John C., B.S., M.Ed., M.A., Emeritus Professor of Art.

Berwanger, Eugene H., B.A., M.A., Ph.D., Emeritus Professor of History.

Binkley, Max A., B.S., M.S., Ph.D., Emeritus Vice President.

Blackburn, Thomas R., B.S., M.S., Emeritus Associate Professor of Animal Sciences.

Blake, Duane L., B.S., M.S., Ph.D., Emeritus Professor of Vocational Education.

Bodig, Jozsef, B.S., M.S., Ph.D., Emeritus Professor of Forest and Wood Sciences.

Boersch, Alfred H., B.A., M.A., Ph.D., Emeritus Professor of Philosophy.

Boes, Duane C., B.A., M.S., Ph.D., Emeritus Professor of Statistics and Emeritus Chair, Department of Statistics.

Bohmont, Bert L., B.S., M.S., Ph.D., Emeritus Professor of Plant Pathology and Weed Science.

Borden, Thomas B., B.S., M.S., Emeritus Director of Colorado State Forest Service.

Bourdon, Richard M., B.S., M.S., Ph.D., Emeritus Associate Professor of Animal Sciences.

Boyd, William L., B.A., M.S., Ph.D., Emeritus Professor of Environmental Health.

Boyne, Harold S., B.A., M.S., Ph.D., Emeritus Professor of Earth Resources.

Braddy, Robert E., B.A., M.A., Emeritus Associate Professor of Music, Theatre, and Dance.

Brammer, Norman D., B.A., M.B.A., Ph.D., Emeritus Associate Professor of Computer Information Systems.

Brengle, Kenneth G., B.S., M.S., Ph.D., Emeritus Associate Professor of Agronomy.

Brink, Kenneth M., B.S., M.S., Ph.D., Emeritus Head and Emeritus Professor of Horticulture.

Brinks, James S., B.S., M.S., Ph.D., Emeritus Professor of Animal Sciences.

Britton, Charles C., B.S., M.S., Emeritus Associate Professor of Electrical Engineering.

Broadhurst, Betty P., B.A., M.S.S., D.S.W., Emeritus Professor of Social Work.

Brown, Dean R., B.S., M.S., Ed.D., Emeritus Professor of Education.

Brubaker, Thomas A., B.S., M.S., Ph.D., Emeritus Professor of Electrical Engineering.

Bruner, Howard D., B.S., M.Ed., Ed.D., Emeritus Professor of Education.

Bryant, Paul T., B.S., M.S., M.A., Ph.D., Emeritus Professor of English.

Budak, Aram, B.S., M.S., Ph.D., Emeritus Professor of Electrical Engineering.

Burns, Robert W., Jr., B.A., M.S., Emeritus Professor of Library Science.

Busch, Stephen E., B.M.Ed., M.M.Ed., Ed.D., Emeritus Associate Professor of Music, Theatre, and Dance.

Carlson, Clarence A., B.A., M.S., Ph.D., Emeritus Professor of Fishery and Wildlife Biology.

Carpenter, Frederick M., B.A., M.A., Emeritus Associate Professor of Mathematics.

Carter, Deane M., B.S., M.B.E., Ph.D., Emeritus Professor of Computer Information Systems.

Carter, Lee D., B.S., M.A., Ph.D., Emeritus Associate Professor of Industrial Sciences.

Caughey, Winslow S., B.S., M.S., Ph.D., Emeritus Professor of Biochemistry and Molecular Biology.

Caulfield, Henry P., Jr., B.S., M.P.A., Emeritus Professor of Political Science.

Cavarra, Robert N., B.A., B.M., M.M., Emeritus Professor of Music, Theatre, and Dance.

Cefkin, J. Leo, B.A., M.A., Ph.D., Emeritus Professor of Political Science.

Cermak, Jack E., B.S. M.S., Ph.D., Emeritus University Distinguished Professor of Civil Engineering.

- Chadwick, Donald K.**, B.S., M.Ed., Emeritus Director of Cooperative Extension Service.
- Chamberlain, Adrian R.**, B.S., M.S., Ph.D., Emeritus President, and Emeritus Professor of Civil Engineering.
- Chambers, Joan L.**, B.A., M.L.S., M.S.S.M., Emeritus Dean and Professor of Libraries.
- Chavez, Ricardo**, B.S., M.A., Ph.D., Emeritus Associate Professor of Exercise and Sport Science.
- Cholas, Gus**, D.V.M., M.P.H., Emeritus Associate Professor of Microbiology and Environmental Health.
- Clark, David G.**, B.A., M.A., Ph.D., Emeritus Professor of Technical Journalism.
- Clark, Robert B.**, B.A., M.C.S., Emeritus Assistant Professor of Business.
- Clegern, Wayne M.**, B.A., M.A., Ph.D., Emeritus Professor of History.
- Coberly, Russell W.**, B.A., M.A., Ph.D., Emeritus Assistant Professor of Anthropology.
- Cole, Stanley M.**, B.S., M.Ed., Ed.D., Emeritus Professor of Occupational and Educational Studies.
- Cook, C. Wayne**, B.S., M.S., Ph.D., Emeritus Professor and Emeritus Head, Department of Range Science.
- Cook, Robert S.**, B.S., M.S., Ph.D., Emeritus Professor of Fishery and Wildlife Biology.
- Cook, William B.**, B.A., M.S., Ph.D., Emeritus Dean, College of Natural Sciences, and Emeritus Professor of Chemistry.
- Crawford, Mildred A.**, B.S., M.S., Emeritus Assistant Professor of Apparel, Interior Design, and Merchandising.
- Creek, C. Richard**, B.S.A., M.S., Emeritus Associate Professor of Economics.
- Crews, Donald L.**, B.S., M.S., Ph.D., Emeritus Associate Professor of Forest Sciences.
- Crim, Donald E.**, B.A., Ph.D., Emeritus Assistant Professor of Anthropology.
- Crim, Harry E.**, B.S., M.S., Emeritus Associate Professor of Economics.
- Cringan, Alexander**, B.S.F., M.A., Ph.D., Emeritus Professor of Fishery and Wildlife Biology.
- Cross, Henry A.**, B.A., M.S., Ph.D., Emeritus Professor of Psychology.
- Cross, Irving C.**, B.S., M.Ed., Ph.D., Emeritus Professor of Vocational Education.
- Cuany, Robin L.**, B.A., M.A., Ph.D., Emeritus Professor of Agronomy.
- Culbertson, William R.**, B.S., Emeritus Extension Associate Professor of Animal Sciences.
- Culley, Jack F.**, B.A., M.S., Ph.D., Emeritus Professor of Management.
- Curfman, John J.**, B.S., M.S., Emeritus Professor of Design and Merchandising.
- Curtis, Betty M.**, Emeritus Assistant Director of Admissions.
- Dallas, Merry Jo**, B.S., M.S., Emeritus Associate Professor of Design, Merchandising, and Consumer Sciences.
- Deal, Ervin R.**, A.B., M.S., Ph.D., Emeritus Associate Professor of Mathematics.
- Dean, John E.**, B.S.E.E., M.S., Emeritus Professor of Electrical Engineering.
- Decker, Eugene**, B.S., M.S., Emeritus Professor of Fishery and Wildlife Biology.
- deMooy, Cornelius J.**, B.S., M.S., Ph.D., Emeritus Professor of Agronomy.
- Derbyshire, William D.**, M.E., M.S., Ph.D., Emeritus Associate Professor of Physics.
- Desjardins, Alvina**, B.S., M.A., Emeritus Associate Professor of Library Science.
- DeWitt, Robert H.**, B.A., M.S., B.L.S., Emeritus Associate Professor of Library Science.
- Dietemann, David A.**, B.F.A., M.F.A., Emeritus Professor of Art.
- Dils, Robert E.**, B.S.F., M.F., Ph.D., Emeritus Professor of Earth Resources.
- Dix, Ralph L.**, B.A., M.S., Ph.D., Emeritus Professor of Biology.
- Dobler, Donald W.**, B.S., M.B.A., Ph.D., Emeritus Dean, College of Business, and Emeritus Professor of Management.
- Doehring, Donald O.**, B.A., M.A., Ph.D., Emeritus Professor of Earth Resources.
- Doxtader, Kenneth G.**, B.S., M.S., Ph.D., Emeritus Professor of Soil and Crop Sciences.
- Duffy, Marjorie R.**, B.A., Ph.D., Emeritus Associate Professor of Communication Disorders.
- Dutcher, Mary A.**, B.S., M.Ed., Emeritus Assistant Professor of Psychology.
- Echevarria, Evelio A.**, B.A., M.A., Ph.D., Emeritus Professor of Foreign Languages and Literatures.

Eddy, Gladys S., B.S., Emeritus Assistant Professor of Administrative Office Management and Business Teacher Education.

Eitzen, D. Stanley, A.B., M.S., M.A., Ph.D., Emeritus Professor of Sociology.

Ellis, John W., B.A., M.B.A., Ph.D., Emeritus Associate Professor of Finance and Real Estate.

Ells, James E., B.S., M.S., Ph.D., Emeritus Associate Professor of Horticulture and Landscape Architecture.

Else, Janet J., B.A., M.S., Emeritus Associate Professor of Design, Merchandising, and Consumer Sciences.

Emmons, Glenroy, B.A., M.A., Ph.D., Emeritus Professor of Foreign Languages and Literatures.

Evans, Howard E., B.A., M.S., Ph.D., Emeritus and University Distinguished Professor of Zoology and Entomology.

Eynon, Derry G., B.S., M.A., Emeritus Associate Professor of Technical Journalism.

Fagan, Irmel W., B.S., M.A., Emeritus Associate Professor of Physical Education.

Fechner, Gilbert H., B.S., M.S., Ph.D., Emeritus Professor of Forest and Wood Sciences.

Feucht, James R., B.S., M.S., Ph.D., Emeritus Professor of Horticulture.

Fisher, Richard I., B.S., M.S., Ed.D., Emeritus Professor of Occupational and Educational Studies.

Fixman, Marshall, A.B., Ph.D., Emeritus University Distinguished Professor of Chemistry.

Flanagan, John A., B.S., M.A., Ed.D., Emeritus Professor of Education.

Flickinger, Stephen A., B.A., M.A., Ph.D., Emeritus Professor of Fishery and Wildlife Biology.

Forsyth, Robert J., B.A., M.A., Ph.D., Emeritus Professor of Art.

Foss, Phillip O., B.A., M.S., Ph.D., Emeritus Professor of Political Science.

Fraleigh, Leslie, B.S., M.S., Ph.D., Emeritus Associate Professor of Radiological Health Sciences.

Frandsen, Rowen D., B.S., D.V.M., M.S., Emeritus Professor of Anatomy and Neurobiology.

Freeman, Kenneth P., B.S., M.S., Emeritus Assistant Professor of Philosophy.

Freeman, Marion F., B.S., M.A., Ph.D., Emeritus Professor of Foreign Languages and Literatures.

Frick, Donald L., B.A., M.S., Ed.D., Emeritus Associate Professor of Education.

Frisinger, H. Howard, B.S., B.B.A., M.S., Ed.D., Emeritus Professor of Mathematics.

Fronk, W. Don, B.S., M.S., Ph.D., Emeritus Professor of Zoology and Entomology.

Fry, Betty C., B.A., M.S., Ed.D., Emeritus Associate Professor of Education.

Frye, Bruce B.¹, B.S., M.A., Ph.D., Emeritus Centennial Professor of History.

Gehrig, Gary B., B.Arch.E., M.B.A., Ph.D., Emeritus Professor of Industrial Sciences.

Geu, Harold L., B.S., M.S., Ph.D., Emeritus Assistant Professor of Accounting and Taxation.

Gibbons, Leslie L., B.S., M.S., Emeritus Associate Professor of Industrial Sciences.

Gibson, Harry L., B.S., M.S., Ph.D., Emeritus Professor of Computer Information Systems.

Gilbert, Paul F., B.S., M.P.E., D.P.E., Emeritus Professor of Exercise and Sport Science.

Gilderhus, Mark T., B.A., M.A., Ph.D., Emeritus Professor of History.

Gilfoyle, Elnora M., B.S., Sc.D. (Hon.), Emeritus Professor and Emeritus Head of Occupational Therapy.

Gillespie, Kay U., B.A., M.A., Ph.D., Emeritus Associate Professor of Foreign Languages and Literatures.

Gillette, Edward L., B.S., M.S., Ph.D., D.V.M., Emeritus Professor of Radiological Health Sciences.

Gilmore, Roger H., B.A., M.A., Ph.D., Emeritus Associate Professor of Foreign Languages and Literatures.

Godden, Irene P., B.A., M.A., M.L.S., Emeritus Professor of Library Science.

Goetz, Harold, B.S., M.S., Ph.D., Emeritus Professor of Rangeland Ecosystem Science.

Goldsberry, Kenneth L., B.S., M.S., Ph.D., Emeritus Professor of Horticulture.

Golus, Harold M., B.S., M.S., Emeritus Associate Professor of Soil and Crop Sciences.

Goodman, James R., B.S., M.S., Ph.D., Emeritus Professor of Civil Engineering.

Gorell, Thomas A., B.S., M.S., Ph.D., Emeritus Associate Dean of Natural Sciences, and Emeritus Professor of Biology.

Gorthy, Willis C., B.A., M.S., M.A., Ph.D., Emeritus Associate Professor of Anatomy and Neurobiology.

- Grant, Dale W.**, B.S., M.S., Ph.D., Emeritus Associate Professor of Microbiology and Environmental Health.
- Grant, Lewis O.**, B.S., M.S., Emeritus Professor of Atmospheric Science.
- Graybill, Franklin A.**¹, B.S., M.S., Ph.D., Emeritus Professor of Statistics.
- Greathouse, Gerald A.**, B.S., M.S., Emeritus Associate Professor of Animal Sciences.
- Grier, Charles C.**, B.S., Ph.D., Emeritus Professor of Forest Sciences.
- Griswold, William J.**, B.A., M.A., Ph.D., Emeritus Professor of History.
- Groves, Ramsey M.**, B.S., M.A., Ph.D., Emeritus Associate Professor of Vocational Education.
- Haas Solomon, Mary H.**, B.A., M.S., Ph.D., Emeritus Professor of Occupational and Educational Studies.
- Haberstroh, Robert D.**, B.S., S.M., Sc.D., Emeritus Professor of Mechanical Engineering.
- Hadley, Lawrence N., Jr.**, B.A., M.S., Ph.D., Emeritus Professor of Physics.
- Hanan, Joe J.**, B.S., M.S., Ph.D., Emeritus Professor of Horticulture.
- Hansen, Richard M.**, B.S., M.S., Ph.D., Emeritus Professor of Range Science.
- Harlan, Aurelia**, B.A., M.A., Ph.D., Emeritus Professor of English.
- Harold, Franklin M.**, B.S., M.S. Emeritus Professor of Biochemistry and Molecular Biology.
- Harper, Judson M.**, B.S., M.S., Ph.D., Emeritus Professor of Chemical and Bioresource Engineering.
- Harrill, Inez K.**, B.S., M.S., Ph.D., Emeritus Professor of Food Science and Nutrition.
- Harrison, Monty D.**, B.S., M.S., Ph.D., Emeritus Professor of Plant Pathology and Weed Science.
- Hartman, Loyal M.**, B.S., M.S., Ph.D., Emeritus Professor of Agricultural and Resource Economics.
- Haus, Thilo E.**, B.S., M.S., Ph.D., Emeritus Professor of Agronomy.
- Hayman, Robert W.**, B.S., M.C.E., Ph.D., Emeritus Professor of Civil Engineering.
- Haynes, Evelyn B.**, B.A., M.L.S., Emeritus Associate Professor of Library Science.
- Heil, Robert D.**, B.S., M.S., Ph.D., Emeritus Director of Agricultural Experiment Station, and Emeritus Professor of Agronomy.
- Hein, Dale A.**, B.S., M.S., Ph.D., Emeritus Professor of Fishery and Wildlife Biology.
- Heiser, Merrill F.**, B.A., M.A., Ph.D., Emeritus Professor of English.
- Held, R. Burnell**, B.S., M.S., Ph.D., Emeritus Professor of Recreation Resources and Landscape Architecture.
- Heller, Marvin W.**, B.A., Ph.D., Emeritus Associate Professor of Physics.
- Hendricks, David W.**, B.S., M.S., Ph.D., Emeritus Professor of Civil Engineering.
- Herin, Reginald A.**, B.S., D.V.M., M.S., Ph.D., Emeritus Professor of Physiology.
- Hibler, Charles P.**, B.S., M.S., Ph.D., Emeritus Professor of Pathology.
- Hilleman, Daniel N.**, B.S., M.S., Emeritus Associate Professor of Technical Journalism.
- Hivner, Walter A.**, B.A., M.S., Ph.D., Emeritus Professor of Management.
- Hodgdon, Linwood L.**, B.A., M.A., Ph.D., Emeritus Professor of Sociology.
- Hoel, Robert F.**, B.A., M.B.A., Ph.D., Emeritus Professor of Marketing.
- Hogge, Vivian E.**, B.S., M.S., Emeritus Assistant Professor of Design, Merchandising, and Consumer Sciences.
- Holley, Winfred D.**, B.S., M.S., Emeritus Professor of Horticulture.
- Hopkins, Richard A.**, B.A., M.A., Emeritus Assistant Professor of Speech and Theatre Arts.
- Hudek, Henry J.**, B.A., B.S.A., Ph.D., Emeritus Associate Professor of Economics.
- Hughes, Jay M.**, B.A., M.F., Ph.D., Emeritus Dean, College of Forestry and Natural Resources, and Emeritus Professor of Forest and Wood Sciences.
- Husted, Paul W.**, B.S., V.M.D., M.S., Emeritus Assistant Professor of Clinical Sciences.
- Ingram, James T.**, D.V.M., M.S., Emeritus Professor of Clinical Sciences.
- Irvine, James R.**, B.S., M.A., Ph.D., Emeritus Professor of Speech Communication.
- Jacobsen, R. Brooke**, B.A., M.A., Ph.D., Emeritus Professor of Human Development and Family Studies.
- Jaenke, Roger**, B.S., D.V.M., Ph.D., Emeritus Associate Professor of Pathology.
- Jansen, G. Richard**, B.A., Ph.D., Emeritus Professor of Food Science and Human Nutrition.
- Jaros, Dean**, B.A., M.A., Ph.D., Emeritus Professor of Political Science, and Emeritus Dean of the Graduate School.

Johnsen, Richard E., B.A., M.S., Ph.D., Emeritus Associate Professor of Bioagricultural Sciences and Pest Management.

Johnson, Donal D., B.S., M.S., Ph.D., Emeritus Dean, College of Agricultural Sciences, and Emeritus Professor of Agronomy.

Johnson, Frances M., B.S., M.S., Emeritus Assistant Professor of Textiles and Clothing.

Johnson, Gearold R., B.S.A.E., M.S., Ph.D., Emeritus Professor of Mechanical Engineering and George T. Abell Endowed Chair.

Johnson, Mildred I., B.S., M.S., Emeritus Assistant Professor of Management.

Johnson, Robert B., B.A., M.S., Ph.D., Emeritus Professor of Earth Resources.

Jones, Artie B., B.A., M.S.W., Emeritus Assistant Professor of Social Work.

Jones, Tobin H., B.A., M.A., Ph.D., Emeritus Associate Professor of Foreign Languages and Literatures.

Jordan, Dawson C., B.S., Emeritus Professor of Animal Sciences.

Jordan, James R., B.Th., Th.M., M.A., Ph.D., Emeritus Associate Professor of History.

Jorgensen, Carl J. C., B.S., M.S., Emeritus Associate Professor of Horticulture.

Joyce, Barbara K., B.A., Ph.D., Emeritus Associate Professor of Microbiology.

Judson, Julia S., B.S., M.S., Emeritus Lecturer of Occupational Therapy.

Kainer, Robert A., D.V.M., M.S., Emeritus Professor of Anatomy and Neurobiology.

Kaman, Vicki S., B.S., M.S., Ph.D., Emeritus Professor of Management.

Kaufman, Harold, B.S., Ph.D., Emeritus Professor of Physics.

Kearney, Phillip D., B.S., M.S., Ph.D., Emeritus Associate Professor of Physics.

Keim, Wayne F., B.S., M.S., Ph.D., Emeritus Professor of Agronomy.

Kelman, Robert B., B.A., M.A., Ph.D., Emeritus Professor of Computer Science.

Kilpatrick, William C., B.S., M.S., Ph.D., Emeritus Professor of Accounting and Taxation.

Kincaid, James M., Jr., B.S., M.S., Ph.D., Emeritus Professor of Education.

King, Wendell B., B.S., M.S., Emeritus Associate Professor of Chemistry.

Knutson, Kenneth W., B.S., M.S., Ph.D., Emeritus Associate Professor of Horticulture.

Koloseus, Herman J., B.C.E., M.S., Ph.D., Emeritus Professor of Civil Engineering.

Kress, George J., B.S.C., M.A., Ph.D., Emeritus Professor of Marketing.

Kreutzer, Jill C., B.S., Ph.D., Emeritus Professor of Human Development and Family Studies.

Krueckeberg, Harry F., B.S., M.S., Ph.D., Emeritus Professor of Marketing.

Kushihashi, Grace K., B.A., M.S., Emeritus Assistant Professor of Social Work.

Kwiatkowski, Ronald W., B.A., M.A., M.F.A., Emeritus Associate Professor of Art.

Kylen, Anne M., B.S., M.S., Emeritus Associate Professor of Food Science and Human Nutrition.

Lakin, Barbara L., B.A., M.A., Ph.D., Emeritus Associate Professor of English.

Lamoreux, Stephen P., B.A., M.A., Emeritus Associate Professor of Technical Journalism.

Landon, Pamela S., A.B., M.S.W., Ph.D., Emeritus Professor of Social Work.

Larsen, Arnold L., B.A., M.S., Ph.D., Emeritus Professor of Plant Pathology and Weed Science.

Lebel, Jack L., B.A., M.S., Ph.D., D.V.M., Emeritus Professor of Radiological Health Sciences.

Lechleitner, Frances W., B.A., M.A., Emeritus Associate Professor of Biology.

Lee, Arthur C., D.V.M., M.S., Ph.D., Emeritus Associate Professor of Radiological Health Sciences.

Lee, Billy D., B.S., M.S., Emeritus Associate Professor of Industrial Sciences.

Lee, Virginia A., B.S., M.S., Ph.D., Emeritus Associate Professor of Food Science and Nutrition.

Lehman, Joe J., B.A., M.S., Ph.D., Emeritus Professor of Chemistry.

Lenz, Terry G., B.S., M.S., Ph.D., Emeritus Professor of Chemical and Bioresource Engineering.

Lett, John T., B.S., Ph.D., Emeritus Professor of Radiological Health Sciences.

Levine, L. Carl, B.S., M.A., Ed.D., Emeritus Professor of English.

Levinger, Bernard W., B.S., M.S., M.S., Ph.D., Emeritus Associate Professor of Mathematics.

Lewis, James H., B.S., M.S., Ph.D., Emeritus Professor of Agricultural and Resource Economics.

Leyendecker, Liston E., B.A., M.A., Ph.D., Emeritus Professor of History.

Lindgren, William F., B.S., B.S.L.S., M.A., Emeritus Associate Professor of Library Science.

Lindon, Paul H., B.S., M.S., Emeritus Associate Professor of Electrical Engineering.

Lindsay, Willard L.¹, B.S., M.S., Ph.D., Emeritus University Distinguished and Centennial Professor of Soil and Crop Sciences.

Livingston, Clark H., B.S., M.S., Ph.D., Emeritus Associate Professor of Plant Pathology and Weed Science.

Loehrke, Richard L., B.S., M.S.M.E., Ph.D., Emeritus Professor of Mechanical Engineering.

Long, James W., B.A., M.A., Ph.D., Emeritus Professor of History.

Lorenz, Klaus J., Ph.B., M.S., Ph.D., Emeritus Professor of Food Science and Human Nutrition.

Lough, John B., Jr., B.S.B.A., M.A., Emeritus Associate Professor of Food Science and Human Nutrition.

Lueker, David C., B.A., M.S., Ph.D., Emeritus Professor of Microbiology and Environmental Health.

Lumb, William V., D.V.M., M.S., Ph.D., Emeritus Professor of Clinical Sciences.

Lupton, David W., B.S., M.S., M.S.L.S., Emeritus Associate Professor of Library Science.

Lynch, Dennis L., B.S., M.S., Ph.D., Emeritus Professor of Forest Sciences.

Maag, Dale D., B.S., M.S., Ph.D., Emeritus Professor and Emeritus Chairman, Department of Chemistry.

Macksam, William G., B.S., M.S., Emeritus Associate Professor of Horticulture.

MacLauchlin, Robert K., B.A., M.Ed., M.S., Ph.D., Emeritus Professor of Speech Communication.

Madsen, Albert G., B.S., M.S., Ph.D., Emeritus Professor of Agricultural and Resource Economics.

Maga, Joseph A., B.S., M.S., Ph.D., Emeritus Professor of Food Science and Human Nutrition.

Mahoney, Charles L., B.S., M.S., Ph.D., Emeritus Professor of Recreation Resources and Landscape Architecture.

Mann, Herbert O., B.S., M.S., Emeritus Associate Professor of Agronomy.

Mark, Thomas R., B.A., M.A., Ph.D., Emeritus Professor of English.

Marlatt, William E., B.A., M.S., Ph.D., Emeritus Professor of Earth Resources.

Marquardt, William C., B.S., M.S., Ph.D., Emeritus Professor of Biology.

Martin, Cecilia A., B.S., M.Ed., Ed.D., Emeritus Head and Assistant Professor of Exercise and Sport Science.

Martin, Robert P., B.A., M.S., Ph.D., Emeritus Professor of Biochemistry.

Masken, James F., B.A., M.S., Ph.D., Emeritus Professor of Physiology.

Matsushima, John K., B.S., M.S., Ph.D., Emeritus Professor of Animal Sciences.

Maxwell, Lee M., B.S., M.S., Ph.D., Emeritus Professor of Electrical Engineering.

Mayberry, Wanda, B.S., O.T.R., Ph.D., Emeritus Associate Professor of Occupational Therapy.

Mayer, Marjorie M., B.S., M.A., M.S., Emeritus Assistant Professor of Chemistry.

McBride, William G., B.S., M.A., Ph.D., Emeritus Professor of English.

McCallum, Malcolm E., B.A., M.S., Ph.D., Emeritus Professor of Earth Resources.

McClendon, Barnett A., B.A., M.A., Ph.D., Emeritus Professor of Foreign Languages and Literatures.

McCornack, Barbara L., A.B., A.M., M.A., Emeritus Assistant Professor of Human Development and Family Studies.

McCosh, R. Bruce, B.S., B.S., M.S.C., D.B.A., Emeritus Professor of Accounting and Taxation.

McHugh, Helen F., B.S., M.S., Ph.D., Emeritus Dean, College of Applied Human Sciences, and Emeritus Professor of Design, Merchandising, and Consumer Sciences.

McIntyre, Gary A., B.S., Ph.D., Emeritus Head and Emeritus Professor of Bioagricultural Sciences and Pest Management.

McKean, John R., B.A., M.A., Ph.D., Emeritus Professor of Agricultural and Resource Economics.

McKee, Thomas B., B.S., M.A., Ph.D., Emeritus Professor of Atmospheric Science.

McLeod, Katherine, B.S., M.S.W., Emeritus Assistant Professor of Social Work.

McMurray, George R., B.A., M.A., Ph.D., Emeritus Professor of Foreign Languages and Literatures.

McWhorter, David B., B.S., M.S., Ph.D., Emeritus Professor of Chemical and Bioresource Engineering.

Melvin, Walter W., M.D., M.P.H. Sc.D., Emeritus Professor of Environmental Health.

Meyer, Lois I., B.A., M.B.E., Ph.D., Emeritus Associate Professor of Administrative Office Management and Business Teacher Education.

Meyers, Albert I., B.S. Ph.D., Emeritus University Distinguished Professor of Chemistry.

Miller, C. Dean, B.S., M.Ed., Ed.D., Emeritus Professor of Psychology.

Miller, W. Dwain, B.S., M.S., Ph.D., Emeritus Associate Professor of Recreation Resources and Landscape Architecture.

Mogren, Edwin W., B.S., M.F., Ph.D., Emeritus Professor of Forest and Wood Sciences, and Emeritus Director of Pingree Park.

Monath, Jennifer M., B.A., M.A., Emeritus Associate Professor of Library Science.

Moody, Lloyd L., B.S., M.Ed., Emeritus Associate Professor of Industrial Sciences.

Moore, Frank D., III, B.S., M.S., Ph.D., Emeritus Professor of Horticulture and Landscape Architecture.

Morel-Seytoux, Hubert J., Baccalaureat, Diplome d'Engenieur, Ph.D., Emeritus Professor of Civil Engineering.

Morgan, William E., B.S., LL.D., M.S., LL.D., LL.D., LL.D., LL.D., Emeritus President.

Morris, Elizabeth A., B.A., M.A., Ph.D., Emeritus Professor of Anthropology.

Moseley, William W., B.A., M.A., Ph.D., Emeritus Professor of Foreign Languages and Literatures.

Moyer, Ruth C., B.S., M.Ed., Ed.D., Emeritus Professor of Administrative Office Management and Business Teacher Education.

Murray, Molly, B.S., M.S., Emeritus Assistant Professor of Accounting and Taxation.

Nagy, Julius G., B.S., M.S., Ph.D., Emeritus Professor of Fishery and Wildlife Biology.

Neidt, Charles O., B.S., M.S., Ph.D., Emeritus Professor of Psychology, Emeritus Academic Vice President, and Emeritus Director of the Human Factors Research Laboratory.

Nelson, Mary Jean, B.S., M.A., Ph.D., Emeritus Assistant Professor of Art.

Nieder, Lois E., B.S., M.S., Emeritus Instructor of Exercise and Sport Science.

Nobe, Kenneth C., B.S., M.S., Ph.D., Emeritus Professor of Agricultural and Resource Economics.

Nockels, Cheryl F., B.S., M.S., Ph.D., Emeritus Professor of Animal Sciences.

Norwood, Fred W., B.B.A., M.B.A., Ph.D., Emeritus Professor of Accounting and Taxation.

Oakleaf, S. Kenneth, B.S., M.Agr., Emeritus Extension Associate Professor of Economics, and Emeritus Assistant Director of Extension Service.

O'Connor, Nancy J., B.A., M.A., Ed.D., Emeritus Professor of Exercise and Sport Science.

Ogg, James E., B.S., Ph.D., Emeritus Professor of Microbiology and Environmental Health.

Olson, Hilding G., B.S. M.S., Ph.D., Emeritus Professor of Mechanical Engineering.

Orman, Jack, B.F.A., M.F.A., Emeritus Professor of Art.

Otero, Jose, B.A., M.A., Ph.D., Emeritus Professor of Foreign Languages and Literatures.

Oxley, James W., B.S., M.S., Ph.D., Emeritus Professor of Animal Sciences.

Oyster, Nancy, B.A., M.S., Ph.D., Emeritus Professor of Exercise and Sport Science.

Paranka, Stephen, B.B.A., M.B.A., D.B.A., Emeritus Professor of Marketing.

Patton, Alva R., B.S., M.S., Ph.D., Emeritus Professor of Chemistry.

Pautler, Eugene L., B.A., Ph.D., Emeritus Professor of Physiology.

Payne, Stella M., Emeritus Registrar and Director of Admissions.

Peterka, Jon A., B.S., M.S., Ph.D., Emeritus Professor of Civil Engineering.

Peterson, Rodney D., B.A., M.S., Ph.D., J.D., Emeritus Professor of Economics and Emeritus University Mediation Officer.

Pettine, Alvin M., B.S., M.S., Ph.D., Emeritus Professor of Physical Education.

Pettus, David, B.A., M.A., Ph.D., Emeritus Professor of Biology.

Phillips, Robert W., B.S., D.V.M., Ph.D., Emeritus Professor of Physiology.

Pickett, Bill W., B.S., M.S., Ph.D., Emeritus Professor of Physiology.

Piermattei, Donald L., D.V.M., M.S., Ph.D., Emeritus Professor of Clinical Sciences.

Pierson, Robert E., D.V.M., Emeritus Professor of Clinical Sciences.

Plese, Elliot R., B.S., M.Ed., Ph.D., Emeritus Associate Professor of Physical Education.

Porter, Charles F., B.A., M.A., Ed.D., Emeritus Professor of Education.

Post, George, B.S., M.S., Ph.D., Emeritus Professor of Fishery and Wildlife Biology.

Radosevich, George E., B.A., M.Ag., J.D., Emeritus Professor of Agricultural and Resource Economics.

Ragouzis, Perry N., B.F.A., M.F.A., Ph.D., Emeritus Professor and Emeritus Chairman, Department of Art.

Ralph, Charles L., B.S., M.S., Ph.D., Emeritus Professor of Biology.

Rehnberg, Rex D., B.S., M.S., Ph.D., Emeritus Professor of Agricultural and Natural Resource Economics.

Reiter, Elmar R., Ph.D. Dozent, Emeritus Professor of Atmospheric Science.

Rennat, Harry O., B.S., M.S., Ph.D., Emeritus Professor of Mechanical Engineering.

Reuss, John O., B.S., M.S., Ph.D., Emeritus Professor of Agronomy.

Rhoades, Marjorie S., B.S., M.S.L.S., Emeritus Associate Professor of Library Science.

Rhoads, Kenneth W., B.A., M.A., Ph.D., Emeritus Associate Professor of English.

Rhodes, George F., Jr., B.S., M.S., Ph.D., Emeritus Professor of Economics.

Richards, H. Rex, B.S., Ph.D., Emeritus Professor and Emeritus Head, Department of Textiles and Clothing.

Richardson, Everett V., B.S., M.S., Ph.D., Emeritus Professor of Civil Engineering.

Roberts, Juanita M., B.S., M.Ed., Emeritus Associate Professor of Vocational Education.

Robertson, Jerold C., B.S., Ph.D., Emeritus Associate Professor of Chemistry.

Robinson, Charles W., B.S., Emeritus Assistant Professor of Agronomy.

Roselius, Ted L., B.S., M.B.A., D.B.A., Emeritus Professor of Management.

Ross, Cleon, B.S., M.S., Ph.D., Emeritus Professor of Bioagricultural Sciences and Pest Management.

Rutstein, Joel S., B.A., M.A., M.S.L.S., Emeritus Professor of Library Science.

Ryder, Ronald A., B.S., M.S., Ph.D., Emeritus Professor of Fishery and Wildlife Biology.

Sabey, Burns R., B.S., M.S., Ph.D., Emeritus Professor of Agronomy.

Sandborn, Virgil A., B.S., M.S., Emeritus Professor of Civil Engineering.

Santini, H. Victor, Laurea in Lingue e Letterature Straniere, Emeritus Assistant Professor and Emeritus Head, Department of Foreign Languages and Literatures.

Sardo, Joseph, B.A., M.A., Ph.D., Emeritus Associate Professor of Sociology.

Savage, Eldon P., B.A., M.P.H., Ph.D., Emeritus Professor and Emeritus Head, Department of Environmental Health.

Schmidt, L. Lee, Jr., B.S.B.A., M.B.A., Ph.D., Emeritus Professor of Accounting and Taxation and Emeritus Associate Dean of Business.

Schroeder, Herbert A., B.S., M.S., D.Sc., Emeritus Professor of Forest Sciences.

Schultz, Norman O., B.S., M.B.A., Ph.D., Emeritus Associate Professor of Accounting.

Schumm, Stanley A., B.A., Ph.D., Emeritus University Distinguished Professor of Earth Resources.

Schweizer, Herbert H., B.S., M.S., Emeritus Professor of Civil Engineering.

Seckler, David W., B.A., M.A., Ph.D., Emeritus Professor of Agricultural Sciences.

Severin, Glenn A., D.V.M., M.S., Emeritus Professor of Clinical Sciences.

Shaner, Willis W., B.S., M.B.A., Ph.D., Emeritus Professor of Mechanical Engineering.

Sheaffer, Mary Alice, B.S., M.S., Emeritus Associate Professor of Vocational Education.

Shen, Hsieh-Wen, B.S., M.S., Ph.D., Emeritus Professor of Civil Engineering.

Shideler, Robert K., D.V.M., Emeritus Professor of Clinical Sciences.

Shook, Frederick, B.A., M.S., Emeritus Professor of Journalism and Technical Communication.

Shuler, Craig E., B.S., M.S., Ph.D., Emeritus Associate Professor of Forest Sciences.

Simons, Daryl B., B.S., M.S., Ph.D., Emeritus Professor of Civil Engineering.

Sims, William E., B.S., M.A., Ed.D., Emeritus Professor of Education.

Sinclair, Peter C., B.S., M.S., Ph.D., Emeritus Associate Professor of Atmospheric Science.

Sjogren, Douglas D., B.A., M.A., Ed.D., Emeritus Professor of Occupational and Educational Studies.

Skinner, Morris M., B.S., M.S., Ph.D., Emeritus Associate Professor of Civil Engineering.

Skogerboe, Rodney K., B.A., Ph.D., Emeritus Professor of Chemistry.

Skold, Melvin D., B.S., M.S., Ph.D., Emeritus Professor of Agricultural and Resource Economics.

Smith, Barbara A., B.S., M.S., Ph.D., Emeritus Assistant Professor of Food Science and Human Nutrition.

Smith, Charles R., B.A., M.A., Ph.D., Emeritus Professor of English.

Smith, Dwight R., B.S., M.S., Ph.D., Emeritus Professor of Fishery and Wildlife Biology.

Smith, George L., B.S., M.S., Emeritus Associate Professor of Civil Engineering.

Smith, Herbert A., B.S., M.A., Ph.D., Emeritus Professor of Education.

Solow, Arthur J., B.S., M.Ed., Emeritus Assistant Professor of Physical Education.

Sorvig, Ralph W., B.S., M.A., Ph.D., Emeritus Associate Professor of English.

Sparling, Edward W., B.S., M.A., Ph.D., Emeritus Professor of Agricultural and Resource Economics.

Spencer, William P., B.S., M.S., Emeritus Associate Professor of Agricultural and Resource Economics.

Spittgerber, George H., B.S., M.S., Ph.D., Emeritus Professor of Chemistry.

Staples, John D., B.S., M.S., Ed.D., Emeritus Associate Professor of Business.

Stead, Richard D., B.S., M.S., D.B.A., Emeritus Professor of Management.

Stein, F. Max, A.B., M.S., Ph.D., Emeritus Professor of Mathematics.

Steinhoff, Harold W.¹, B.S., M.S., Ph.D., Emeritus Centennial Professor of Fishery and Wildlife Biology.

Stermitz, Frank R., B.S., M.S., Ph.D., Emeritus Centennial Professor of Chemistry.

Stevens, Eleanour V., B.S., M.B.A., Ph.D., Emeritus Professor of Management.

Stonaker, Howard H., B.S.A., M.S., Ph.D., Emeritus Professor of Animal Sciences.

Striffler, William D., B.S., B.S.F., M.F., Ph.D., Emeritus Professor of Earth Resources.

Strong, Fred G., B.B.A., M.P.A., Emeritus Assistant Professor of Accounting and Taxation.

Suinn, Richard M., B.A., M.A., Ph.D., Emeritus Professor of Psychology.

Sutherland, Thomas, B.S., M.S., Ph.D., Emeritus Professor of Animal Sciences.

Swanson, Vern B., B.S., M.S., Ph.D., Emeritus Professor of Animal Sciences.

Swink, Jerre F., B.S., M.S., Emeritus Assistant Professor of Agronomy.

Tanner, James E., Jr., B.A., M.A., Ph.D., Emeritus Associate Professor of English.

Tengerdy, Robert P., Diploma of Civil Engineering, Ph.D., Emeritus Professor of Microbiology.

Tharp, Martha P., B.A., M.A., Emeritus Associate Professor of Journalism and Technical Communication.

Thayer, Sanford B., B.S., M.S., Ph.D., Emeritus Professor of Mechanical Engineering.

Theodoratus, Robert J., B.A., M.A., Ph.D., Emeritus Professor of Anthropology.

Thomas, William R., B.S., M.S., Ph.D., Emeritus Associate Dean, College of Agricultural Sciences, and Emeritus Professor of Animal Sciences.

Thompson, Tommy B., B.S., M.S., Ph.D., Emeritus Professor of Earth Resources.

Titely, Bonnie, B.A., M.A., Ed.D., Emeritus Assistant Professor of Applied Human Sciences.

Titely, Robert W., B.A., M.A., Ph.D., Emeritus Professor of Psychology.

Trock, Warren L., B.S., M.S., Ph.D., Emeritus Professor of Agricultural and Resource Economics.

Tu, Anthony T., B.S., M.S., Ph.D., Emeritus Professor of Biochemistry and Molecular Biology.

Turner, Joseph G., B.A., M.S., Ph.D., Emeritus Professor of Human Development and Family Studies.

Twomey, James A., B.S., M.S., Emeritus Associate Professor of Horticulture.

Tyler, Daniel, B.A., M.A., Ph.D., Emeritus Professor of History.

Udall, Robert H., B.A., Ph.D., D.V.M., Emeritus Professor of Pathology.

Vail, Carl J., Jr., B.S., M.B.A., D.B.A., Emeritus Associate Professor of Management.

Valentine, Ivan E., B.S., M.Ed., Ph.D., Emeritus Professor of Vocational Education.

Vance, Laura A., B.S., M.S., Emeritus Assistant Professor of Textiles and Clothing.

Vaughan, John D., B.S., Ph.D., Emeritus Professor of Chemistry.

Vedvik, Jerry D., B.A., M.A., Ph.D., Emeritus Associate Professor of Foreign Languages and Literatures.

Vredenburg, Harvey L.¹, B.S., M.A., D.B.A., Emeritus Centennial Professor of Marketing.

Walker, James G., B.S., M.S., Emeritus Assistant Professor of Horticulture.

Wallace, Harold R., B.S., M.A., Ph.D., Emeritus Professor of Occupational and Educational Studies.

Walsh, Richard G., B.S., M.A., Ph.D., Emeritus Professor of Agricultural and Resource Economics.

Wangaard, Frederick F., B.S., M.S., Ph.D., Emeritus Professor and Emeritus Head, Department of Forest and Wood Sciences.

Ward, James V., B.S., M.A., Ph.D., Emeritus Professor of Biology.

Ward, Richard T., B.S., M.S., Ph.D., Emeritus Professor of Biology.

Warnock, Charles R., B.E.E., M.S., D.B.A., Emeritus Associate Professor of Computer Information Systems.

Warren, C. Gerald, B.A., Ph.D., Emeritus Associate Professor of Chemistry.

Wasser, Clinton H., B.S., M.S., M.F., Emeritus Professor of Range Science.

Wedell, Allen J., B.S., M.S., Ph.D., Emeritus Professor of Marketing.

Weitz, Joseph L., B.A., M.S., Ph.D., Emeritus Professor of Earth Resources.

Wengert, Norman I., B.A., J.D., Ph.D., M.A., Emeritus Professor of Political Science.

Werner, Otto, B.S., M.A., Emeritus Professor of Music, Theatre, and Dance.

Whitaker, Rosemary, B.M., B.M.E., M.A., Ph.D., Emeritus Professor of English.

Whitcomb, Kenneth J., B.S., M.A., B.A., Emeritus Associate Professor of Mathematics.

Whiteman, Charles E., D.V.M., Ph.D., Emeritus Professor of Pathology.

Wiggins, Ronald L., B.S.I.E., M.S., J.D., Ph.D., Emeritus Professor of Management.

Wilcox, Arthur T., B.S., M.F., Ph.D., Emeritus Professor of Recreation Resources and Landscape Architecture.

Wilken, Gene C., B.S., M.A., Ph.D., Emeritus Professor of Earth

Resources.

Willeford, Jack A., B.A., Ph.D., Emeritus Professor of Communication Disorders.

Wilmarth, Wilson E., B.A., M.A., Ph.D., Emeritus Professor of Foreign Languages.

Wilson, Patricia A., B.S., M.S., Emeritus Associate Professor of Design, Merchandising, and Consumer Sciences.

Winder, Dale R., B.A., M.A., Ph.D., Emeritus Associate Professor of Physics.

Winn, C. Byron, B.S., M.S., Ph.D., Emeritus Professor of Mechanical Engineering.

Winn, J. Hugh, B.S., M.S., Emeritus Professor of Agricultural and Resource Economics.

Wolfe, Hubert H., B.A., M.A., Ed.D., Emeritus Professor of Education.

Wood, Donald R., B.S., M.S., Ph.D., Emeritus Professor of Agronomy.

Woods, Porter S., B.A., M.A., D.F.A., Emeritus Professor of Music, Theatre, and Dance.

Woolley, Tyler A., B.S., M.S., Ph.D., Emeritus Professor of Zoology.

Woolrich, Avis M., B.S., M.S., Emeritus Professor of Consumer Sciences and Housing.

Workman, Milton, B.S., Ph.D., Emeritus Professor of Horticulture.

Worrall, Arthur J., B.A., M.A., Ph.D., Emeritus Professor of History.

Wyrick, Jean, B.A., M.A., Ph.D., Emeritus Professor of English.

Yevjevich, Vujica, C.E., D.Engg.Sc., Emeritus Professor of Civil Engineering.

Young, James W., B.S., M.S., Ed.D., Emeritus Professor of Industrial Sciences.

Young, Robert A., B.S., M.S., Ph.D., Emeritus Professor of Agricultural and Resource Economics.

Young, Stuart, M.R.C.V.S., D.V.S.M., M.S., Ph.D., Emeritus Professor of Pathology.

Youngman, Vern E., B.S., M.S., Ph.D., Emeritus Associate Professor of Agronomy.

In “recognition” of a tradition of excellence at Colorado State University, here is a guide to the University’s official seal and logo. Each was designed to unify all those who are, and who will be, associated with the University. Identification with one or all of the symbols below is facilitated by the images, feelings, and memories they invoke. In identifying with these trademarks, the spirit of Colorado State University is perpetuated through generations of students, alumni, administrators, and personnel!

The University Logo

Our name says it all! Our logo communicates immediately that we are Colorado State University to any audience, anywhere. The University’s name distinguishes it as a historical institution dedicated to excellence and innovation. The name has changed at three different junctures to accommodate the changes in educational needs paralleled by developments in society. The University’s name identifies the institution as the first authorized college and the only land-grant institution in Colorado.

Initially, Colorado State was referred to as Colorado Agricultural College. This name was deemed appropriate for the purposes of the University until the 1930s when the curricula expanded beyond an agricultural education. At that point, the institution was renamed Colorado State College of Agricultural and Mechanic Arts (Colorado A&M). The final name change, Colorado State University, coincided with the University’s implementation of an institutional focus on research.

The University’s logo, and name in any form, is protected from unauthorized use by federal trademark regulation.



Knowledge to Go Places



Knowledge to Go Places

The University Seal

The official University seal displays the year of the University’s establishment, the institution’s name since 1957, and the components of its land-grant mission: education, service, extension, and research.

The official seal is reserved for use on diplomas, medallions, awards, certificates, and official University documents. Such uses require the formal dignity of the University as signified by the seal.



The Ram Logo

The ram logo provides a standard graphic identity for the University’s athletic programs. The ram logo was designed by a University employee whose design was selected from 273 entries in a ram logo contest.



Knowledge to Go Places

In retrospect . . . exactly what Colorado State University means to us will be different for everyone. Through all the experiences, the University’s name and symbols remind us of a time and a place, of fond memories, of living, learning and growing that result from our Colorado State experience.